



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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October 28, 2015

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**SUBJECT: DUANE ARNOLD ENERGY CENTER—NRC INTEGRATED INSPECTION  
REPORT 05000331/2015003**

Dear Mr. Vehec:

On September 30, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Duane Arnold Energy Center. The enclosed report documents the results of this inspection, which were discussed on October 8, 2015, with you, and other members of your staff.

Based on the results of this inspection, the NRC inspectors did not identify any findings or violations of more than minor significance.

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 (PARS)

T. Vehec

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Sincerely,

*/RA/*

K. Stoedter, Chief  
Branch 1  
Division of Reactor Projects

Docket No. 50-331  
License No. DPR-49

Enclosure:  
IR 05000331/2015003  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-331

License No: DPR-49

Report No: 05000331/2015003

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: July 1 through September 30, 2015

Inspectors: R. Baker, Acting Senior Resident Inspector  
C. Norton, Senior Resident Inspector  
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Branch 1  
Division of Reactor Projects

Enclosure

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## SUMMARY OF FINDINGS

Inspection Report 05000331/2015003; 07/01/2015—09/30/2015; Duane Arnold Energy Center; Integrated inspection report.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. No findings of significance were identified by the inspectors. The U.S. Nuclear Regulatory Commission's (NRCs) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

**A. NRC-Identified and Self-Revealed Findings**

No findings were identified during this inspection.

**B. Licensee-Identified Violations**

No findings were identified during this inspection.

## REPORT DETAILS

### Summary of Plant Status

At the beginning of the inspection period, Duane Arnold Energy Center (DAEC) was operating at approximately 78 percent reactor power and increasing to full power following a planned load reduction late in the previous inspection period to perform a control rod sequence exchange and load line adjustment. The reactor reached full power on July 9, 2015, and remained at this power level for the remainder of the inspection period with the exception of brief power reductions to accomplish rod pattern adjustments or planned surveillance testing activities.

### 1. REACTOR SAFETY

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

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 Readiness for Impending Adverse Weather Condition—Tornado Watch

##### a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecasted in the vicinity of the facility for August 18, 2015, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On August 17 and 18, 2015, the inspectors walked down the high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems, in addition to the licensee's emergency alternating current (AC) power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined that the staff's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also reviewed a sample of corrective action program (CAP) items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one readiness for impending adverse weather condition sample as defined in Inspection Procedure (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:

- “A” standby diesel generator (SBDG) with the “B” SBDG out-of-service (OOS) while performing the fast start surveillance test procedure (STP);
- “B” emergency service water (ESW) and “B” SBDG with “A” ESW/residual heat removal service water (RHRSW) OOS while divers performed pit clean/inspection activities; and
- Electrical lineups while “B” ESW and RHRSW OOS for diving activities.

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, the UFSAR, Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports (CRs), 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 inspections constituted three partial system walkdown samples as defined in IP 71111.04–05.

#### b. Findings

No findings were identified.

### .2 Semi-Annual Complete System Walkdown

#### a. Inspection Scope

On July 28, 2015, the inspectors performed a complete system alignment inspection of the core spray (CS) system to verify the functional capability of the system. This system was selected because it was considered both safety significant and risk significant in the licensee’s probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment lineups; electrical power availability; system pressure and temperature indications, as appropriate; component labeling; component lubrication; component and equipment cooling; hangers and supports; operability of support systems; and to ensure that ancillary equipment or debris did not interfere with

equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one semi-annual complete system walkdown sample 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 were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Pump house, all fire zones;
- Intake structure, all fire zones;
- Reactor building elevation 716, fire zones 1B, 1D, 1E, 1F, and 1H;
- Reactor building elevation 828, fire zone 5-C; and
- Outside areas including: standby transformer 1X4, instrument air compressor building, main transformer 1X1, auxiliary transformer 1X2, and startup transformer 1X3.

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 OOS, 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 inspections constituted five routine resident inspector tour samples as defined in IP 71111.05–05.



.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On September 15, 2015, the inspectors observed the control room activities associated with a fire brigade activation for a fire drill in the control rod drive pump heating, ventilation, and air conditioning (HVAC) room. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- Control room personnel follow procedure for verification of the fire and initiation of response, including identification of fire location, dispatching of the fire brigade, and sounding alarms;
- Emergency action levels are declared and notifications are made in accordance with NUREG-0654 and Title 10 of the *Code of Federal Regulations* (10 CFR) 50;
- Radio communications between the command post, control room, and plant operators and among fire brigade members remain efficient and effective for the duration of the drill;
- Adherence to the pre-planned drill scenario; and
- Drill objectives.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted one annual fire protection drill observation sample as defined in IP 71111.05-05.

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures (AOPs) to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant areas to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- HPCI room;
- Rad waste tank room;
- RCIC room;
- Torus basement;
- Southeast corner room;
- Northeast corner room; and
- Electrical manholes (MH)104; MH105; MH106; and MH107.

Documents reviewed during this inspection are listed in the Attachment to this report.

This inspection constituted one internal flooding sample as defined in IP 71111.06–05.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07T)

.1 Triennial Review of Heat Sink Performance

a. Inspection Scope

The inspectors reviewed completed surveillances, vendor manual information, associated calculations, performance test results, and heat exchanger inspection results associated with the “A” residual heat removal (RHR) heat exchanger (1E201A). This heat exchanger was chosen based on its risk significance in the licensee’s probabilistic safety analysis, its important safety-related mitigating system support functions, and its operating history.

For the “A” RHR heat exchanger, the inspectors reviewed the adequacy of the testing, inspection, maintenance, and monitoring of biotic fouling and macrofouling programs to ensure proper heat transfer. This was accomplished by determining whether: (1) the test method used was consistent with accepted industry practices, or equivalent; (2) the test conditions were consistent with the selected methodology; (3) the test acceptance criteria were consistent with the design basis values; and (4) results of heat exchanger performance testing. The inspectors also reviewed test results to ensure: (1) they appropriately considered differences between testing conditions and design conditions; (2) the frequency of testing based on trending of test results was sufficient to detect degradation prior to loss of heat removal capabilities below design basis values; and (3) test results considered test instrument inaccuracies and differences.

For the “A” RHR heat exchanger, the inspectors also reviewed the methods and results of heat exchanger performance inspections. The inspectors reviewed the methods used to inspect and clean heat exchangers to ensure they were consistent with as found conditions identified and expected degradation trends, and the as found results were recorded, evaluated, and appropriately dispositioned such that the as left condition was acceptable.

In addition, the inspectors reviewed the condition and operation of the “A” RHR heat exchanger to ensure it was consistent with its design assumptions in heat transfer calculations and as described in the UFSAR. This included a review of the number of plugged tubes to ensure it was within pre-established limits based on capacity and heat

transfer assumptions. The inspectors also reviewed the licensee's controls and operational limits for the heat exchanger to ensure they were adequate to prevent heat exchanger degradation due to excessive flow-induced vibration during operation. In addition, eddy current test reports and visual inspection records were reviewed to determine the structural integrity of the heat exchanger.

