UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

May 8, 2019

Mr. Bryan C. Hanson
Senior Vice President, Exelon Generation Company,
Nine Mile Point Nuclear Station, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: NINE MILE POINT NUCLEAR STATION UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000220/2019001 AND 05000410/2019001

Dear Mr. Hanson:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Nine Mile Point Nuclear Station Units 1 and 2. On April 25, 2019 the NRC inspectors discussed the results of this inspection with Mr. Peter Orphanos and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. Two of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance or severity of the violations 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 I; the Director, Office of Enforcement; and the NRC resident inspector at Nine Mile Point. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; and the NRC resident inspector at Nine Mile Point.

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

Sincerely,

/RA/

Erin E. Carfang, Chief
Projects Branch 1

Docket Nos.: 05000220 and 05000410
License Nos.: DPR-63 and NPF-69

Enclosure:
Inspection Report 05000220/2019001 and
05000410/2019001

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SUBJECT: NINE MILE POINT NUCLEAR STATION UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT 05000220/2019001 AND 05000410/2019001 DATED MAY 8, 2019

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000220 and 05000410
License Numbers:	DPR-63 and NPF-69
Report Numbers:	05000220/2019001 and 05000410/2019001
Enterprise Identifier:	I-2019-001-0038
Licensee:	Nine Mile Point Nuclear Station, LLC
Facility:	Nine Mile Point, Units 1 and 2
Location:	Lycoming, NY
Inspection Dates:	January 1, 2019 to March 31, 2019
Inspectors:	E. Miller, Senior Resident Inspector J. Dolecki, Resident Inspector B. Sienel, Resident Inspector J. DeBoer, Emergency Preparedness Inspector M. Orr, Reactor Inspector A. Rosebrook, Senior Project Engineer A. Turilin, Reactor Inspector
Approved By:	Erin E. Carfang, Chief Projects Branch 1 Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Quarterly inspection at Nine Mile Point Units 1 and 2 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. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

Inadequate Procedure Acceptance Criteria for Unit 2 High Pressure Core Spray Diesel Generator Hot Restart Surveillance			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000410/2019001-01 Open/Closed	H.3 - Change Management	71111.15
The NRC identified a Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," when Exelon failed to provide adequate acceptance criteria in procedure N2-OSP-EGS-M@002, "Diesel Generator and Diesel Air Start Valve Operability Test – Division III," Revision 02100. Specifically, from January 18, 1995, to January 29, 2019, Exelon did not provide adequate acceptance criteria in Section 8.3, "Diesel Generator 24 Month Start and Load Test," to verify Technical Specification Surveillance Requirement 3.8.1.13.b was met for diesel generator steady state frequency.			

Unit 2 High Pressure Core Spray Diesel Generator Failure			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000410/2019001-02 Open/Closed	None	71152
The inspectors documented a self-revealed Green finding and associated non-cited violation of Unit 2 Technical Specification 5.4.1 "Procedures," when Exelon failed to implement procedure N2-MSP-EGS-R002, "Diesel Generator Inspection Division III," Revision 01900, resulting in a jacket water leak from the #3 inlet jacket water cooling jumper line lower basket connection and subsequently the hydro-locking of the #3 cylinder and catastrophic failure of the Division III diesel generator.			

Inadequate Work Instructions Result in a Reactor Scram			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green FIN 05000410/2019001-03 Open/Closed	H.11 - Challenge the Unknown	71152
A self-revealed Green finding was identified when Exelon failed to adequately develop work order steps, in accordance with MA-CE-716-010-1000, "Maximo Work Order Planning Manual," Revision 3, to perform Unit 2 main generator relay testing. Specifically, Exelon identified inadequate procedure steps that led to shorting screws remaining in a main			

generator relay following offline testing in April 2018. The shorting screws in the main generator relay resulted in early actuation, a main generator trip and reactor scram on August 27, 2018 when Unit 2 experienced a grid disturbance.

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
URI	05000410/2018001-02	Potential Inadequate 50.59 Evaluation for TS 3.3.1.1 Bases Change	71153	Closed
LER	05000410/2018-002-00	LER 2018-002-00 for Nine Mile Point, Unit 2, Turbine Trip and Scram Due to Unit Differential Relay Trip	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On January 30, 2019, Unit 1 began an end of fuel cycle power coastdown period, which continued until the refueling outage. On March 18, 2019, operators commenced a shutdown, from 100 percent power, for a planned refueling and maintenance outage (N1R25). Unit 1 remained shutdown for the remainder of the inspection period due to the planned refueling and maintenance outage.

Unit 2 began the inspection period at rated thermal power. On March 1, 2019, operators commenced a planned downpower to 65 percent to remove the 'A' feedwater pump from service and place the 'C' feedwater pump in service, conduct control rod scram time testing, and conduct turbine valve reactor protection system surveillance testing. On March 2, 2019, operators returned Unit 2 to rated thermal power. On March 29, 2019, operators commenced an unplanned downpower to 75 percent due to a degraded stator water cooling system. Unit 2 remained at 75 percent for the remainder of the inspection period.

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 performed plant status activities described in IMC 2515 Appendix D, “Plant Status” and conducted routine reviews using IP 71152, “Problem Identification and Resolution.” 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

71111.01 - Adverse Weather Protection

Impending Severe Weather Sample (IP Section 03.03) (2 Samples)

(1) The inspectors evaluated readiness for impending adverse weather conditions for a winter storm on January 18, 2019
(2) The inspectors evaluated readiness for impending adverse weather for high winds and blizzard conditions on February 22, 2019, through February 25, 2019

71111.04 - Equipment Alignment

Partial Walkdown (IP Section 02.01) (6 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) Unit 1 12 core spray system on February 28, 2019
(2) Unit 1 11 reactor building emergency ventilation system on March 5, 2019
(3) Unit 1 12 shutdown cooling system on March 19, 2019

(4) Unit 1 emergency diesel generator 103 on March 22, 2019
(5) Unit 1 122 core spray system on March 25, 2019
(6) Unit 1 11 and 12 spent fuel pool cooling systems on March 25, 2019

71111.04S - Equipment Alignment

Complete Walkdown (IP Section 02.02) (1 Sample)

The inspectors evaluated system configuration during a complete walkdown of the Unit 2 instrument air system on February 7, 2019

71111.05 - Fire Protection (IP Section 03.01) (7 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Unit 1 turbine building 261’ northeast, fire area 3, on January 17, 2019
(2) Unit 1 reactor building 237’ east, fire area 1, on January 17, 2019
(3) Unit 2 reactor building 175’ north, reactor core isolation coolant pump room, fire area 2, on February 2, 2019
(4) Unit 1 reactor building 298', emergency condenser isolation valve room, fire area 1, on February 8, 2019
(5) Unit 1 turbine condenser/heater bay 250', fire area T1, on March 19, 2019
(6) Unit 1 main steam tunnel, fire area T1A, on March 19, 2019
(7) Unit 1 drywell, fire area 3, on March 21, 2019

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 02.02a.) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the Unit 2 Division II service water pump bay on March 11, 2019.

71111.07A - Heat Sink Performance

Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated a change to the service water flow factor and its impact on thermal performance of safety-related unit coolers at Unit 2.

