



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

August 10, 2016

Mr. David Hamilton
Site Vice President
FirstEnergy Nuclear Operating Company
Perry Nuclear Power Plant
P.O. Box 97, 10 Center Road, A-PY-290
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT—NRC INTEGRATED INSPECTION REPORT
05000440/2016002

Dear Mr. Hamilton:

On June 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed a baseline inspection at your Perry Nuclear Power Plant. On July 12, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The enclosed report represents the results of this inspection.

Based on the results of this inspection, the NRC has identified one issue that was evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that a violation is associated with this issue. Because the licensee initiated condition reports to address this issue, this issue is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. The NCV is described in the subject inspection report (IR). Further, the inspectors documented two licensee-identified violations, which were determined to be of very low safety significance in this report. The NRC is treating these violations as 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) the NRC resident inspectors at the Perry Nuclear Power Plant.

In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 Regional Administrator, Region III, and the NRC resident inspectors at the Perry Nuclear Power Plant.

D. Hamilton

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In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Billy Dickson, Chief
Branch 5
Division of Reactor Projects

Docket No. 50-440
License No. NPF-58

Enclosure:
IR 05000440/2016002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-440
License No: NPF-58

Report No: 05000440/2016002

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Perry Nuclear Power Plant

Location: North Perry, Ohio

Dates: April 1 through June 30, 2016

Inspectors: M. Marshfield, Senior Resident Inspector
J. Nance, Resident Inspector
S. Bell, Health Physicist
R. Ng, Project Engineer

Approved by: B. Dickson, Chief
Branch 5
Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report (IR) 05000440/2016002, 04/01/2016 – 06/30/2016, Perry Nuclear Power Plant; Radioactive Gaseous and Liquid Effluent Treatment.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One finding was identified by the inspectors that was considered a Green non-cited violation (NCV) of the U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of inspection 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 February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated February 2014.

Self-Revealed and NRC Identified Violation

Cornerstone: Public Radiation Safety

- Green. A finding of very low safety significance, and an associated NCV of Technical Specification (TS) 5.5.1 was identified by the NRC inspectors for the failure to follow Offsite Dose Calculation Manual (ODCM) requirements during the execution of a liquid effluent discharge. The license entered this event into their CAP as CR-2016-07572 and the individual was coached regarding procedure compliance.

The inspectors determined that the performance deficiency was more than minor because the issue impacted the program and process attribute of the Public Radiation Safety cornerstone, and adversely affected the cornerstone objective of ensuring adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. Specifically, on February 1, 2016, a liquid effluent discharge was performed with the radwaste to essential service water discharge monitor inoperable and without the required independent verification of release rate calculations. The finding was determined to be of very low safety significance (Green) because it was not a failure to implement the Effluent Program, nor did public dose exceed Appendix I or Title 10 of the *Code of Federal Regulations* (CFR), Part 20.1301(e) criteria. The inspectors concluded that the finding had a cross-cutting aspect in the human performance area of procedure adherence because procedures for this task were not followed [IMC 0310, H.8]. (Section 2RS6)

Licensee-Identified Violation

- Two violations of very low safety significance were identified by the licensee and have been reviewed by the NRC. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program (CAP). These violations and CAP tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

The plant began the inspection period at 100 percent power. Early in the morning of June 24, 2016, the licensee identified a leak on the hydraulic lines to a turbine stop valve. The operators reduced plant power to 60 percent power and determined that the leak could not be fixed with the turbine online and subsequently continued the down power and separated from the grid at 9:49 p.m. on June 24, 2016. Following repairs to the hydraulics lines, the operator synchronized the main generator to the grid at 10:52 p.m. on June 25, 2016. While raising power following the reconnection to the grid, plant operators identified a steam leak at about 20 percent power, which also required the operators to separate the plant from the grid for repair. That action occurred at 1:42 a.m. on June 26, 2016. After repairing the source of the steam leak, the plant operators again synchronized to the grid at 6:25 p.m. on June 26, 2016. Throughout the operations to conduct the repairs to the steam plant, the reactor remained critical. Power level reached 100 percent at 8:30 a.m. on June 30, 2016 and remained there throughout the day of June 30, 2016. During the calendar quarter covered by this inspection period, minor reductions in power occurred to support routine surveillances and deeper down powers for rod pattern adjustments other than those specifically delineated above in this paragraph.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

1R01 Adverse Weather Protection (71111.01)

.1 Readiness of Offsite and Alternate AC Power Systems

a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- coordination between the TSO and the plant during off-normal or emergency events;
- explanations for the events;
- estimates of when the offsite power system would be returned to a normal state; and
- notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

- actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;
- re-assessment of plant risk based on maintenance activities which could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures.

This inspection constituted one readiness of offsite and alternate AC power systems sample as defined in Inspection Procedure (IP) 71111.01–05.

b. Findings

No findings were identified.

.2 External Flooding

a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Safety Analysis Report (USAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining in the event of heavy precipitation, and determined that barriers required to mitigate the potential flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site, which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also walked down barriers for underground bunkers/manholes subject to flooding that contain multiple train or multiple function risk-significant cables. The inspectors also reviewed the off-normal instruction for mitigating the design basis flood to ensure it could be implemented as written. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one external flooding sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- 125 volt direct current unit 1, division 1 distribution;
- control room ventilation and emergency recirculation 'A';
- low pressure core spray system; and
- reactor core isolation cooling system.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, USAR, TS requirements, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

These activities constituted four partial system walkdown samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns, which focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- fire zone 1AB2, auxiliary building 599' elevation;

- fire zones 0CC–1a,b,c, control complex 574' elevation;
- fire zone 0FH–3, fuel handling building 620' elevation;
- fire zones 1DG–1a, diesel building division 2 620' elevation and 1CC–3a, control complex unit 1 – division 2 – 4160V and 480V switchgear and reactor protection system motor generator rooms 620' elevation; and
- fire zone 0IB–2, intermediate building 599' elevation.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment to this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

These activities constituted five quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Underground Vaults

a. Inspection Scope

The inspectors selected underground bunkers/manholes subject to flooding that contained cables whose failure could disable risk-significant equipment. The inspectors determined that the visible cables were not submerged, that visible splices were intact, and that appropriate cable support structures were in place. In those areas where dewatering devices were used, such as a sump pump, the device was operable and level alarm circuits were set appropriately to ensure that the cables would not be submerged. In those areas without dewatering devices, the inspectors verified that drainage of the area was available, or that the cables were qualified for submergence conditions. The inspectors also reviewed the licensee's corrective action documents with respect to past submerged cable issues identified in the corrective action program to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following underground bunkers/manholes subject to flooding:

- electrical manhole #2, east vault division 3 safety-related circuits; and
- electrical manhole #2, west vault division 2 safety-related circuits.

