



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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LISLE, IL 60532-4352

February 1, 2011

Mr. Christopher R. Costanzo
Vice President
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Palo, IA 52324-9785

**SUBJECT: DUANE ARNOLD ENERGY CENTER INTEGRATED INSPECTION REPORT
05000331/2010005**

Dear Mr. Costanzo:

On December 31, 2010, 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 January 11, 2011, 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.

Based on the results of this inspection, two NRC-identified findings and one self-revealed finding of very low safety significance were identified. The findings involved violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Duane Arnold Energy Center. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at the Duane Arnold Energy Center.

C. Costanzo

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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 document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Kenneth Riemer, Chief
Branch 2
Division of Reactor Projects

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

Enclosure: Inspection Report 05000331/2010005
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: 05000331/2010005

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: October 1 through December 31, 2010

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Enclosure

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SUMMARY OF FINDINGS

IR 05000331/2010005; 10/01/2010 – 12/31/2010; Duane Arnold Energy Center; Radiological Hazard Assessment and Exposure Controls, Identification and Resolution of Problems, and Follow-Up of Events and Notices of Enforcement Discretion.

This report covers a three-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors and one Green finding was self-revealed. The findings were considered non-cited violations (NCVs) 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". Findings for which the Significance Determination Process 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 NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors for the licensee's failure to promptly identify and correct a condition adverse to quality. Specifically, the licensee failed to identify that conduits containing safety-related cables were subject to water intrusion following the discovery of water filling an adjacent conduit containing non-safety related cables in the same cable vault. The licensee entered the issue into the corrective action program (CAP) as condition report (CR) 577166, implemented shiftly inspections of the cable vault, and performed inspections and dewatering of the safety-related cable conduits.

The inspectors determined that the issue was a performance deficiency because it was the result of the failure to meet a requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The inspectors determined that the performance deficiency was more than minor and a finding because, if left uncorrected, it had the potential to lead to a more significant safety concern. The finding was of very low safety significance because the finding was a qualification deficiency that did not result in a loss of operability. The inspectors determined that the contributing cause that provided the most insight into the performance deficiency affected the cross-cutting area of Problem Identification and Resolution, having corrective action program components, and involving aspects associated with thoroughly evaluating problems such that the resolutions address causes and extent of conditions, as necessary. [P.1(c)] (Section 40A2.4)

Cornerstone: Initiating Events

- Green. A finding of very low safety significance and associated NCV of Technical Specification 5.4.1 was self revealed during the performance of Operating Instruction (OI) 358, "Reactor Protection System." Specifically, while transferring the 'B' Reactor Protection System to its alternate power supply, the common suction isolation valve for both trains of shutdown cooling closed, causing a loss of shutdown cooling. The licensee entered the issue into the CAP as CR 593949, and revised OI 358 to prevent a similar condition in the future.

The inspectors determined that the issue was a performance deficiency because it was the result of the failure to meet a requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The inspectors determined that the performance deficiency was more than minor and a finding because it was associated with the procedure quality attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown. The inspectors determined the finding was of very low safety significance using IMC 0609 Appendix G, "Shutdown Operations Significance Determination Process," Table 1, "Losses of Control," and Checklist 7 of Attachment 1, "BWR Refueling Operation with RCS Level >23'." No cross-cutting aspect was identified for this finding since it did not reflect current performance. (Section 4OA3.3)

Cornerstone: Occupational Radiation Safety

- Green. A finding of very low safety significance and associated NCV of Technical Specification 5.4.1 was identified by the inspectors for the licensee's failure to implement adequate written procedures regarding the radiation safety program. Specifically, the licensee failed to comply with the requirements of the radiation work permit (RWP) when retrieving a piece of a highly irradiated boron tube from the reactor cavity to moisture separator/steam dryer pit weir wall. Immediate corrective actions included lessons learned being shared with the radiation protection staff to ensure congruency with radiological pre-job briefings and RWP requirements.