The inspectors reviewed the performance of ultimate heat sinks (UHS) and safety-related service water systems and their subcomponents such as piping, intake screens, pumps, valves, etc. by tests or other equivalent methods to ensure availability and accessibility to the in-plant cooling water systems. Specifically, the inspectors reviewed the UHS in accordance with subsections d.5, and d.7, of section 02.02, "Triennial Review," of IP 71111.07, "Heat Sink Performance."

The inspectors reviewed the licensee's performance testing of service water system and UHS results. This included reviewing the performance test results for pumps and valves in the Inservice Test Program and service water flow balance test results. In addition, the inspectors compared the flow balance results to system configuration and flow assumptions during design basis accident conditions. Interconnections between the safety-related and non-safety portions of the service water systems were reviewed to ensure adequate isolation during design basis events. The proper performance of risk-significant nonsafety-related functions was also reviewed.

The inspectors performed a system walkdown of the river water intake structure and service water pump house to verify structural integrity and component functionality. This included verifying the proper functioning of traveling screens and strainers, and structural integrity of component mounts. In addition, the inspectors reviewed the pump bay inspections to ensure the river water and service water pump bays' silt accumulation was monitored, trended, and maintained at an acceptable level in the intake structure and the pump house; and that water level instruments were functional and routinely monitored. The inspectors also reviewed the licensee's ability to ensure functionality during adverse weather conditions. The inspectors reviewed the monitoring of the river to ensure adequate water would still flow past sand-limiting underwater weir walls during periods of low river level. The inspectors also verified that the licensee had adequately protected against silt introduction during periods of low river flow or level.

In addition, the inspectors reviewed CRs related to the RHR heat exchangers and heat sink performance issues to verify that the licensee had an appropriate threshold for identifying issues and to evaluate the effectiveness of the corrective actions. The documents that were reviewed are included in the Attachment to this report.

These inspections constituted two heat sink inspection samples as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

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

a. Inspection Scope

On August 24, 2015, 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;
- 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 resident inspector quarterly review of licensed operator requalification 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 August 1 and 2, 2015, the inspectors observed licensed operators in the control room perform significant reactivity manipulations associated with the revised monthly STP 3.1.3-01, "Control Rod Exercise." The STP was revised to support operations with a potential fuel defect. This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas of the crew:

- licensed operator performance;
- 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 manipulations;
- oversight and direction from supervisors; and

- ability to identify and implement appropriate TS actions and emergency plan actions and notifications.

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 resident inspector quarterly observation of heightened activity or 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:

- On-Site [Electrical Power] Distribution Startup System (SUS) 4.00, 5.00, 6.00, 7.00, 17.00, 57.00; and
- “B” Control Building Chiller (CBC).

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.

These inspections constituted two routine quarterly evaluation 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 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:

- Work week 1529 – river bottom dredging/removal of the T-1 (345kV/161kV) main transformer (and thereby standby transformer) from service for repairs;
- Work week 1530 – river water supply (RWS) pit and pump house diving operations/RCIC steam flow calibration first time evolution;
- Work week 1532 – RHRSW and RHR system work windows; and
- Work week 1537 - DAEC decision to defer maintenance on the directional distance relay.

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 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 inspections constituted four maintenance risk assessment and emergent work control samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- HPCI/MO-2239, HPCI outboard steam isolation valve, loss of position indication operability issues;
- "B" CBC degradation and inoperability; and

- Inboard recirculation system sample line isolation valve position indication.

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 UFSAR 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.

These inspections constituted three operability evaluation 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 the following modifications:

- Replace "B" RHR minimum flow bypass valve due to erosion.

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system. The inspectors, as applicable, 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. As applicable, 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 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 post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- Operational testing following racking out/in the “A” and “C” RHRSW 4kV motor breakers to support diving operations in the “A” RHRSW/ESW pit;
- Retest activities following replacement of the 27/P relay (250 VDC power monitoring relay) for primary containment isolation valve MO-2239;
- Repair and testing activities for replacement of auxiliary relay 95–K4303 for the chemistry lab exhaust fan 1VEF019B;
- Operational testing of the “B” low pressure coolant injection (LPCI) subsystem following system maintenance window;
- Operational testing of the “B” RHRSW subsystem following system maintenance window; and
- “B” CBC following temperature control valve replacement.

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 UFSAR, 10 CFR 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.

These inspections 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:

- “A” RWS and screen wash system vibration measurement and operability test (In-service Test);
- “B” SBDG operability test (fast start) (Routine);
- Remote shutdown panel functional test for CS and instrumentation (Isolation Valve);
- “B” ESW operability test (Routine);
- “B” control building/standby gas treatment instrument air system compressor functional check valve test (Routine); and
- “A” SBDG operability test (slow start from emergency air) (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 UFSAR, 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.

These inspections constituted four routine surveillance testing samples, one in-service test sample, and one containment isolation valve sample as defined in IP 71111.22, Sections –02 and –05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on September 3, 2015, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the control room 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 licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This inspection constituted one emergency preparedness drill sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Occupational and Public Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

This inspection constituted one complete sample as defined in IP 71124.01–05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed all licensee Performance Indicators (PI) for the Occupational Exposure Cornerstone for follow-up. The inspectors reviewed the results of the radiation protection program audits (e.g., licensee's quality assurance audits or other independent audits). The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection. The inspectors reviewed the results of the audit, and operational report reviews to gain insights into overall licensee performance.

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors determined if there were changes to plant operations since the last inspection that might have resulted in a significantly new radiological hazard for onsite workers or members of the public. The inspectors evaluated whether the licensee assessed the potential impact of these changes and had implemented periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors reviewed the last two radiological surveys from selected plant areas and evaluated whether the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

The inspectors conducted walkdowns of the facility, including radioactive waste processing, storage, and handling areas to evaluate material conditions and performed independent radiation measurements to verify conditions.

The inspectors selected the following radiologically risk-significant work activities that involved exposure to radiation:

- 1F-207 septa change out;
- "A" demineralizer vessel work; and
- "A" reactor water cleanup (RWCU) pump work.

For these work activities, the inspectors assessed whether the pre-work surveys performed were appropriate to identify and quantify the radiological hazard and to establish adequate protective measures. The inspectors evaluated the radiological survey program to determine if hazards were properly identified, including the following:

- identification of hot particles;
- the presence of alpha emitters;
- the potential for airborne radioactive materials, including the potential presence of transuranics and/or other hard-to-detect radioactive materials (This evaluation may include licensee planned entry into non-routinely entered areas subject to previous contamination from failed fuel.);

- the hazards associated with work activities that could suddenly and severely increase radiological conditions, and that the licensee had established a means to inform workers of changes that could significantly impact their occupational dose; and
- severe radiation field dose gradients that can result in non-uniform exposures of the body.

The inspectors observed work in potential airborne areas and evaluated whether the air samples were representative of the breathing air zone. The inspectors evaluated whether continuous air monitors were located in areas with low background to minimize false alarms and were representative of actual work areas. The inspectors evaluated the licensee's program for monitoring levels of loose surface contamination in areas of the plant with the potential for the contamination to become airborne.

b. Findings

No findings were identified.