Specific documents reviewed during this inspection are listed in the Attachment to this report. This inspection constituted one underground vaults sample as defined in IP 71111.06–05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On April 4, 2016, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation during Periods of Heightened Activity or Risk (71111.11Q)

a. Inspection Scope

On May 1, 2016, the inspectors observed the operating crew perform the accident monitoring and remote shutdown channel checks surveillance test. This was an activity

that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms (if applicable);
- correct use and implementation of procedures;
- control board (or equipment) manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions.

The performance in these areas was compared to pre-established operator action expectations, procedural compliance and task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- reactor protection system (RPS); and
- generator auxiliaries.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the conditions or maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- RPS channel 'D' reactor high pressure master trip unit and reactor pressure residual heat removal (RHR) isolation high reactor pressure slave trip unit gross failure alarm;
- RPS 'D' turbine stop valve closure trip logic half scram;
- average power range monitor 'D' monitor pushbutton troubleshooting;
- maintenance on alternate feed breaker to bus L11 causes unscheduled entry into yellow risk; and
- switchyard breaker replacement/removal results in emergent and unplanned testing of switchyard components.

These activities were selected based on their potential risk significance relative to the Reactor Safety cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed Technical Specification (TS) requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Documents reviewed during this inspection are listed in the Attachment to this report.

These maintenance risk assessments and emergent work control activities constituted five samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- functionality assessment of LH1B transformer deluge system following failure of 24 month surveillance test;
- operability determination for plant operations with RPS “D” turbine stop valve closure trip in bypass;
- division 2 diesel generator past-operability with failed diodes identified during post maintenance testing (PMT) after pull-to-lock switch replacement;
- XHF-1-A transformer functionality assessment; and
- thermal power limits computer calculations using substitute data.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS 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 TS and USAR to the licensee’s evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This operability inspection constituted five samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors reviewed engineering change plant (ECP) modification ECP 16-0129-001, “ECP to Document Removal of Switchyard Breaker S-662.” The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the USAR and Technical Specifications (TS); to verify that the modification did not affect the operability or availability of the affected systems. The inspectors observed ongoing and completed work activities to ensure that the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. The inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant

modification with operations, engineering, and training personnel to ensure that the individuals were aware of how the operation with the plant modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one permanent plant modification sample as defined in IP 71111.18-05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following PMT activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- replacement of turbine stop valve #4, 1C71A-K010D relay PMT;
- 1B21-N678D and 1B21-N679D master and slave trip unit gross failures PMT;
- replace division 2 diesel generator pull to lock switch PMT;
- division 3, EH13 bus, EH1302 preferred and EH1303 alternate preferred breaker replacement PMT;
- reactor core injection cooling system outage PMT; and
- division 2, EH12 bus, EH1213 alternate preferred breaker replacement PMT.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSS, the USAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted six post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- SVI-P45-T2003; high pressure core spray essential service water pump and valve operability test (IST);
- SVI-R43-T1347; division 1 standby diesel generator 24-hour run (Routine);
- SVI-N31-T1151; main turbine valve exercise test (Routine);
- SVI-E31-T0124-A; reactor core isolation cooling steam line flow high & timer channel calibration for 1E31-N083A (Routine); and
- PTI-E12-P0002; RHR heat exchangers A and C performance testing (Routine).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;

- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted four routine surveillance testing samples and one in-service test sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspector observed a simulator training evolution for licensed operators on April 4, 2016, which required emergency plan implementation by a licensee operations crew. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the CAP. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the Attachment to this report.

This inspection of the licensee's training evolution with emergency preparedness drill aspects constituted one sample as defined in IP 71114.06–05.

b. Findings

No findings were identified.

2. RADIATION SAFETY

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

.1 Walkdowns and Observations (02.02)

a. Inspection Scope

The inspectors walked down select effluent radiation monitoring systems to evaluate whether the monitor configurations aligned with Offsite Dose Calculation Manual (ODCM) descriptions and to observe the materiel condition of the systems.

The inspectors walked down selected components of the gaseous and liquid discharge systems to evaluate whether equipment configuration and flow paths align with plant documentation and to assess equipment materiel condition. The inspectors also assessed whether there were potential unmonitored release points, building alterations

which could impact effluent controls, and ventilation system leakage that communicated directly with the environment.

For equipment or areas associated with the systems selected for review that were not readily accessible, the inspectors reviewed the licensee's materiel condition surveillance records.

The inspectors walked down filtered ventilation systems to assess for conditions such as degraded high-efficiency particulate air/charcoal banks, improper alignment, or system installation issues that would impact the performance or the effluent monitoring capability of the effluent system.

As available, the inspectors observed selected portions of the routine processing and discharge of radioactive gaseous effluent to evaluate whether appropriate treatment equipment was used and the processing activities aligned with discharge permits.

The inspectors determined if the licensee has made significant changes to their effluent release points.

As available, the inspectors observed selected portions of the routine processing and discharging of liquid waste to determine if appropriate effluent treatment equipment was being used and that radioactive liquid waste was being processed and discharged in accordance with procedure requirements and aligned with discharge permits.

These inspection activities constituted one sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.2 Calibration and Testing Program (02.03)

a. Inspection Scope

The inspectors reviewed calibration and functional tests for select effluent monitors to evaluate whether they were performed consistent with the ODCM. The inspectors assessed whether National Institute of Standards and Technology (NIST) traceable sources were used, primary calibration represented the plant nuclide mix, secondary calibrations verified the primary calibration, and calibration encompassed the alarm set points.