The inspectors reviewed the guidance in IMC 0612, Appendix E, "Examples of Minor Issues," and did not identify any similar performance issues. The inspectors then compared the issue to the minor screening questions in IMC 0612 Appendix B "Issue Screening" and determined that the issue was more than minor because, if left uncorrected, the performance deficiency had the potential to lead to a more significant radiological safety concern and could result in unplanned radiological exposures. The finding was determined to be of very low safety significance because the problem was not an As-Low-As-Is-Reasonably-Achievable (ALARA) planning issue, there were no overexposures, nor substantial potential for overexposures, and the licensee's ability to assess dose was not compromised. The inspectors determined that the cause of the incident involved a cross-cutting aspect in the human performance area for work practices. Specifically, personnel work practices did not support human performance because the licensee did not effectively communicate expectations regarding procedural compliance and personnel failed to follow procedures. [H.4(b)] (Section 2RS1.2)

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

Summary of Plant Status

Duane Arnold Energy Center (DAEC) operated at full power for the entire assessment period except for brief down-power maneuvers to accomplish rod pattern adjustments and to conduct planned surveillance testing activities with the following exceptions:

- On October 7, 2010, fuel cycle coastdown, began leading to a planned refueling outage beginning on October 23. The refueling outage continued through December 8, 2010, with the generator connected to the grid on December 9, 2010. Power ascension was completed on December 16, 2010, when the plant returned to full power.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Winter Seasonal Readiness Preparations

a. Inspection Scope

The inspectors conducted a review of the licensee's preparations for winter conditions to verify that the plant's design features and implementation of procedures were sufficient to protect mitigating systems from the effects of adverse weather. Documentation for selected risk-significant systems was reviewed to ensure that these systems would remain functional when challenged by inclement weather. 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. Cold weather protection, such as heat tracing and area heaters, was verified to be in operation where applicable. The inspectors also reviewed CAP items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station procedures. Specific documents reviewed during this inspection are listed in the Attachment to this report. The inspectors' reviews focused specifically on the following plant systems due to their risk significance or susceptibility to cold weather issues:

- Plant Freeze Protection System and Reactor Building Heating and Ventilation System.

This winter seasonal readiness preparations inspection constituted one sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

.2 Readiness for Impending Adverse Weather Condition – High Wind Conditions

a. Inspection Scope

Since high winds were forecast in the vicinity of the facility for October 26 and 27, 2010, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On October 26 and 27, the inspectors walked down the 'B' standby diesel generator (SBDG) system, in addition to the licensee's emergency alternating current 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's preparations against the site's procedures and determined that the licensee'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 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 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 procedures. Specific documents reviewed during this inspection are listed in the Attachment to this report.

This readiness for impending adverse weather condition inspection constituted one 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:

- 'A' residual heat removal service water (RHRSW) system with the 'B' RHRSW system out-of-service (OOS) for surveillance testing;
- 'B' emergency service water (ESW) system with 'A' ESW system OOS for planned maintenance; and
- 'A' SBDG with 'B' SBDG OOS for surveillance testing.

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, UFSAR, Technical Specification (TS) requirements, outstanding work

orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the Attachment to this report.

These partial system walkdown inspections constituted three 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 fire protection and firefighting equipment in the following risk-significant plant areas:

- Area Fire Plan (AFP) 28, 29, 30; Pump House;
- AFP 10, 11, 12 ; Main Plant Exhaust, Heat Pump and Decay Tank;
- AFP 17; Condenser, Heater Bay and Steam Tunnel;
- AFP 04, 05, 06; Reactor Building North and South Control Rod Drive (CRD) Module Areas and Residual Heat Removal (RHR) Valve Room; and
- AFP 03; Reactor Building High Pressure Coolant Injection (HPCI), Reactor Core Isolation Cooling (RCIC) and Radwaste Tank Rooms.

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

seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Specific documents reviewed during this inspection are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08G)

From November 8 through November 17, 2010, the inspectors conducted a review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system, risk-significant piping and components and containment systems.

The ISIs described in Sections 1R08.1 and 1R08.2 below constituted one inspection sample as defined in IP 71111.08-05.