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (2 Samples)

(1) The inspectors observed Unit 2 operations personnel during a planned reactor downpower to 65 percent to remove the 'A' feedwater pump from service and perform turbine valve reactor protection system testing on March 1, 2019
(2) The inspectors observed Unit 1 operations personnel during a planned reactor shutdown to commence refueling and maintenance outage N1R25 on March 18, 2019

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (2 Samples)

(1) The inspectors observed a Unit 1 simulator evaluation that involved a failure of a reactor recirculation pump, increased turbine vibrations, a loss of power board 11 due to a seismic event, a trip of an additional reactor recirculation pump, and an un-isolable reactor water cleanup leak on January 22, 2019
(2) The inspectors observed a Unit 2 simulator evaluation that involved a control rod drift, a feedwater level controller failure, a reactor fuel failure, and a reactor steam leak outside containment with the standby gas treatment system unavailable on January 22, 2019

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (3 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Unit 1 containment spray raw water system on January 18, 2019
(2) Unit 1 drywell internal structural monitoring on March 21, 2019
(3) Unit 1 torus internal structural monitoring on March 23, 2019

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (9 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Unit 2 planned maintenance on the 'F' service water pump on January 29, 2019
(2) Unit 1 unplanned maintenance due to the failure of the 13 feedwater flow control valve on February 10, 2019
(3) Unit 1 unplanned maintenance due to the failure of 13 feedwater pump clutch actuator package 11 on February 11, 2019
(4) Unit 2 planned maintenance on the 'A' service water pump strainer replacement on February 19, 2019
(5) Unit 1 planned maintenance for the removal of the stator water system runback circuit on February 26, 2019
(6) Unit 2 elevated risk during emergent removal of 'A' feedwater pump from service on March 1, 2019
(7) Unit 1 elevated risk during reactor cavity flood up on March 19, 2019
(8) Unit 1 elevated risk during 115 kV relay testing and Line 1 planned outage on March 21, 2019
(9) Unit 1 elevated risk during control rod drive mechanism replacements on March 25, 2019

71111.15 - Operability Determinations and Functionality Assessments

Sample Selection (IP Section 02.01) (6 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) Unit 2 Division III high pressure core spray diesel generator following hot restart surveillance test on January 2, 2019
(2) Unit 2 safety relief valve design discrepancy on January 11, 2019
(3) Unit 2 reactor core isolation cooling following identification of liquid under the turbine on January 31, 2019
(4) Unit 2 Division I drywell average air temperature during channel calibration surveillance testing on February 12, 2019
(5) Unit 2 'A' feedwater pump outboard pump seal leak on February 22, 2019
(6) Unit 2 reactor protection system following scram discharge volume level transmitter surveillance complications on March 6, 2019

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (3 Samples)

The inspectors evaluated the following temporary or permanent modifications:

(1) Permanent Modification: Engineering Change Package 19-000161, Remove Vent Valve 2RDS*V140C (scram discharge volume vent valve) and Replace with Welded Pipe Cap
(2) Permanent Modification: Engineering Change Package 15-000412, Unit 1 RPS (reactor protection system) Trip Unit Replacement Instrument Loops A, B, and C
(3) Permanent Modification: Engineering Change Package 18-000518, Improve Locking Mechanism on Butterfly Valves

71111.19 - Post Maintenance Testing

Post Maintenance Test Sample (IP Section 03.01) (8 Samples)

The inspectors evaluated the following post maintenance tests:

(1) Unit 2 Division I control room chiller service water temperature control valve, 2SWP*TV25A, replacement on January 16, 2019
(2) Unit 2 Division II standby gas treatment system modification to fan discharge butterfly valve, 2GTS*V2000B, on January 30, 2019
(3) Unit 1 13 feedwater pump hydraulic clutch 11 positive displacement pump replacement on February 11, 2019
(4) Unit 2 'A' service water pump replacement on February 19, 2019
(5) Unit 1 primary containment to atmosphere vacuum relief check valve, IV-68-05, actuator rebuild on March 6, 2019
(6) Unit 1 low-low-low reactor level master trip unit, 36-05A-M, replacement on March 25, 2019

(7) Unit 1 emergency condenser 111 heat exchanger internal aging management inspection on March 29, 2019
(8) Unit 1 solenoid inspection for electromatic relief valve 113 on March 30, 2019

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Partial)

The inspectors evaluated Unit 1 refueling and maintenance outage N1R25 activities from March 17, 2019 to March 31, 2019.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Containment Isolation Valve (ISO) (IP Section 03.01) (2 Samples)

(1) N1-ST-TYC-001, MSIV Type C Leak Rate Tests, Attachment 15, on March 19, 2019
(2) N1-ST-TYC-001, MSIV Type C Leak Rate Tests, Attachment 16, on March 19, 2019

In Service Testing (IST) (IP Section 03.01) (3 Samples)

(1) N2-OSP-SLS-Q001, Standby Liquid Control Pump, Check Valve, Relief Valve Operability Test and ASME XI Pressure Test, on January 9, 2019
(2) N1-ST-R9, Core Spray Operability Test Using Demineralized (CST) Water, on March 20, 2019
(3) N1-ST-R2A, LOCA and EDG 102 Simulated Auto Initiation Test, on March 27, 2019

Surveillance Testing (IP Section 03.01) (4 Samples)

(1) N2-OSP-EGS-M@001, Diesel Generator and Diesel Air Start Valve Operability Test, Divisions I and II, on January 2, 2019
(2) N1-ST-M4B, Emergency Diesel Generator 103 and PB 103 Operability Test, on January 7, 2019
(3) N2-ESP-ENS-Q731, Quarterly Channel Functional Test of LPCS/LPCI Pumps A, B, and C (Normal and Emergency Power) Auto Start Time Delay Relays, on February 14, 2019
(4) N2-OSP-RPS-Q001, RPS Turbine Stop Valve Closure Logic, Control Valve Fast Closure Scram Functional Tests and Turbine Valve Cycling, on March 2, 2019

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (2 Samples)

(1) Unit 1, January 1, 2018–December 31, 2018
(2) Unit 2, January 1, 2018–December 31, 2018

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (2 Samples)

(1) Unit 1, January 1, 2018–December 31, 2018
(2) Unit 2, January 1, 2018–December 31, 2018

IE04: Unplanned Scrams with Complications Sample (IP Section 02.03) (2 Samples)

(1) Unit 1, January 1, 2018–December 31, 2018
(2) Unit 2, January 1, 2018–December 31, 2018

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (2 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Issue Report 04167387, Unit 2 Turbine Trip and Scram Due to Main Generator Unit Phase 1 Differential Relay Trip
(2) Issue Report 04199519, Unit 2 High Pressure Core Spray Diesel Generator Mechanical Failure

71153 - Followup of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (3 Samples)

(1) Unit 1 failure of 13 feedwater flow control valve on February 10, 2019
(2) Unit 1 failure of 13 feedwater pump hydraulic clutch 11 on February 11, 2019
(3) Unit 2 unplanned power reduction to 75 percent due to a degraded stator water cooling system on March 30, 2019

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports which can be accessed at https://lersearch.inl.gov/LERSearchCriteria.aspx:

License Event Report (LER) 05000410/2018-002-00, NMP2 Turbine Trip and Scram Due to Unit Differential Relay Trip

Reporting (IP Section 03.05) (2 Samples)

(1) Closure of URI 05000410/2018001-02, Potential Inadequate 50.59 Evaluation for Technical Specification 3.3.1.1 Bases Change.
(2) Review of reportability and performance indicator data related to the Unit 2 high pressure core spray diesel generator failure.