The inspectors assessed whether effluent monitor alarm set points were established as provided in the ODCM and procedures.

The inspectors evaluated the basis for changes to effluent monitor alarm set points.

These inspection activities constituted one sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.3 Sampling and Analyses (02.04)

a. Inspection Scope

The inspectors reviewed select effluent sampling activities and assessed whether adequate controls had been implemented to ensure representative samples were obtained.

The inspectors reviewed select effluent discharges made with inoperable effluent radiation monitors and assess whether controls were in place to ensure compensatory sampling was performed consistent with the ODCM and that those controls were adequate to prevent the release of unmonitored effluents.

The inspectors determined whether the facility was routinely relying on the use of compensatory sampling in lieu of adequate system maintenance.

The inspectors reviewed the results of the Inter-Laboratory Comparison Program to evaluate the quality of the radioactive effluent sample analyses and assessed whether the Inter-Laboratory Comparison Program included hard-to-detect isotopes as appropriate.

These inspection activities constituted one sample as defined in IP 71124.06–05.

b. Findings

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated NCV of TS 5.5.1 for the licensee's failure to follow ODCM requirements during the execution of a liquid effluent discharge performed on February 1, 2016. The failure to comply with the requirements that were stated in the ODCM and related procedure were within the licensee's ability to foresee and correct and should have been prevented, therefore constituting a performance deficiency.

Description: On February 1, 2016, the licensee performed a liquid effluent batch discharge (permit number 16–010L). At the time of the discharge, the radwaste to essential service water discharge effluent monitor was inoperable. The ODCM allowed discharges to occur when this monitor was inoperable provided that additional actions were taken. One of these actions was to independently verify release rate calculations. However, this action was not performed due to human error not to follow procedure CHI–0007, "Midas," which required this action.

Analysis: The inspectors determined that the failure to comply with the requirements contained with the ODCM and procedure CHI–0007, "Midas," were within the licensee's ability to foresee and correct and should have been prevented, therefore constituting a performance deficiency. The performance deficiency was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening", because the finding impacted the program and process attribute of the Public Radiation Safety cornerstone, and adversely affected the cornerstone objective of ensuring adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. Specifically, on February 1, 2016, with the radwaste to essential service water discharge monitor inoperable, the required action to independently verify release rate calculations was not performed. The finding was determined to be of very-low safety significance in

accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," dated February 12, 2008. The violation was of very-low safety significance (Green) because it was not a failure to implement the effluent program, nor did public dose exceed Appendix I or 10 CFR 20.1301(e) criteria.

The inspectors concluded that the finding had a cross-cutting aspect in the human performance area, procedure adherence, because procedural guidance was not followed [IMC 0310, H.8].

Enforcement: Technical Specification 5.5.1 "Offsite Dose Calculation Manual (ODCM)," requires in part, that radioactive effluent controls be contained within the ODCM. Contrary to the above, on February 1, 2016, a liquid effluent batch discharge was performed not in accordance with the ODCM. The licensee entered this issue into the CAP as CR-2016-07572 and provided coaching to the individual on procedure compliance. Because this violation was of very low safety significance and was entered into the licensee's CAP, this violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. **(NCV 05000440/2016002-01; Failure to Comply with ODCM during Liquid Effluent Discharge)**

.4 Instrumentation and Equipment (02.05)

a. Inspection Scope

The inspectors reviewed the methodology used to determine the effluent stack and vent flow rates to determine if the flow rates were consistent with plant documentation, and that differences between assumed and actual stack and vent flow rates did not affect the results of the projected public doses.

The inspectors assessed whether surveillance test results for Technical Specification required ventilation effluent discharge systems met Technical Specification acceptance criteria.

The inspectors assessed calibration and availability for select effluent monitors used for triggering emergency action levels or for determining protective action recommendations.

These inspection activities constituted one sample as defined in IP 71124.06-05.

b. Findings

No findings were identified.

.5 Dose Calculations (02.06)

a. Inspection Scope

The inspectors reviewed significant changes in reported dose values compared to the previous radiological effluent release report to evaluate the factors which may have resulted in the change.

The inspectors reviewed radioactive liquid and gaseous waste discharge permits to assess whether the projected doses to members of the public were accurate.

Inspectors evaluated the isotopes that are included in the source term to assess whether analysis methods were sufficient to satisfy detectability standards. The review included the current Part 61 analyses to ensure hard-to-detect radionuclides are included in the source term.

The inspectors reviewed changes in the licensee's offsite dose calculations to evaluate whether changes were consistent with the ODCM and Regulatory Guide 1.109. Inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to evaluate whether appropriate factors were being used for public dose calculations.

The inspectors reviewed the latest Land Use Census to assess whether changes have been factored into the dose calculations.

For select radioactive waste discharges, the inspectors evaluated whether the calculated doses were within the 10 CFR 50, Appendix I, and Technical Specification dose criteria.

The inspectors reviewed select records of abnormal radioactive waste discharges to ensure the discharge was monitored by the discharge point effluent monitor. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed to ensure that an evaluation was made to account for the source term and projected doses to the public.

These inspection activities constituted one sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.6 Problem Identification and Resolution (02.07)

a. Inspection Scope

Inspectors assessed whether problems associated with the Effluent Monitoring and Control Program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. In addition, they evaluated the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving radiation monitoring and exposure controls.