.3 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors selected various containers holding non-exempt licensed radioactive materials that might cause unplanned or inadvertent exposure of workers, and assessed whether the containers were labeled and controlled in accordance with 10 CFR 20.1904, "Labeling Containers," or met the requirements of 10 CFR 20.1905(g), "Exemptions To Labeling Requirements."

The inspectors reviewed the following radiation work permits (RWPs) used to access high-radiation areas and evaluated the specified work control instructions or control barriers:

- RWP 15-002; routine health physics duties;
- RWP 15-011; tank inspections, cleaning, maintenance and support work in [radioactive material area] RMA, [radiological controlled area] RCA, [radiation area] RA, [high radiation area] HRA, [locked high radiation area] LHRA; and
- RWP 15-0010; routine operations duties.

For these RWPs, the inspectors assessed whether allowable stay times or permissible dose (including from the intake of radioactive material) for radiologically significant work under each RWP were clearly identified. The inspectors evaluated whether electronic personal dosimeter alarm set-points were in conformance with survey indications and plant policy.

The inspectors reviewed selected occurrences where a worker's electronic personal dosimeter noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the CAP, and dose evaluations were conducted as appropriate.

For work activities that could suddenly and severely increase radiological conditions, the inspectors assessed the licensee's means to inform workers of changes that could significantly impact their occupational dose.

b. Findings

No findings were identified.

.4 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors observed locations where the licensee monitors potentially contaminated material leaving the radiological control area and inspected the methods used for control, survey, and release from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use and evaluated whether the work was performed in accordance with plant procedures and whether the procedures were sufficient to control the spread of contamination and prevent unintended release of radioactive materials from the site. The inspectors assessed whether the radiation monitoring instrumentation had appropriate sensitivity for the type(s) of radiation present.

The inspectors reviewed the licensee's criteria for the survey and release of potentially contaminated material. The inspectors evaluated whether there was guidance on how to respond to an alarm that indicated the presence of licensed radioactive material.

The inspectors reviewed the licensee's procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters. The inspectors assessed whether or not the licensee had established a de facto "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high-radiation background area.

The inspectors selected several sealed sources from the licensee's inventory records and assessed whether the sources were accounted for and verified to be intact.

The inspectors evaluated whether any transactions, since the last inspection, involving nationally tracked sources were reported in accordance with 10 CFR 20.2207.

b. Findings

No findings were identified.

.5 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors evaluated ambient radiological conditions (e.g., radiation levels or potential radiation levels) during tours of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, RWP's, and worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage (including audio and visual surveillance for remote job coverage), and contamination controls. The inspectors evaluated the licensee's use of electronic personal dosimeters in high-noise areas as high radiation area monitoring devices.

The inspectors assessed whether radiation monitoring devices were placed on the individual's body consistent with licensee procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that the licensee properly employed an NRC-approved method of determining effective dose equivalent.

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in high radiation work areas with significant dose rate gradients.

As applicable, the inspectors reviewed RWPs for work within airborne radioactivity areas with the potential for individual worker internal exposures. For these RWPs, the inspectors evaluated airborne radioactive controls and monitoring, including potential for significant airborne levels (e.g., grinding, grit blasting, system breaches, entry into tanks, cubicles, and reactor cavities). The inspectors assessed barrier (e.g., tent or glove box) integrity and temporary high-efficiency particulate air ventilation system operation.

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (i.e., nonfuel) stored within spent fuel and other storage pools. The inspectors assessed whether appropriate controls (i.e., administrative and physical controls) were in place to preclude inadvertent removal of these materials from the pool.

The inspectors examined the posting and physical controls for selected high radiation areas, and very high radiation areas to verify conformance with the occupational PI.

b. Findings

No findings were identified.

.6 Risk-Significant High Radiation Area and Very High Radiation Area Controls (02.06)

a. Inspection Scope

The inspectors discussed with the radiation protection manager the controls and procedures for high-risk, high radiation areas, and very high radiation areas. The inspectors discussed methods employed by the licensee to provide stricter control of very high radiation area access as specified in 10 CFR 20.1602, "Control of Access to Very High Radiation Areas," and Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas of Nuclear Plants." The inspectors assessed whether any changes to licensee procedures substantially reduced the effectiveness and level of worker protection.

The inspectors discussed the controls in place for special areas that had the potential to become VHRAs during certain plant operations with first-line health physics supervisors (or equivalent positions having backshift health physics oversight authority). The inspectors assessed whether these plant operations require communication beforehand

with the health physics group, so as to allow corresponding timely actions to properly post, control, and monitor the radiation hazards including re-access authorization.

The inspectors evaluated licensee controls for very high radiation areas and areas with the potential to become very high radiation areas to ensure that an individual was not able to gain unauthorized access to the very high radiation areas.

b. Findings

No findings were identified.

.7 Radiation Worker Performance (02.07)

a. Inspection Scope

The inspectors observed radiation worker performance with respect to stated radiation protection work requirements. The inspectors assessed whether workers were aware of the radiological conditions in their workplace and the RWP controls/limits in place, and whether their performance reflected the level of radiological hazards present.

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be human performance errors. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. The inspectors discussed any problems with the corrective actions planned or taken with the radiation protection manager.

b. Findings

No findings were identified.

.8 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

The inspectors observed the performance of the radiation protection technicians with respect to all radiation protection work requirements. The inspectors evaluated whether technicians were aware of the radiological conditions in their workplace and the RWP controls/limits, and whether their performance was consistent with their training and qualifications with respect to the radiological hazards and work activities.

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be radiation protection technician error. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

b. Findings

No findings were identified.

.9 Problem Identification and Resolution (02.09)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved radiation monitoring and exposure controls. The inspectors assessed the licensee's process for applying operating experience to their plant.

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 Mitigating Systems Performance Index—Emergency Alternating Current Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System performance for the period from the third quarter 2014 through the second quarter 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (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 integrated inspection reports for the period of July 2014 through June 2015 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.



## .2 Mitigating Systems Performance Index—High Pressure Injection Systems

### a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems performance for the period from the third quarter 2014 through the second quarter 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the 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 integrated inspection reports for the period of July 2014 through June 2015 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.

### b. Findings

No findings were identified.

## .3 Mitigating Systems Performance Index—Heat Removal System

### a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Heat Removal System performance for the period from the third quarter 2014 through the second quarter 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the 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, event reports, MSPI derivation reports, and NRC integrated inspection reports for the period of July 2014 through June 2015 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 - Heat Removal System sample as defined in IP 71151-05.

### b. Findings

No findings were identified.

#### .4 Reactor Coolant System Specific Activity

##### a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system (RCS) specific activity PI for DAEC for the period from the fourth quarter 2014 through the second quarter 2015. The inspectors used PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 2013, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's RCS chemistry samples, TS requirements, issue reports, event reports, and NRC integrated inspection reports 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. In addition to record reviews, the inspectors reviewed RCS samples. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one RCS specific activity sample as defined in IP 71151-05.