INSPECTION RESULTS

Inadequate Procedure Acceptance Criteria for Unit 2 High Pressure Core Spray Diesel Generator Hot Restart Surveillance			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000410/2019001-01 Open/Closed	H.3 - Change Management	71111.15

The NRC identified a Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," when Exelon failed to provide adequate acceptance criteria in procedure N2-OSP-EGS-M@002, "Diesel Generator and Diesel Air Start Valve Operability Test – Division III," Revision 02100. Specifically, from January 18, 1995, to January 29, 2019, Exelon did not provide adequate acceptance criteria in Section 8.3, "Diesel Generator 24 Month Start and Load Test," to verify Technical Specification Surveillance Requirement 3.8.1.13.b was met for diesel generator steady state frequency.

Description: Following a December 2, 2018, failure of the Division III high pressure core spray diesel generator, 2EGS*EG2, Exelon replaced the diesel engine and governor. On December 18, 2018, during post maintenance testing, Exelon performed a hot restart surveillance on the diesel to demonstrate Technical Specification Surveillance Requirement 3.8.1.13, "AC Sources – Operating." The purpose of Requirement 3.8.1.13 is to verify that the diesel can be restarted from a hot (recently shut down) condition. Specifically, Requirement 3.8.1.13.b states the diesel should, "…start and achieve steady state…frequency between 58.8 and 61.2 Hz."

During this test, the diesel started and reached a steady state frequency of 61.6 Hz. The diesel was run at this frequency for approximately 6 minutes. The inspectors observed the surveillance in the main control room and locally at the diesel. The inspectors questioned the steady state frequency as the acceptance criteria in the surveillance was, "between 58.8 and 61.2 Hz." Operators used computer data, as allowed by procedure, to confirm the surveillance requirements were met. Operators then adjusted the governor setting and the diesel properly maintained frequency at 60 Hz for approximately 1 minute before operators shut it down per procedure. The diesel was declared operable later that day.

The inspectors questioned whether changing the governor setting during the test met the intent of the surveillance requirement. The inspectors determined no violation of Technical Specification Surveillance Requirement 3.8.1.13.b occurred based on the diesel performance during all of the other post maintenance tests and following the readjustment of the governor setting during the hot restart test. Significant technical evaluation was required to come to this conclusion.

During the operability assessment, the inspectors compared the surveillance data with the technical specification and determined the acceptance criteria stated in the procedure was inadequate as it did not match the technical specification surveillance requirement. Specifically, N2-OSP-EGS-M@002, "Diesel Generator and Diesel Air Start Valve Operability Test – Division III," Step 8.3.39, states, "Using TARS [plant computer] or other suitable means verify…frequency…60 Hz (58.8 to 61.2) within [approximately] 15 seconds of start signal." However, Technical Specification Surveillance Requirement 3.8.1.13.b states, "Verify

each required diesel generator starts and achieves steady state…frequency greater than or equal to 58.8 and less than or equal to 61.2 Hz." The surveillance requirement is to achieve a steady state (i.e. to maintain) frequency, while the procedure acceptance criteria could be read to mean that frequency needs to reach 60 Hz within 15 seconds but does not need to be maintained there. The computer data also confirmed only what was stated in the procedure, which was not the surveillance requirement. (The computer confirmed the time the diesel took to reach 58.5 Hz was less than 15 seconds.) Therefore, when the operators looked at the computer printout for the surveillance run, it indicated all acceptance criteria were met. The inspectors determined that the computer system was modified earlier in the year and the new algorithm was not adequate to confirm the steady state frequency requirement.

In order to confirm prior Division III diesel operability, the inspectors reviewed documentation for the two most recent prior performances of this surveillance and confirmed the technical specification surveillance requirement was met for steady state frequency. The inspectors also noted that the computer printout data for these surveillances was more specific and mirrored the technical specification surveillance requirement.

Corrective Action: As previously stated, the operators restored the governor setting before shutting the diesel down during the surveillance. The following day, Exelon staff performed an operability determination to evaluate the surveillance test results and confirmed diesel operability. Exelon determined that in combining post maintenance test surveillances, a step to restore the governor setting following a previous run was not performed as it should have been before commencing the hot restart surveillance, thereby resulting in the higher steady state frequency upon restart. The acceptance criteria for procedure N2-OSP-EGS-M@002, as well as other applicable surveillances, were revised to better articulate the technical specification surveillance requirement.

Corrective Action References: IRs 4204705 and 4211553

Performance Assessment:

Performance Deficiency: The inspectors determined that Exelon did not provide adequate acceptance criteria in procedure N2-OSP-EGS-M@002, "Diesel Generator and Diesel Air Start Valve Operability Test – Division III," Section 8.3, "Diesel Generator 24 Month Start and Load Test," to verify Technical Specification Surveillance Requirement 3.8.1.13.b was met for diesel generator steady state frequency.

Screening: This finding is more than minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. This finding is also similar to the more than minor Examples 3.j and 3.k in IMC 0612 Appendix E, "Examples of Minor Issues," Revised October 1, 2018, in that it resulted in a reasonable doubt of operability.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations." The inspectors assessed the significance of this finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions." This finding was determined to be of very low safety significance (Green) because it did not affect the design or qualification of a mitigating structure, system, or component, did not represent a loss of system or function, did not represent an actual loss of function of at least a single train

for greater than its technical specification allowed outage time, and did not did not represent an actual loss of function of one or more trains of highly safety significant non-technical specification equipment.

Cross-cutting Aspect: H.3 - Change Management: Leaders use a systematic process for evaluating and implementing change so that nuclear safety remains the overriding priority. The plant computer was upgraded in 2018 and the new algorithm used to verify the procedure acceptance criteria was incorrect. This error led operators to determine that the surveillance criteria were met when they may not have been.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings" requires, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances… Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

Contrary to the above, from January 18, 1995, to January 29, 2019, Exelon did not ensure surveillance procedure N2-OSP-EGS-M@002, "Diesel Generator and Diesel Air Start Valve Operability Test – Division III," included adequate acceptance criteria to verify equipment operability in accordance with plant technical specifications.

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

Unit 2 High Pressure Core Spray Diesel Generator Failure			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000410/2019001-02 Open/Closed	None	71152

The inspectors documented a self-revealed Green finding and associated non-cited violation of Unit 2 Technical Specification 5.4.1 "Procedures," when Exelon failed to implement procedure N2-MSP-EGS-R002, "Diesel Generator Inspection Division III," Revision 01900, resulting in a jacket water leak from the #3 inlet jacket water cooling jumper line lower basket connection and subsequently the hydro-locking of the #3 cylinder and catastrophic failure of the Division III diesel generator.

Description: On November 26, 2018, Exelon removed the Unit 2 high pressure core spray emergency diesel generator (Division III) to conduct the 18-year preventive maintenance system outage in accordance with Exelon Procedure N2-MSP-EGS-R002. Unit 2 Division III diesel generator is a General Motors Electro-Motive Division 20 cylinder series 645 two-stroke diesel engine. The maintenance involved removing the cylinder, piston assembly, and disassembling the jacket water, fuel oil, and lube oil lines to each cylinder. Upon reassembly, leak checks were performed with the systems filled but not pressurized. The systems are pressurized by engine-driven pumps when the engine operates during the post maintenance runs; however, many portions of these systems are inside the diesel inspection covers and not visible when pressurized during operation.

