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

May 12, 2017

Mr. Bryan C. Hanson
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: NINE MILE POINT NUCLEAR STATION – INTEGRATED INSPECTION REPORT 05000220/2017001 AND 05000410/2017001

Dear Mr. Hanson:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Nine Mile Point Nuclear Station, LLC (NMPNS), Units 1 and 2. On April 19, 2017, the NRC inspectors discussed the results of this inspection with Mr. Peter Orphanos, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. 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 of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the 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 NMPNS. 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 NMPNS.

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 the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Anthony Dimitriadis, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos. 50-220 and 50-410
License Nos. DPR-63 and NPF-69

Enclosure:
Inspection Report 05000220/2017001 and 05000410/2017001
w/Attachment: Supplementary Information

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REGION I

Docket Nos.	50-220 and 50-410
License Nos.	DPR-63 and NPF-69
Report Nos.	05000220/2017001 and 05000410/2017001
Licensee:	Exelon Generation Company, LLC (Exelon)
Facility:	Nine Mile Point Nuclear Station, LLC (NMPNS) Units 1 and 2
Location:	Oswego, New York
Dates:	January 1, 2017, through March 31, 2017
Inspectors:	K. Kolaczyk, Senior Resident Inspector E. Miller, Resident Inspector G. Stock, Resident Inspector J. Kulp, Senior Reactor Inspector R. Rolph, Health Physicist A. Rosebrook, Senior Project Engineer
Approved by:	Anthony Dimitriadis, Chief Reactor Projects Branch 1 Division of Reactor Projects

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SUMMARY

Inspection Report 05000220/2017001 and 05000410/2017001; 01/01/2017 – 03/31/2017; NMPNS, Units 1 and 2; Operability Determinations and Functionality Assessments and Problem Identification and Resolution.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The inspectors identified two Green findings, both of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Barrier Integrity

- Green. The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion III, "Design Control," for Exelon's failure to correctly translate the design basis into the NMPNS Unit 1 instrument air system to ensure the Unit 1 outboard main steam isolation valves (MSIVs) were capable of performing their design function. Specifically, the NMPNS Unit 1 Updated Final Safety Analysis Report (UFSAR) states, "Reliable operation of instrument air end users and in-line components is dependent on the filtration and removal of particulates greater than 40 microns. Additional filtration for various components exists where the 40 micron limit is not satisfactory." The MSIV pilot valves at Unit 1 have a tighter clearance than the 40 micron limit. However, contrary to the UFSAR, NMPNS did not install additional filtration upstream of the pilot valves. As a result, during a surveillance test conducted on December 10, 2016, foreign material in the instrument air system potentially contributed to the failure of an outboard MSIV. Exelon's immediate corrective actions included entering this issue into its corrective action program (CAP) as issue report (IR) 03959732, performing an air purge of the instrument air system to remove foreign material from the system, and replacing the current style pilot valves with new style valves with larger clearances during the spring 2017 refueling outage.

  The performance deficiency was determined to be more than minor because it was associated with the design control attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents for events. Specifically, Exelon failed to install additional filtration in the instrument air system upstream of the outboard MSIV pilot valve in accordance with the Unit 1 UFSAR even though the internal clearance of the pilot valve was significantly less than the 40 micron particulate limit. Additionally, example 3.j from IMC 0612, Appendix E, "Examples of Minor Issues," provides a similar scenario to this issue. Example 3.j details that a performance deficiency is more than minor if the error results in a condition where there is a reasonable doubt of the operability of a system or component. This performance deficiency is more than minor because without the additional filtration defined in the UFSAR there

existed a reasonable doubt of operability for the Unit 1 outboard MSIVs. The finding was evaluated in accordance with IMC 0609.04, "Initial Characterization of Findings," and Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," and determined to be of very low safety significance (Green). The finding has a cross-cutting aspect in the area of Human Performance, Documentation, because Exelon failed to create and maintain complete, accurate, and up-to-date documentation pertaining to instrument air sampling for high particulate. Specifically, Exelon failed to develop and implement a surveillance testing program for the instrument air system that would alert personnel that particulate greater than 5 microns could jeopardize the operability of the outboard MSIVs. [H.7] (Section 1R15)

Cornerstone: Initiating Events

- Green. The inspectors documented a self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," for the failure to identify and correct a non-conformance (an inadequate capacitor) in safety-related uninterruptable power supplies (UPSs) 162 and 172. Between 2008 and 2017, this non-conformance led to multiple component failures, loss of vital power supplies, plant transients, and in one case, loss of the emergency condenser safety function. Specifically, in 2003, during a preventative maintenance activity, NMPNS installed a commercially dedicated capacitor (part number C-805) that was not rated for the normal service temperature for the application. This resulted in chronic overheating, reduction of service life, and in seven cases failures (internal shorts of C-805) which resulted in the loss of the associated safety-related UPS. Upon identification, Exelon entered each failure into the CAP conducted an apparent cause evaluation (ACE) following the 2016 and 2017 failures, and developed corrective actions to replace the underrated capacitors.

  The performance deficiency was determined to be more than minor because it affected the equipment performance attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge the critical safety functions during shutdown as well as power operations. Specifically, the underrated capacitors failure resulted in the loss of a vital alternating current (AC) bus, a support system and in one case the unplanned loss of a safety function required to bring and maintain the plant in safe shutdown. In accordance with IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," a detailed risk assessment was required. Using the NMPNS Unit 1 Standardized Plant Analysis Risk (SPAR) Model Version: 8.21, model date January 28, 2010, a Region I senior reactor analyst ran a zero maintenance condition assessment with basic events for emergency condenser (EC) motor operated valve (MOV) 39-09R and EC MOV 39-10R, normally closed condensate return isolation valves, failed for a duration of one hour. The results were a ΔCDP of 1.37E-08. The dominant risk sequences involved loss of feedwater and loss of offsite power. As a result, the finding is of very low safety significance (Green). The performance deficiency for this finding occurred in 2008. Because the performance deficiency occurred greater than 3 years ago and is not indicative of current performance based upon the corrective actions taken following the 2016 failure, there is no cross-cutting aspect assigned to this finding. (Section 4OA2.3)

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 97 percent power due to the planned end of fuel cycle power coastdown period, which continued until the refueling outage. On March 20, 2017, reactor power was reduced to remove Unit 1 from service to commence a planned refueling outage. Unit 1 remained offline for the remainder of the inspection period due to the planned refueling outage.

Unit 2 began the inspection period at 100 percent power. On January 22, 2017, reactor power was reduced to 80 percent to perform a rod sequence exchange. Operators restored power to 100 percent the same day. On March 12, 2017, reactor power was reduced to 84 percent to perform turbine valve testing. Operators restored power to 100 percent the same day. Unit 2 remained at or near 100 percent for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 3 samples)

.1 Readiness for Impending Adverse Weather Conditions (2 samples)

a. Inspection Scope

On January 9, 2017, the inspectors reviewed Exelon's readiness for the onset of seasonal cold temperatures for Unit 1 and Unit 2. The review focused on preparations and response to frazil ice environmental conditions. The inspectors reviewed procedures, including Exelon procedure N1-OP-19, "Circulating Water System," Revision 03600 and N2-OP-11, "Service Water System," Revision 01200.

On March 2, 2017, the inspectors reviewed Exelon's readiness for the onset of high winds. The review included a tour of the Unit 1 and Unit 2 intake structures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

.2 External Flooding (1 sample)

a. Inspection Scope

During the week of March 1, 2017, the inspectors performed an inspection of the external flood protection measures for NMPNS. The inspectors reviewed technical specifications, procedures, design documents, and Unit 2 UFSAR, which depicted the

design flood levels and protection areas containing safety-related equipment, to identify areas that may be affected by external flooding. The inspectors conducted a walkdown of the site external flood protection berm to ensure that Exelon flood protection measures were consistent with design specifications.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 7 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the systems listed below. The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, technical specifications, work orders, IRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

- Unit 1 liquid poison pump 12 on January 4, 2017
- Unit 1 control room emergency ventilation system on January 18, 2017
- Unit 1 125 volts direct current (VDC) power distribution system on January 25, 2017
- Unit 1 instrument air system on March 17, 2017
- Unit 1 shutdown cooling system following reactor shutdown on March 20, 2017
- Unit 1 spent fuel pool cooling system during refuel outage on March 22, 2017
- Unit 1 line 4 and backfeed through lines 8 and 9 during line 4 planned maintenance on March 30, 2017

b. Findings

No findings were identified.

.2 Full System Walkdowns (71111.04S – 1 sample)

a. Inspection Scope

On March 1, 2017, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 reactor building normal ventilation system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify

the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies.

Additionally, the inspectors reviewed a sample of related IRs and work orders to ensure Exelon appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

1. Resident Inspector Quarterly Walkdowns (71111.05Q – 9 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 2 Division I diesel generator room, fire area 28 on January 3, 2017
- Unit 2 Division II diesel generator room, fire area 29 on January 3, 2017
- Unit 2 Division III diesel generator room, fire area 30 on January 3, 2017
- Unit 2 reactor core isolation cooling (RCIC) pump room 175', fire area 2 on January 5, 2017
- Unit 2 RCIC valve room 196', fire area 1 on January 5, 2017
- Unit 1 drywell, fire area 3 on March 21, 2017
- Unit 1 main steam tunnel, fire area T1A on March 22, 2017
- Unit 1 turbine condenser/heater bay area, fire area T1 elevation 250' on March 22, 2017
- Unit 1, foam room, fire area AB1F on March 30, 2017

b. Findings

No findings were identified.

2. Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on January 20, 2017, that involved a fire in the Unit 1 reactor building elevation 261' west cable tray. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that Exelon personnel identified deficiencies, openly discussed them in a self-critical manner at the debriefing, and took appropriate corrective actions as required. The inspectors evaluated the following specific attributes of the drill:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate firefighting techniques
- Sufficient firefighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Exelon's firefighting strategies.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors review focused on the Unit 2 north and west electrical cable tunnels. The inspectors verified the adequacy of equipment seals located below the flood line, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. The inspectors assessed the adequacy of operator actions that Exelon had identified as necessary to cope with flooding in this area and also reviewed the corrective action program to determine if Exelon was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07A – 1 sample)

The inspectors reviewed the Unit 2 high pressure core spray diesel generator cooler 2EGS*EG2 readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified Exelon's commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment." The inspectors observed actual performance tests and reviewed the results of previous inspections of the high pressure core spray diesel generator cooler 2EGS*EG2. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that Exelon initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08 – 1 sample)

a. Inspection Scope

From March 27, 2017, to March 31, 2017, the inspectors conducted an onsite inspection and review of inservice inspection (ISI) activities in order to assess the effectiveness of Exelon's program for monitoring degradation of the reactor coolant system boundary, risk-significant piping boundaries, and the containment system boundaries during the NMPNS Unit 1 1R24 refueling outage.

Non-destructive Examination and Welding Activities (IP Section 02.01)

The inspectors observed a sample of in-process non-destructive examinations (NDEs), reviewed completed documentation, and interviewed Exelon personnel to verify that the NDE activities performed as part of the fourth interval, third period, of the NMPNS Unit 1 ISI program were conducted in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 2004 Edition with no Addenda. For augmented examinations, the inspectors verified that activities were performed in accordance with Exelon's augmented inspection program and procedures, and with applicable industry guidance documents. The inspectors verified that indications and defects, if present, were dispositioned in accordance with the ASME Code or an NRC-approved alternative, and verified that relevant indications were compared to previous examinations to determine if any changes had occurred.

Activities included a review of phased array ultrasonic testing (PAUT), radiographic testing (RT), and visual testing (VT). The inspectors reviewed certifications of the NDE technicians performing the examinations and verified that the inspections were performed in accordance with qualified NDE procedures and industry guidance. For ultrasonic testing (UT) activities, the inspectors also verified the calibration of equipment used to perform the examinations. The inspectors further verified that the test results were reviewed and evaluated by personnel with certifications that met or exceeded

ASME Code requirements and that the parameters used in the test were in accordance with the limitations, precautions, and prerequisites specified in the test procedure.

ASME Code Required Examinations

- Observation and documentation review of the PAUT of the N6A core spray nozzle to safe end dissimilar metal weld (40-WD-039)

- Observation and documentation review of the PAUT of the reactor vessel lower longitudinal weld (RV-WD-140)

- Review of video capture and documentation review of the VT1 examination of the N3A main steam nozzle inner radius (01-WD-001-IR)

- Documentation and film review of the RT of three field welds (FW-1, FW-2, and FW-3) performed as part of a modification activity to install a containment hardened vent system

- Documentation review of the ASME IWE VT inspection of the containment (i.e., drywell) interior penetrations and surfaces, and independent examination of the condition of the drywell at all accessible floor elevations

Other Augmented, License Renewal or Industry Initiative Examinations

The inspectors conducted a direct observation of the remote enhanced VT records of the reactor vessel internals during in-vessel visual inspection activities in accordance with BWRVIP-03. Specifically, the inspectors observed video capture of inspections of the steam dryer and the steam dryer support lugs, interviewed the technicians and analysts, and reviewed documentation of the inspections.

Review of Previous Indications

The inspectors reviewed the UT and VT of the steam dryer support lugs due to indications initially identified in the 1R21 refueling outage and required evaluation for continued service. The inspectors reviewed PAUT data, interviewed the Level III certified analysts, and observed video capture and still pictures of the VT examination. The data taken and analysis of that data taken during the current 1R24 outage showed no change to the indications and remained bounded by the evaluation performed to show acceptance of the indications for continued service.

Welding on Pressure Boundary Systems

The inspectors reviewed the containment boundary risk-significant welding activity, including the associated NDE, of three field welds (FW-01 and -02 in 2-CPS-012-24-2) which were part of a modification to connect the torus to the hardened vent piping that was previously installed. The inspectors performed a documentation review of the welding activities conducted before the outage to verify that the welding and final acceptance RT inspections were performed in accordance with ASME Code requirements. The inspectors reviewed the weld procedure specification to ensure it contained the required essential and supplemental essential weld variables and that

those variables were within the ranges demonstrated by the supporting qualification record. The modification was performed under work order C92294852.

Identification and Resolution of Problems (IP Section 02.05)

The inspectors reviewed a sample of NMPNS Unit 1 corrective action reports identified since the previous refueling outage and during the current outage. The inspectors verified that non-conforming conditions were properly identified, characterized, evaluated, and that corrective actions were identified and entered into the CAP for resolution.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11Q – 4 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training (2 samples)

a. Inspection Scope

The inspectors observed:

- A February 16, 2017, Unit 1 licensed operator training class that reviewed plant modifications to be installed during the spring 2017 refueling outage, and the shutdown safety management program to be implemented during that outage

- A Unit 2 simulator scenario conducted on February 21, 2017, which included a loss of instrument air, a loss of control rod drive, an inadvertent stuck open safety relief valve, and a main steam line rupture inside primary containment

The inspectors evaluated operator performance during the simulated event and verified completion of risk-significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the unit supervisor. The inspectors verified the accuracy and timeliness of the emergency classifications made by the shift manager and the technical specification action statements by the unit supervisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room (2 samples)

a. Inspection Scope

The inspectors observed:

- Unit 2 Division III emergency diesel generator (EDG) surveillance testing, alarm response during lowering barometric pressure, K6 geomagnetic storm actions, and reactor water cleanup manipulations on March 1, 2017

- Unit 1 shutdown activities including taking 13 feedwater pump out of service, opening the main generator breakers, and turbine overspeed testing on March 20, 2017

The inspectors reviewed HU-AA-101, "Human Performance Tools and Verification Practices," Revision 009, and observed test performance to verify that procedure use, crew communications, and coordination of plant activities among work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 5 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance work orders, and maintenance rule basis documents to ensure that Exelon had identified and had properly evaluated performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the structure, system, or component was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for structures, systems, and components classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these structures, systems, and components to (a)(2). Additionally, the inspectors ensured that Exelon staff had identified and addressed common cause failures that occurred within and across maintenance rule system boundaries. Additionally inspectors verified that parts installed in safety-significant systems that were purchased as commercial grade parts but were dedicated prior to installation in a quality grade application.

- Unit 1 and Unit 2 spent fuel pool exterior walls on January 3, 2017
- Unit 1 motor operated blocking damper BV-210-30A, return air blocking valve from instrument shop on January 10, 2017
- Unit 1 diesel driven fire pump low air pressure auto start test failures on February 9, 2017
- Unit 1 torus supports and seismic restraints on March 22, 2017

- Commercial grade dedication of C-805 capacitors for Unit 1 UPS on March 23, 2017 (Quality Control)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 8 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed the appropriate risk assessments prior to removing equipment from service. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 2 risk mitigation actions during 'B' residual heat removal (RHR) maintenance window on January 5, 2017
- Unit 1 risk mitigation actions and troubleshooting activities following the unexpected trip of the 11 train clutch actuation package for feedwater pump 13 on January 18, 2017
- Unit 2 feedwater level control valve lockup following the loss of 2NJS-US1, non-safety-related 600 volts alternating current (VAC) power supply on March 6, 2017
- Unit 1 risk mitigation actions while line 1 was out of service for repairs on March 10, 2017
- Unit 2 Division I control room air conditioning system following failure of Division II control room air conditioning system service water supply pump suction valve 2SWP*V224B and service water discharge check valve 2SWP*V240B on March 10, 2017
- Unit 1 shutdown risk assessment and mitigating actions for replacement of station battery 12 on March 22, 2017
- Unit 1 risk mitigation actions during transformer 101S out of service for a planned modification on March 27, 2017
- Unit 1 shutdown risk assessment and mitigating actions for refueling activities during phase II core shuffle activities on March 29, 2017

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 8 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the degraded or non-conforming conditions based on the risk significance of the associated components and systems listed below. The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, the inspectors evaluated whether the measures in place would function as intended and were properly controlled by Exelon.

- Unit 1 instrument air system air quality following MSIV failure to close on December 19, 2016
- Unit 1 torus pressure instrumentation on January 6, 2017
- Unit 2 2CSH*P2 high pressure core spray keep fill pump abnormal noise on January 12, 2017
- Unit 2 SW pump 'A' bay level switch 2DFM*LS136 on February 22, 2017
- Unit 2 Division II RHR minimum flow valve operation on March 1, 2017
- Unit 2 Division II EDG 21 past operability after failure of emergency fuel control solenoid 2EGS*SOV7003B on March 9, 2017
- Unit 2 Division I EDG post-maintenance testing following voltage regulator replacement on March 10, 2017
- Unit 2 reactor recirculation pump 'A' elevated motor winding cooler leakage on March 27, 2017

b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for Exelon's failure to correctly translate the design basis into the NMPNS Unit 1 instrument air system to ensure the Unit 1 outboard MSIVs were capable of performing their design function. Specifically, the NMPNS Unit 1 UFSAR states, "Reliable operation of instrument air end users and in-line components is dependent on the filtration and removal of particulates greater than 40 microns. Additional filtration for various components exists where the 40 micron limit is not satisfactory." The MSIV pilot valves at Unit 1 have a tighter clearance than the 40 micron limit. However, contrary to the UFSAR, NMPNS did not install additional filtration upstream of the pilot valves. As a result, during a surveillance test conducted on December 10, 2016, foreign material that was greater than 40 microns in the instrument air system potentially contributed to the failure of an outboard MSIV.

