



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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October 25, 2012

Mr. Richard L. Anderson
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NextEra Energy Duane Arnold, LLC
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Palo, IA 52324-9785

**SUBJECT: DUANE ARNOLD ENERGY CENTER – NRC INTEGRATED INSPECTION
REPORT 05000331/2012004**

Dear Mr. Anderson:

On September 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Duane Arnold Energy Center. The enclosed report documents the results of this inspection, which were discussed on October 4, 2012, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

One NRC-identified finding of very low safety significance (Green) was identified during this inspection. This finding was determined to involve a violation of NRC requirements. Further, a Green licensee-identified violation is listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these violations or the significance of the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector Office at the Duane Arnold Energy Center.

If you disagree with the cross-cutting aspect assigned in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector Office at the Duane Arnold Energy Center.

R. Anderson

-2-

In accordance with 10 CFR 2.390 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 Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading_rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Mark A. Ring, Chief
Branch 1
Division of Reactor Projects

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

Enclosure: Inspection Report 05000331/2012004
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000331/2012004

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: July 1 through September 30, 2012

Inspectors: L. Haeg, Senior Resident Inspector
R. Murray, Resident Inspector
B. Palagi, Operator Licensing Inspector
R. K. Walton, Operator Licensing Inspector

Approved by: Mark Ring, Chief
Branch 1
Division of Reactor Projects

Enclosure

TABLE OF CONTENTS

| | |
|---|----|
| SUMMARY OF FINDINGS..... | 1 |
| REPORT DETAILS..... | 2 |
| Summary of Plant Status..... | 2 |
| 1. REACTOR SAFETY..... | 2 |
| 1R01 Adverse Weather Protection (71111.01)..... | 2 |
| 1R04 Equipment Alignment (71111.04)..... | 3 |
| 1R05 Fire Protection (71111.05)..... | 4 |
| 1R06 Flooding (71111.06)..... | 6 |
| 1R07 Annual Heat Sink Performance (71111.07A)..... | 7 |
| 1R11 Licensed Operator Requalification Program (71111.11)..... | 7 |
| 1R12 Maintenance Effectiveness (71111.12)..... | 11 |
| 1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)..... | 14 |
| 1R15 Operability Determinations and Functional Assessments (71111.15)..... | 14 |
| 1R19 Post-Maintenance Testing (71111.19)..... | 15 |
| 1R22 Surveillance Testing (71111.22)..... | 16 |
| 1EP6 Drill Evaluation (71114.06)..... | 17 |
| 4. OTHER ACTIVITIES..... | 18 |
| 4OA1 Performance Indicator Verification (71151)..... | 18 |
| 4OA2 Identification and Resolution of Problems (71152)..... | 20 |
| 4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)..... | 21 |
| 4OA5 Other Activities..... | 22 |
| 4OA6 Management Meetings..... | 23 |
| 4OA7 Licensee-Identified Violations..... | 23 |
| SUPPLEMENTAL INFORMATION..... | 1 |
| KEY POINTS OF CONTACT..... | 1 |
| LIST OF ITEMS OPENED, CLOSED AND DISCUSSED..... | 2 |
| LIST OF DOCUMENTS REVIEWED..... | 3 |

SUMMARY OF FINDINGS

Inspection Report 05000331/2012004, 07/01/2012 – 09/30/2012; Duane Arnold Energy Center; Maintenance Effectiveness.

This report covers a three-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was identified by the inspectors. The finding was considered an NCV of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance and associated non-cited violation (NCV) of Technical Specification (TS) 5.4.1.d, Fire Protection Program Implementation, was self-revealed on June 24, 2012, for the failure of the licensee to test the diesel fire pump in accordance with established procedures recommended by the equipment manufacturer. Specifically, licensee surveillance test procedure (STP) NS13B015, "Diesel Driven Fire Pump Periodic Pump Run," did not ensure the coolant tank was completely filled with water prior to operation as recommended in the equipment manufacturer's operation and maintenance manual; leading to the diesel fire pump overheating and being declared non-functional. Corrective actions by the licensee included replacing the degraded coolant reservoir tank and revising applicable procedures to implement the recommendations by the equipment manufacturer.

The inspectors determined that failing to test the diesel fire pump in accordance with established procedures recommended by the equipment manufacturer was a performance deficiency because it was the failure to meet a TS requirement, and the cause was reasonably within the licensee's ability to foresee and prevent and should have been corrected. The performance deficiency was determined to be more than minor and a finding because it was associated with the Protection Against External Factors (Fire) attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. An NRC regional Senior Risk Analyst determined the finding was of very low safety significance (Green). The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Problem Identification and Resolution, having Corrective Action Program components, and involving the licensee taking appropriate corrective actions to address safety issues and adverse trends in a timely manner commensurate with their safety significance and complexity. [P.1(d)] (Section 1R12)

B. Licensee-Identified Violations

A violation of very low safety significance that was identified by the licensee was reviewed by inspectors. Corrective actions planned or taken by the licensee were entered into the licensee's corrective action program. The violation and corrective action tracking number is listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Duane Arnold Energy Center (DAEC) operated at full power for the entire inspection period except for brief down-power maneuvers to accomplish rod pattern adjustments or to conduct planned surveillance testing activities. On August 3, 2012, DAEC began cycle coastdown in anticipation for Refueling Outage 23.

1. **REACTOR SAFETY**

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Summer Seasonal Readiness Preparations

a. Inspection Scope

The inspectors performed a review of the licensee's preparations for summer weather for selected systems, including conditions that could lead to an extended drought.

During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. 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. Specific documents reviewed during this inspection are listed in the Attachment to this report. The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into the CAP in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the following plant systems:

- River Water Supply (RWS), Emergency Service Water (ESW), and Residual Heat Removal Service Water (RHRSW).

This inspection constituted one seasonal adverse weather sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

.2 External Flooding

a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the UFSAR for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs

did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to mitigate the flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also walked down underground bunkers/manholes subject to flooding that contained multiple train or multiple function risk-significant cables. The inspectors also reviewed the abnormal operating procedures (AOPs) for mitigating the design basis flood to ensure the procedures could be implemented as written.

The inspectors performed this sample as a part of TI-2515/187, which is documented in Section 4OA5.

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

b. Findings

No findings were identified.