Following the maintenance, the inspection covers were reinstalled, the engine was barred over, and each cylinder was inspected for moisture prior to the first maintenance run per procedure with no issues noted. The engine was started three times for post maintenance testing. There were time gaps of 16 hours and 10 hours, respectively, before the second and third runs. The Division III diesel generator was run unloaded for the first two runs and was not loaded until the third run, 21 minutes before the failure. In accordance with the procedure, since less than 24 hours elapsed between runs, no additional barring was required prior to the second and third starts.

Exelon determined that one of the inlet jacket water cooling jumper line lower bucket connections began leaking and spraying water after the system was pressurized during the first post maintenance test run. With the engine stopped in a position with the #3 cylinder piston at bottom stroke, spray from the leaking jacket water connection had a path inside that cylinder via the air intake ports and collected on the piston head. During either the second or third start, a hydro-lock event occurred upon start up, resulting in some damage to the piston or bending of the connecting rod in that cylinder. Twenty-one minutes after the Division III diesel generator was fully loaded during that third run, the damaged equipment failed, liberating the piston from the connecting rod. The connecting rod, being driven at 900 revolutions per minute via the crank shaft, caused significant damage to the #3 and #13 cylinders, piston carriers and pistons, the lube oil and jacket water connecting lines, and resulted in scoring of the crank shaft.

Inspectors reviewed vendor and Exelon Fleet templates for Electro-Motive Division engines and none required a functional system pressure test. The inspectors noted that Exelon procedure MA-AA-716-012 Post Maintenance Testing, Revision 23, Attachment 1 for Pumps Post Maintenance Testing Matrix for work on piping/piping supports adjacent to the pump, recommends a general leak test at operational pressure and temperature. However, Attachment 1 for Emergency Diesel Generators/Components Test Matrix does not require a general leak test.

Inspectors determined that the established post maintenance testing procedure failed to address the most probable cause of the jacket water leak, a workmanship error during reinstallation. Inspectors independently confirmed Exelon's investigation that the appropriate procedure was used, the steps followed in the proper order, and human performance error prevention tools were used as expected. The inspectors concluded that the procedure was adequate for reassembly as written and was followed, but was not executed properly. Normally, workmanship errors are expected to be identified during the post maintenance test. However, in this case, no leak test at functional pressure was specified, the established post maintenance test did not identify this workmanship error.

Corrective Actions: Exelon entered the issue into their corrective action program as IR 04199519 and completed a root cause evaluation. Based upon the evaluation of the damage done to the Division III diesel generator, the decision was made to replace the entire engine. An emergency Technical Specification amendment was granted on December 9, 2018 to support a one-time technical specification limiting condition for operation extension for the high pressure core spray system from 14 days to 35 days to support replacement and retesting of the Division III diesel generator following a failure (ADAMS Accession number ML18342A015). The high pressure core spray system was restored to an operable status on December 18, 2018.

The root cause was determined to be the lack of post maintenance testing inspections for the pressurization of the lower engine jacket water cooling lines. A contributing cause was determined to be inadequate procedural guidance for barring activities to detect or remove oil and or liquids from cylinders following maintenance. A Corrective Action to Prevent Recurrence (CAPR) included revising applicable emergency diesel generator maintenance procedures to require a functional system pressure test prior to installing the inspection covers. A second CAPR revised applicable maintenance procedures changing the barring requirement time from 24 hours following a run to barring if greater than 4 hours have passed since running or barring the engine over. Additional corrective actions included revising the barring procedure to specify that two observers are required to walk down the emergency diesel generator while it is being barred over. Site and industry communications were developed to communicate the lessons learned. Finally, inspections of the Unit 1 emergency diesel generator jacket water lines were added to the scope of the next 2-year preventive maintenance on the Unit 1 Electro-Motive Division emergency diesel generators.

Corrective Action Reference: IR 04199519

Performance Assessment:

Performance Deficiency: Failure to properly implement procedure N2-MSP-EGS-R002, in that the inlet jacket water cooling jumpers were not proper reinstalled per Section 6 of N2-MSP-EGS-R002, was a performance deficiency reasonably within Exelon's ability to foresee and prevent.

Screening: This finding is more than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations." The Performance Deficiency was evaluated using Inspection Manual Chapter (IMC) 0609 Attachment 4, "Initial Characterization of Findings," and IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The Division III diesel generator was unavailable for 22.5 days resulting in the supported system, high pressure core spray, to be inoperable for greater than its normal technical specification allowed outage time of 14 days, therefore in accordance with IMC 0609 Appendix A Exhibit 2, "Mitigating Systems Screening Questions," a detailed risk assessment is required.

The regional senior reactor analyst made the following assumptions with respect to exposure time and crediting risk management actions. The performance deficiency occurred on day 5 of a normal maintenance outage window for which the requirements of 10 CFR 50.65 (a)(4) were met to mitigate plant risk. Thus the exposure period for the performance deficiency was reduced from 22.5 days to 17.5 days. Following the failure, Exelon requested and was granted an emergency technical specification amendment for a one-time extension of the high pressure core spray allowed outage time from 14 to 35 days with additional risk management actions required to be in place. This extension was effective on December 10, 2019 at 1:00 a.m. and lasted 8.5 days. The risk management actions required by the emergency technical specification amendment were credited during the final 8.5 days of exposure to acknowledge the fact that without an emergency technical specification amendment, operators would have shutdown to Mode 4 as required by the original Technical Specifications. A senior reactor analyst conducted an event assessment using the Nine Mile

Point Unit 2 SPAR Model, Revision 8.50 dated February 28, 2017, and SAPHIRE, Version 8.1.8. The analyst conservatively set basic event EPS-DGN-TM-DG2 [DG2 (Purple) unavailable due to test and maintenance] to true to model the failure since the emergency diesel generator was in a maintenance status for 22.5 days. This precludes a common cause factor adjustment since the error occurred during the maintenance. This was run for 9 days. For the next 8.5 days, the analyst also set test and maintenance to false for all equipment specified as protected via the emergency Technical Specification AMendment required risk management actions. The two runs were added together to estimate total plant risk. The plant risk was determined to be 6.11 E-7 events per year with a dominant accident sequence of a loss of offsite power coincident with a loss of coolant accident with a failure of reactor coolant isolation cooling and a failure of operators to manually depressurize. Risk contribution of fire and external events was negligible. The analyst also used IMC 0609, Appendix H, “Containment Integrity Significance Determination Process,” dated May 6, 2004, to determine the total increase in large early release frequency of the finding was less than 1.0 E-7 per year. This corresponds to very low safety significance (Green).

Cross-cutting Aspect: None. The primary contributor to the failure to execute procedure N2-MSG-EGS-R002 was the post maintenance testing not being sufficient to detect a leak at system pressure. However, because vendor, fleet, and industry guidance did not require or recommend an operational pressure testing for diesel support systems, this was not considered to be indicative of current licensee performance. As such, no cross-cutting aspect was assigned.

Enforcement:

Violation: Unit 2 Technical Specification 5.4.1, “Procedures,” requires that written procedures shall be established, implemented, and maintained as recommended by Appendix A of Regulatory Guide 1.33, Revision 2. Appendix A of Regulatory Guide 1.33 Section 9, “Procedures for Performing Maintenance,” states maintenance that can affect the performance of safety related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Exelon Procedure N2-MSP-EGS-R002, "Diesel Generator Inspection Division III," Revision 01900, implements this requirement for the Division III diesel generator.

Contrary to the above, on or about December 1, 2018, Exelon staff failed to adequately implement procedure N2-MSP-EGS-R002 when the #3 inlet jacket water cooling jumper line lower basket connection was improperly reassembled and leaked resulting in hydro-locking of the #3 cylinder upon startup and the subsequent catastrophic failure of the Division III diesel generator on December 2, 2018.