##### b. Findings

No findings were identified.

#### .5 Occupational Exposure Control Effectiveness

##### a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Exposure Control Effectiveness PI for the period from the fourth quarter 2014 through the second quarter 2015. The inspectors used PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 2013, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's assessment of the PI for occupational radiation safety to determine if indicator related data was adequately assessed and reported. To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with radiation protection staff, the scope and breadth of its data review and the results of those reviews. The inspectors independently reviewed electronic personal dosimetry dose rate and accumulated dose alarms and dose reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. The inspectors also conducted walkdowns of numerous locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one occupational exposure control effectiveness sample as defined in IP 71151-05.

##### b. Findings

No findings were identified.

.6 Radiological Effluent Technical Specification/Off-Site Dose Calculation Manual  
Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the radiological effluent technical specification (RETS)/off-site dose calculation manual (ODCM) radiological effluent occurrences PI for the period from the fourth quarter 2014 through the second quarter 2015. The inspectors used PI definitions and guidance contained in the NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 2013, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted off-site dose. The inspectors reviewed gaseous effluent summary data and the results of associated off-site dose calculations for selected dates to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one RETS/ODCM radiological effluent occurrences sample as defined in IP 71151-05.

b. Findings

No findings were identified.

40A2 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 IPs 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 that 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.

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

.1 (Closed) Licensee Event Report 05000331/2015-001-00 and 05000331/2015-001-01: Both Doors in Secondary Containment Airlock Opened Concurrently

This event, which occurred on March 21, 2015, involved the simultaneous opening of two doors (door 225 and 228) while workers were traversing through a secondary containment access airlock. The workers recognized the airlock condition, closed both doors in less than 10 seconds and verified that the doors were latched, and notified the control room. The momentary opening of both doors within the airlock resulted in the station failing to meet TS surveillance requirement 3.6.4.1.2 to verify that either door in each secondary containment access opening was closed, and therefore, momentarily rendered secondary containment inoperable per TS limiting condition for operation (LCO) 3.6.4.1. The licensee performed an investigation and identified, through a root cause evaluation, that the door interlock was not designed to prevent more than one airlock door from opening under all possible conditions. The licensee installed signs at the affected airlock doors that instructed personnel using the doors to wait an additional two seconds after access was granted, to allow the interlock mechanism appropriate time to actuate and prevent further simultaneous door openings during those conditions not previously prevented by the interlock design. Additionally, the licensee satisfactorily performed the secondary containment airlock verification surveillance test to demonstrate functionality of the interlock.

The inspectors reviewed Licensee Event Reports (LERs) 05000331/2015-001-00 and 05000331/2015-001-01 against reporting requirements and found no issues. The inspectors also reviewed the licensee's assessment of safety consequences in the LER, specifically, the basis for not considering the condition a safety system functional failure. Based on the licensee's post-loss of coolant accident dose calculation of record that did not credit secondary containment integrity for on-site and off-site doses for the first five minutes of the event, the inspectors determined that it was reasonable to conclude that the simultaneous opening condition of the secondary containment doors was bounded

by the existing licensing basis calculation of record. Documents reviewed are listed in the Attachment to this report. These LERs are closed.

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

.2 (Closed) Licensee Event Report 05000331/2015-003-00 and 05000331/2015-003-01: Both Doors in Secondary Containment Airlock Opened Concurrently

This event, which occurred on April 16, 2015, involved the simultaneous opening of two doors (door 225 and 227) while workers were traversing through a secondary containment access airlock. The workers recognized the airlock condition, closed both doors in less than 10 seconds and verified that the doors were latched, and notified the control room. The momentary opening of both doors within the airlock resulted in the station failing to meet TS surveillance requirement 3.6.4.1.2 to verify that either door in each secondary containment access opening was closed, and therefore, momentarily rendered secondary containment inoperable per TS LCO 3.6.4.1. The licensee performed an investigation and identified, through a root cause, evaluation that the door interlock was not designed to prevent more than one airlock door from opening under all possible conditions. The licensee installed signs at the affected airlock doors that instruct personnel using the doors to wait an additional two seconds after access was granted, to allow the interlock mechanism appropriate time to actuate and prevent further simultaneous door openings during those conditions not previously prevented by the interlock design. Additionally, the licensee satisfactorily performed the secondary containment airlock verification surveillance test to demonstrate functionality of the interlock.

The inspectors reviewed LERs 05000331/2015-003-00 and 05000331/2015-003-01 against reporting requirements and found no issues. The inspectors also reviewed the licensee's assessment of safety consequences in the LER, specifically, the basis for not considering the condition a safety system functional failure. Based on the licensee's post-loss-of-coolant accident dose calculation of record that did not credit secondary containment integrity for on-site and off-site doses for the first five minutes of the event, the inspectors determined that it was reasonable to conclude that the simultaneous opening condition of the secondary containment doors was bounded by the existing licensing basis calculation of record. Documents reviewed are listed in the Attachment to this report. These LERs are closed.

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

.3 (Retracted) Event Notification 50891: Low Pressure Coolant Injection Declared Inoperable

On March 12, 2015, the licensee was performing STP 3.3.5.1-29, "Containment Spray Logic System Functional Test and RHR Timer Calibration," when the LPCI loop select ½-second time delay relay was found out of tolerance. The LPCI loop select ½-second time delay relay was found at 0.03 seconds, whereas the relay acceptance criteria was 0.44 – 0.55 seconds. The as found condition resulted in the licensee exceeding the allowed out of service time of 6 hours, at which time the licensee entered unplanned TS LCO 3.3.5.1, Condition C, for LPCI loop select recirculation pump differential pressure. The licensee made an 8-hour non-emergency notification to the NRC per 10 CFR 50.72(b)(3)(v)(D), "Any event or condition that at the time of discovery could

have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.”

The licensee calibrated, bench tested, and replaced the relay but during post maintenance testing, the licensee could not achieve the required 0.44 – 0.55 second time delay even though the bench test resulted in repeatable values of 0.5 seconds. The results during the post maintenance testing were similar to the as found during the surveillance test. By bench testing the original relay, the licensee determined that the testing setup was affecting the surveillance results. The original relay was able to be calibrated and achieve repeatable results on the bench at 0.53 seconds. The new relay installed was confirmed to have a time delay within the required range and the system was returned to an operable status on March 13, 2015.

The licensee performed an apparent cause evaluation (ACE) to determine the causes and contributors for the surveillance results. As part of engineering change 275798, the licensee had changed the testing methodology associated with the LPCI loop select ½-second time delay relay. Previously, the relay was removed from the system, tested and replaced in the circuitry. The testing was changed to allow the relay to be tested while still installed in the circuit. This allowed for parallel electrical paths to be present through the relay of interest as well as the testing device itself. This parallel circuit was demonstrated to affect the time delay circuitry by the licensee by using a test setup to mimic the plant installed circuitry. The licensee determined that the apparent and contributing causes to the surveillance failure was lack of understanding associated with the test device impedance and less than adequate procedure development.