Description. NMPNS Unit 1 has two steam lines. Each line has two MSIVs which are open during normal operation and are designed to automatically close in sufficient time to limit the loss of reactor coolant in the event of a major leak or break in the main steam piping outside the primary containment and limit the release of radioactive materials to

the environment. The inboard primary containment MSIVs are MOVs. The outboard MSIVs, MSIV 01-03 and MSIV 01-04, are air operated valves (AOVs), which utilize the safety-related instrument air system to open the valve and close the valve with spring assist. When called upon to operate either manually or automatically, each AOV has two pilot valves, which are the same style valve but serve different purposes that reposition to port instrument air below the AOV cylinder to open the MSIV and vent the air allowing the springs to close the valve, as seen in Figure 1. One pilot valve is for normal operation while the other is a test pilot valve used to slowly close the MSIV only 7 percent of full travel before repositioning to open the MSIV. These pilot valves are designed with a shuttle and a cage. The shuttle is a shaft with a series of lands to block or open the ports in the pilot valve. The cage contains holes that lead to air supply piping, above or below the AOV cylinder, or atmosphere. The design clearance between the shuttle and the cage is approximately 5 microns.

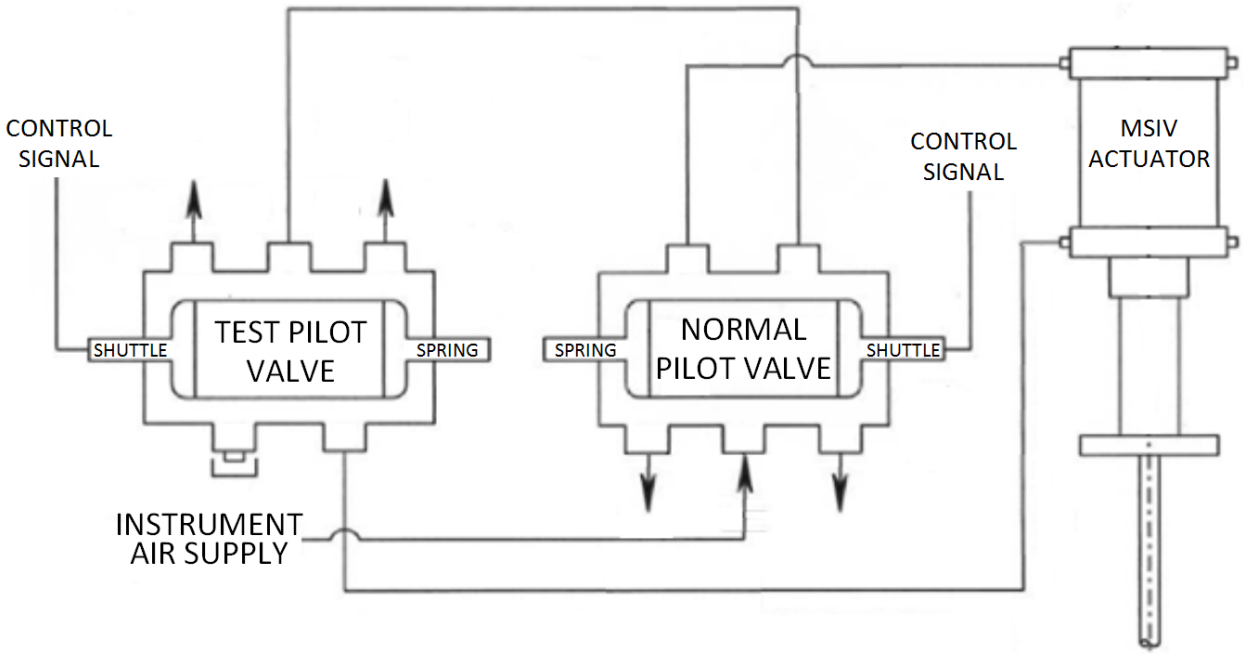

Figure 1

On December 10, 2016, MSIV 01-04 failed to close during surveillance testing. An Exelon investigation discovered that the MSIV failed to close because the pilot valve was bound. This is similar to an event that happened in September 2015 where MSIV 01-03 continued closed during a partial stroke test, eventually leading to a scram. The cause for the complete valve closure was also due to a bound pilot valve. The inspectors recognized that the valves are commonly supplied with instrument air for valve control, so following the December 2016 failure, the inspectors conducted a walkdown of the instrument air system and reviewed the system maintenance and testing program. The inspectors noted that since May 2016, particulate greater than the 40 micron requirement described in the Unit 1 UFSAR was discovered in the instrument air system, constituting a sample failure. These failures were documented in IRs 02676351, 02703052, and 03949765. The sampling process takes samples from various locations in the instrument air system to determine the quality of the whole system. Section X.I.3.0 of the NMPNS UFSAR states, “Reliable operation of instrument air end users and in-line components is dependent on the filtration and removal of particulates greater than

40 microns. Additional filtration for various components exists where the 40 micron limit is not satisfactory." The inspectors recognized that the 5 micron clearance of the outboard MSIV pilot valve would require filtration to remove particulate much smaller than 40 microns, however none exists between the instrument air sampling points and the pilot valves. Without additional filtration for particulate greater than the 5 micron clearance of the pilot valves, there is a potential for foreign material to become lodged between the shuttle and the cage locking it in position. If the pilot valves are unable to change position, the MSIVs might not operate as seen in both the September 2015 and December 2016 events. Indeed, a subsequent Exelon Powerlabs report, following the December 2016 event, found that a potential cause of the pilot valve binding was due to foreign material being introduced by the instrument air system.

When the inspectors questioned why the MSIV pilot valves were not evaluated for susceptibility for damage due to foreign material following the failed surveillance, Exelon personnel stated the sample point closest to the MSIVs had not failed for high particulate, therefore they had not evaluated the pilot valves. The instrument air sampling process categorizes particulate quantities based on sizes of 3 to 20 microns, 20 to 40 microns, and greater than 40 microns. Any particulate discovered greater than 40 microns would constitute a failure in accordance with the Unit 1 UFSAR. However, given the 5 micron clearances that exist in the pilot valves, particulate found in any of those ranges would constitute a potential to impact MSIV control without additional filtration. The sample location closest to the MSIVs had historically been found to contain particulate in the 3 to 20 micron range, but the procedure did not require test personnel to alert Exelon supervisory personnel of the potential to damage the pilot valves.

Exelon's immediate corrective actions included entering this issue into its CAP as IR 03959732, performing an air purge of the instrument air system to remove foreign material from the system, and replacing the current style pilot valves with new style valves with larger clearances during the spring 2017 refueling outage.

Analysis. The inspectors determined that Exelon's failure to implement design control measures as described in the Unit 1 UFSAR for the instrument air system was a performance deficiency that was reasonably within Exelon's ability to foresee and prevent. The inspectors determined the performance deficiency to be more than minor because it was associated with the design control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents for events. Specifically, Exelon failed to install additional filtration in the instrument air system upstream of the outboard MSIV pilot valve in accordance with the Unit 1 UFSAR even though the internal clearance of the pilot valve was significantly less than the 40 micron particulate limit. Additionally, example 3.j from IMC 0612, Appendix E, "Examples of Minor Issues," provides a similar scenario to this issue. Example 3.j details that a performance deficiency is more than minor if the error results in a condition where there is now a reasonable doubt on the operability of a system or component. This performance deficiency was more than minor because without the additional filtration defined in the UFSAR, there existed a reasonable doubt of operability for the Unit 1 outboard MSIVs, as evidenced by the instrument air particulate issues and occurrences of two failures described above.

The inspectors evaluated this finding using IMC 0609.04, "Initial Characterization of Findings," and Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." While the outboard AOV MSIVs could potentially fail due to the lack of additional instrument air filtration, the inboard MSIVs are MOVs and are not susceptible to the same failure mode. Consequently, the performance deficiency did not represent an actual open pathway in the physical integrity of reactor containment (valves, airlocks, etc.), containment isolation system (logic and instrumentation), and heat removal components. Additionally, the performance deficiency was not a pressurized thermal shock issue nor did it involve an actual reduction in function of hydrogen igniters in the reactor containment. Therefore, this finding was determined to be of very low safety significance (Green).

The finding has a cross-cutting aspect in the area of Human Performance, Documentation, because Exelon failed to develop and implement a surveillance testing program for the instrument air system that had acceptance criteria which would alert personnel that particulate greater than 5 microns could jeopardize the operability of the outboard MSIVs. [H.7]

Enforcement. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, "measures shall be established to assure that applicable regulatory requirements and the design basis… are correctly translated into specifications, drawings, procedures, and instructions." The Unit 1 UFSAR states, "Reliable operation of instrument air end users and in-line components is dependent on the filtration and removal of particulates greater than 40 microns. Additional filtration for various components exists where the 40 micron limit is not satisfactory." Contrary to the above, Exelon failed to identify equipment that needed additional filtration in accordance with the Unit 1 UFSAR. Specifically, MSIV 01-03 and MSIV 01-04 pilot valves possess clearances which require additional filtration in the instrument air system upstream of the pilot valves as defined by their design basis in the Unit 1 UFSAR. Exelon's corrective actions following the December 2016 failure included replacing the affected pilot valve, performing an air purge of the instrument air system, and pilot valve replacement with a different style valve with larger clearances. Because this violation was of very low safety significance (Green), and Exelon entered this issue into its CAP, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000220/2017001-01, Deficient Design Control of Outboard MSIV Pilot Valve Instrument Air Supply)**

1R18 Plant Modifications (71111.18 – 2 samples)

Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- Unit 1 ECP-13-000086, hardened containment vent system on March 31, 2017
- Unit 1 ECP-15-000581, MSIV shuttle valve replacement on March 31, 2017