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

Inadequate Work Instructions Result in a Reactor Scram			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Initiating Events	Green FIN 05000410/2019001-03 Open/Closed	H.11 - Challenge the Unknown	71152

A self-revealed Green finding was identified when Exelon failed to adequately develop work order steps, in accordance with MA-CE-716-010-1000, “Maximo Work Order Planning Manual,” Revision 3, to perform Unit 2 main generator relay testing. Specifically, Exelon identified inadequate procedure steps that led to shorting screws remaining in a main generator relay following offline testing in April 2018. The shorting screws in the main generator relay resulted in early actuation, a main generator trip and reactor scram on August 27, 2018, when Unit 2 experienced a grid disturbance.

Description: On August 27, 2018, a grid disturbance occurred, resulting in a Unit 2 main generator trip and reactor scram. Following the reactor scram, it was discovered that the ‘A’ phase unit differential relay actuated as a result of the grid disturbance. Additional investigation identified shorting screws remaining in the first terminal strip of the unit differential relay. Exelon evaluated extent of cause and extent of condition, and identified two additional relays with shorting screws in their respective terminal strip. The shorting screws were used as electrical protection during April 2018 and May 2018 offline main generator relay testing. Ultimately, the shorting screws resulted in early and unnecessary actuation of the main generator unit differential relay during the grid disturbance.

Exelon conducted a root cause evaluation following the reactor scram. The cause evaluation identified the direct cause to be the grid disturbance that occurred on the ‘A’ phase of a transmission line external to Nine Mile Point. The root cause was determined to be a failure of seconded relay and control technicians to properly execute Human Performance Error Prevention tools while removing shorting screws from the unit differential relay circuit.

The work order used to conduct the offline testing provided steps that were not able to be properly place kept and the steps were unclear and difficult to follow. The technicians involved with the work recognized the formatting was unclear, however they understood the work and agreed with proceeding based on review of applicable drawings. At a later time, when work was recommenced with an additional technician, no pre-job brief was performed. Also, the additional technician questioned why the screws were left in on some of the terminal strips, however prints nor the installation procedure were referenced to determine if it was acceptable. Placekeeping was also not properly performed.

As stated in MA-CE-716-010-1000, “Maximo Work Order Planning Manual,” Revision 3, Section 4.6.5, Step 5.E, the Planner is required to ensure “placekeeping is provided whenever written instructions are being referenced to directly perform a task per HU-AA-104-101, 'Procedure Use and Adherence.'” Step 4.6.10 – “Human Performance/Error Prevention,” states “the Planner shall ensure job steps are clear and easy to follow with a single action to be performed. Direction to perform tasks per other documents should be clear and minimized when possible.” Contrary to the requirements of MA-CE-716-010-1000, inadequate procedure steps developed on June 3, 2016 led to shorting screws remaining in a main generator relay following offline testing in April 2018.

Corrective Actions: Exelon removed the shorting screws identified in the three main generator protective relays. Exelon also removed the qualifications of the technicians involved with the relay testing. Exelon conducted a review of additional work orders as part of extent of condition and extent of cause, and did not identify any additional errors. Exelon also developed a new screening process for non-station personnel which includes interviews and oral boards commensurate with their job responsibilities, which is in addition to training already received.

Corrective Action Reference: IR 04167387

Performance Assessment:

Performance Deficiency: The inspectors determined that the failure to develop adequate work order steps to perform Unit 2 main generator relay testing was contrary to MA-CE-716-010-1000, "Maximo Work Order Planning Manual," Revision 3.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedure Quality attribute of the Initiating Events cornerstone. It adversely affected the associated cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations.

Significance: The inspectors assessed the significance of the finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations" Exhibit 1, "Initiating Events Screening Questions." The inspectors determined that although this finding caused a reactor trip, it did not cause a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable condition. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

Cross-cutting Aspect: H.11 - Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding. The inspectors determined that the finding had a cross-cutting aspect of Challenge the Unknown within the cross-cutting area of Human Performance because the technicians involved with the work recognized the formatting was unclear, however they proceeded based on review of applicable drawings. At a later time, when work was recommenced with an additional technician, no pre-job brief was performed. Also the additional technician questioned why the screws were left in on some of the terminal strips, yet neither prints nor the installation procedure were referenced to determine if it was acceptable. Each of these situations represented an opportunity to utilize proper Human Performance Error Reduction techniques to challenge the situation and mitigate the possibility of a transient.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Unresolved Item (Closed)	Potential Inadequate 50.59 Evaluation for TS 3.3.1.1 Bases Change 05000410/2018001-02	71153

Description: On February 23, 2018, Exelon personnel performed a 50.59 screening for a change to Unit 2 Technical Specification Bases 3.3.1.1, Reactor Protection System (RPS) Instrumentation, for main steam isolation valve (MSIV) and turbine stop valve (TSV) surveillance testing. Exelon personnel performed this activity to address operating experience associated with the use of a test box that prevents a scram signal during RPS surveillance testing for TS 3.3.1.1 Function 5 MSIV – Closure and Function 8 TSV - Closure.

Technical Specification Bases B 3.3.1.1, C.1, Revision 1 was revised to state, in part, "For Function 5 (MSIV – Closure), this would require both trip systems to have at least one channel associated with the MSIVs for each main steam line in one Trip Logic Channel (not necessarily the same main steam lines for both trip systems), Operable or in trip (or the associated trip system in trip). For Function 8 (Turbine Stop Valve – Closure), this would

require both trip systems to have the channels for one Trip Logic Channel, Operable or in trip (or the associated trip system in trip)."

The inspectors questioned whether the change to Technical Specification Bases B 3.3.1.1 resulted in a change to the implementation of Technical Specification 3.3.1.1. A licensee is permitted to make changes to their Technical Specification Bases documents without NRC review and approval. However, in certain cases, such as a change to the Technical Specification Bases that would change how the associated Technical Specification is applied, NRC review and approval would be required. The inspectors requested assistance from the Office of Nuclear Reactor Regulation (NRR) to determine whether this change to the Technical Specification Bases reasonably would have required NRC review and approval.

Nine Mile Point Unit 2 Technical Specification 3.3.1.1 contains a NOTE modifying the surveillance requirements that states: "When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains RPS trip capability."

Nine Mile Point Unit 2 Technical Specification Table 3.3.1.1-1, Reactor Protection System Instrumentation, Function 5, Main Steam Isolation Valve - Closure requires that eight channels per trip system (for a total of 16 channels) be operable. Technical Specification Table 3.3.1.1-1, Reactor Protection System Instrumentation, Function 8, Turbine Stop Valve Closure, requires that four channels per trip system (for a total of eight channels) be operable. In this context, a channel is considered to be the position monitoring circuitry associated with each MSIV or TSV.

The position circuitry (channel) loses its identity at the trip logic. The reactor protection system is comprised of two independent trip systems (A and B), with two trip logics in each trip system (logics A1 and A2, B1 and B2). The reactor protection system trip (scram) logic subsystems (A1, A2, B1, B2) are sometimes informally referred to as channels, creating the potential for confusion. These subsystems are more appropriately described as trip logics.