In addition to performing an ACE, the licensee evaluated past operability from March 14, 2013, until March 12, 2015, which was the time duration between the first instance of the new testing methodology being used and condition discovery. Through the test setup and bench testing of the original relay, the licensee was able to determine that the results obtained on March 12, 2015, were consistent with that of a relay able to perform its safety related function. Therefore, the LPCI loop select ½-second time delay relay had always been operable. On April 23, 2015, the licensee retracted Event Notification (EN) 50891 due to the causal analysis results and past operability review. The inspectors reviewed the EN, licensee procedures, the response to the event, applicable TS, the ACE, the past operability review and vendor documents and did not identify any issues. Documents reviewed are listed in the Attachment to this report.

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

#### .4 (Retracted) Event Notification 51006: Safety Systems Declared Inoperable

On April 23, 2015, the licensee performed a surveillance test of the HPCI system. Because the HPCI turbine steam exhaust is directed to the torus during the surveillance test, the licensee must provide cooling in order to maintain the torus temperatures below the TS limit. The licensee aligned the RHR system to provide torus cooling using all four RHR pumps. While the RHR system is aligned for torus cooling, the LPCI function cannot operate as required during accident scenarios and must be declared inoperable. The licensee followed the appropriate TS LCO 3.5.1, Required Action B and declared one low pressure emergency core cooling subsystem inoperable. After successful performance of the HPCI surveillance test, the licensee was realigning the RHR system to a normal lineup when they discovered that the “C” RHR pump could not be stopped from the control room. The licensee dispatched operators to the pump breaker but the

breaker failed to electrically trip locally. The “C” RHR pump was finally stopped when the pump breaker was tripped mechanically. The “C” RHR breaker was promptly removed, replaced with a spare which tested satisfactorily. The licensee was then able to exit the applicable LCO action statements the same day.

Due to the failure of the “C” RHR pump breaker to divorce from the division “1” essential electrical bus, the licensee determined that a reasonable assurance of operability did not exist for the protective function for the breaker. Therefore, the licensee declared the division “1” essential electrical bus inoperable. The licensee then performed a safety function determination in accordance with administrative control procedure (ACP) 1410.2, “LCO Tracking and Safety Function Determination Program,” and TS LCO 5.5.11, “Safety Function Determination Program.” The licensee determined that because the division “1” electrical bus had been declared inoperable due to the “C” RHR breaker equipment malfunction, the supported function of “A” CS was also inoperable. This led the licensee to determine that during the time while the LPCI function was inoperable for torus cooling and “A” CS function was inoperable due to the breaker malfunction, two emergency core cooling subsystems were inoperable and a loss of safety function had occurred. The licensee made an 8-hour non-emergency notification to the NRC per 10 CFR 50.72(b)(3)(v)(D), “Any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.”

The licensee performed an ACE to determine the causes and contributors for the equipment malfunction. Breaker tripping was accomplished by rotating the trip shaft. For electrical tripping, a trip coil is energized which pulls the trip coil plunger upward by a linkage pulling the back of the trip coil actuator upward, rotating the front of the trip coil actuator downward on to an Allen head bolt. The Allen head bolt rotates the trip shaft. The Allen head bolt is secured in place by a set screw. Licensee investigation identified the Allen head bolt had fallen to the bottom of the breaker cubicle which prevented the process described above from occurring. The licensee determined that the apparent and contributing causes to the surveillance failure was a procedural inadequacy associated with CKTBKR–G080–07, “GE AM 4.16-350–2H Medium Voltage Breaker Overhaul,” which was unclear in specifying allowable Allen head bolt position. The procedure was corrected with clarifying information associated with Allen head bolt position.

In addition to performing an ACE, the licensee evaluated past operability from April 18, 2015, until April 23, 2015, which was the time duration between “C” RHR pump breaker opening demands. As part of the past operability review, the licensee performed an evaluation of “A” SBDG voltage and frequency response in response to a loss-of-offsite-power with loss-of-coolant-accident signal, SBDG startup and loading sequence. The licensee was able to demonstrate during the time duration in question that the diesel would have been able to perform its safety-related function to start, connect and load as required. Therefore, between April 18, 2015, and April 23, 2015, a condition did not exist which resulted in the inoperability of either the division “1” essential electrical bus or the “A” CS pump. On May 8, 2015, the licensee retracted EN 51006 due to the causal analysis results and past operability review. The inspectors reviewed the EN, licensee procedures, the response to the event, applicable TS, the ACE, the past operability review and operating experience, and did not identify any issues. Documents reviewed are listed in the Attachment to this report.

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

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On October 8, 2015, the inspectors presented the inspection results to Mr. P. Hansen, Plant General Manager, 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 Meetings

Interim exits were conducted for:

- The inspection results for the areas of radiological hazard assessment and exposure controls; and RCS specific activity, occupational exposure control effectiveness, and RETS/ODCM radiological effluent occurrences PI verification with Mr. P. Hansen, Plant General Manager, on July 24, 2015; and
- The inspection results for the triennial review of heat sink performance were discussed with Mr. T. Vehec, Site Vice President, on August 28, 2015.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION



## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

T. Vehec, Site Vice President  
P. Hansen, Plant General Manager  
K. Kleinheinz, Site Engineering Director  
M. Davis, Licensing Manager  
M. Fritz, Emergency Preparedness Manager  
B. Simmons, Nuclear Oversight Manager  
R. Wheaton, Operations Director  
R. Porter, Radiation Protection Manager  
D. Olsen, Chemistry Manager  
J. Schwertfeger, Security Manager  
C. Hill, Training Manager  
B. Murrell, Licensing Senior Engineer  
L. Swenzinski, Licensing Senior Engineer  
P. Collingsworth, System Engineering  
D. Church, Engineering Programs Manager

#### Nuclear Regulatory Commission

K. Stoedter, Chief, Reactor Projects Branch 1  
M. Chawla, Project Manager, NRR

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

None

### Closed

05000331/2015001-00; LER Both Doors in Secondary Containment Airlock Opened  
05000331/2015001-01 Concurrently (Section 4OA3)

05000331/2015003-00; LER Both Doors in Secondary Containment Airlock Opened  
05000331/2015003-01 Concurrently (Section 4OA3)

### Discussed

None

## 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 (71111.01)

- AOP 903; Severe Weather; Revision 52
- CR 02070673; NRC Question on Tornado Hazard
- NG-269K; Tornado Missile Hazard Inspection; Revision 5
- OI 150 QRC1; RCIC Rapid Start; Revision 3
- OI 150A4; RCIC Control Panel Lineup; Revision 3
- OI 152 QRC1; HPCI Rapid Start; Revision 5
- OI 152; HPCI System; Revision 112
- OI 152A4; HPCI Control Panel Lineup; Revision 5
- OP-102-1002; Seasonal Readiness; Revision 8
- Operating Instruction (OI) 150; RCIC System; Revision 80