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 12 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity. The inspectors reviewed these post-maintenance tests to determine if the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, and reviewed test data to verify quality control hold points were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Unit 1 diesel fire pump following air start modifications on January 12, 2017
- Unit 2 Division III EDG jacket water heat exchanger cleaning and inspection, service water check valves 2SWP*V259 and 2SWP*V260 cleaning and inspection, and Woodward governor replacement on January 24, 2017
- Unit 1 intermediate range monitor/source range monitor drive motor contactor maintenance on March 9, 2017
- Unit 2 Division I EDG after voltage regulator replacement on March 10, 2017
- Unit 1 stroke time testing for hardened containment vent system AOVs IV-201.13-71 and IV-201.13-74 following installation on March 12, 2017
- Unit 1 emergency relief valve (ERV) 122 pilot valve cycling following replacement of the ERV on March 28, 2017
- Unit 1 open phase modification functional test for reserve station service transformer XF-101S and 115kV line 4 on March 29, 2017
- Unit 1 reactor shutdown cooling system outboard isolation check valve 38-12 following corrective maintenance on March 29, 2017
- Unit 1 4.16KV powerboard 103 following planned maintenance on March 29, 2017
- Unit 1 automatic depressurization system operability test following ERV maintenance on March 30, 2017
- Unit 1 liquid poison system 12 squib valve testing prior to replacement on March 31, 2017
- Unit 1 control rod drive system containment isolation check valve CKV-44.3-12 following unplanned maintenance to restore valve to original design on March 28, 2017

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 maintenance and refueling outage, conducted March 20 through April 4, 2017. The inspectors reviewed Exelon's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Plant cooldown activities on March 20, 2017
- Drywell work activities performed on March 21, 2017
- Fuel moves conducted on March 28, 2017
- Impact of outage work on the ability of operations to operate the spent fuel pool cooling system
- Activities that could affect reactivity
- Configuration management including maintenance of defense-in-depth
- Monitoring of decay heat removal requirements
- Identification and resolution of problems related to refueling outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 9 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant structures, systems, and components to assess whether test results satisfied technical specifications, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- Unit 2 standby liquid control pump, check valve, relief valve operability test and ASME XI pressure test on January 31, 2017 (inservice test (IST))
- Unit 1 EDG 103 and PB 103 operability test on February 6, 2017
- Unit 2 RCIC pump and valve operability test and system integrity test and ASME XI functional test on February 9, 2017 (IST)
- Unit 2 Division I EDG operability test on February 15, 2017
- Unit 1 diesel generator 102 monthly surveillance test on February 27, 2017
- Unit 1 remote shutdown panel drywell temperature calibration on March 9, 2017

- Unit 2 reactor protection system (RPS) turbine stop valve closure logic, control valve fast closure scram functional tests and turbine valve cycling on March 12, 2017
- Unit 1 DG-102 monthly surveillance test performed on March 18, 2017
- Unit 1 type 'C' containment isolation valve leak rate test N1-ISP-LRT-TYC, for MSIV 01-03, primary containment isolation valve on March 21, 2017 (LLRT)

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)

Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine Exelon emergency preparedness drill at Unit 2 on February 7, 2017, to identify any weaknesses and deficiencies in the classification, notification, and protection action recommendation development activities. The inspectors observed emergency response operations in the simulator and technical support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by Exelon staff in order to evaluate Exelon critique and to verify whether Exelon was properly identifying weaknesses and entering them into the CAP.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety and Occupational Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 6 samples)

a. Inspection Scope

The inspectors reviewed Exelon's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR Part 20, technical specifications, applicable Regulatory Guides (RGs), and the procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators for the occupational exposure cornerstone, radiation protection program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors conducted walk-downs of the facility and reviewed the radiological survey program, air sampling and analysis, continuous air monitor use, recent plant radiation surveys for radiological work activities, and any changes to plant operations since the last inspection to verify survey adequacy of any new radiological hazards for onsite workers or members of the public.

Instructions to Workers

The inspectors reviewed high radiation area (HRA) work permit controls and use, and observed containers of radioactive materials and assessed whether the containers were labeled and controlled in accordance with requirements.

The inspectors reviewed several occurrences where a worker's electronic personal dosimeter alarmed. The inspectors reviewed Exelon's evaluation of the incidents, documentation in the CAP, and whether compensatory dose evaluations were conducted when appropriate. The inspectors verified follow-up investigations of actual radiological conditions for unexpected radiological hazards were performed.

Radiological Hazards Control and Work Coverage

The inspectors evaluated in-plant radiological conditions and performed walkdowns and observation of radiological work activities. The inspectors assessed whether posted surveys, radiation work permits, worker radiological briefings, and radiation protection job coverage; the use of continuous air monitoring, air sampling and engineering controls; and dosimetry monitoring were consistent with the present conditions. The inspectors examined the control of highly activated or contaminated materials stored within the spent fuel pools and the posting and physical controls for selected HRAs, locked high radiation areas, and very high radiation areas (VHRAs) to verify conformance with the occupational performance indicator.

Risk-Significant HRA and VHRA Controls

The inspectors reviewed the procedures and controls for HRAs, VHRAs, and radiological transient areas in the plant.

Radiation Worker Performance and Radiation Protection Technician Proficiency

The inspectors evaluated radiation worker performance with respect to radiation protection work requirements. The inspectors evaluated radiation protection technicians in performance of radiation surveys and in providing radiological job coverage.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring and exposure control (including operating experience) were identified at an appropriate threshold and properly addressed in the CAP.

b. Findings

No findings were identified.

2RS2 Occupational ALARA Planning and Controls (71124.02 – 2 samples)

a. Inspection Scope

The inspectors assessed Exelon's performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements contained in 10 CFR Part 20, applicable RGs, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors conducted a review of NMPNS's collective dose history and trends, ongoing and planned radiological work activities, previous post-outage ALARA reviews, radiological source term history and trends, and ALARA dose estimating and tracking procedures.

Radiological Work Planning

The inspectors selected the following radiological work activities based on exposure significance for review:

- NM-1-17-00506, drywell scaffolding
- NM-1-17-00513, drywell control rod drive activities
- NM-1-17-00518, drywell inservice inspection exams and support
- NM-1-17-00601, reactor building reactor water cleanup system maintenance
- NM-1-17-00901, reactor disassembly/reassembly

For each of these activities, the inspectors reviewed ALARA work activity evaluations, exposure estimates, and exposure reduction requirements.

Source Term Reduction and Control

The inspectors reviewed the current plant radiological source term and historical trend, plans for plant source term reduction, and contingency plans for changes in the source term as the result of changes in plant fuel performance or changes in plant primary chemistry.

The inspectors observed radiological work activities and evaluated the use of shielding and other engineering work controls based on the radiological controls and ALARA plans for those activities.

Radiation Worker Performance

The inspectors observed radiation worker and radiation protection technician performance during radiological work to evaluate worker ALARA performance according to specified work controls and procedures. Workers were interviewed to assess their knowledge and awareness of planned and/or implemented radiological and ALARA work controls.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03 – 2 samples)

a. Inspection Scope

The inspectors reviewed the control of in-plant airborne radioactivity and the use of respiratory protection devices in these areas. The inspectors used the requirements in 10 CFR Part 20, "Standards for Protection Against Radiation," NUREG/CR-0041, "Manual of Respiratory Protection Against Airborne Radioactive Material," RGs, technical specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the UFSAR to identify ventilation and radiation monitoring systems associated with airborne radioactivity controls and respiratory protection equipment staged for emergency use. The inspectors also reviewed respiratory protection program procedures and current performance indicators for unintended internal exposure incidents.

Engineering Controls

The inspectors reviewed operability and use of both permanent and temporary ventilation systems, and the adequacy of airborne radioactivity radiation monitoring in the plant based on location, sensitivity, and alarm set-points.

Use of Respiratory Protection Devices

The inspectors reviewed the adequacy of Exelon's use of respiratory protection devices in the plant to include applicable ALARA evaluations.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were identified at an appropriate threshold and addressed by Exelon's CAP.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04 – 3 samples)

a. Inspection Scope

The inspectors reviewed the monitoring, assessment, and reporting of occupational dose. The inspectors used the requirements in 10 CFR Part 20, RGs, technical

specifications, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors reviewed radiation protection program audits, National Voluntary Laboratory Accreditation Program (NVLAP) dosimetry testing reports, and procedures associated with dosimetry operations.

Source Term Characterization

The inspectors reviewed the plant radiation characterization (including gamma, beta, alpha, and neutron) being monitored.

External Dosimetry

The inspectors reviewed dosimetry NVLAP accreditation, on-site storage of dosimeters, the use of correction factors to align electronic personal dosimeter results with NVLAP dosimetry results, dosimetry occurrence reports, and CAP documents for adverse trends related to external dosimetry.

Special Dosimetric Situations

The inspectors reviewed Exelon's worker notification of the risks of radiation exposure to the embryo/fetus, the dosimetry monitoring program for declared pregnant workers, external dose monitoring of workers in large dose rate gradient environments, and dose assessments performed since the last inspection that used multi-badging, skin dose or neutron dose assessments.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with occupational dose assessment were identified at an appropriate threshold and properly addressed in the CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications (6 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittals for the following Initiating Events cornerstone performance indicators for the period of January 1, 2016, through December 31, 2016:

- Unit 1 and Unit 2 Unplanned Scrams (IE01)
- Unit 1 and Unit 2 Unplanned Power Changes (IE03)
- Unit 1 and Unit 2 Unplanned Scrams with Complications (IE04)

To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors reviewed NMPNS's operator narrative logs, maintenance planning schedules, IRs, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to determine if Exelon entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended condition report screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Exelon performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

No findings were identified.