During testing of the MSIV closure trip function and the TSV closure trip function using the reactor protection system test box, the reactor protection system trip (scram) logic subsystem being tested is effectively “bypassed” (i.e., it is not OPERABLE or in trip). For these two functions, multiple position indication channels are bypassed. When the reactor protection system test box is being used, the channels associated with the valves in two steamlines are bypassed for the trip system that is being tested. That trip system would only receive input from the two remaining steamlines. The NOTE is only applicable when one channel is bypassed, and is not applicable when multiple channels are bypassed. Therefore, the NOTE is not applicable during testing of these two functions using the reactor protection system test box.

Condition C of TS 3.3.1.1 is applicable when there are one or more Functions with reactor protection system trip capability not maintained. This would require restoring RPS trip capability within 1 hour. The Technical Specification Bases provide clarity on whether reactor protection system trip capability is maintained. Prior to the Technical Specification Bases change in February 2018, the NMPNS Unit 2 Technical Specification Bases were consistent with the Standard Technical Specification Bases and stated, in part:

“Required Action C.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same trip system for the same Function result in the Function not maintaining RPS trip capability. A Function is considered to be maintaining RPS trip capability when sufficient channels are OPERABLE or in trip (or the associated trip system is in trip), such that both trip systems will generate a trip signal from the given Function on a valid signal...”

For Function 5 (Main Steam Isolation Valve - Closure), this would require both trip systems to have each channel associated with the MSIVs in three main steam lines (not necessarily the same main steam lines for both trip systems) OPERABLE or in trip (or the associated trip system in trip). For Function 8 (Turbine Stop Valve - Closure), this would require both trip systems to have three channels, each OPERABLE or in trip (or the associated trip system in trip).”

The licensee revised the section of the Technical Specification Bases associated with Condition C to state:

"For Function 5 (Main Steam Isolation Valve - Closure), this would require both trip systems to have at least one channel associated with the MSIVs for each MSL in one Trip Logic Channel (not necessarily the same MSLs for both trip systems), OPERABLE or in trip (or the associated trip system in trip). For Function 8 (Turbine Stop Valve - Closure), this would require both trip systems to have the channels for one Trip Logic Channel, OPERABLE or in trip (or the associated trip system in trip).

When the RPS test box is being used, the channels of the trip system being tested associated with the valves in two steamlines are bypassed. The trip system that is being tested would therefore only receive input from the two remaining steamlines.”

Prior to the change, the Technical Specification Bases stated that RPS trip capability is maintained when each trip system (A and B) was receiving position input from the isolation valves in three main steam lines. Therefore, if a trip logic (A1, A2, B1 or B2) is bypassed, its associated trip system would not be receiving position input from the valves in three main steam lines, and Condition C would be applicable. The Technical Specification Bases were changed to state that both trip systems need to have at least one channel associated with the MSIVs for each MSL [main steam line] in one trip logic channel OPERABLE or in trip. This changes the explanation of what is necessary for maintaining “RPS trip capability."

Prior to the change, the Technical Specification Bases stated that RPS trip capability is maintained when both trip systems have three channels of TSV position. Therefore, if a trip logic is bypassed, its associated trip system would not be receiving position input from three TSVs, and Condition C would be applicable. Subsequent to the TS Bases clarification, the TS Bases state that RPS trip capability is maintained when both trip systems have the channels for at least one trip subsystem operable. Applying the revised TS Bases statement of what constitutes maintaining RPS trip capability, during testing of the TSV function when one trip logic channel is bypassed, Condition C would no longer be applicable.

NRC NRR subject matter experts and management determined that NRC review and approval was not required for the TS Bases change. The changes that Exelon made to the Bases for Condition C of TS 3.3.1.1 clarified the number of channels needed for Functions 5 and 8 in order to maintain RPS trip capability. Since this was a clarification, Condition C of TS 3.3.1.1 was not changed by this TS Bases change. If a Bases change to the TSs

changes information derived from the analysis and evaluation included in the safety analysis report, then in accordance with 10 CFR 50.59, if a change to the TSs is involved, the change must be submitted to the NRC for review and approval prior to implementation in accordance with 10 CFR 50.90. Because this TS Bases change did not change information derived from the analysis and evaluation included in the safety analysis report for Condition C, the licensee can screen the TS Bases change as non-adverse and no prior NRC approval is required.

URI Closure Basis: No violation of 10 CFR 50.59 exists in this case. URI 05000410/2018001-02 is Closed.

Corrective Action Reference: IR 04055602

LER (Closed)	LER 2018-002-00 for Nine Mile Point, Unit 2, Turbine Trip and Scram Due to Unit Differential Relay Trip 05000410/2018-002-00	71153

Description: On August 27, 2018, a grid disturbance occurred resulting in a Unit 2 main generator trip and reactor scram. Following the reactor scram it was discovered that the 'A' Phase Unit Differential relay actuated as a result of the grid disturbance. Additional investigation identified shorting screws remaining in the first terminal strip of the Unit Differential relay. Exelon evaluated extent of cause and extent of condition, and identified two additional relays with shorting screws in their respective terminal strip. The shorting screws were used as electrical protection during April 2018 and May 2018 offline main generator relay testing. Ultimately, the shorting screws resulted in early and unnecessary actuation of the main generator Unit Differential relay during the grid disturbance.

Planned Closure Actions: The NRC identified one Green finding. The NRC evaluation of this event is discussed in Section 71152 of this inspection report. The inspectors did not identify any further issues during the review of the LER. This LER is closed.

Licensee Actions: Exelon conducted a root cause evaluation following the reactor scram. The cause evaluation identified the direct cause to be the grid disturbance that occurred on the 'A' phase of a transmission line external to Nine Mile Point. The root cause was determined to be a failure of seconded relay and control technicians to properly execute Human Performance Error Prevention tools while removing shorting screws from the Unit Differential relay circuit.

As part of corrective actions, Exelon removed the shorting screws identified in the three main generator protective relays. Exelon also removed the qualifications of the technicians involved with the relay testing. Exelon conducted a review of additional work orders as part of extent of condition and extent of cause, and did not identify any additional errors. Exelon also developed a new screening process for non-station personnel which includes interviews and oral boards commensurate with their job responsibilities, which is in additional to training already received.

Corrective Action Reference: IR 04167387

NRC Tracking Number: 05000410/2018-002-00

This LER is Closed.

EXIT MEETINGS AND DEBRIEFS

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

- On April 25, 2019, the inspector presented quarterly resident inspector inspection results to Mr. Peter Orphanos and other members of the licensee staff.
- On March 8, 2019, the inspector presented the IP 71152A -High Pressure Core Spray Emergency Diesel Generator Failure to Pete Orphanos, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

71111.01

Procedures
N1-OP-64, Meteorological Monitoring, Revision 01900
N1-SOP-64, High Winds, Revision 00300
N2-OP-102, Meteorological Monitoring, Revision 02500
N2-SOP-90, Natural Events, Revision 00800
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 17

71111.04

Procedures
N1-OP-2, Core Spray System, Revision 03700
N1-OP-4, Shutdown Cooling System, Revision 04800
N1-OP-10, Reactor Building Heating, Cooling, and Ventilating System, Revision 02900
N1-OP-34, Refueling Procedure, Revision 03900
N1-OP-45, Emergency Diesel Generators, Revision 04700
N1-ST-M8, Reactor Building Emergency Ventilation System Operability Test, Revision 01700
N1-ST-Q1B, CS 121 Pump, Valve and SDC Water Seal Check Valve Operability Test, Revision 02000