.3 Readiness For Imminent Adverse Weather Condition – Extreme Heat/Drought Conditions

a. Inspection Scope

The inspectors performed a detailed review of the licensee's procedures and preparations for operating the facility during an extended period of time when ambient outside temperature was high and the ultimate heat sink was experiencing elevated temperatures and below average levels. The inspectors focused on plant specific design features and implementation of the procedures for responding to or mitigating the effects of these conditions on the operation of the facility. Inspection activities included a review of the licensee's adverse weather procedures, daily monitoring of the off-normal environmental conditions, and that operator actions specified by plant specific procedures were appropriate to ensure operability of the facility's normal and emergency cooling systems. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one readiness for imminent adverse weather condition sample as defined in IP 71111.01-05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- 'B' RWS during High Pressure Core Injection (HPCI) and Standby Liquid Control (SBLC) STPs;
- 4160V/480V Essential Electrical Distribution and Switchyard during Abnormal Electrical Lineup for Breaker Maintenance and Inspection; and
- HPCI system during testing of Reactor Core Isolation Cooling (RCIC) system.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the systems and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, 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 activities constituted three partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Area Fire Plan (AFP)-01; Torus Area and North Corner Rooms Elevation 716'-9" and 735'-7 1/2";
- AFP-26; Control Building Control Room Complex;
- AFP-27; Control Building Control Room HVAC Room;
- AFP-16; Condensate Pump Area; and
- AFP-69; Main Transformer 1X1.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate

compensatory measures for out-of-service, degraded or non-functional 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 licensee'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 licensee'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, that fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On September 11, 2012, the inspectors observed a fire brigade activation following a declaration of a fire outside of the mechanical maintenance shop. 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:

- proper wearing of turnout gear and self-contained breathing apparatus;
- proper use and layout of fire hoses;
- employment of appropriate fire fighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

Documents reviewed are listed in the Attachment to this report.

These activities constituted one annual fire protection inspection 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 AOPs to identify licensee commitments. 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 system. 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 area 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:

- Torus Room and Low Level Radioactive Waste Areas during Torus Water Temporary Storage Vault Modification.

Specific 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.

.2 Underground Cable Vaults

a. Inspection Scope

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

- 1MH117/2MH216, 1MH116/2MH215, and 2MH207.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted one underground cable vaults sample as defined in IP 71111.06-05.

b. Findings

No findings were identified.

1R07 Annual Heat Sink Performance (71111.07A)

.1 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's testing of the Control Building Chiller heat exchangers to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. Inspectors also verified that test acceptance criteria considered differences between test conditions, design conditions, and testing conditions. Documents reviewed for this inspection are listed in the Attachment to this report.

This inspection constituted one annual heat sink performance sample as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11)

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

a. Inspection Scope

On August 28 and 29, 2012, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator annual regualification testing to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and testing was being conducted in accordance with licensee procedures. 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;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and

- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

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

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11-05, by taking credit for the review of an annual licensed operator requalification test.

b. Findings

No findings were identified.

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

a. Inspection Scope

On September 25, 27, and 28, 2012, the inspectors observed control room operators performing surveillance testing activities in the main control room. 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;
- 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 quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

.3 Annual Operating Test Results (71111.11A)

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the Biennial Written Examination, and the Annual Operating Test, administered by the licensee from July 30 through August 31, 2012, required by 10 CFR 55.59(a). The results were compared to the

thresholds established in Inspection Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process," to assess the overall adequacy of the licensee's Licensed Operator Requalification Training (LORT) program to meet the requirements of 10 CFR 55.59.

This inspection constituted one annual licensed operator requalification inspection sample as defined in IP 71111.11A.

b. Findings

No findings were identified.

.4 Biennial Review (71111.11B)

a. Inspection Scope

The following inspection activities were conducted during the weeks of August 13 and August 20, 2012, to assess: 1) the effectiveness and adequacy of the facility licensee's implementation and maintenance of its systems approach to training (SAT) based LORT program, put into effect to satisfy the requirements of 10 CFR 55.59; 2) conformance with the requirements of 10 CFR 55.46 for use of a plant referenced simulator to conduct operator licensing examinations and for satisfying experience requirements; and 3) conformance with the operator license conditions specified in 10 CFR 55.53. The documents reviewed are listed in the Attachment to this report.

- Problem Identification and Resolution (10 CFR 55.59(c); SAT Element 5 As Defined in 10 CFR 55.4): The inspectors evaluated the licensee's ability to assess the effectiveness of its LORT program and the ability to implement appropriate corrective actions to maintain its LORT Program up-to-date. The inspectors reviewed documents related to the plant's operating history and associated responses (e.g., plant issue matrix and performance review reports; recent examination and inspection reports; licensee event reports). The inspectors reviewed the use of feedback from operators, instructors, and supervisors as well as the use of feedback from plant events and industry experience information. The inspectors reviewed the licensee's quality assurance oversight activities, including licensee training department self-assessment reports.
- Licensee Requalification Examinations (10 CFR 55.59(c); SAT Element 4 As Defined in 10 CFR 55.4): The inspectors reviewed the licensee's program for development and administration of the LORT biennial written examination and annual operating tests to assess the licensee's ability to develop and administer examinations that are acceptable for meeting the requirements of 10 CFR 55.59(a).
 - The inspectors reviewed the methodology used to construct the examination including content, level of difficulty, and general quality of the examination/test materials. The inspectors also assessed the level of examination material duplication from week-to-week for both the operating tests conducted during the current year as well as the written examinations administered in 2012. The inspectors reviewed a sample of the written

examinations and associated answer keys to check for consistency and accuracy.