.2 Annual Sample: Repetitive Unit 1 Diesel Driven Fire Pump (DFP) Low Air Auto Start Failures

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's CAP and maintenance rule evaluations, corrective actions, and action plans to address repetitive failures of the Unit 1 DFP. Specifically, from 2014 to present, there have been at least 12 failures of the DFP low accumulator air pressure auto start feature as documented in numerous IRs listed in the appendix.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon was appropriately identifying,

characterizing, and correcting problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Exelon's CAP and Exelon's maintenance rule program and 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." In addition, the inspectors performed field walkdowns and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

The Unit 1 DFP is a neither safety-related nor technical specification-required equipment. However, the DFP is credited in the station blackout (SBO) coping analysis as a source of makeup water and is listed in the NMPNS Unit 1 emergency operating procedures. Therefore, the DFP is scoped into the maintenance rule under 10 CFR 50.65(b)(2). The DFP is considered a high-risk component in NMPNS's maintenance rule program and is monitored at the component level.

The DFP is required to automatically start on low fire main header pressure and low starting air accumulator pressure. The low starting air auto start is to ensure the DFP is available during a SBO event before air system pressure bleeds off. NMPNS procedure N1-PM-M9, "Monthly Operation of Fire Pumps, Revision 0801," tests the auto start functions of the DFP. Both starting air accumulators must sense low pressure in order to satisfy the starting logic. Therefore, if one instrument fails to generate a low pressure signal, the DFP will not start and the function is lost.

Exelon staff appropriately documented each test failure in both the work order and in an IR. For each IR, the DFP was declared non-functional as appropriate, evaluated to be a maintenance rule functional failure (MRFF), as appropriate, the pressure switches were adjusted, an adverse trend was noted, and a work group evaluation, as required by CAP trending program requirements, was performed. The system exceeded its maintenance rule performance criteria of no greater than two MRFF in a 24-month period and was moved to (a)(1) status via IR 02508957 in June 2015. An action plan was developed and a number of equipment obsolescence issues were identified. Exelon subsequently developed ECP-16-00791 to raise the low start air setpoint and to change the logic so only one low air signal was required to start the DFP. This change would ensure that one instrument failure would not prevent the DFP from meeting its safety function and a failure would no longer be considered a MRFF. Exelon staff appropriate revised the action plan when performance goals were not being met as required by 10 CFR 50.65 (a)(1).

The inspectors determined that although DFP performance issues have not been fully resolved, Exelon is continuing to evaluate and monitor the issue and has developed reasonable corrective actions. Exelon is using the correct processes under the CAP and maintenance rule programs to improve and monitor DFP performance, and compensatory actions have been developed to allow operators time to take manual actions to start the DFP when needed. As a result, no violation of NRC requirements was identified.

.3 Annual Sample: Repetitive Unit 1 UPS Failures Due to Constant Voltage Transformer Capacitor (C-805) Failures

a. Inspection Scope

The inspectors performed an in-depth review of repetitive failures of NMPNS Unit 1's vital 120 VAC UPSs. Specifically, since 2006, seven failures of UPS 162 A and B, and 172 A and B have occurred due to the failure of a common component, constant voltage transformer capacitor C-805. In four cases, the loss of the UPS resulted in a loss of the associated 120 VAC RPS and instrument buses, half scrams in RPS, and system isolations and initiations. In one case, the loss of the UPS also resulted in the isolation of both trains of ECs and a loss of their safety functions.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon appropriately identified, characterized, and corrected problems associated with this issue and whether the planned or completed corrective actions were appropriate. The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR Part 50, Appendix B. In addition, the inspectors performed field walkdowns and interviewed engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Assessments and Observations

In 1993, NMPNS installed four UPSs to replace the original motor generator sets to supply conditioned 120 VAC to the two RPS buses and two 120 VAC Instrument buses. The UPSs are supplied from a vital 480 VAC bus, stepped down to 120 VAC via a transformer and rectified into direct current (DC). The rectified DC signal is compared with the DC signal from the safety-related station battery and the higher voltage signal is passed. The signal is then converted back to AC via an inverter to give a conditioned 120 VAC waveform. At the output of the inverter, power goes through a static switch, which can supply the loads via the UPS or non-conditioned 120 VAC (bypass/maintenance power supply). Part of the static switch module includes a bank of 32 capacitors (C-805s) in parallel.

The UPS vendor manual recommended replacing capacitors every 10 years and NMPNS developed a preventive maintenance (PM) task to accomplish this. However, in 2003 when the PM was first due, the UPS vendor no longer maintained a stock of C-805 capacitors due to obsolescence. NMPNS elected to procure and commercially dedicate an equivalent capacitor from a different manufacturer. Starting in 2006, NMPNS Unit 1 began experiencing UPS failures due to internal shorting of a C-805 capacitor. A total of seven failures occurred in 2006, 2008 (two events), 2013, 2014, 2016, and 2017. NMPNS entered each failure into its CAP and in 2008, identified an adverse trend, conducted an ACE, and sent two failed capacitors to the UPS vendor and capacitor supplier for failure analysis (CR-2008-007092). CR-2008-007092 also determined that maintenance rule performance criteria had been exceeded and recommended moving the system to (a)(1) status, which it was. Although the capacitors were manufactured in 2003 and had been in service for under 5 years, the ACE determined the apparent cause to be component aging. A failure modes and effects analysis ruled out heat related degradation. The failure analysis from the UPS vendor and capacitor manufacturer did not determine the cause; however, the UPS vendor did inform NMPNS

that it now had a more robust capacitor as a replacement for the original part. The part was designed for this application, was dedicated at the factory for safety-related service, had a service life of 10 years with a 99.9 percent survival rate at rate temperature and voltage, and was rated to 90°C. A corrective action was developed to replace the C-805 with the UPS vendor recommended model. However, this corrective action was never implemented.

Following the 2016 failure, IR 02698532 recommended replacing the C-805 capacitors with the UPS vendor recommended model and this plan was approved, but implementation had not taken place prior to the January 2017 failure. In 2017, Exelon sent the failed capacitor to a laboratory for failure analysis. The analysis determined that the capacitor failed due to chronic overheating above 70°C. This resulted in degradation of the dielectric material and eventually failure due to carbonization to casing internal short. Corrective actions including expediting the replacement of the C-805 capacitors, scheduled to be completed by June 2017. One UPS in each pair had the new capacitors as of February 2017. The ACE conducted following the 2017 failure determined that the commercially dedicated replacement for C-805 that NMPNS began to install in 2003, was not rated for the actual inservice temperatures. The inspectors concluded the 2008 ACE was inadequate and corrective actions to address the stated cause were also not completed.

c. Findings

Introduction. The inspectors documented a self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Actions,” for the failure to identify and correct a non-conformance, specifically an inadequate capacitor, in the safety-related UPSs. Between 2008 and 2017, this non-conformance lead to multiple component failures, loss of vital power supplies, plant transients, and in one case loss of the emergency condenser safety function. Specifically, an equivalent capacitor part (C-805) was not rated for the normal service temperature for the application. This resulted in chronic overheating, reduction of service life, and in seven cases failures (internal shorts of C-805) which resulted in the loss of the associated safety-related UPS. Exelon entered each failure into the CAP, conducted an ACE following the 2008, 2016, and 2017 failures, and developed corrective actions to replace the underrated capacitors.

Description. In 1993, NMPNS Unit 1 replaced motor generator sets with UPSs 162 A and B and UPSs 172 A and B to supply conditioned 120 VAC power to the RPS and instrument buses. The UPS vendor’s technical manual recommended replacing UPS capacitors every 10 years. In 2003 when this PM task was to be performed, NMPNS staff discovered that the original models of C-805 was obsolete and no longer available through the UPS vendor and no equivalent part was specified at the time. NMPNS staff identified a commercial grade capacitor used for a similar application, conducted an equipment equivalency review and commercially dedicated the capacitors for use in this safety-related application. The UPS vendor technical manual did not have any specified temperature information for individual components, only a general specification for ambient temperature from 0-50°C. The staff used engineering judgment to conclude that a temperature rating of 70°C would provide ample margin over the maximum 50°C ambient which itself was conservative.

However, the component needs to be rated for the temperatures it will see in service. This includes not only ambient temperature but also heat generated by the component

and other components around it. There are 32 C-805 capacitors connected in parallel with tight clearances between capacitors minimizing cooling air flow. Thus the temperature a capacitor located in the middle of the bank is exposed to is significantly higher than ambient temperature. Overheating of the capacitor results in significant shortening of service life due to thermal degradation of the dielectric material, resulting in changes in the capacitance of the capacitor and leading to carbonization and a short to the casing. The original capacitors had no failures during their 10 years in service. In 2006 and twice in 2008, there were UPS failures due to internal shorting of a C-805 capacitor. Following the third failure, NMPNS staff sent the failed capacitors to the UPS vendor and to the capacitor manufacturer for failure analysis, and conducted an ACE (CR-2008-007092). The ACE concluded the failure was due to component aging. A failure modes and effects analysis ruled out heat-related degradation as a potential cause.

The manufacturer's lab report did not identify a cause for the failure but stated that there were no other reported problems with this batch of capacitors, and that the capacitors had a 94 percent survival rate for their rated service life of 60,000 hours (7.8 years) at rated temperature and voltage. (Note: the required service life was 10 years.) The manufacturer concluded three failures out of 128 capacitors was within the service objective and no corrective actions were necessary. However, the UPS vendor identified that the failed part was not from a vendor-approved manufacturer and that they now had a replacement part for the obsolete C-805 capacitor. This part was specifically designed for this application, was dedicated by the vendor at its factory, had a service life of 10 years and 99.9 percent survival rate at rated voltage and temperature, and was rated to 90°C. One of the corrective actions from CR-2008-007092 was to replace the commercially dedicated capacitors with the UPS vendor-recommended model because it was more robust and dedicated by the vendor at the factory.