### 1R04 Equipment Alignment (71111.04)

- AOP 302.1; Loss of 125 VDC Power; Revision 55
- CR 02063230; NRC Identified: SE Corner Room Floor Drain Cover Missing
- CR 02063493; Sediment Found in "A" RWS Pit Heavier Than Normal
- Drawing BECH-M132 [2]; P&ID 1G031 SBDG; Revision 16
- Drawing BECH-M132 [3]; P.&I.D. 1G021 SBDG; Revision 18
- OI 151A1; CS System Electrical Lineup; Revision 3
- OI 151A2; A CS System Valve Lineup and Checklist; Revision 6
- OI 151A4; B CS System Valve Lineup and Checklist; Revision 4
- OI 151A6; CS System Control Panel Lineup; Revision 2
- OI 302A1; Division 1, 125 VDC Power Distribution System 1D10, 1D11, 1D12, 1D13, and 1D14 Electrical Lineup; Attachment 1; Revision 4
- OI 324A1; SBDG 1G-31 System Electrical Lineup; Revision 2
- OI 324A10; SBDG Standby/Readiness Condition Checklist; Revision 18
- OI 324A2; SBDG 1G-21 System Electrical Lineup; Revision 2
- OI 324A3; SBDG 1G-31 System Valve Lineup and Checklist; Revision 11
- OI 324A4; SBDG 1G-21 System Valve Lineup and Checklist; Revision 15
- OI 324A6; ESW System Control Panel Lineup; Revision 2
- OI 324A7; SBDG 1G-31 System Control Panel Lineup; Revision 5
- OI 324A8; SBDG 1G-21 System Control Panel Lineup; Revision 4
- OI 454A1; ESW System Electrical Lineup; Revision 5
- OI 454A4; B ESW System Valve Lineup and Checklist; Revision 18
- OP-AA-102-1003; Guarded Equipment; Revision 7

### 1R05 Fire Protection (71111.05Q)

- ACP 1203.53; Fire Protection; Revision 11
- ACP 1412.4; Fire System; Revision 74
- AOP 913; Revision 77
- CR 02074644; Need Two Copies of EAL Basis in Control Room

- EAL-01; Revision 9
- FHA-400; Fire Protection Program- Fire Hazards Analysis; Revision 17
- PFP-OE-757; Pre-Fire Plan (PFP) OAG-PA East EI 757; Revision 1
- PFP-OS-757; PFP OAG-PA South EI 757; Revision 1
- PFP-RB-716; PFP Reactor Building EI. 716; Revision 1
- PFP-RB-828; PFP Reactor Building EI 528; Revision 1
- PFP-PH-757; PFP Pump House; Revision 1
- WO 40338511; Crew 6 Fire Drill

#### 1R06 Flooding (71111.06)

- AOP 902; Flood; Revision 54
- BECH-E350<1>; Underground Duct Bank Layout; Revision 7
- CR 02077277; Evaluate MH Inspection ACMP for OPS Burden
- GMP-ELEC-39; Electrical MH Inspection; Revision 3
- Probabilistic Evaluation of Internal Flooding; 1249309D-010; Revision 2
- Prompt Operability Determination; MH104, MH105, and MH107 Found With Water
- Work Plan PMRQ 22567-01; Electrical MH Sump Pump

#### 1R07 Triennial Heat Sink Performance (71111.07T)

- ACP 1208.4; GL 89-13 Heat Exchanger Performance & Trending; Revision 14
- AOP 410; Loss of RWS/High River Bed Elevation/Low River Water Depth; Revision 28
- ARP 1C03B; Annunciator Response Procedure – ARP 1C03B – Reactor and Containment Cooling and Isolation; Revision 41
- BECH-M113; RHR Service Water and ESW Systems; Revision 75
- BECH-M129; RWS System Intake Structure; Revision 45
- BECH-M146; Service Water System Pumphouse; Revision 89
- CR 01701371; Sand Gate Position
- CR 01721047; ESW Pump 1P099A Differential Pressure in American Society of Mechanical Engineers Alert Range
- CR 01938058; Trend CR: <6 Inches of Sand in B ESW Strainer
- CR 01949020; Intake Sluice Gate (1S087) Operator Broken Anchor Bolts
- CR 01972939; ESW System Unavailability in Maintenance Rule Yellow Status
- CR 01994333; Sand Bed Elevation Continues to Rise
- CR 02019784; NRC Resident Question on HPCI STP and EOP 2
- CR 02050768; MO-2046 Indicates Full Open With 4900 GPM RHR-SW Flow
- CR 02057945; UHS Self-Assessment – RHR Heat Exchanger Maximum Flow
- CR 02058301; 2015 UHS Self-Assessment – EOP 2 Review
- CR 02060563; RHR HX RHRSW Outlet MO-1947 Indicates Dual When Closed
- CR 02069466; 2015 NRC UHS Inspection Safety Function of RHRSW Strainer Bypass Valves
- CR 02069861; 2015 NRC UHS Inspection – RHR HX Test Flow Rate Accuracy
- CR 02069867; 2015 NRC UHS UFSAR Historical Info. Not Clearly Identified
- FPLE-1-DAEC-03; Final Eddy Current Inspection Report FPLE#19 – RHR 1E201A; February 17, 2009
- OI 410; RWS System; Revision 72
- OI 416; RHR Service Water System; Revision 66
- OI 454; ESW System; Revision 65
- OI 710A1; Intake Structure HVAC Lineup; Revision 4
- OI 711; Pumphouse HVAC System; Revision 17
- OP-AA-102-1002; Seasonal Readiness; Revision 8

- STP 3.7.9-02A; A CB/SBGTS Instrument Air Compressor Functional Test and Check Valve Testing; Revision 6
- SUS 16.00; DAEC Maintenance Rule Program - Performance Criteria Basis Document - RHRSW; Revision 5
- WO 01145899; Verify Relief Valve Setpoint PSV2068
- WO 01283869-01; MA: Clean Coils & Inspect Unit
- WO 01140682; Perform RHR HX 1E201A Heat Transfer Test IAW EMP-1E201-HT
- WO 01144177; Inspect & Clean Service Water Side of HX
- WO 40039437-02; D RWS Pump Differential Pressure Was Not Within Limits
- WO 40059675-01; F11971A – Calibrate
- WO 40081342; LS2904 – Adjust Setpoint to 66 Inches NRC Commitment
- WO 40116232-01; 1E201A: Perform RHR HX 1E201A Heat Transfer Test IAW EMP
- WO 40250967; LIS4935A: Calibrate A ESW Pit Level
- WO 40254627-01; STP NS490002 LPCI Inject Check Valve Full Flow Test
- WO 40268637; Inspect & Clean Pumphouse Stilling Basin
- WO 40268640; Inspect & Clean B RWS Intake Pit
- WO 40268647; Inspect & Clean B RHRSW/ESW Pit
- WO 40324835; A RHR Service Water Operability Test
- WO 40324835; A RWS and Screen Wash
- WO 40327161; A ESW Operability Test
- WO 40330934; LT4935A: Calibrate
- WO 40336650; A RWS and Screen Wash
- WO 40337243; V13-0126: Remove Bonnet and Verify Disk Moves Freely
- WO 40346140; A RHR Service Water Operability Test
- WO 40346686; A ESW Operability Test
- WO 40358587; Inspect & Clean River Side of Intake Structure
- WO 40358594; Inspect & Clean A RWS Intake Pit
- WO 40358607; Inspect & Clean A RHRSW/ESW Pit
- WO A66164; Re-repair the Pass Divider Plate