- The inspectors observed the administration of the annual operating test and biennial written examination to assess the licensee's effectiveness in conducting the examinations, including the conduct of pre-examination briefings, evaluations of individual operator and crew performance, and post-examination analysis. The inspectors evaluated the performance of one crew in parallel with the facility evaluators during two dynamic simulator scenarios, and evaluated various licensed crew members concurrently with facility evaluators during the administration of several Job Performance Measures (JPMs).
- The inspectors assessed the adequacy and effectiveness of the remedial training conducted since the last requalification examinations and the training planned for the current examination cycle to ensure that they addressed weaknesses in licensed operator or crew performance identified during training and plant operations. The inspectors reviewed remedial training procedures and individual remedial training plans.
- Conformance with Examination Security Requirements (10 CFR 55.49): The inspectors conducted an assessment of the licensee's processes related to examination physical security and integrity (e.g., predictability and bias) to verify compliance with 10 CFR 55.49, "Integrity of Examinations and Tests." The inspectors reviewed the facility licensee's examination security procedure, and observed the implementation of physical security controls (e.g., access restrictions and simulator input/output controls) and integrity measures (e.g., security agreements, sampling criteria, bank use, and test item repetition) throughout the inspection period.
- Conformance with Simulator Requirements Specified in (10 CFR 55.46): The inspectors assessed the adequacy of the licensee's simulation facility (simulator) for use in operator licensing examinations and for satisfying experience requirements. The inspectors reviewed a sample of simulator performance test records (e.g., transient tests, malfunction tests, scenario based tests, post-event tests, steady state tests, and core performance tests), simulator discrepancies, and the process for ensuring continued assurance of simulator fidelity in accordance with 10 CFR 55.46. The inspectors reviewed and evaluated the discrepancy corrective action process to ensure that simulator fidelity was being maintained. Open simulator discrepancies were reviewed for importance relative to the impact on 10 CFR 55.45 and 55.59 operator actions as well as on nuclear and thermal hydraulic operating characteristics.
- Conformance with Operator License Conditions (10 CFR 55.53): The inspectors reviewed the facility licensee's program for maintaining active operator licenses and to assess compliance with 10 CFR 55.53(e) and (f). The inspectors reviewed the procedural guidance and the process for tracking on-shift hours for licensed operators, and which control room positions were granted watch-standing credit for maintaining active operator licenses. Additionally, medical records for 10 licensed operators were reviewed for compliance with 10 CFR 55.53(l).

This inspection constituted one biennial licensed operator requalification inspection sample as defined in IP 71111.11B.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

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

- Diesel Fire Pump; and
- Control Building/Standby Gas Treatment (SBGT) Instrument Air Compressors.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safety 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 (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

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

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

b. Findings

(1) Diesel Fire Pump

Introduction: A finding of very low safety significance and associated NCV of TS 5.4.1.d, Fire Protection Program Implementation, was self revealed on June 24, 2012, for the failure of the licensee to test the diesel fire pump in accordance with established procedures recommended by the equipment manufacturer.

Description: On June 24, 2012, the licensee was performing STP NS13B015, “Diesel Driven Fire Pump Periodic Pump Run.” Following startup of the diesel fire pump the operator left the room and returned several minutes later to find the diesel engine overheating (coolant boiling and steaming through coolant reservoir cap) and the “Water Temp Above Safe Limit” light illuminated on the local alarm panel. The operator immediately tripped the engine by placing the hand switch in OFF. Additionally, the control room had received a diesel fire pump trouble light and alarm, but the operator had tripped the engine prior to the control room announcing/communicating the alarm.

The licensee determined that the cause of the engine overheating was due to a corroded coolant reservoir neck and cap that allowed engine coolant to leak and evaporate during engine shutdown (due to vibrations) while performing periodic testing. On June 24, 2012, the engine was started with a low coolant level which contributed to the short time period that the engine ran prior to overheating. The licensee replaced the coolant reservoir, performed additional required repairs, and retested the engine on June 26, 2012.

The degraded condition of the coolant reservoir was first documented in a condition report dating back to March, 2011. Corrective actions were originally assigned to the Fix-it-Now team, but due to delays in receiving parts and other issues, the licensee delayed scheduling repairs until the third week of July, 2012. From March, 2011, until the failure of the diesel fire pump, there were seven condition reports written documenting the leak of coolant following operation of the diesel fire pump. Only one of those CRs had assigned a work request to add coolant to the reservoir. The licensee stated that normal fluid additions such as oil or coolant were not normally documented, so it is unknown how often coolant was being added to the reservoir.

The inspectors noted that the licensee had not implemented any compensatory measures or additional monitoring to ensure adequate coolant remained in the reservoir until final corrective actions could be implemented.

The licensee’s apparent cause evaluation identified that STP NS13B015 (as well as other testing procedures associated with the diesel fire pump), contained a step that stated, “verify engine coolant is visible in the tank on top of the east end of the engine.” In order to perform this step, the operator would remove the cap on the coolant reservoir and look down into the reservoir to verify whether *any* coolant was visible (emphasis added). The licensee identified that the diesel fire pump engine operation and maintenance manual stated, in part, to “keep cooling system filled to the operating level, ...keep cooling system completely filled, and ...add coolant as needed to completely fill the system.” The inspectors determined that the STP NS13B015 did not clearly state the requirement to maintain the system full as required by the equipment manufacturer, and was contrary to the Duane Arnold Energy Center (DAEC) Fire Plan Volume 1, Section 8, which states, in part, that “the fire protection systems are periodically tested and maintained in accordance with established procedures recommended by equipment manufacturers.” The DAEC Fire Plan is the primary procedure by which Duane Arnold establishes, implements, and maintains the fire protection program under TS 5.4.1.d.

Analysis: The inspectors determined that failing to test the diesel fire pump in accordance with established procedures recommended by the equipment manufacturer was a performance deficiency because it was a failure to meet a TS requirement, and

the cause was reasonably within the licensee's ability to foresee and prevent, and should have been corrected.

The performance deficiency was determined to be more than minor and a finding because it was associated with the Protection Against External Factors (Fire) attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the diesel fire pump is an important piece of equipment to aid in the licensee's ability to combat a fire.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," Table 3b the inspectors determined the finding degraded the fire protection defense-in-depth strategies. The inspectors determined that Appendix F was not an effective tool in evaluating this finding. An NRC Regional Senior Risk Analyst evaluated the finding using the Duane Arnold Standardized Plant Analysis Risk External Events Model, Version 8.22, SAPHIRE Version 8.0.8.0. In accordance with the Risk Assessment of Operational Events Handbook, because the pump failed on June 24, 2012, and the last successful test was performed on June 3, 2012, the exposure period assumed was 11-days, which is one-half of the time period between the failure of the pump and its last successful test.