Issue Reports

04200048	04214686	04215811	04217254
04217597	04220622		

Drawings
C-18007-C, Sheet 1, Reactor Core Spray Piping & Instrumentation Diagram, Revision 63
C-18008-C, Spent Fuel Storage Pool Filtering and Cooling System P&I Diagram, Revision 44
C-18013-C, Reactor Building Heating, Cooling, and Ventilating System P&I Diagram, Revision 35
C-18018-C, Reactor Shutdown Cooling P & I Diagram, Revision 32
PID-19A, Piping and Instrumentation Diagram Instrument & Service Air, Revision 16
PID-19B, Piping and Instrumentation Diagram Instrument & Service Air, Revision 46
PID-19C, Piping and Instrumentation Diagram Instrument & Service Air, Revision 27
PID-19D, Piping and Instrumentation Diagram Instrument & Service Air, Revision 22
PID-19E, Piping and Instrumentation Diagram Instrument & Service Air, Revision 14
PID-19F, Piping and Instrumentation Diagram Instrument & Service Air, Revision 14
PID-19G, Piping and Instrumentation Diagram Instrument & Service Air, Revision 27
PID-19L, Piping and Instrumentation Diagram Instrument & Service Air, Revision 8
PID-19M, Piping and Instrumentation Diagram Instrument & Service Air, Revision 5

71111.05

Procedures
N1-FST-FPG-C002, Halon System Functional Test, Revision 01300
N1-PFP-0101, Unit 1 Pre-Fire Plans, Revision 00500
N2-FPI-PFP-0201, Unit 2 Pre-Fire Plans, Revision 05

Work Order
C93613008

Drawing
F-45094-C, Fire Protection Halon P&I Diagram, Revision 7

Miscellaneous
DCD-805, Nine Mile Point Unit 1 NFPA 805 Design Criteria, Revision 1

71111.07

Procedures
N2-TTP-HVP-@001, Performance Evaluation Test for Diesel Generator Unit Coolers, Revision 00700
N2-TTP-HVY-@002, Performance Evaluation Test for Unit Cooler 2HVY*UC2A, B, C, and D, Revision 00500
S-TDP-REL-0103, GL 89-13 Service Water System Problems Affecting Safety-Related Equipment Program Plan, Revision 00

Issue Report
04216401

Miscellaneous
A10.1-N-423, HVC/HVP/HVY Unit Cooler Testing Flow Factors, Revision 0
ESR-19-000024, Assessment on Revised Service Water Flow Factors from A10.1-N-423, Revision 0
HVY-021-03C, Service Water pump Bay Heat Gain - Reconciliation with 84F Ultimate Heat Sink Temperature, Revision 03
HVP-006-03A, Standby Diesel Generator Building Control Room Cooling Load and Unit Cooler Sizing - Reconciliation with 84F Ultimate Heat Sink Temperature, Revision 03

71111.06

Procedures
EP-AA-1013 Addendum 4, Nine Mile Point Nuclear Station Unit 2 Emergency Classification Technical Bases, Revision 3
N2-IPM-GEN-@001, Safety Related Loop Calibration, Revision 01000

Issue Report
04218303

Work Orders
C93697273
C93524642

Drawings
EE-3RB, Misc Field Instrumentation, Revision 14
PID-66D, Miscellaneous Drains, Revision 14
TL2DFM-024, Test Loop Diagram Service Water Pump Bay ‘B’ Level 2DRM*LS137, Revision 2

Miscellaneous
ECP-19-000100, Service Water 'B' Area Level Switch Found Not Functioning, Revision 0
ESR-19-000034, Service Water Bay 'B' Area, High-High-High Level Switch 2DRM*LS137 Closed Contacts Found Degraded and Not Functioning Properly, Revision 0

71111.11

Procedures
2102-SIMCPE004, 2019 CPE Unit 2 Scenario #1, December 21, 2018
N1-OP-43C, Plant Shutdown, Revision 02600
N2-OP-3, Condensate and Feedwater System, Revision 05100
N2-OSP-RPS-Q001, RPS Turbine Stop Valve Closure Logic, Control Valve Fast Closure SCRAM Functional Tests & Turbine Valve Cycling, Revision 01400

71111.12

Procedures
N1-MSP-GEN-025, Suppression Chamber Interior Inspection, Revision 03
N1-ST-Q28, Containment Spray Raw Water Inter Tie Check Valve, Revision 01200
N1-ST-Q28, Containment Spray Raw Water Inter Tie Check Valve, Revision 01300
S-MRM-REL-0102, Structural Monitoring Program, Revision 01000

Issue Reports (*initiated in response to inspection)

04207059	04231702*	04231872*	04231815*
04232341*	04232311*		

Miscellaneous
PCR-18-06228, Remove Unnecessary Steps, Clarify N/A Steps, Adjust Noun Names, Move IVs to the Return to Normal Section, Revision 1.0
93-039, Safety Class Determination, Revision 5

71111.13

Procedures
MA-AA-716-021, Rigging and Lifting Program, Revision 30
N1-ARP-H3, Control Room Panel H3, Revision 01500
N1-OP-34, Refueling Procedure, Revision 03900
N1-PM-34, Reactor Cavity Flood Up and Drain Down, Revision 00800
N1-SOP-1.5, Unplanned Reactor Power Change, Revision 00500
N1-SOP-16.1, Feedwater System Failures, Revision 01100
N2-MPM-SWP-A513, Service Water Strainer P.M., Revision 00602
N2-OP-3, Condensate and Feedwater System, Revision 05100
OP-NM-108-117, Protected Equipment Program at Nine Mile Point, Revision 00500
OU-NM-103-101, Shutdown Safety Management Program, Revision 00300
WC-AA-104, Integrated Risk Management, Revision 25

Issue Reports

04119690	04218733	04218775	04219062*
04219226	04222237	04225699	04230591
04234115*			

Work Orders

C93613018	C93620400	C93621573	C93652102
C93690560	C93696955	C93697216	

Drawings

C-18005-C, Feedwater Flow High Pressure (Flow Control Valve 29-134) P&I Diagram, Revision 9
C-18006-C, Drywell & Torus Isolation Valves P & I Diagram, Revision 42
C-18015-C, Reactor Vessel Instrumentation P & I Diagram, Revision 42
C-23076-C, One Line Diagram Feedwater Control System, Revision 37
C-35843-C, Reactor Vessel Instrumentation Level Ranges, Actuation Points and Water Volumes, Revision 4
PID-11B, Piping & Instrumentation Diagram Service Water System, Revision 20

Miscellaneous

N1R25-SSCMP-01: Relay Testing with Potential to Trip Lines 1 & 4, Revision 0

71111.15

Procedures

CY-NM-250-512, RCIC Turbine Lube Oil Quarterly Preventative Maintenance Sampling, Revision 0
N2-ARP-851500, 2CEC*PNL851 Series 500 Alarm Response Procedures, Revision 00500
N2-IPM-RDS-R002, Scram Discharge Volume Water Level Instrument Maintenance Procedure, Revision 00100
N2-ISP-CMS-R108, Operating Cycle Calibration of Accident Monitoring Drywell Air Temperature Instrument Channels, Revision 00900
N2-ISP-RDS-@101, Scram Discharge Volume Water Level Instrument Channel Calibration, Revision 002T2
N2-MPM-EGS-508, General Motors Diesel (DIV III) Lube Oil Preventative Maintenance Sampling, Revision 00000
N2-OP-3, Condensate and Feedwater System, Revision 05100
N2-OP-97, Reactor Protection System, Revision 01800
N2-OSP-EGS-M@002, Diesel Generator and Diesel Air Start Valve Operability Test, Division III, Revision 02100
N2-OSP-EGS-R006, Operating Cycle Diesel Generator 24 Hour Run and Load Rejection Test Division III, Revision 01200
N2-SOP-06, Feedwater Failures, Revision 01101