These inspection activities constituted one sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator (PI) for the second quarter 2015 through the first quarter 2016. To determine the accuracy of the PI data reported, definitions and guidance contained in Nuclear Energy Institute (NEI) document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC integrated IRs to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one safety system functional failures sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index—Emergency AC Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System PI for the second quarter 2015 through the first quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC IRs to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI emergency AC power system sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index—High Pressure Injection Systems

c. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems PI for the second quarter 2015 through the first quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC IRs to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI high pressure injection system sample as defined in IP 71151-05.

d. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment to this report.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

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 licensee's CAP. This review was accomplished through inspection of the station's daily CR packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues: Reviewed Licensee Corrective Actions for Unit 1 Division 1 Normal Battery Charger Failure to Sustain an Output Voltage

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized corrective action items for CR-2015-01152, which documented repeated failures of the normal battery charger for Unit 1 division 1. The corrective actions identified maintenance which the licensee would conduct on an as-fails basis to ensure the charger would function when called upon to support the battery. During the under-voltage event described in Section 4OA3.3 of this report, the battery charger failed to achieve design voltage. The operators shifted the electric plant to allow the Unit 1 division 1 reserve battery charger to support the division 1 battery. The TS requirements were satisfied by the reserve charger's acceptable performance. Blown fuses were identified as the cause and replaced. Of the 6 battery chargers on the site that supported vital or back-up Unit 2 vital buses, this was the only charger that exhibited this deficiency. The inspectors verified that the charger was performing its required functions currently with no deficiencies and concluded that the significant bus shifts that occurred on February 12, 2016, likely contributed to the failure of the charger on that day. The inspectors reviewed the corrective actions in CR-2016-02441 and determined that the licensee's actions are acceptable.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152-05.

b. Findings

No findings were identified.

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

.1 (Closed) Licensee Event Report 050004402016-001-00: Drywell Leakage, Level 8 Automatic SCRAM, and Average Power Range Monitor Loss of Safety Function

a. Inspection Scope

The inspectors reviewed the plant's response to an increase in unidentified leakage in the drywell that exceeded TS limits which required the licensee to shutdown and cooldown the reactor. While shutting down the reactor, all average power range monitors became inoperable, for a brief period of time when the reactor recirculation pumps were shifted to slow speed (one was previously declared inoperable and bypassed due to failed input). This resulted in the loss of a safety function. A few hours later, after reducing power to 8 percent, licensee personnel, while attempting to transfer feedwater flow from the turbine driven reactor feed pump to the motor driven feed pump, were unable to control the rate of feedwater flow to the reactor and the reactor pressure vessel level rose to the Level 8 SCRAM setpoint, causing an automatic Reactor Protection System scram which shutdown the reactor as designed. The inspectors documented non-cited violations for these three events in NRC Integrated Inspection Report (IR) 05000440/2016001, Section 1R20.1. The leakage were identified as being caused by a bad weld completed during the last refueling outage in the spring of 2015. No additional findings were identified by the inspectors following review of this Licensee Event Report (LER). Documents reviewed as part of this inspection are listed in the Attachment to this report. This LER is closed.

This event follow-up review constituted one sample as defined in IP 71153-05.

.2 (Closed) Licensee Event Report 05000440/2016-002-00: Manual Reactor SCRAM Due to Spurious Opening of Safety Relief Valves

On February 8, 2016, at 1503 hours, control room operators initiated a manual RPS actuation in response to rising temperature in the suppression pool. The inspectors were in the control room, observing the licensee's response to multiple safety relief valves opening due to an invalid reactor pressure vessel (RPV) pressure signal when the manual scram was inserted by the licensed operators. The licensee determined the direct cause of the event to be a momentary pressure perturbation limited to the Reactor Pressure Vessel (RPV) 'B' reference leg that caused the connected transmitters to send a false RPV pressure value to the SRV actuation circuitry which resulted in thirteen SRVs either opening or partially opening. The licensee entered this issue into their CAP as CR-2016-01866. Corrective actions include, the revision of plant procedures to ensure proper direction and guidance for when to startup, shutdown, and fill and vent the reference leg purge panels and design changes to ensure that all entrained air could be vented from the reference leg purge panels and adjusting the time constants for the at-risk transmitters to prevent spurious actuations. When completed, these corrective actions appeared to be reasonable to prevent recurrence. Documents reviewed are listed in the Attachment to this report. This LER is closed.

This event follow-up review constituted one sample as defined in IP 71153-05.

.3 (Closed) Licensee Event Report 05000440/2016-003-00: Loss of Safety Related Electrical Bus Results in a Loss of Shutdown Cooling

On February 11, 2016, at approximately 1505 hours, with the plant in Mode 4, an indicated loss of power to the division 1 4160 volt bus, EH11, occurred. The inspectors were on-site and responded to the control room and observed the licensee's response to the loss of the division 1 safety-related bus and shutdown cooling. An invalid undervoltage (UV) signal tripped the safety related bus supply breaker which then shed the loads from the bus as designed, including division 1 shutdown cooling which was in-service. The division 1 emergency diesel generator (EDG) started and loaded to the bus as designed; however, the UV circuit had a defective fuse in phase "A" and presented the appearance of an UV condition and prevented safety related equipment from loading onto the bus, even though the EDG was producing 4160 volts AC on the bus. Because the emergency service water pump "A," which supplied cooling water to the division 1 EDG, would not start due to the apparent UV condition, the licensed operators immediately shutdown the EDG. Operators also took action to place division 2 shutdown cooling in-service. Shutdown cooling was lost for a total of approximately 42 minutes, in which reactor coolant system temperature reached 112 degrees Fahrenheit. The inspectors questioned whether the failure of one fuse in the UV sensing circuit should cause the loss of a safety related bus and an entire train of safe shutdown equipment. A special inspection team (SIT) was formed to inspect the events of both the opening of the safety relief valves and the loss of Shutdown Cooling and the Division 1 Safety-Related Bus. The SIT exited their inspection with an unresolved item (URI 05000440/2016008-01: Coincidence Logic to Preclude Spurious Trips of the Offsite Power Source). Separately, the licensee has committed to modify its UV/degraded voltage protection design. The licensee documented the event and their corrective actions in its CAP, as CR-2016-02048. Documents reviewed are listed in the Attachment to this report. This LER is closed.

This event follow-up review constituted one sample as defined in IP 71153-05.