The Senior Risk Analyst ran the model with the diesel fire pump failed for the 11-day period and the resultant Δ CDF was $4.5E-8/yr$. The dominant sequence was a weather-related loss of offsite power initiating event, failure of suppression pool cooling, failure to recover offsite power within 10-hours, failure of shutdown cooling, failure of containment spray, and failure of late injection. The risk result represented a finding of very low risk significance (Green).

The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Problem Identification and Resolution, having Corrective Action Program components, and involving the licensee taking appropriate corrective actions to address safety issues and adverse trends in a timely manner commensurate with their safety significance and complexity. Specifically, the licensee had a recurring problem with coolant spilling out of the coolant reservoir during the end of diesel fire pump testing and never identified the adverse trend that required compensatory measures to ensure the coolant reservoir remained full of water. [P.1(d)]

Enforcement: TS 5.4.1.d requires the licensee to establish, implement and maintain written procedures covering implementation of the Fire Protection Program. The Duane Arnold Energy Center (DAEC) Fire Plan implements the licensee's fire protection program. Section 8.0 of DAEC Fire Plan, Volume 1, Section 8, Revision 61, states, in part, that, "the fire protection systems are periodically tested and maintained in accordance with established procedures recommended by equipment manufacturers." The DAEC diesel fire pump engine was manufactured by Cummins and the Operation and Maintenance Manual from Cummins states, "keep the cooling system completely filled," and to, "add coolant as needed to completely fill the system."

Contrary to the above, on June 24, 2012, the licensee failed to implement the requirements of the fire protection program. Specifically, STP NS13B015, "Diesel Driven Fire Pump Periodic Pump Run" only required that engine coolant be visible in the

coolant reservoir and did not require that the diesel fire pump coolant system be completely filled. Because this violation was of very low safety significance and was entered into the licensee's CAP as CR 1778882, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000331/2012004-01, Diesel Fire Pump Overheating due to Inadequate Test Procedure)**.

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 listed below affecting risk-significant and safety-related equipment to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Plant Air Supply Cooling Water Valve Control Relay Failure;
- Work Week 1230 Risk; and
- B SBGT Heater Control Panel Blown Fuse.

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

This inspection constituted three maintenance risk assessments 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:

- Prompt Operability Determination (POD) for Extent of Condition Following CR 01789290; 1VAD042B Remained Intermediate After Bleeding Off Air, and CR 01789292; 1VAD051B Remained Intermediate After Depressurizing;
- Past Operability Review of B SBGT Variable Heater Fuse Failure;

- POD for Susceptibility of SBDG to Tornado Generated Missiles in CR 01778680; Conclusions of CR 01762746 Evaluation Questioned;
- Past Operability Review of 1K-04 B SBTG Air Compressor Failing to Start During Post Maintenance Testing; and
- Past Operability Review of Reactor Water Cleanup System Return Flow Square Root Converter Being Found Out of Tolerance.

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 TSs and the 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.

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

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:

- Testing of 1K03 CB/SBTG Instrument Air Compressor Following Corrective Maintenance;
- Testing of SBLC System Following Corrective Maintenance;
- Testing of CV-4313, Drywell N2 Makeup Primary Containment Isolation System Valve Following Replacement of its Associated Pressure Control Valve;
- Testing of B SBTG Following Pre-Planned Maintenance;
- Testing of Diesel Fire Pump Following Pump Replacement;
- Testing of B CBC Following Temperature Load Controller and Temperature Control Valve Replacement; and
- Testing of Condensate Service Tank (CST) Low Level Instrument Following Corrective Maintenance.

These activities were selected based upon the ability of the structure, system, or component 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 the TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with the importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted seven 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:

- STP 3.5.1-01B; B Core Spray System Operability Test (In-Service Test);
- STP 3.3.5.1-23; Functional Test of the Condensate Storage Tank Level (Low) Instrumentation (Routine);
- STP 3.8.1-06B; B Standby Diesel Generator Operability Test (Fast Start) (Routine);
- STP 3.3.6.1-13; Reactor Water Cleanup High differential Flow Channel Calibration (Routine); and
- STP 3.5.3-02; RCIC System Operability Test (Routine).

The inspectors also observed in-plant activities and reviewed procedures and associated records to determine whether:

- preconditioning occurred;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria was clearly stated, demonstrated operational readiness, and was 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 the 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;
- inservice testing activities were 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;
- test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- safety-related instrument control surveillance test reference setting data were accurately incorporated into the test procedure;
- actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Training Observation

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on August 15, 2012, that required emergency plan implementation by a crew of licensed operators. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the

CAP. As part of the inspection, the inspectors also reviewed the scenario package and other documents listed in the Attachment to this report.

This inspection constituted one training evolution with emergency preparedness drill aspects as defined in IP 71114.06-05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstone: Mitigating Systems

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index - Emergency Alternating Current (AC) Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System performance indicator for the period from the third quarter 2011 through the second quarter 2012. To determine the accuracy of the Performance Indicator (PI) data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, condition reports, event reports and NRC Integrated Inspection Reports for the period of July, 2011 through June, 2012 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 CAP 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 Mitigating Systems Performance Index - High Pressure Injection Systems performance for the period from the third quarter 2011 through the second quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI

Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, was used. The inspectors reviewed the licensee's operator narrative logs, condition reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of July, 2011 through June, 2012 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 CAP 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 Mitigating Systems Performance Index - Heat Removal System performance for the period from the third quarter 2011 through the second quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, condition reports, event reports, MSPI derivation reports, and NRC Integrated Inspection Reports for the period of July, 2011 through June, 2012 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.

4OA2 Identification and Resolution of Problems (71152)

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

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

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that the issues 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, these reviews 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 condition report packages.

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

b. Findings

No findings were identified.

.3 Selected Issue Follow-Up Inspection: Measuring and Test Equipment Program

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting findings from a licensee nuclear oversight department audit of the measuring and test equipment (M&TE) program. The inspectors reviewed the condition and apparent cause evaluations to determine whether the licensee maintained proper control over M&TE by implementing procedures and associated processes. The inspectors reviewed various documents including the licensee's quality assurance program and M&TE program procedures, and interviewed personnel. The inspectors also performed a review of past condition reports documenting instances of M&TE issues to verify that problems were being identified at a low threshold, appropriately evaluated, and whether corrective actions were taken.