However, this corrective action was subsequently cancelled. The basis for this decision was based upon a review of the capacitor manufacturer's component curve life verse temperature. Using a conservative estimate of 54°C internal temperature and significantly lower than rated voltage (120 VAC vs 1000 VAC), NMPNS staff concluded that the component service life should be at least 13.7 years under those conditions and replacement was not necessary (ACR 08-5749). This evaluation did not explain the empirical data based upon three actual failures in under 5 years of service life, which was a failure rate that was not acceptable for safety-related applications. Additionally, the manufacturer's stated survival rate for the component at 94 percent called into question whether the reliability was appropriate for a safety-related application. Finally, the evaluation used a questionable assumption on internal temperature based solely on engineering judgement. Given that the UPS vendor recommended replacement capacitor was specifically designed for this application and rated for 90°C, the assumption of internal temperature of 54°C should have been questioned.

As a result, four additional failures occurred in 2013, 2014, 2016, and January 2017. The failures in 2016 and 2017 occurred 1.5 to 2.5 years after the capacitors were replaced during the 10-year PM (completed in 2014 and 2015). Following the 2016 failure, IR 02698532 recommended replacing the C-805 capacitors with the UPS vendor recommended model. Although this plan was approved, implementation had not taken place prior to the January 2017 failure. In 2017, Exelon sent the failed capacitor to a laboratory for failure analysis. The analysis determined that the capacitors failed due to chronic overheating above 70°C.

The 2016 failure resulted in the loss of UPS 162 A, the loss of the 11 RPS and instrument buses, a half scram, system isolation of the reactor cleanup system, initiation of control room emergency ventilation, and the isolation of both trains of ECs due to a spurious high steam flow isolation signal produced by voltage oscillation prior to UPS fuses blowing. Operators reduced power per procedure for the loss of reactor water cleanup and subsequently had to lower power to 90 percent due to indications of a turbine bypass valve coming open during the transient recovery. Exelon made Event Notification 52133, and subsequently submitted Licensee Event Report 05000220- 2016- 002 for an event which could have prevented the fulfillment of a safety function designed to shut down the reactor and maintain it in a safe shutdown condition.

Analysis. The inspectors determined that Exelon's failure to identify and correct the fact that a component in a safety-related application was not rated for the service environment that it was subject to is a performance deficiency and was reasonably within Exelon's ability to foresee and correct and should have been prevented. The issue was evaluated using IMC 0612, Appendix B, "Issue Screening," and IMC 0612, Appendix E, "Example of Minor Issues." This issue is more than minor because it affects the equipment performance attribute of the Initiating Events cornerstone and adversely affects the cornerstone objective since the failure resulted in plant transients and in one case the unplanned loss of a safety function. This is consistent with examples 3.b and 4.b of 10 CFR Part 50, Appendix E, because a design or calculation error is more than minor if it adversely affects system operation or results in a plant trip or transient. Using IMC 0609, Attachment 4, "Initial Characterization of Findings," and the Initiating Events screening questions in IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," the inspectors answered question C 'yes'. Support System Initiators: Did the finding involve the complete or partial loss of a support system that contributes to the likelihood of, or cause, an initiating event and affected mitigation equipment? Examples of support system initiators are loss of offsite power, loss of a DC bus, loss of an AC bus, loss of component cooling water, loss of service water, and loss of instrument air. For the July 2016 failure, the loss of the 162 B UPS resulted in the loss of a vital AC bus (a support system) and resulted in loss of both trains of a mitigating system credited for bringing and maintaining the plant in safe shutdown (emergency condenser). Therefore, a detailed risk assessment was required. Using the NMPNS Unit 1 SPAR Model Version: 8.21, Model Date: January 28, 2010, the SRAs ran a zero maintenance condition assessment with basic events for isolation condenser MOV 39-09R and isolation condenser MOV 39-10R, normally closed valves; failed for a duration of one hour. The results were a ΔCDP of 1.37E-08. The dominant risk sequences involved loss of feedwater and loss of offsite power. As a result, the finding is of very low safety significance (Green).

The performance deficiency for this finding occurred in 2008. Because the performance deficiency occurred greater than 3 years ago and is not indicative of current performance based upon the corrective actions taken following the 2016 failure, there is no cross-cutting aspect assigned to this finding.

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, states, in part, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected." Contrary to the above, from 2008 until 2017, NMPNS failed to identify and correct a non-conforming condition which

resulted in several failures of safety-related equipment. Because the violation was of very low safety significance (Green) and was entered into Exelon's CAP as IR 03994746, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000220/2017001-02, Failure to Identify and Correct a Non-Conforming Condition in Safety Related UPSs)**

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 2 samples)

Plant Events

a. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the events to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance.

- Unit 2 feedwater level control valve lockup following the loss of 2NJS-US1, non-safety-related 600 VAC power supply, on March 6, 2017
- Unit 1 manual scram due to mechanical pressure regulator oscillations while performing turbine overspeed testing to begin refueling outage on March 20, 2017

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On April 19, 2017, the inspectors presented the inspection results to Mr. Peter Orphanos, Site Vice President, and other members of the NMPNS staff. The inspectors verified that no propriety information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

P. Orphanos, Site Vice President
R. Kreider, Plant Manager
M. Busch, Director Site Operations
J. Gerber, Manager Site Chemistry, Environment and Radwaste
S. Homoki, Senior Engineer
P. Kehoe, Engineering Analyst
M. Khan, Senior Manager Engineering
B. Knowlton, Site Engineer
B. Koscielniak, Manager Engineering
K. Kristensen, Regulatory Principle Engineer
M. Kunzwiler, Manager Site Security
D. Moore, Manager Regulatory Assurance
R. Pritchard, Regulatory Assurance
A. Sterio, Director Site Engineering
D. Tulowiecki, Manager Site Radiation Protection

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000220/2017001-01	NCV	Deficient Design Control of Outboard MSIV Pilot Valve Instrument Air Supply)
05000220/2017001-02	NCV	Failure to Identify and Correct a Non- Conforming Condition in Safety-Related UPSs

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
N1-OP-19, Circulating Water System, Revision 03600
N2-MPM-Gen-A016, Probable Maximum Precipitation Flood Berm and 10,000 Year Culvert Inspection, Revision 00301
N2-MSP-GEN-V001, Revetment Ditch Structure Inspection, Revision 00501
N1-OP-64, Meteorological Monitoring, Revision 1500

N2-OP-11, SW System, Revision 01200
N2-OP-102, Meteorological Monitoring, Revision 02000

Issue Reports

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02077619	03983215* (NRC identified)		

Work Order
C92122288

Preventive Maintenance Task
N2083303

Section 1R04: Equipment Alignment

Procedures
N1-EPM-GEN-296, 345KV Backfeed and Restoration in Conjunction with Main Transformer, Station Transformer and 24KV Isophase Bus Duct Inspections and Testing, Revision 01300
N1-OP-6, Fuel Pool Filtering and Cooling System, Revision 02901
N1-OP-33A, 115KV System, Revision 03000
N1-OP-49, Control Room Ventilation, Revision 03500
N1-OP-47A, 125 VDC Power System, Revision 03100
N1-SOP-47A.1, Loss of DC Power, Revision 00300
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C93000744

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Section 1R05: Fire Protection

Procedures
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N1-FSS-F001, Fire PRA Detailed Notebook Fire Modeling, Revision 3
N1-OP-4, Shutdown Cooling System, Revision 04600

N1-PFP-0101, Unit 1 Pre-Fire Plans, Revision 00500
N1-SOP-20.1, Instrument Air Failure, Revision 00500
N2-FPI-PFP-0201, Unit 2 Pre-Fire Plans, Revision 05
OP-AA-201-003, Fire Drill Performance, Revision 16

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C-18011-C, Instrument Air System P&ID, Revision 49
C-18018-C, Sheet 1 Reactor Shutdown Cooling, Revision 32
C-18022-C, Sheet 2, Reactor Building Closed Loop Cooling System, Revision 55
C-18041-C, Sheet 2, Sampling Points, Liquids – Shutdown Cooling, Fuel Pool, Cleanup and Liquid Poison Systems, Revision 26

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UFSAR Section X.A, Reactor Shutdown Cooling System, Revision 17
Unit 2 USAR, Revision 22
NMPNS Unit 1 NFPA 805 Design Criteria, Revision 1

Section 1R06: Flood Protection Measures

Issue Report
03972605

Drawing
EB-22B, Fire Protection Arrangement Unit 2 Station Buildings Plan EL 214'-0" and 215'-0" (SH-2), Revision 13

Miscellaneous
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Section 1R07: Heat Sink Performance

Procedure
ER-AA-335-038, Examination of Non-Magnetic Heat Exchanger Tubing, Revision 3

Drawing
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Issue Reports
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Work Orders
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C92915485

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MS-4378, Determination of Min Wall Thickness Requirements for 2EGS*E1C HTX Tubing, Revision 0
NC-002-1631, Eddy Current Inspection Report for Diesel Jacket Water Cooler – 1C (2EGS*E1C), January 25, 2017

Section 1R08: Inservice Inspection

Procedures
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ER-AA-330-009, ASME Section XI Repair/Replacement Program, Revision 13
ER-AA-335-018, Visual Examination of ASME IWE Class MC and Metallic Liners of IWL Class CC Components, Revision 12
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SI-UT-209, Procedure for Encoded, Phased Array Ultrasonic Examination of Dissimilar Metal Piping Welds, Revision 0

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Work Order
C92294852

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Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance

Procedures
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N1-OP-32, Generator, Revision 03700
N1-OP-33C, Main Transformer XF-TB01, Revision 00600
N1-OP-43C, Plant Shutdown, Revision 02200
N1-PM-V7, Turbine Trip Tests, Revision 00700
N2-SOP-70, Major Grid Disturbances, Revision 00300
N2-OP-37, Reactor Water Cleanup System, Revision 02900
N2-OSP-EGS-M@002, Diesel Generator and Diesel Air Start Valve Operability Test – Division III, Revision 01900
N2-ARP-851300, 2CEC*PNL851 Series 300 Alarm Response Procedures, Revision 00300
N2-SOP-19, Loss of Instrument Air, Revision 00600
N2-SOP-34, Stuck Open Safety Relief Valve, Revision 00401
N2-SOP-101C, Reactor Scram, Revision 01200
N2-EOP-RPV, RPV Control – Flowchart, Revision 01400
N2-EOP-C4, RPV Flooding – Flowchart, Revision 01500
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C92768723