40A5 Other Activities

.1 (Closed) Liquid Effluent Calibration (Unresolved Item 05000440/2015004-02)

The inspectors identified that the efficiency calibration for the liquid effluent radiation monitor, 0D17-K0606 could not be located. The licensee performed a new efficiency determination on the monitor during digital modification upgrade on 2006 for all effluent monitors. According to the licensee, the calculated count rate using a new standard National Institute of Standards and Technology traceable sources indicated a close approximation to the liquid detector count rates data determined during the detector initial (primary) calibration. The licensee was unable to provide the initial calibration paperwork indicating that the calibration count rates for the detector efficiency determinations are correlatable. The inspectors attempted to assess whether the original standard count rates for efficiency determination are correlatable to the initial calibration paperwork; however, this assessment was not be completed within the inspection period. Consequently, the inspectors opened an Unresolved Item in NRC Inspection Report 05000440/2015004.

Subsequently, the inspectors received documents associated with the efficiency calibration of the liquid effluent radiation monitor, 0D17-K0606, on January 6, 2016.

The following calibration document of surveillance tests were reviewed for accuracy: SVI-G50-T5266, March 11, 2013, and SVI-D17-T8002, September 25, 2013. In addition, two work order tests of the same dates were reviewed. The inspectors verified the licensee's justification of the calculated count rate based on the detector efficiencies and actual as-read count rate for liquid radwaste discharges. In addition, inspectors assessed whether the secondary source checks for the liquid process monitors done during the initial installation in 2003 were correlatable with the subsequent calibration performed on the liquid monitor in 2013. The inspector also assessed the accuracy of the surveillance tests of the subsequent years using new NIST traceable calibration sources that the licensee had ordered due to the decay of the older secondary traceable sources. The inspectors reviewed the NRC Positions on the Effluent Radiation Monitor Calibrations, HPOS-040 PDR-9111210182, and per this guidance concluded that routine re-calibration may be less rigorous than the one-time initial calibration. These periodic recalibrations should be viewed as ensuring that the radiation monitor remained stable over time. Therefore, the single point calibration using a secondary standard sources should be considered adequate to meet the requirements where the detector was inherently linear. Inspectors determined that when the liquid monitor was installed, the secondary source checks were done by the manufacture/licensee and found that the decay corrected source response was within tolerance and proper detector response was verified by the licensee. Upon review of the documents, the inspectors did not identify any findings or violations and therefore, this issue is closed.

4OA6 Management Meetings

.1 Exit Meeting Summary

On July 12, 2016, the inspectors presented the inspection results to Mr. D. Hamilton and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meeting

An Interim exit meeting was conducted concerning the inspection results for the area of radioactive gaseous and liquid effluent treatment with Mr. D. Hamilton, on June 10, 2015. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

4OA7 Licensee-Identified Violations

The following violations of very low significance (Green) were identified by the licensee and are violations of NRC requirements, which meet the criteria of the NRC Enforcement Policy for being dispositioned as a Non-Cited Violation (NCV).

- Title 10 of the CFR, Part 50.65(a)(4) states, in part, "Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Contrary to the above, the licensee identified that it failed to perform the required risk assessment prior to commencing maintenance activities. Specifically, on April 28, 2016, the licensee racked out the L1006 breaker, which was the alternate supply to

bus L11 from the Unit 1 startup transformer. The At-The-Controls licensed reactor operator then questioned whether or not an availability log entry was required for this breaker being racked to the disconnect position. At that time, the unit supervisor ran the probabilistic risk assessment (PRA) program for the L1006 breaker being racked to the disconnect position with the plant in its current configuration. The result of the PRA resulted in an increase in risk from Green Risk to Yellow Risk. The Unit Supervisor stopped the evolution and directed the breaker to be racked back in. After an evaluation of the schedule was performed and permission was received from the general plant manager to continue with the plant in Yellow PRA Risk, breaker L1006 was racked out and preventive maintenance proceeded.

The finding was determined to be of very low safety significance because the risk deficit incremental core damage probability risk assessment increase of $6.6E-10$ was less than the $1E-6$ threshold. The licensee initiated CR-2016-06093 to address this issue.

- Technical Specification 5.5.1, "Offsite Dose Calculation Manual (ODCM)," requires, in part, that radioactive effluents control information be contained within the ODCM. ODCM, Revision 20, requires that the liquid radioactive waste to essential service water radiation monitor have periodic channel functional tests performed. Contrary to the above, on December 13, 2015, it was identified by the licensee that this test, which was required on September 13, 2015, had not been performed. On August 26, 2015, the licensee identified that the monitor would not pass the required functional test. The licensee incorrectly deferred the required channel functional test.

This was identified by the operation department staff. The licensee documented this issue in CR-2015-16711, December 13, 2015. The finding was determined to be of very-low safety significance (Green) because it was not a failure to implement the Effluent Program, nor did public dose exceed Appendix I or 10 CFR 20.1301(e) criteria.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

D. Hamilton, Site Vice President
F. Payne, General Plant Manger
T. Brown, Performance Improvement Director
D. Reeves, Engineering Director

U.S. Nuclear Regulatory Commission

B. Dickson, Chief, Reactor Projects Branch 5

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000440/2016002-01	NCV	Failure to Comply with ODCM During Liquid Effluent Discharge (2RS6)
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Closed

05000440/2016-001-00	LER	Drywell Leakage, Level 8 Automatic SCRAM, and APRM Loss of Safety Function (4OA3)
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05000440/2016-002-00	LER	Manual Reactor SCRAM Due to Spurious Opening of Safety Relief Valves (4OA3)
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05000440/2016-003-00	LER	Loss of Safety Related Electrical Bus Results in a Loss of Shutdown Cooling (4OA3)
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05000440/2015004-02	URI	Liquid Effluent Calibration (4OA5)
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LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

1R01 Adverse Weather Protection

- ECP 15-0212-001; Reference Docs – Site Flooding Sand Bags Temporary Modification; June 30, 2015
- ONI-ZZZ-1; Tornado or High Winds; Revision 26
- Calculation 50:51; Local Intense Precipitation Modeling for Perry Site
- Draft Perry Modification Summary for External Door Level Fixes Due to Calculation 50:51 Results
- NOP-OP-1003; Grid Reliability Protocol; Revision 7
- PAP-0102; Interface With the Transmission System Owner; Revision 14
- OA-0201; Operations Standing Order; Transmission Yard Access; November 20, 2015