The inspectors characterized one issue of concern as a licensee-identified Green finding and NCV of 10 CFR 50, Appendix B, Criterion XII as discussed in Section 40A7.

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

b. Findings

No findings were identified.

40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report (LER) 05000331/2012-004-0: High Pressure Coolant Injection (HPCI) Declared Inoperable

a. Inspection Scope

On July 2, 2012, the licensee declared HPCI inoperable due to the unexpected isolation of the HPCI outboard steam isolation valve and outboard torus suction valve. This isolation was due to a trip of the HPCI steam leak detection (SLD) system. The licensee verified that there was no steam leak in the HPCI room and the licensee's investigation identified that there was a broken thermocouple wire in the SLD circuitry. Earlier in the day, the licensee had performed maintenance in the same cabinet as the broken SLD wire, however, no maintenance was performed on that particular wire. Following replacement and testing of the broken wire, the licensee declared HPCI operable.

The inspectors reviewed the licensee's root cause evaluation (RCE). The licensee determined that a recorder modification (containing the broken wire) was installed in 2007. It is suspected that the broken wire was stretched at the time of installation and then it was potentially stretched even more and weakened during maintenance earlier in the day on July 2, 2012. The licensee was unable to definitively determine why the open circuit was sensed nearly 50 minutes following completion of the maintenance in the cabinet; however, according to the RCE the suspected causes were "either the spring force created due to the maintenance applied to the necked wire over the 50 minute delay period causing failure or increased resistance causing localized melting of the wire and subsequent failure."

Corrective action included installing signs inside the cabinets containing these wires warning of their fragility. The licensee also planned to inspect other wires associated with the same modification for signs of necking and stretching, replacing wires as necessary, and installing wire hold-downs to provide some stress relief to the installed wires.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

4OA5 Other Activities

.1 Licensee Strike Contingency Plans (92709)

a. Inspection Scope

The inspectors reviewed the licensee's work stoppage plans to determine if the plans adequately addressed the areas of reactor operations, emergency planning, facility security, fire protection, technical specifications, and other regulatory requirements in the event of an employee strike or management lockout. The inspectors reviewed records and conducted interviews with licensee staff to verify that qualified personnel would be available to meet the minimum requirements for safe operation of the plant, if a strike or lockout were to occur. No actual work stoppage occurred during the inspection period.

b. Findings

No findings were identified.

.2 (Discussed) NRC Temporary Instruction (TI) 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," and NRC TI 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns"

a. Inspection Scope

Inspectors accompanied the licensee on a sampling basis during their flooding and seismic walkdowns to verify that the licensee's walkdown activities were conducted using the methodology endorsed by the NRC. These walkdowns were being performed at all sites in response to a letter from the NRC to licensees, entitled "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident," dated March 12, 2012 (ADAMS Accession No. ML12053A340).

Enclosure 3 of the March 12, 2012, letter requested licensees to perform seismic walkdowns using an NRC-endorsed walkdown methodology. Electric Power Research Institute (EPRI) document 1025286 titled, "Seismic Walkdown Guidance," (ADAMS Accession No. ML12188A031) provided the NRC-endorsed methodology for performing

seismic walkdowns to verify that plant features credited in the current licensing basis for seismic events were available, functional, and properly maintained.

Enclosure 4 of the letter requested licensees to perform external flooding walkdowns using an NRC-endorsed walkdown methodology (ADAMS Accession No. ML12056A050). Document NEI 12-07 titled, "Guidelines for Performing Verification Walkdowns of Plant Protection Features," (ADAMS Accession No. ML12173A215) provided the NRC-endorsed methodology for assessing external flood protection and mitigation capabilities to verify that plant features credited in the CLB for protection and mitigation from external flood events were available, functional, and properly maintained.

As part of the inspection for TI 2515/187, the inspectors performed IP 71111.01, "Adverse Weather," Section 02.04; as documented in Section 1R01 of this report.

Due to the scheduling of the licensee's walkdowns, all inspection requirements were unable to be completed as defined in TI 2515/187 and TI 2515/188. Inspection activities (additional walkdowns of inaccessible areas and independent walkdowns by the inspectors) under TI 2515/187 and TI 2515/188 will continue into the 4th quarter of the 2012 baseline inspection period and documented when complete.

b. Findings

Findings or violations associated with the flooding and seismic walkdowns, if any, will be documented in the 4th quarter integrated inspection report.

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 4, 2012, the inspectors presented the inspection results to Mr. R. Anderson, Site Vice President, 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:

- On August 24, 2012, the operator licensing inspectors presented the 71111.11B inspection results to Mr. R. Anderson, 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. Proprietary material received during the inspection was returned to the licensee.

4OA7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- The licensee identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50, Appendix B, Criterion XII, "Control of Measuring and Test Equipment," on June 7, 2012, when the licensee concluded in Condition Evaluation 01781809 that Administrative Control Procedure (ACP) 1408.8, "Control of Measuring and Test Equipment," Revision 21 was not adequate to ensure proper controls of M&TE at the station. This was evidenced by several instances over the prior two years where various M&TE was identified as missing during weekly verifications of M&TE inventory. Corrective actions included a revision to ACP 1408.8 to include requirements for M&TE checkout prior to removal from storage locations, and improvements to the M&TE checkout process.

The failure to establish measures to assure controls of M&TE was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. Specifically, failing to properly control M&TE would have the potential to impact the quality of maintenance, or results of testing of safety-related equipment.

The inspectors evaluated the finding in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," and then proceeded to IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2 Questions. Since the inspectors answered "No" to Question 4, the finding screened as very low safety significance (Green).