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Procedures
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ER-AA-310-1001, Maintenance Rule Scoping, Revision 4
N1-FST-FPP-C005, Ventilation/Smoke Purge System, Revision 00700
N1-IGN-F001, NMPNS1 Fire PRA Notebook, Ignition Frequency Notebook, Revision 2
N1-PM-M9, Monthly Operation of Fire Pumps, Revision 0801
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Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
N1-OP-16, Feedwater System Booster Pump to Reactor, Revision 06401
N1-SOP-33A.1, Loss of 115kV, Revision 00600
N2-OP-71C, 600V AC Power Distribution, Revision 00303
N2-OSP-SWP-Q@003, Control Building Chiller Condensing Water Pump Operability Test, Revision 00500
N2-SOP-06, Feedwater Failures, Revision 01101
OP-AA-108-117, Protected Equipment Program, Revision 4
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Drawing
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Section 1R15: Operability Determinations and Functionality Assessments

Procedures
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N1-MPM-113-921, Instrument Air Sampling and Analysis, Revision 00200
N1-ST-V8, MS, FW/HPCI, SDC, EC, RX Head Vent Valve Cold s/D Operability Test, Revision 01000
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Unit 2 Division 2 EDG Baseline Data and PMT Data Plots, March 18, 2017

Section 1R18: Plant Modifications

Procedures
LS-AA-104-1001, 50.59 Review Coversheet Form, Revision 4
LS-AA-104-1003, 50.59 Screening Form, Revision 4
N1-ST-Q26, Feedwater and Main Steam Line Power Operated Isolation Valves Partial Exercise Test and Associated Functional Testing of Reactor Protection System Trip Logic, Revision 01600

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C-23292-C, Reactor Building, Containment Sampling System, Hydrogen Oxygen Monitoring System 11 and 12, Plan Elevation 237'-0", Elevation 261, Revision 12
C-18474-C, Reactor Building Instrument Room El. 237'-0" Instrument Piping Sections, Revision 12
C-18178-C, Reactor Building Instrument and Metering Piping Torus Level Plan El. 198'-0" w/Details, Revision 9
F-45940-C, Hardened Containment Vent Single Line Diagram, Revision 0

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01700518	02551180	02595188	03987176
03987863	03987957		

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C93376356

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125VDCSCES-FLEX-BDB, Fukushima/NFPA-805 125 VDC Portable Battery Charger Equipment Sizing
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ECP-15-000581, Unit 1 Main Steam Pilot Valve Replacement, Revision 0
ECP-15-000581-103-02, Design Consideration Summary, Revision 0000
ECP-13-000086, NMP1 Reliable Hardened Containment Vent System, Revision 0003
ECP-13-000086-103, Design Consideration Summary, Revision 0003
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Section 1R19: Post-Maintenance Testing

Procedures
HU-AA-101, Human Performance Tools and Verification Practices, Revision 9
MA-AA-716-234, FIN Team Process, Revision 12
N1-EPM-GEN-124, Electromatic Solenoid Inspection, Revision 00700
N1-ISP-066-003, Auto Depressurization System Operability Test, Revision 00200
N1-ISP-LRT-TYC, Type 'C' Containment Isolation Valve Leak Rate Test, Revision 01300
N1-MMP-GEN-861, Diesel Generator Woodward Governor Drive Assembly Maintenance, Revision 00501
N1-PM-M9, Monthly Operation of Fire Pumps, Revision 01000
N1-RCSP-GEN-335, Functional Test of 4.16KV Emergency Bus Loss and Degraded Voltage Relays, Revision 00
N1-ST-C13, Reactor Shutdown Cooling System Valve Leakage Test, Revision 01700
N1-ST-R11, Valve Remote Position Indicator Verification, Revision 01800
N2-MSP-EGS-R002, Diesel Generator Inspection Division III (2EGS*EG2), Revision 01700
OP-AA-116-101, Equipment Labeling, Revision 2

Drawings
C34857C, Elementary Wiring Diagram, Auxiliary Control Cabinet 1S79, Alarm Relay 74A, Revision 7
CBV-M5-30-0001, Sheet 1, 3-Inch Reduced Port Check Valve Carbon Steel Construction Butt Welded X Flanged End ANSI Class 900, Revision 1
F-46100-C, Reactor Building Hardened Vent System Isometric, Revision 0

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01705966	02475702	03962041	03977070
03977072	03977074	03988075	03990241
03997443*			

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C92307302	C92711991	C92915485	C93013620
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Miscellaneous
ECP-13-000086-107-01, Attachment 1, Configuration Change and Acceptance Criteria
ECP-14-000340, Unit 1 Open Phase Relaying, Revision 0003

Section 1R20: Refueling and Other Outage Activities

Procedures
GAP-HSC-02, System Aging Inspection and Cleanliness Controls, Revision 02000
MA-AA-716-008-1008, Refuel Services FME Plan, Revision 12
N1-FHP-9R, Movement of Fuel Into the Spent Fuel Pool During Whole Core Reload, Revision 00200
N1-FHP-25, General Description of Fuel Moves, Revision 02600
N1-FHP-27C, Core Shuffle, Revision 01100
N1-OP-43C, Plant Shutdown, Revision 02200
S-MMP-FHP-100, Receiving, Inspection, and Storage of New Fuel, Revision 01200

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C93151849

Section 1R22: Surveillance Testing

Procedures
N1-ESP-042-360, Liquid Poison System Squib Valves Test Firing and Inspection, Revision 00600
N1-ISP-201-043, Drywell Ambient Temperature Channel Calibration (Shutdown Panel), Revision 00501
N1-ISP-LRT-TYC, Type "C" Containment Isolation Valve Leak Rate Test, Revision 01300
N1-ST-M4, EDG 102 and Power Board 102 Operability Test, Revision 02000
N1-ST-M4A, EDG 102 and Power Board 102 Functionality Test, Revision 02000
N1-ST-M4B, EDG 103 and PB 103 Operability Test, Revision 01800
N1-ST-R2B, LOCA and EDG 103 Simulated Auto Initiation, Revision 00100
N2-OP-31, RHR System, Revision 03200
N2-OSP-EGS-M@001, Diesel Generator and Diesel Air Start Valve Operability Test, Division I and II, Revision 01300
N2-OSP-ICS-Q@002, RCIC Pump and Valve Operability Test and System Integrity Test and ASME XI Functional Test, Revision 01301
N2-OSP-RPS-Q001, RPS Turbine Stop Valve Closure Logic, Control Valve Fast Closure Scram Functional Tests and Turbine Valve Cycling, Revision 00500
N2-OSP-SLS-Q001, Standby Liquid Control Pump, Check Valve, Relief Valve Operability Test and ASME XI Pressure Test, Revision 01600

Drawings
0007.241-001-004, Sheet 4, Elementary Diagram RHR, Revision 4
0007.241-001-009, Sheet 9, Elementary Diagram RHR System, Revision 3
0007.241-001-017, Sheet 17, Elementary Diagram RHR System, Revision 2
0007.241-001-023, Sheet 23, Elementary Diagram RHR System, Revision 3
12177-EJ-ECCS-A-0, Emergency Cooling Systems Flow Diagram, Revision 0
ESK-6RHS27, AC Elementary Diagram 600V MCC Circuit RHR Motor Operated Valves, Revision 6
PID-36A, P&ID Standby Liquid Control, Revision 25

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03974806
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C93067618
C93068857
C93357915

Miscellaneous
Diesel Engine Report Division I, February 15, 2017, 14:39:39
ECP-15-000609-CN-250 TL2RHS-014-001-03.00, Test Loop Diagram, 2RHS*P1C Discharge Flow, 2RHS*FT86C, Revision 1
N2B35000PUMP002, Technical Manual for Vertical RHR Pumps, Revision 4

Section 1EP6: Drill Evaluation

Procedures
EP-AA-112-200-F-51, Plant Status Report (CNG), Revision A
EP-CE-114-100-F-05, NMP Notification Fact Sheet, Part 1, Revision C
EPIP-EPP-02-EAL, Emergency Action Level Matrix Unit 2, Revision 22

Section 2RS1: Radiological Hazard Assessment and Exposure Controls

Procedures
RP-AA-376, Radiological postings, Labeling, and Markings, Revision 9
RP-AA-376-1001, Radiological postings, Labeling, and Marking Standard, Revision 14
RP-AA-401-1002, Radiological Risk Management, Revision 10
RP-AA-401-1004, Controls for the Draining and Decon of BWR/PWR Reactor Cavity and Associated Pits, Revision 3
RP-AA-460, Controls for High and Locked High Radiation Areas, Revision 29
RP-AA-460-001, Controls for Very High Radiation Areas, Revision 6
RP-AA-460-002, Additional High Radiation Exposure Control, Revision 3
RP-AA-503, Unconditional Release Survey Method, Revision 14
RP-AA-503-F-01, Unconditional Release Instructions Using the Small Articles Monitor (SAM) for Personal Item Used in the Radiologically Controlled Area (RCA) and in Contaminated Area, Revision 4

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02716748 02723282 02723359 02727734
03945336

Surveys

Map No.	Survey No.	Date	Time	Location
021	1RB-25584 (Assembled)	2/14/2017	1500	Unit 1 Reactor Building 340’ Refuel Floor
021	1RB-25587 (Assembled)	3/8/2017	1230	Unit 1 Reactor Building 340’ Refuel Floor
022	1RB-25582	1/31/2017	0910	Unit 1 Reactor Building 318’ Open Area
022	1RB-25588	3/18/2017	0700	Unit 1 Reactor Building 318’ Open Area
023	1RB-25586	2/28/2017	0900	Unit 1 Reactor Building 298’ Open Area
023	1RB-25587	3/8/2017	1000	Unit 1 Reactor Building 298’ Open Area