1R04 Equipment Alignment

- ELI-R42; DC Systems: Batteries Chargers Switchboards; Revision 8
- Management Alignment and Ownership Meeting Packet—Tuesday, May 31, 2016
- VLI-M25/26; Control Room HVAC and Emergency Recirculation System; Revision 7
- Drawing 912-0610-00000; Control Room HVAC and Emergency Recirculation System; Revision GG
- Drawing 912-0611-00000; MCC Swgr and Misc. Elec. Eqpt. Areas HVAC System and Battery Room. Control Room HVAC and Emergency Recirc. System Notes and Operating Data; Revision P
- VLI-E21; Low Pressure Core Spray System Valve Lineup Instruction; Revision 11
- SOI-E21; Low Pressure Core Spray System; Revision 29
- Drawing 302-0705-00000; Low Pressure Core Spray System; Revision HH
- VLI-E51; Reactor Core Isolation Cooling System Valve Lineup Instruction; Revision 10
- SOI-E51; Reactor Core Isolation Cooling System; Revision 33
- Drawing 302-0631-00000; Reactor Core Isolation Cooling System; Revision GG

1R05 Fire Protection

- FPI-0FH; Fuel Handling Building; Revision 5
- FPI-1DG; Diesel Generator Building; Revision 8
- FPI-0CC; Control Complex; Revision 10
- FPI-1AB; Auxiliary Building; Revision 3
- FPI-0IB; Intermediate Building; Revision 9
- GCI-0016; Scaffolding Erection, Modification or Dismantling Guidelines; Revision 24
- Field Change Request 10470; Rework of Unistrut in Gypboard Walls; September 15, 1988
- NFPA 13; Standard for the Installation of Sprinkler System; 1972

1R06 Flooding

- PDB-H0055; Equipment Associated With Electrical Manholes; Revision 0
- WO 200664157; Inspect and Dewater Manholes 1, 2, 3, and 4; May 23, 2016
- CR 2016-07172; High Water Level in Safety-Related Electrical Manhole #2; May 27, 2016
- NOP-ER-2007; Underground Piping and Tanks Integrity Program; Revision 5
- NOP-ER-3100; Cable Aging Management Program; Revision 0
- NOP-ER-2101; Engineering Program Management; Revision 9
- NORM-ER-3112; Cable Monitoring; Revision 2
- NOP-ER-4001; FENOC Condition Monitoring; Revision 3
- NOP-ER-4002; Medium Voltage Shielded Cable Testing and Diagnostics; Revision 0
- NOP-OP-1007; Risk Management; Revision 23

1R11 Licensed Operator Requalification Program

- OTLC-3058201607-PY-SGC-Cycle 7 2016 Evaluated Scenario C2; March 11, 2016
- NOP-OP-1002; Conduct of Operations; Revision 11
- SVI-C61-T1104; Accident Monitoring and Remote Shutdown Cannel Checks; May 1, 2016
- NOP-OP-1002; Conduct of Operations; Revision 11
- Operations Night Order; Availability of Plant Equipment; April 29, 2016
- NOP-OP-1007; Risk Management; Revision 22
- PAP-1924; Risk-Informed Safety Assessment and Risk Management; Revision 8
- eSOMS Plant Narrative Logs; May 1, 2016

1R12 Maintenance Effectiveness

- Perry Nuclear Power Plant, Plant Health Report 2015-02-C71 - Reactor Protection System; February 1, 2016
- CR 2016-05009; Unexpected Half Scram RPS B/D; April 10, 2016
- CR 2016-05106; Unexpected Gross Fail Alarm; April 12, 2016
- CR 2013-16777; Stator Cooling Water Flow at Low End of Band; October 19, 2013
- CR 2014-04196; Stator Water Cooling Flow is Low Out of Band on Plant Rounds; March 2, 2014
- CR 2014-03638; Stator Water Cooling Pump Degraded Flow; February 23, 2014
- CR 2014-15973; Stator Water Conductivity has Increased Close to Alarm Point of 0.5 micromho/cm; October 21, 2014
- CR 2014-16524; Stator Water Cooling Flow Low Condition Has Not Been Corrected; November 3, 2014
- WO 200492144; Replace Main H₂ Seal Oil Pump Mechanical Seal; Scheduled for 1R16
- WO 200669410; Replace H₂ Seal Oil Vapor Extractor Pump, Motor, and Gear Reducer; Not Scheduled
- WO 200640457; Repair/Replace 1N43F0106, Deionizer Inlet Valve; Scheduled for 1R16
- PNPP System Health Report 2015-02 - N42 - Generator Auxiliaries; February 1, 2016

1R13 Maintenance Risk Assessments and Emergent Work Control

- PAP-1924; Risk-Informed Safety Assessment and Risk Management; Revision 8
- NOP-OP-1007; Risk Management; Revision 22
- PDB-C0011; PSA Pre-Solved Configurations for Online Risk; Revision 7

- Drawing 208–0013–00012; Nuclear Steam Supply Shutoff System—RHR/RWCU Isolation Signals; Revision GG
- Drawing 209–100 Sheet 160; Electrical Interconnection Wiring Diagram, PGCC Termination Cabinet 1H13–P717 Bay E; Revision H
- Drawing 208–0040–00008; Reactor Protection System; Revision Y
- WO 200678610; 1B21N0678D and 1B21N0679D Master and Slave Trip Unit Gross Fails; April 13, 2016
- eSOMS Plant Narrative Logs; April 12, 2016
- NOP–ER–3001–2, Revision 00; Failure Mode Analysis; Unexpected Half Scram on the ‘D’ Channel; April 15, 2016
- NOP–ER–3001–3, Revision 3; Simple Troubleshooting Plan; Main Turbine Valve Exercise Test
Received Unexpected Half Scram on RPS ‘D’; April 10, 2016
- NOP–ER–3001; Problem Solving and Decision Making; Risk Assessment – During Main Turbine Valve Testing Received Half Scram; April 10, 2016
- WO 200678393; T/S Unexpected Half Scram on RPS B/D; April 10, 2016
- eSOMS Plant Narrative Log; June 21, 2016
- CR 2016–07978; A Half Scram was Received on APRM ‘D’ When Performing Work Order 200685035; June 21, 2016
- WO 200685035; Monitor Pushbutton Not Working/CR; June 21, 2016
- CR 2016–06093; Avoidable Elevated Core Damage Frequency (CDF) Results in Yellow PRA Risk; April 29, 2016
- CR 2016–06067; Late Identification of Elevated Risk Work in Perry Work Schedule; April 28, 2016
- CR 2016–06078; L1006 Breaker Failed Minimum Operating Voltage Checks Per GEI–0136; April 29, 2016
- WO 200676192; Breaker S-662 Elimination/ECP 16-0129-001; May 6, 2016