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

R. Anderson, Site Vice President
G. Pry, Plant General Manager
K. Kleinheinz, Site Engineering Director
T. Byrne, Licensing Manager (Acting)
G. Young, Nuclear Oversight Manager
G. Rushworth, Operations Site Director
R. Wheaton, Maintenance Site Director
R. Porter, Chemistry & Radiation Protection Manager
B. Kindred, Security Manager
B. Simmons, Training Manager
M. Davis, Emergency Preparedness Manager
B. Murrell, Licensing Engineer Analyst
D. Barta, Licensing Engineer Analyst
C. Conklin, Project Manager
C. Harberts, Refuel Floor Project Manager
K. Peveler, Nuclear Oversight Supervisor
P. Collingsworth, System Engineering
J. Dubois, Program Engineering Manager
C. Bauer, Training Supervisor
P. Hansen, Performance Improvement Director
S. Huebsch, Design Engineering Manager (Acting)
L. Swenzinski, Licensing Engineer Analyst

Nuclear Regulatory Commission

K. Feintuch, Project Manager, NRR
M. Ring, Chief, Reactor Projects Branch 1

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

| | | |
|---------------------|-----|--|
| 05000331/2012004-01 | NCV | Diesel Fire Pump Overheating due to Inadequate Test Procedure (Section 1R12) |
|---------------------|-----|--|

Closed

| | | |
|---------------------|-----|---|
| 05000331/2012004-01 | NCV | Diesel Fire Pump Overheating due to Inadequate Test Procedure (1R12) |
| 05000331/2012-004-0 | LER | High Pressure Coolant Injection Declared Inoperable (Section 4OA3.01) |

Discussed

| | | |
|----------|----|--|
| 2515/187 | TI | Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns (Section 4OA5.02) |
| 2515/188 | TI | Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns (Section 4OA5.02) |

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

OP-AA-102-1002 (DAEC); Seasonal Readiness; Revision 007
OP-AA-102-1002; Seasonal Readiness; Revision 000
AOP 903; Severe Weather; Revision 036
CR 01781709; MISO Declares "Conservative Grid Operations" Alert
ACP 101.16; Midwest ISO: Communication and Mitigation Protocols for Nuclear Plant/ Electric System Interfaces; Revision 7
CR 01781345; Rising River Water Inlet Temperatures
Adverse Condition Monitoring Plan for rising river temperatures dated 7/3/12
STP 3.0.0-01; Instrument Checks; Revision 123
CR 01780503; Indications Observed During Extreme Hot Weather
CR 01781385; TIS-4443 Channel 1 is Reading 180 Degrees Fahrenheit
CR 01781356; TI-1222 1P001A Lube Oil Outlet Temperature High Out of Specification
CR 01781353; TI-4718 'A' Bus Duct Temperature High Out of Specification
CR 01781768; Several Alarms Received Due to High Ambient Temperatures

1R04

OP-AA-102-1003; Guarded Equipment; Revision 003
OP-AA-102-1003 (DAEC); Guarded Equipment (DAEC Specific Information); Revision 023
Operating Instruction (OI) 304.2A1; 4160V/ 480V Essential Electrical Distribution System; Revision 1
OI 410A4; 'B' River Water Supply System Valve Lineup and Checklist; Revision 13
OI 152A1; HPCI System Electrical Lineup; Revision 3
OI 152A2; HPCI System Valve Lineup and Checklist; Revision 16
OI 152A4; HPCI System Control Panel Lineup; Revision 5

1R05

ACP 1203.53; Fire Protection; Revision 016
ACP 1412.4; Impairments to Fire Protection Systems; Revision 065
DAEC Fire Plan – Volume 1, Program; Revision 61
AFP 01; Torus Area and North Corner Rooms Elevation 716'-9" and 735'-7 1/2"; Revision 26
AFP 26; Control Building Control Room Complex; Revision 32
AFP 27; Control Building Control Room HVAC Room; Revision 25
AFP 16; Condensate Fire Pump Area 734'; Revision 25
AFP 69; Main Transformer 1X1; Revision 5

1R06

AOP-902; Flood; Revision 42
WO 40139552; SUS99.09: Inspect Manholes for Water Intrusion
Calculation-C12-008; Evaluation of Resin Storage Area for Water Storage; Revision 0

Engineering Change (EC)-275543; Cross Connects for Water Transfer to Resin Storage Area of Low Level Radwaste Processing and Storage Facility Room Number 803; Revision 0
EC-276874; Temporary Modification-12-009 Install Temporary Drain and Support Hoses to Process Water for the Torus Recoat Project; Revision 0

1R11

ACP 103.10; Control of Time Critical Tasks; Revision 4
DA OP-032; Quarterly Personnel Watchstanding Verification; Revision 11
DAEC 50008; Training Program Description; Revision 26
Reactor Feed Pump 403; Performance of Fuel Handling Activities; Revision 51
TDAP 1801.4; Simulator Configuration Management; Revision 17
TDAP 1835; Licensed Operator Requalification Program Examinations; Revision 19
TDAP 1837; NRC License Applications/Medical Examination/License Jacket; Revision 18
TDAP 1867; Examination Security Process; Revision 14
TDF-6.28; Report of Licensed Operator Medical Examination; Revision 4
TR-AA-21; Simulator Change Control; Revision 1
TC07; EHC Pressure Transmitter Failure; August 3, 2011
FW20; Feedwater Break Inside Containment – Isolable; July 18, 2011
RD11; CRD Hydraulic Pump Trip; July 13, 2011
FW09; Reactor Feedwater Pump Trip; March 22, 2012
MS25; Spurious Group 4 Isolation; February 22, 2012
Service Water 34; RHRSWP Trip; March 2, 2012
3.1.1(5)A; Operations at Hot Shutdown; April 17, 2012
3.1.1(6)A; Load Changes; April 23, 2012
3.1.1(1)A; Plant Startup from Cold to Hot Shutdown; June 1, 2011
3.1.1(2)A; Nuclear Startup from Hot Standby to Rated Power; May 3, 2011
3.1.1(9); Core Performance Testing; May 27, 2012
4.0; Operability & Steady State Test; July 6, 2012
Transient Test 4.2.6, Main Turbine Trip without Scram (<26% power); July 12, 2012
CR 00318215; Fuel Bundle Wrong Orientation
CR 00318716; Fuel Bundle Lowered into Cell Without Control Rod Inserted
CR 00390176; Discuss Fast Power Reduction During Sequence Exchange
CR 00584112; 'A' SBDG Fast Start Performance Errors
CR 00589013; Average Power Range Monitor Inoperability Not Tracked
CR 00593371; Delay in Fuel Movement due to Mode Switch in Shutdown
CR 01611062; Indicated Core Thermal Power on PPC too High
CR 01618022; Operations Identifies Inadequate Procedure Adherence Trend; 4Q2010
CR 01623363; Core Thermal Power Exceeded License Limits
CR 01638640; Discrepancy Between Crews Operating HPCI During SBLOCA
CR 01672896; Both Supply Breakers to Refuel Bridge Found ON
CR 01678139; Refuel Bridge Rod Block During Startup
CR 01678733; Spent Fuel Bundle Placed in Wrong Coordinate in Fuel Pool
CR 01721924; Orientation Error Discovered in Fuel Move Plan for Badger
CR 01768471; Refuel Floor Projects
CR 01775073; While Installing the Mast After Refurbishment; Found FME
Apparent Cause Evaluation (ACE) 01599871; CRD 34-19 Withdraw Performance Problems During Startup from RFO22
Evaluation Scenario Guides (ESG) 138, Revision 0; ESG 143, Revision 0; ESG 150, Revision 0; ESG 152, Revision 0; ESG 156, Revision 0; and ESG 158, Revision 0
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JPM 295029-01, Revision 2; JPM 259002-06, Revision 0; JPM 2.4.35-01, Revision 6;
JPM 217000-18, Revision 0; JPM 2.1.2-05, Revision 0; and JPM 204000-7, Revision 0
Series C; Revision.0; 2012 Biennial Exam for Reactor Operators
Series C; Revision.0; 2012 Biennial Exam for Senior Reactor Operators
Series D; Revision.0, 2012 Biennial Exam for Reactor Operators
Series D; Revision 0, 2012 Biennial Exam for Senior Reactor Operators
2010 RF 022-03L; Fuel Handling, Core ALTS, and Fuel Handling Events; Revision 0
2012A-08L; 2011 Annual Exam Review; Revision 0
2012D-07L; New Core Design; Revision 0
2012D-09L; Foreign Material Exclusion / Fuel Handling; Revision 0
2012D-05L; Reactivity Management; Revision 0