#### 1R11 Licensed Operator Regualification Program (71111.11)

- AD-AA-100-1006; Procedure and Work Instruction Use and Adherence; Revision 5
- OP-AA-100-1000; Conduct of Operations; Revision 15
- OP-AA-103-1000; Reactivity Management; Revision 4
- Reactivity Management Plan; Downpower for Control Rod Exercise; August 2015
- Simulator Exercise Guide PDA OPS 2015D-01E; Revision 0
- STP 3.1.3-01; Control Rod Exercise; Revision 1

#### 1R12 Maintenance Effectiveness (71111.12)

- CR 02037970; Spurious 1C26B B Chiller 1V-CH-1B Trouble
- CR 02040319; Small Refrigerant Leak Around PSV-6943B Threads
- CR 02042403; TCV 6924B Chiller Temperature Controller Needs Oil
- CR 02061489; Safety-Potential Slip Hazard by B CBC
- CR 02063447; Evaluation of a Potential Proficiency Issue Requested
- CR 02065346; Load Shed Function not Monitored by Maintenance Rule
- DAEC Performance Criteria Basis Document; Emergency Diesel Generator and the Technical Support Center Diesel Generator SUS 23.00, 24.01, 24.02, 24.03, 24.04; Revision 7
- DAEC Performance Criteria Basis Document; On-Site Distribution SUS 4.00, 5.00, 6.00, 7.00, 17.00, 57.00; Revision 7

- DAEC Performance Criteria Basis Document; RHR SUS 49.00; Revision 5
- ER-AA-100-2002; Maintenance Rule Program Administration; Revision 2
- LTR-0078-0071-02; Evaluation of SBDG Voltage and Frequency Response with RHR2 Pump Motor Starting at Breaker Closure; May 27, 2015
- NUMARC 93-01; Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants; Revision 4A
- Vendor Manual HTEXCH-D270; Section A; Inspection; Revision 27
- Work Plan; PM Task; 1VCH001 AUNIT; CBC

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

- AOP 410; Loss of RWS/High River Bed Elevation/Low River Water Depth; Revision 28
- BECH-M119; RHR System; Revision 85
- CE 02070307; Evaluation of Actions to Address Foreign Material in Relay 50BU-I/H
- CR 02056009; Considering RHRSW Pumps Available During Heat Exchanger Outlet Valve Work
- CR 02061300; AOP-410 Entry; River Bed Elevation at 727.4 FT
- CR 02063623; Incorrect System Guarded
- CR 02063672; I&C STPs Need Improvement Flowing In and Out of Electronic Systems Maintenance Procedures
- CR 02063675; 3.3.6.1-27-RCIC Steam Line Flow-High Channel Calibration
- CR 02063941; Mitigating Actions for Orange Online Risk Management
- CR 02066261; Equipment OOS Calculation not Correct for Certain Combinations of RHR
- MA-AA-100-1005; Conduct of Diving Operations; Revision 4
- OI 410; RWS System; Revision 72
- OP-AA-102-1003; Guarded Equipment; Revisions 7 and 8
- OP-AA-104-1007; Online Aggregate Risk; Revision 3
- Option Decision Matrix; Foreign Material in Relay 50BU-I/H Appear To Be Metal Shavings
- PI-AA-102-1006; Nuclear Fleet Administrative Procedure; Decision Making; Revision 0 Draft
- STP 3.3.6.1-27; RCIC Steam Line Flow-High Channel Calibration; Revisions 9 and 10
- System Description 304; Electrical Power Systems; Revision 19
- WM-AA-1000; Work Activity Risk Management; Revision 4
- Work Planning Guideline-1; Work Process Guideline; Revision 62
- Work Planning Guideline-2; Online Risk Management Guideline; Revision 67
- Work Week 1529 Work Activity Risk Management (WARM) Summary and Weekly Probabilistic Risk Analysis; Revisions 0, 1, and 2
- Work Week 1530 Work Activity Risk Management (WARM) Summary and Weekly Probabilistic Risk Analysis
- Work Week 1532 Work Activity Risk Management (WARM) Summary and Weekly Probabilistic Risk Analysis; Revision 0

1R15 Operability Determinations and Functionality Assessments (71111.15)

- ACP 1410.2; LCO Tracking and Safety Function Determination Program; Revision 33
- CR 02037970; Spurious 1C26B B Chiller 1V-CH-1B Trouble
- CR 02040319; Small Refrigerant Leak Around PSV-6943B Threads
- CR 02042403; TCV 6924B Chiller Temperature Controller Needs Oil
- CR 02061489; Safety-Potential Slip Hazard by "B" CBC
- CR 02064123; Loss of Position Indication for MO2239
- CR 02072430; Recirc Sample Valve Loss of Open Indication

- EN-AA-203-1001; Operability Determinations/Functionality Assessments; Revision 20
- MA-AA-100-1011-F01; Initial Troubleshooting Investigation for CR 02064123 for MO2239 Loss of Position Indication; August 1, 2015
- OP-AA-105-1000; Operational Decision Making; Revision 1

#### 1R18 Plant Modifications (71111.18)

- BECH-M119; RHR System; Revision 68
- Engineering Change 280550; Replace B RHR Minimum Flow Bypass Valve MO-1935 Due to Erosion; Revision 2

#### 1R19 Post-Maintenance Testing (71111.19)

- ACP 1407.3; American Society of Mechanical Engineers Section XI Pump and Valve Testing; Revision 20
- AOP 913; Fire; Revision 77
- CR 02064149; 95-K4303 Coil Discovered Hot at Greater Than 320 Degrees
- CR 02064158; Momentary AOP 913 Fire Entry
- MD-024; Post-Maintenance Testing Program; Revision 80
- MD-062; WO Task(s); Revision 10
- NS160002B; B RHR Service Water Operability Test; Revision 8
- OI 730; Control Building HVAC System; Revision 120
- STP 3.5.1-11B; B LCPI System Operability Tests and Comprehensive Pump Test; Revision 15
- STP 3.7.5-01B; B CBC Operability; Revision 3
- WO 40358608; Support Diver Inspect & Clean as Needed, A RHRSW/ESW Pit
- WO 40403992; 1D4109; Loss of Position Indication for MO2239
- WO 40404519; Replace Relay 95-K4303 in 1C23 for 1VEF019B, Chemistry Lab Exhaust Fan, Control Circuit
- WO 40407447; Replace B CBC Temperature Control Valve Operator