023a	1RB-25581	1/28/2017	1330	Unit 1 Reactor Building 298' ECIV Supply Room
023a	1RB-25587	3/8/2017	1030	Unit 1 Reactor Building 298' ECIV Supply Room
024	1RB-25578	1/7/2016	0700	Unit 1 Reactor Building 281' Open Area
024	1RB-25582	1/31/2017	1130	Unit 1 Reactor Building 281' Open Area
025	1RB-25584	2/13/2017	1430	Unit 1 Reactor Building 261' Open Area
027a	1RB-25581	1/23/2017	0830	Unit 1 Reactor Building 237' Ease Hall
027a	1RB-25585	2/22/2017	1330	Unit 1 Reactor Building 237' East Hall
027b	1RB-25581	1/23/2017	0800	Unit 1 Reactor Building 237' North Hall
027b	1RB-25585	2/22/2017	1300	Unit 1 Reactor Building 237' North Hall
027c	1RB-25585	2/22/2017	1230	Unit 1 Reactor Building 237' West Hall
027c	1RB-25589	3/20/2017	0300	Unit 1 Reactor Building 237' West Hall
028c	1RB-25584	2/17/2017	1330	Unit 1 Reactor Building 198' & 218' NW Corner
028c	1RB-25587	3/10/2017	0930	Unit 1 Reactor Building 198' & 218' NW Corner
028d	1RB-25578	1/3/2017	0900	Unit 1 Reactor Building 198' & 218' NE Corner
028d	1RB-25580	1/21/2017	0030	Unit 1 Reactor Building 198' & 218' NE Corner
028e	1RB-25574	12/7/2016	2120	Unit 1 Reactor Building 198' & 218' SE Corner
028e	1RB-25589	3/20/2016	1030	Unit 1 Reactor Building 198' & 218' SE Corner
028f	1RB-25584	2/17/2017	1115	Unit 1 Reactor Building 198' & 218' SW Corner
028f	1RB-25574	12/7/2016	2110	Unit 1 Reactor Building 198' & 218' SW Corner
027m	1RB-25581	1/23/2017	0900	Unit 1 Reactor Building 237' Hydraulic Control Unit Area
072	1DW-6169	3/20/2017	0900	Unit 1 Dry Well 305' Open Area
073	1DW-6168	3/20/2017	0830	Unit 1 Dry Well 295' Open Area
074	1DW-6168	3/20/2017	0420	Unit 1 Dry Well 259' Open Area
075a	1DW-6169	3/20/2017	1330	Unit 1 Dry Well 243' Under Vessel
076	1DW-6169	3/20/2017	0420	Unit 1 Dry Well 237' Open Area
077	1DW-6169	3/20/2017	0410	Unit 1 Dry Well 225' Open Area

Section 2RS2: Occupational ALARA Planning and Controls

Procedures

RP-AA-400, ALARA Program, Revision 14
RP-AA-400-1001, Establishing Collective Radiation Exposure Annual Business Plan Goals, Revision 4
RP-AA-400-1002, Dose Equalization, Revision 2
RP-AA-400-1003, Work Group Radiological Excellence Plans, Revision 2
RP-AA-400-1004, Emergent Dose Control and Authorization, Revision 8
RP-AA-400-1005, ALARA Suggestion Program, Revision 2
RP-AA-400-1006, Outage Exposure Estimating and Tracking, Revision 5
RP-AA-400-1007, Elevated Dose Rate Response Planning, Revision 2
RP-AA-400-1008, Exposure Goal Recovery Plans, Revision 2

RP-AA-401, Operational ALARA Planning and Controls, Revision 22
RP-AA-401-1001, Dose Reporting Guidance, Revision 7
RP-AA-401-1002, Radiological Risk Management, Revision 10
RP-AA-402, Radiation Protection Dose Excellence Planning Process, Revision 7

RWP/ALARA Plans:

RWP #	Description	ALARA #
NM-1-17-00506	Dry Well Scaffolding	2017-1-006
NM-1-17-00513	Dry Well Control Rod Drive Activities	2017-1-012
NM-1-17-00518	Dry Well Inservice Inspection Exams and Support	2017-1-018
NM-1-17-00601	Reactor Building Reactor Water Clean Up System Maintenance	2017-1-032
NM-1-17-00901	Reactor Disassembly/Reassembly	2017-1-026

Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation

Procedures
RP-AA-300-1001, Discrete Radioactive Particle Controls, Revision 5
RP-AA-300-1002, Electron Capture Isotope Control, Revision 6
RP-AA-301, Radiological Air Sampling Program, Revision 10
RP-AA-302, Determination of Alpha Levels and Monitoring, Revision 8
RP-AA-825, Maintenance, Care, and Inspection of Respiratory Protective Equipment, Revision 8
RP-NM-440-001, Recharge of Breathing Air Cylinders Using Ingersoll-Rand Recharging System, Revision 0
RP-NM-825-1002, Scott Self-Contained Breathing Apparatus Inspection, Revision 0
RP-NM-825-1035-F-01, Respiratory Equipment Monthly Inventory, Revision 00

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02691741
02719310

Section 2RS4: Occupational Dose Assessment

Procedures
RP-AA-203, Exposure Control and Authorization, Revision 5
RP-AA-203-1001, Personnel Exposure Investigations, Revision 9
RP-AA-210, Dosimetry Issue, Usage, and Control, Revision 27
RP-AA-210-1001, Dosimetry Logs and Forms, Revision 10
RP-AA-211, Personnel Dosimetry Performance Verification, Revision 12
RP-AA-216, Dose Assessment for Contaminated Wounds, Revision 0
RP-AA-220, Bioassay Program, Revision 12
RP-AA-220-1002, Bioassay Program Review, Revision 0

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02723529
03966081
03988882

Section 4OA1: Performance Indicator Verification

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02726204
03944724
03951525

Miscellaneous
LER 220-2017-001
NEI-99-02, Regulatory Assessment Performance Indicator Guideline, Revision 7

Section 4OA2: Problem Identification and Resolution

Procedures
N1-IGN-F001, NMP1 Fire PRA Notebook, Ignition Frequency Notebook, Revision 2
N1-PM-M9, Monthly Operation of Fire Pumps, Revision 0801
N1-SOP-33A.2, Station Blackout/ELAP, Revision 01400

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02048261	02048262	02493185	02494255
02508957	02508957	02596315	02596320
02623596	02680464	02687391	02687404
02687714	02690048	02698136	02698532
02719543	02719543	02722348	03953093
03955901	03962041	03963439	03970192

Condition Report
CR-2008-007092

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10 CFR 50.59 Review for DFP ECP 16-000791 Revision 000
ACR 08-05749, UPS 172B Failure/Troubleshooting and Repair Summary, August 26, 2008
Calculation S0-SBO-M016, NMPNS Unit 1 SBO, Revision 2
Design Basis Document-0805, Transition to 10 CFR 48(c)/ NFPA-805 Transition Report, June 2012
ECP-16-000791, Diesel Driven Fire Pump Air Start –Setpoint and Logic Change, Revision 000
ECP-17-000058, UPS 162 A&B and 172 A&B Undervoltage Setpoint Change, Revision 000
Hardware Equivalency Evaluation EE006600 CT N1-03-155, July 3, 2003
Maintenance Rule Basis Document
NMPNS 1 USFSAR Revision 20
NMPNS Plan of the Day, February 9, 2017
NRC Inspection Report 50-220 and 50 -410/2015004
Procurement Requirement Evaluation Form 02769, Film/Oil Capacitors, Revision 14, November 20, 2015

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures
N1-PM-V7, Turbine Trip Tests, Revision 00700
N1-SOP-31.2, Pressure Regulator Malfunctions, Revision 00300
N2-OP-71C, 600V AC Power Distribution, Revision 00303
N2-SOP-06, Feedwater Failures, Revision 01101
WC-AA-101-1006, On-Line Risk Management and Assessment, Revision 2
WC-AA-2000, Emergent Issue Response, Revision 7

Drawings
DWG 186R999, Turbine Control Diagram, Revision 11
EE-001BA, One Line Diagram Normal Bus Power Distribution, Revision 15

Issue Reports
03982135
03987066

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C91928414
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C93614515

LIST OF ACRONYMS

10 CFR	Title 10 of the *Code of Federal Regulations*
AC	alternating current
ACE	apparent cause evaluation
AOV	air operated valve
ASME	American Society of Mechanical Engineers
ALARA	as low as reasonably achievable
CAP	corrective action program
DC	direct current
DFP	diesel fire pump
EC	emergency condenser
EDG	emergency diesel generator
ERV	emergency relief valve
HRA	high radiation area
IR	issue report
ISI	inservice inspection
IST	inservice test
IMC	Inspection Manual Chapter
MOV	motor operated valve
MRFF	maintenance rule functional failure
MSIV	main steam isolation valve
NDE	non-destructive examination
NCV	non-cited violation
NMPNS	Nine Mile Point Nuclear Station, LLC
NRC	Nuclear Regulatory Commission, U.S.
NVLAP	National Voluntary Laboratory Accreditation Program
PAUT	phased array ultrasonic testing
PM	preventive maintenance
RCIC	reactor core isolation cooling
RG	regulatory guide
RHR	residual heat removal
RPS	reactor protection system
RT	radiographic testing
SBO	station blackout
UFSAR	Updated Final Safety Analysis Report
UPS	uninterruptible power supply
UT	ultrasonic testing
VAC	volts alternating current
VDC	volts direct current
VHRA	very high radiation area
VT	visual testing