1R12

CR 01786365; Diesel Fire Pump Engine High Temp During Run
STP NS13B009; Diesel Driven Fire Pump Operability Tests and Fuel Oil Supply Verification;
Revision 34
Fire Plan Volume I; Program; Revision 61
Fire Plan Volume II; Fire Brigade Organization; Revision 47
CR 01778894; Timeliness of Repairs Result in Diesel Fire Pump LCO
CR 01626667; Safety- Hot Glycol Spill Due To Tank Cap Coming Off
CR 01694567; Diesel Fire Pump Engine Coolant Leak
CR 01703780; 1P-49 Coolant Overflow to Floor During Weekly STP
CR 01724836; Diesel Fire Pump Coolant Cap Vibrated Loose During S/D
CR 01768810; Engine Coolant Leak During Engine Shutdown
CR 01774772; Safety-1P49 Sprays Glycol Upon Engine Shutdown
CR 01778882; Diesel Fire Pump 1P-49 Engine Overheat
ACE 01778882; Diesel Fire Pump 1P-49 Engine Overheat

1R13

Work Planning Guideline-1; Work Process Guideline; Revision 053
Work Planning Guideline-2; Online Risk Management Guideline; Revision 061
OP-AA-104-1007; Online Aggregate Risk; Revision 002
WM-AA-1000; Work Activity Risk Management; Revision 012
WM-AA-1000 (DAEC); Work Activity Risk Management (DAEC); Revision 000
OP-AA-102-1003; Guarded Equipment; Revision 003
OP-AA-102-1003 (DAEC); Guarded Equipment (DAEC Specific Information); Revision 023
Work Week 1230 WARM Summary and Weekly Probabilistic Risk Analysis; Revisions 0-2
CR 01788802; Relay 95-K0102 Overheated and Failed Causing Well Water Load Shed

1R15

EN-AA-203-1001; Operability Determinations/ Functionality Assessments; Revision 006
OP-AA-100-1000; Conduct of Operations; Revision 008
CR 01786170; B SBTG Variable Heater Fuse Failure
Technical Assessment for Reportability 01786170; B SBTG Variable Heater Fuse Failure
ACE 01786170; B SBTG Variable Heater Fuse Failure
CR 01801705; SBTG Heater Differential Temperature UFSAR Requirements

CR 01730686; TDIC5805B Not Controlling in Auto
CR 01777572; 1K004 Failed Its Post Maintenance Testing
CR 01795597; FY7248 Found Out of Tolerance During STP 3.3.6.1-13

1R19

ACP 1408.1; Work Order Task(s); Revision 179
WO 40116310; 1P230A Repack Pump
STP 3.1.7-01; SBLC Pump Operability Test; Revision 33
CR 01783631; 1K-3 SBTG Compressor Failed to Load During STP
STP 3.7.9-01A; CB/SBTG Instrument Air Compressor 1K-3 Functional Test; Revision 3
WO 1283563; Replace Pressure Control Valve 4313 and Rebuild CV 4313-O
STP 3.6.1.1-12; Containment Isolation Valve Leak tightness Test – Type C Penetrations –
Containment Atmosphere Valves; Revision 9
WO 40139543; SBTG 1V-SGT-1A/B Flow Controller For Train B
WO 1283294; STBY Gas Treatment Timer
WO 1383207; SBTG System B 20lb Instrument Air Supply Pressure Relief
STP 3.6.4.3-05; Standby Gas Treatment Operation with Heaters On; Revision 9
WO 40180086; Diesel Driven Fire Pump
NS12B004; Diesel Driven Fire Pump Full Flow Discharge Test for National Fire Protection
Agency Trending
WO 40178145; Lube Oil Cooler 1E-237B Cooling Water Temp Control
WO 40133064; B CB Chiller Temperature Load Controller
WO 40181586-04; LE5218: MA: Contingency to Pull LE5218 Probes Out of CST
STP 3.3.5.1-24; Calibration of the Condensate Storage Tank Level (Low) Instrumentation;
Revision 14

1R22

Operating Instruction (OI) 151; Core Spray System; Revision 64
ASME Pump Performance Data Book; Revision 157
STP 3.3.6.1-13; Reactor Water Cleanup High Differential Flow Channel Calibration; Revision 15
CR 01795597; FY2748 Found OOT Tolerance During STP 3.3.6.1-13
STP 3.8.1-06B; B Standby Diesel Generator Operability Test (Fast Start); Revision 15
STP 3.3.5.1-23; Functional Test of the Condensate Storage Tank Level (Low) Instrumentation;
Revision 11
STP 3.5.1-01B; B Core Spray System Operability Test; Revision 11
STP 3.5.3-02; RCIC System Operability Test; Revision 36