Issue Reports (*Initiated in response to inspection)

04202188	04203952	04204705	04207617
04211553	04216095*	04222237	04226891
04227070	04227071	04227358	04229677
04229798			

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PID-6C, Piping & Instrumentation Diagram Feedwater System, Revision 22
PID-30C, Control Rod Drive Hydraulic System, Revision 14

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C93410240	C93579251	C93597837	C93597838
C93602044	C93607262	C93614865	C93615013
C93630857	C93640193	C93689087	

Miscellaneous

N2D16700Valve001, Dikkers Nuclear Safety Relief Valve Instruction Manual, Part A - Instruction & Guidelines, Part B Supporting Documents, Revision 8
NWS Technologies Customer Equipment Anomalies Report, 18-430
PCR-17-02113, Remove 1/2 Scram Initiations from this Procedure by Using a Black Box, Revision 0
RCIC Turbine 2ICS*T1 Results for Spectrochemical Analysis of RCIC Turbine Lube Oil on November 9, 2018, May 15, 2018, November 9, 2017, and May 11, 2017

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N2-OSP-GTS-M001, Standby Gas Treatment System Functional Test, Revision X
N2-OSP-GTS-R001, Secondary Containment Integrity Test, Revision Y

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04126851
04158622
04226891

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G-1292-A / 0010310107013A
G-1292-2 / 0010310107014B
PID-30C, Control Rod Drive Hydraulic System, Revision 14

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C93665154
C93682797
C93700432
C93700463

Miscellaneous

ECP-12-000749, Unit 1 Replace Rosemount 510DU Trip Units with 710DU Upgrades, Revision 0
ECP-15-000412, Unit 1 RPS [reactor protection system] Trip Unit Replacement Instrument Loops A, B, C, Revision 0
ECP-18-000518, Improve Locking Mechanism on Butterfly Valves, Revision 0000
ECP-19-000161, Temporarily Remove Vent Valve 2RDS*V140C and Replace with Welded Pipe Cap, Revision 0
Safety Class Determination 92-149, Revision 1
Screening Number 5059-2018-333, Improve Locking Mechanism on Butterfly Valves, 2GTS*V2000A & B, Revision 0

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ER-AA-321, Administrative Requirements for Inservice Testing, Revision 013
N1-EPM-GEN-124, Electromatic Solenoid Inspection, Revision 00700
N1-ISP-036-105, Low low low Reactor Water Level Instrument Trip Channel Calibration, Revision 00800
N1-ST-Q5, Primary Containment Isolation Valves Operability Test, Revision 03400
N1-ST-R11, Valve Remote Position Indicator Verification, Revision 02000
N2-IPM-SWP-R111, Calibration of Control Building Service Water Out Temperature Channels, Revision 00400
N2-MSP-GTS-R@001, Testing and Analysis of Unit 2 Standby Gas Treatment System, Revision 0
N2-OSP-SWP-Q@001, Division I Service Water Operability Test, Revision 00900
S-EPM-GEN-402, Pre-Use/Post-Use Verification of Crimping Tools, Revision 00300

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01995009	04096540	04119690	04126851
04158622	04218775		

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C91127167	C92237788	C93215906	C93276377
C93517523	C93599432	C93615515	C93616433
C93617130	C93665154	C93697218	

Drawings

B-18023-C, Sheet 1, Shaft Driven Reactor Feedwater Pump #13 Gear & Clutch Oil P&I Diagram, Revision 16
C-18006-C, Sheet 2, Drywell & Torus Isolation and Blocking Valves P&I Diagram, Revision 34

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ECP-15-000184, Replacement of Electro-Hydraulic Actuators for the Valves that Modulate Service Water to the Control Room Chillers (2SWP*TV35/A/B), Revision 0
PCR-19-00264, Update Required Stroke Time Bands for 2SWP*TV35A as Determined by IST Evaluation Following Actuator Replacement per ECP-15-000184, Revision 1

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N1-ST-M4B, Emergency Diesel Generator 103 and PB 103 Operability Test, Revision 02100
N1-ST-R2A, LOCA and EDG 102 Simulated Auto Initiation Test, Revision 00100
N1-ST-R9, Core Spray Operability Test Using Demineralized (CST) Water, Revision 016T1
N1-ST-TYC-001, MSIV Type C Leak Rate Tests, Revision 00200
N1-ST-TYC-027, HCVS Outboard Primary Containment Isolation Valve Type C Leak Rate Tests, Revision 00100
N2-ESP-ENS-Q731, Quarterly Channel Functional Test of LPCS/LPCI Pumps A, B, and C (Normal and Emergency Power) Auto Start Time Delay Relays, Revision 00800
N2-OSP-EGS-M@001, Diesel Generator and Diesel Air Start Valve Operability Test - Division I and II, Revision 01700
N2-OSP-RPS-Q001, RPS Turbine Stop Valve Closure Logic, Control Valve Fast Closure Scram Functional Tests & Turbine Valve Cycling, Revision 01400

N2-OSP-SLS-Q001, Standby Liquid Control Pump, Check Valve, Relief Valve Operability Test and ASME XI Pressure Test, Revision 01900

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02684642	04148971	04201625	04207630
04207632	04209551	04224831	04230591
04230937	04231328	04233517	

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C93620057	C93620060	C93620064	C93620069
C93622456	C93642616	C93644620	C93646274
C93646707	C93647886	C93651871	C93668585
C93671126	C93673643	C93673644	C93683022
C93684783	C93689087	C93693282	

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C-18002-C, Steam Flow Main Steam & High Pressure Turbine P&I Diagram, Revision 49
C-18007-C, Reactor Core Spray System P&I Diagram, Revision 63
ESK-5ENS21, 4160 Volt Switchgear Undervoltage Protection Circuit 2ENS*SWG101, Revision 19

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PCR-19-00900, Multiple Step Changes Required, as Noted During First Performance After Revs 01300 and 01400 Were Enacted; Two Values Must be Changed and One Major Test Step Must be Added Back In; Other Non-Critical Enhancements, Revision 0
PCR-19-01253, Change EC isolation from IV-39-09R to IV-39-07R for Step 7.10.6 (IR 04230591), Revision 0
PCR-19-01254, Page 14 & 18 Transposition Errors, Revision 0

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04139862
04148579

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HU-AA-104-101, Procedure Use and Adherence, Revision 5
MA-CE-716-010-1000, Maximo Work Order Planning Manual, Revision 3
PI-AA-120, Issue Identification and Screening Process, Revision 008
PI-AA-125, Corrective Action Program (CAP) Procedure, Revision 006
PI-AA-125-1001, Root Cause Analysis Manual, Revision 003
PI-AA-125-1006, Investigation Techniques Manual, Revision 004

Issue Report

04167387

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EE-001A, Main One Line Diagram Generator & Main Transformer, Revision 26
ESK-08SPU001, A.C. Elementary Diagram Key Drawing & Unit Differential, Revision 16

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04119690
04220930
04233592

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C93697218

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B-18023-C, Sheet 1, Shaft Driven Reactor Feedwater Pump #13 Gear & Clutch Oil P&I Diagram, Revision 16
PID-26A, Piping & Instrumentation Diagram Stator Winding Water Cooling, Revision 25