#### 1R22 Surveillance Testing (71111.22)

- ACP 107; Surveillance Tests; Revision 19
- BECH-E106<005>; (Drawing) SBDG and Auxiliary Control; Revision 1
- CR 02059993; B SBDG Oil Leak
- CR 02061661; Evaluate STPs That Have us Enter and Exit Equipment LCOs
- OI 324; SBDG System; Revision 115
- OI 324A10; SBDG Standby/Readiness Condition Checklist; Revision 18
- OI 324A9; SBDG Operating Checklist; Revision 12
- STP 3.3.3.2-03; Remote Shutdown Panel Functional Test for CS and Instrumentation; Revision 21
- STP 3.7.9-02B; B Control Building/Standby Gas Treatment Instrument Air System Compressor Functional Test and Check Valve Testing; Revision 6
- STP 3.8.1-05A; A SBDG Operability Test (Slow Start From Emer Start Air); Revision 20
- STP 3.8.1-06B; B SBDG Operability Test (Fast Start); Revision 22
- STP NS100102A; A RWS and Screen Wash System Vibration Measurement and Operability Test; Revision 22
- STP NS540002B; B ESW Operability Test; Revision 33
- STP3.8.1-12A; A SBDG Diesel Fuel Oil Transfer Pump Tests; Revision 1

## 2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

- HPP 3103.01; HP Survey Performance and Frequencies; Revision 41
- HPP 3103.08; Container and Material Labeling; Revision 13
- HPP 3107.04; Radioactive Source Inventory, Control, and Leak Check; Revision 19
- Radiological Surveys; 1F-207 Septa Change Out; May 23, 2015 through May 20, 2015
- Radiological Surveys; A Demin Vessel Work; June 19, 2015 through June 22, 2015
- Radiological Surveys; A RWCU Pump Work; June 1, 2015 through June 4, 2015
- Radiological Surveys; RB051; Various Dates
- Radiological Surveys; RB315C; Various Dates
- Radiological Surveys; RB430; Various Dates
- Radiological Surveys; TB140; Various Dates
- RFP 607; Removal and Movement of Materials Within the Spent Fuel Pool and Cask Pool; Revision 14
- RWP 15-0010; Routine Operations Duties; Revision 0
- RWP 15-002; Routine Health Physics Duties; Revision 0
- RWP 15-011; Tank Inspections, Cleaning, Maintenance, and Support Work in RMA, RCA, RA, HRA, LHRA; Revision 01
- STP NS999901; Sealed Source Leakage Test; January 13, 2015

## 4OA1 Performance Indicator Verification (71151)

- ACP 1402.4; NRC, World Association of Nuclear Operators and Monthly Operating Performance Report Performance Indicator Reporting; Revision 20
- CE 02041387; Evaluate HPCI Oil Filter 1F299; June 9, 2015
- CR 02006600; HPCI Booster Pump Bearings Have Low Oil Level
- CR 02032868; HPCI Booster Pump Outboard Oil Level is Low
- CR 02041387; HPCI Hydraulic System Appears Sluggish
- CR 02043494; MO-2202 HPCI Steam Supply Valve Stem Galled
- DAEC MSPI Basis Document; Revision 16
- EN-AA-105-1005; MSPI; Revision 2
- NRC PI Data Calculation, Review, and Approval; MSPI AC Power System; Third Quarter 2014 Through Second Quarter 2015
- NRC PI Data Calculation, Review, and Approval; MSPI Heat Removal System; Third Quarter 2014 Through Second Quarter 2015
- NRC PI Data Calculation, Review and Approval; MSPI High Pressure Injection System; Third Quarter 2014 Through Second Quarter 2015

## 4OA2 Identification and Resolution of Problems (71152)

- OP-AA-100-1002; Plant Status Control Management; Revision 6
- OP-AA-101-1000; Clearance and Tagging; Revision 11
- PI-AA-100-1005; Root Cause Analysis; Revision 13
- PI-AA-100-1006; Common Cause Evaluation; Revision 10
- PI-AA-100-1007; Apparent Cause Evaluation; Revision 12
- PI-AA-103; Human Performance Program; Revision 11
- PI-AA-103-1000; Human Performance Program Error Reduction Tools; Revision 5
- PI-AA-104-1000; Corrective Action; Revision 6



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

- ACE 0203249-04; LPCI Loop Select ½ Second Delay Relay Found Out-Of-Tolerance; Revision 0
- ACE 02042903-16; 1A306 RHR Pump 1P-229C Breaker Failure To Trip; Revision 1
- Calculation 0078-0071VDB-01; Evaluation Of SBDG Voltage and Frequency Response With C RHR Pump Motor Starting at SBDG Breaker Closure; Revision 0
- CKTBKR-G080-07; GE AM 4.16-350-2H Medium Voltage Breaker Overhaul; Revision 20
- CR 01781882; STP 3.3.5.1-29 – Containment Spray Logic System Functional Test
- CR 02032049; E11A-K028A as Found Out-Of-Tolerance. Unable to Adjust
- CR 02032390; E11A-K028A Relay Timing Issues
- CR 02034076; Secondary Containment Airlock Doors 225 and 228 Both Opened
- CR 02041172; Two Secondary Containment Doors Momentarily Open
- CR 02042903; 1A306 for C RHR Pump Would Not Trip From the Control Room
- POR 02032049-16; E11A-K028A, LPCI Loop Select ½ Second Delay Relay, Found Out-Of-Tolerance and Unable to Adjust; Revision 1
- POR 02042903-03; 1A306, C RHR Pump 4160 Volt Breaker Failed to Trip From the Control Room; Revision 0
- RCE 0203476-08; Secondary Containment Airlock Doors 225 And 228 Opened Simultaneously; Revision 0
- STP 3.3.5.1-29; Containment Spray Logic System Functional Test and RHR Timer Calibration; Revision 29

## LIST OF ACRONYMS USED

10 CFR	Title 10 of the Code of Federal Regulations
AC	Alternating Current
ACE	Apparent Cause Evaluation
ACP	Administrative Control Procedure
ADAMS	Agencywide Document Access Management System
AOP	Abnormal Operating Procedure
CAP	Corrective Action Program
CBC	Control Building Chiller
CR	Condition Report
CS	Core Spray
DAEC	Duane Arnold Energy Center
EN	Event Notification
ESW	Emergency Service Water
HPCI	High-Pressure Coolant Injection
IP	Inspection Procedure
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LPCI	Low Pressure Coolant Injection
MH	Manholes
MSPI	Mitigating Systems Performance Index
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Off-Site Dose Calculation Manual
OI	Operating Instruction
OOS	Out-of-service
PARS	Publicly Available Records System
PFP	Pre-Fire Plan
PI	Performance Indicator
RCIC	Reactor Core Isolation Cooling
RCS	Reactor Coolant System
RETS	Radiological Effluent Technical Specification
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RWCU	Reactor Water Cleanup
RWP	Radiation Work Permit
RWS	River Water Supply
SBDG	Standby Diesel Generator
STP	Surveillance Test Procedure
SUS	Startup System
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sinks
WO	Work Order

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Sincerely,

*/RA/*

K. Stoedter, Chief  
Branch 1  
Division of Reactor Projects

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