1EP6

Evaluation Scenario Guide 156; Revision 0

4OA1

DAEC MSPI Basis Document; Revision 14
MSPI Maintenance Rule Data Entry Sheets and Attachments; Standby Diesel Generators;
July, 2011 through June, 2012
NRC PI Data Calculation, Review and Approval Packages for MSPI HPCI; 3rd Quarter 2011
through 2nd Quarter 2012
MSPI Unreliability Index Derivation Reports for HPCI System; July 2011 through June 2012

MSPI Unavailability Index Derivation Reports for HPCI System; July 2011 through June 2012
NRC PI Data Calculation, Review and Approval Packages for MSPI Heat Removal RCIC System; 3rd Quarter 2011 through 2nd Quarter 2012
MSPI Unreliability Index Derivation Reports for Heat Removal System; July 2011 through June 2012
MSPI Unavailability Index Derivation Reports for Heat Removal System; July 2011 through June 2012

4OA2

ACP 1410.15; Plant Status Control Program; Revision 007
PI-AA-101-1000; Human Performance Program Error Reduction Tools; Revision 009
ACP 1410.2; LCO Tracking and Safety Function Determination Program; Revision 029
ACP 1410.5; Plant Status Control Program; Revision 104
ACP 101.01; Procedure Use and Adherence; Revision 052
PI-AA-204; Condition Identification and Screening; Revision 017
PI-AA-100-1007; Apparent Cause Evaluation; Revision 005
ACP 1408.8; Control of Measuring and Test Equipment; Revision 21 and 22
CR 01769057; Location of M&TE is Not Properly Controlled
CR 01769062; Use History Evaluations for Lost M&TE Not Timely
CR 01781809; M&TE Trend Identified by MRC for M&TE Not Signed Out
CR 01783305; ACP 1408.8 Requirements Not Always Met for Operations M&TE

4OA3

CR 01781296; HPCI System Isolation
RCE 01781296-01; HPCI System Isolation

4OA5

DAEC Seismic Walkdown Equipment List; Revision 0
CR 01807155; Japan Earthquake Pump Base Plate Anchor Bolt Discrepancy
CR 01806541; Japan Earthquake Unacceptable Storage of Transient Material
CR 01806830; Japan Earthquake Missing Fastener on Conduit Support
CR 01807582; Japan Earthquake B RHRSW Strainer Foundation Bolt Missing
Seismic Walkdown Checklist Attachments for 1D1, 1V-AC-11, and MO-1903
Area Walk-by Checklist Attachments for 1D1 Battery Room, Northwest Corner Room, and Torus Bay 14
AOP 902; Flood; Revision 42-43
CR 01800619; AOP-902 Strategy Differs From UFSAR
CR 01800380; AOP 902 Deficiency. INTAKE STRUCTURE
CR 01802038; NEI 12-07, Flood Walkdown, Electrical Penetration Degraded
CR 01802047; NEI 12-07, Flood Walkdown, Electrical Penetration Degraded
CR 01802080; NEI 12-07, Flood Walkdown, Penetration Seal Degraded
CR 01802409; NEI 12-07, Flood Walkdown, Grouted Wall Crack
CR 01802430; NEI 12-07, Flood Walkdown, Wall Penetration Degraded
CR 01802431; NEI 12-07, Flood Walkdown, Electrical Penetration Degraded
CR 01802432; NEI 12-07, Flood Walkdown, Wall Penetration Degraded
CR 01805216; NEI 12-07, Door 805 Steel Barrier Alignment Issues

List of Acronyms Used

| | |
|-------|--|
| AC | Alternating Current |
| ACE | Apparent Cause Evaluation |
| ACP | Administrative Control Procedure |
| ADAMS | Agencywide Document Access Management System |
| AFP | Area Fire Plan |
| AOP | Abnormal Operating Procedure |
| CAL | Calculation |
| CAP | Corrective Action Program |
| CFR | Code of Federal Regulations |
| CR | Condition Report |
| CRD | Control Rod Drive |
| CST | Condensate Storage Tank |
| DAEC | Duane Arnold Energy Center |
| DC | Direct Current |
| DG | Diesel Generator |
| DRP | Division of Reactor Projects |
| EC | Engineering Change |
| EPRI | Electric Power Research Institute |
| ESG | Evaluation Scenario Guidelines |
| ESW | Emergency Service Water |
| HPCI | High Pressure Core Injection |
| HVAC | Heating Ventilation and Air Conditioning |
| IMC | Inspection Manual Chapter |
| IP | Inspection Procedure |
| JPM | Job Protective Measures |
| LCO | Limiting Condition for Operation |
| LER | Licensee Event Report |
| LORT | Licensed Operator Requalification Testing |
| M&TE | Measuring and Test Equipment |
| MSPI | Mitigating Systems Performance Index |
| NCV | Non-Cited Violation |
| NEI | Nuclear Energy Institute |
| NRC | U.S. Nuclear Regulatory Commission |
| OI | Operating Instruction |
| PARS | Publicly Available Records System |
| PI | Performance Indicator |
| POD | Prompt Operability Determination |
| RCIC | Reactor Core Isolation Cooling |
| RCE | Root Cause Evaluation |
| RHR | Residual Heat Removal |
| RHRSW | Residual Heat Removal Service Water |
| RWS | River Water Supply |
| SAT | Systems Approach to Training |
| SBDG | Standby Diesel Generator |
| SBGT | Standby Gas Treatment |
| SBLC | Standby Liquid Control |
| SDP | Significance Determination Process |
| SLC | Standby Liquid Control |
| SLD | Steam Leak Detection |

| | |
|-------|--------------------------------------|
| SSC | Systems, Structures, and Components |
| STP | Surveillance Test Procedure |
| TI | Temporary Instruction |
| TS | Technical Specification |
| UFSAR | Updated Final Safety Analysis Report |
| WARM | Work Activity Risk Management |
| WO | Work Order |

R. Anderson

-2-

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Sincerely,

/RA/

Mark A. Ring, Chief
Branch 1
Division of Reactor Projects

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