1R15 Operability Determinations and Functionality Assessments

- NOP–WM-2003; Work Management Surveillance Process; Revision 8
- PAP–1910; Fire Protection Program; Revision 34
- CR 2016–04631; Deluge Spray Nozzles Found Blocked During Testing; April 5, 2016
- WO 200645096; Contingency Order to Clean Nozzles During Water Spray Flow Test of Station Transformers (Deluge Testing); April 4, 2016
- PTI–P54–P0064B; Water Spray Flow Test for Unit 1 Interbus Transformer ‘B’; April 5, 2016
- CR 2016–06450; Division 2 DG Abnormal Indications on Start; May 6, 2016
- CR 2016–06552; XHF–1–A Transformer Core Does Not Meet Acceptable Megger Criteria; May 9, 2016
- CR 2016–06672; Post-Event Critique Division. 2 DG Emergency Shutdown and Pri–200 Actions; May 12, 2016
- Operability Determination PY–16–01; Operation with RPS “D” Turbine Stop Valve Closure Trip Logic Issue; April 20, 2016
- Past Operability Review, Form 2016–06450–2 Attached to CR 2016–06450; May 13, 2016
- LER 05000440/1988–009-00; Misadjustment of Average Power Range Monitor Readings Due To an Error in Heat Balance Calculation Results in Technical Specification Violation; March 25, 1988
- PRI–TSR; Technical Specification Rounds; Revision 36
- PRI–TSR; Technical Specification Rounds; May 9, 2016
- CR 2016–06625; Partial Loss of Plant Computer System; June 10, 2016

- CR 2016–06750; Loss of Power to 1H22P0113 Rack 1; June 10, 2016
- eSOMS Plant Narrative Logs; May 10, 2016
- FTI–B0005; Core Heat Balance; Revision 9
- CR 1998–1463; While Performing Feedwater Re-alignment Resulted in Entry Into the Immediate Exit Region of the Power to Flow Map; July 4, 1998

1R18 Plant Modifications

- ECP 16–0129–000; ECP to Document Removal of Switchyard Breaker S–662; April 5, 2016
- ECP 16–0129–001; ECP to Document Removal of Switchyard Breaker S–662; April 7, 2016
- WO 200676192; Breaker S–662 Elimination/ECP 16–0129–001; May 6, 2016
- WO 200670850; Parallel Order, Eliminate SWYD Bkr S–662;

1R19 Post-Maintenance Testing

- WO 200678393; Replace Relay 1C71A–K010D; April 29, 2016
- WO 200678610; 1B21N0678D and 1B21N0679D Master and Slave Trip Unit Gross Fails Received While Getting Ready to Perform Work Under Order 200678393; April 12, 2016
- WO 200678020; Replace the Pull to Lock Switch for Division 2 Diesel Generator; May 6, 2016
- WO 200515519; Overhaul / Replace Division 3 EH13 BKR EH1302, Alternate Preferred Source Breaker; May 13, 2016
- WO 200518494; Replace PT Primary Fuses EH1301 & EH1304; May 14, 2016
- SVI–R43–T1318; Diesel Generator Start and Load Division 2; Revision 16
- SOI–R43; Division 1 and 2 Diesel Generator System; Revision 45
- GEI–0135; ABB Power Circuit Breakers 5 KV Types 5HK250 and 5HK350 Maintenance; Revision 34
- CR 2016–06739; EH13 Bus PT Knife Switch Bent During Primary Fuse Replacement; May 13, 2016
- SVI–E51–T2001; RCIC Pump and Valve Operability Test, May 20, 2016
- WO 200682519; During PMT, EH1303 Tripped Due to a Loss of Bus Voltage; May 13, 2016
- WO 200297043; 4.16 KV ESF Division 2 Bus EH–12, Breaker EH1213 Replacement; May 31, 2016

1R22 Surveillance Testing

- SVI–R43–T1347; Division 1 Standby Diesel Generator 24 Hour Run; April 1, 2016
- SVI–P45–T2003; HPCS ESW Pump and Valve Operability Test; April 12, 2016
- SVI–N31–T1151; Main Turbine Valve Exercise Test; April 11, 2016
- SVI–E31–T0124–A; RCIC Steam Line Flow High & Timer Channel Calibration for 1E31–N083A; May 20, 2016
- Drawing 208–0040–00002; Reactor Protection System Relay Tabulations; Revision HH
- Drawing 208–0040–00008; Reactor Protection System Channel ‘D’ Sensor Relays; Revision Y
- Drawing 208–0040–00009; Reactor Protection System Channel A, B, C & D Scram Trip Logic; Revision T
- PTI–E12–P0002; RHR Heat Exchangers A and C Performance Testing; June 16, 2016

1EP6 Drill Evaluation

- OTLC–3058201607–PY–SGC–Cycle 7 2016 Evaluated Scenario C2; March 11, 2016

2RS6 Radioactive Gaseous and Liquid Effluent Treatment

- ODCM; Revision 20
- Annual Environmental and Effluent Release Report; April 29, 2015
- Radiological Effluents Dose Assessment; First Quarter 2016
- Unit 1 Vent Noble Gas Radiation Monitor Calibration for 1D17; July 8, 2015
- LRW to ESW Radiation Monitor Channel Functional for D17-K606; May 21, 2015
- Effluent Monitor Availability Data: January 2015 through May 2016.
- Liquid Radioactive Waste System Performance Data; Current Data
- Liquid Radioactive Effluent Composite Analysis; 2015
- Liquid Batch Discharge Permits; Various 2016 Permits
- Gaseous Effluent Sample Analysis; June 8, 2016
- SOI-D17; Airborne Radiation Monitoring System (Effluents); Revision 13
- CHI-0007; Midas; Revision 19
- REC-0107; Control of the Offsite Dose Calculation Manual; Revision 2
- SVI-M40T533-2; "B" Fuel Handling Building Ventilation Charcoal Adsorber Operability Test and Plenum Inspection; September 4, 2015
- PY-SVI-D19T1358A; DW High Range Radiation Monitor Channel A Detector Calibration; March 29, 2015
- CR 2015-00977; Nuclear Closed Cooling Activity Trends Become Unstable; January 23, 2015
- CR 2015-16711; Surveillance SVI-D17-T8003 Not Performed; December 13, 2015
- CR 2016-04696; Chemistry ODCM Controls not Identified in Work Package; April 4, 2016
- CR 2016-07560; M40 Surveillance Requirements; June 8, 2016
- CR 2016-07572; NRC ID No Evidence of an Independent Verification of Release Rate Calculations for a Liquid Radwaste Discharge Done With the Liquid Radwaste Monitor Inoperable; June 8, 2016
- CR-2016-07619; NRC ID Potential Green NCV for Inoperable LRW to ESW Rad Monitor; June 9, 2016
- CR-2016-07634; NRC ID Ambiguous Statement in 2015 Annual Environmental and Effluent Release Report (AEERR) Regarding the Annual Meteorological Report; June 10, 2016

4OA1 Performance Indicator Verification

- NOBP-LP-4012; NRC Performance Indicators; Revision 5
- NOBP-LP-4012-08, Revision 2; Safety System Functional Failures; April 2015-March 2016
- NOBP-LP-4012-04, Revision 3; Mitigating Systems Performance Index (MSPI) Unavailability Index (UAI) & Unreliability Index (URI) for Emergency AC Power Systems; April 2015 through March 2016
- NOBP-LP-4012-05, Revision 2; Mitigating Systems Performance Index (MSPI) Unavailability Index (UAI) & Unreliability Index (URI) for High Pressure Injection System (HPICS) & High Pressure Emergency Diesel Generator (EDG); April 2015-March 2016

4OA2 Problem Identification and Resolution

- CR 2015-01152; Unit 1 Division 1 Normal Battery Charger Failed to Maintain Normal Output Voltage during SVI-R42T5228; January 27, 2015
- CR 2016-02441; Electrical Transient during Shift from Charger EFD-12-A to Charger EFD-1A; February 20, 2016

4OA3 Follow-Up of Events and Notices of Enforcement Discretion

- LER 05000440/2016-002-00; Manual Reactor SCRAM Due to Spurious Opening of Safety Relief Valves; April 8, 2016
- CR 2016-01866; Manual Reactor SCRAM Based on Suppression Pool Temperature of 95 Degrees F Due to Open SRVs SCRAM 1-16-02; dated February 8, 2016
- LER 05000440/2016-003-00; Loss of Safety Related Electrical Bus Results in a Loss of Shutdown Cooling; April 8, 2016
- LER 05000440/2016-001-00; Drywell Leakage, Level 8 Automatic SCRAM, and APRM Loss of Safety Function; March 23, 2016
- L-16-142; Perry Nuclear Power Plant Docket No. 50-440, License No. NPF-58 Commitment to Modify Undervoltage/Degraded Voltage Protection Design; June 7, 2016

4OA5 Other Activities

- Perry Operation Manual; Offsite Dose Calculation Manual; March 7, 2013
- Perry Nuclear Power Plant Annual Environmental and Effluent Release Report 2014
- HPPOS-040 PDR-9111210182; Effluent Radiation Monitor Calibration; June 5, 2015
- CHI-0006; Radiation Monitoring Alarm Setpoint Determination; Revision 22
- Work Order 200056365; Determine Why the RW to ESW Rad Monitor Count Rate Decline During Discharge; September 15, 2003
- Work Order 2004888927; LRW to ESW Radiation Monitor Channel Calibration for D17-K606; November 6, 2013
- Work Order 200032863; LRW to ESW Radiation Monitor Channel Calibration for D17-K606; September 25, 2003
- SVI-G50-T5266; Liquid Radwaste Release Permit; Revision 20; March 27, 2015
- SVI-G50-T5266; Liquid Radwaste Release Permit; Revision 20; October 23, 2014
- SVI-G50-T5266; Liquid Radwaste Release Permit; Revision 20; January 24, 2013
- CHI-0006; Radiation Monitoring Setpoint Determination; Revision 19
- Perry Annual Environmental and Effluent Release Report 2014
- Perry Offsite Dose Calculation Manual; February 7, 2013
- SVI-D17-T8031; Unit 1 Vent Noble Gas Radiation Monitor Calibration for 1D17-K86; Revision 9
- PY-SVI-D17T8033; Unit 1 Vent Sampler Flow Rate Monitor 1H51-PO86 Calibration
- PY-SVI-D17T8031; Unit 1 Noble Gas Radiation Monitor Calibration for 1D17-K786
- PY-SVI-D17T8002; LRW to ESW Radiation Monitor Channel Calibration for D17-K606; November 6, 2013
- CHI-0007; Attachment 3: Liquid Effluent Post-Release Dose Data Log; November 10, 2014 through May 2, 2015

LIST OF ACRONYMS USED

AC	Alternate Current
ADAMS	Agencywide Document Access Management System
CAP	Corrective Action Program
CFR	<i>Code of Federal Regulations</i>
ECP	Engineering Change Plant
EDG	Emergency Diesel Generator
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
LER	Licensee Event Report
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PI	Performance Indicator
PMT	Post Maintenance Testing
PRA	Probabilistic Risk Assessment
RPS	Reactor Protection System
RPV	Reactor Pressure Vessel
SIT	Special Inspection Team
TS	Technical Specification
TSO	Transmission System Operator
USAR	Updated Safety Analysis Report
UV	Undervoltage

D. Hamilton

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Sincerely,

/RA/

Billy Dickson, Chief
Branch 5
Division of Reactor Projects

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