.1 Piping Systems ISI

a. Inspection Scope

The inspectors observed the following non-destructive examinations (NDE) mandated by the American Society of Mechanical Engineers (ASME) Section XI Code to evaluate compliance with the ASME Code Section XI and Section V requirements and if any indications and defects were detected, to determine if these were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Ultrasonic Examination (UT) of the HPCI Pipe-90 Degree Long Radius Elbow Weld, HPC-CF029, Report No. UT-10-058; and
- Liquid Penetrant Examination (PT) of the Recirculation Riser Safe-End-To-Safe-End Extension Weld RRC-F002A, Report No. PT-10-009.

During the prior outage non-destructive surface and volumetric examinations, the licensee did not identify any relevant/recordable indications. Therefore, no NRC review was completed for this inspection procedure attribute.

The inspectors reviewed the following pressure boundary weld completed for a risk-significant system since the beginning of the last refueling outage to determine if the licensee applied the pre-service non-destructive examinations and acceptance criteria required by the ASME Code Section XI. Additionally, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to determine if the weld procedure was qualified in accordance with the requirements of Construction Code and the ASME Code Section XI.

- GBB-016 RHR Pump Discharge Line High Point Vent Installation; Work Order 01146528.

b. Findings

No findings were identified.

.2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI-related problems entered into the licensee's corrective action program and conducted interviews with licensee staff to determine if:

- the licensee had established an appropriate threshold for identifying ISI-related problems;
- the licensee had performed a root cause (if applicable) and taken appropriate corrective actions; and
- the licensee had evaluated operating experience and industry generic issues related to ISI and pressure boundary integrity.

The inspectors performed these reviews to evaluate compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On November 29, 2010, the inspectors observed a crew of licensed operators in the plant's simulator during just in time training for reactor startup to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

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

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

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

b. Findings

No findings were identified.

.2 Annual Operating Test Results (71111.11B)

a. Inspection Scope

The inspector reviewed the overall pass/fail results of the biennial written examination, the individual Job Performance Measure operating tests, and the simulator operating tests (required to be given per 10 CFR 55.59(a)(2)) administered in 2010, as part of the licensee's operator licensing requalification cycle. These results were compared to the thresholds established in Inspection Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The documents reviewed during this inspection are listed in the Attachment to this report.

Completion of this section 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:

- Emergency Service Water System; and
- River Water Supply System.

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

These maintenance effectiveness inspections constituted two quarterly 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:

- Various shutdown maintenance activities performed during for the week of November 1, 2010;
- Shutdown risk while switching from 'A' equipment work window to 'B' equipment work window;
- Risk associated with activities performed during 'A' SBDG STP with the HPCI room cooler OOS;
- Shutdown Risk while draining the reactor cavity and changing from Mode 5 to Mode 4 following refueling; and
- Reactor startup activities and subsequent shutdown of the reactor for emergent work after identifying a leakage path associated with a safety relief valve.

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.

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

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- Control rod drive flange bolts potentially torqued to less than the procedural specified value;
- Seismic adequacy of standby liquid control system test tank;
- Required plant conditions for ESW flow adjustments;
- SBDG digital reference unit (DRU) setpoint and jacket water heat exchanger tube plugging; and
- Effect of clogged reactor building floor drains.

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

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

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification:

- Procedure change for OI-149, Residual Heat Removal System.

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation information 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 also compared the licensee's information to operating experience information to ensure that lessons learned from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modification was installed as directed; the modifications operated as expected; 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. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary modification in place could impact overall plant performance. Specific documents reviewed during this inspection are listed in the Attachment to this report.

This temporary modification inspection constituted one 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:

- 'A' SBDG testing following diesel reassembly and maintenance;
- Stand-by liquid control (SBLC) testing following maintenance; and
- Reactor vessel Class 1 leakage test following refueling and recirculation riser 'A' weld overlay.

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 TS, 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 their importance to

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

These post-maintenance testing inspections constituted three samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the Outage Safety Plan (OSP) and contingency plans for the DAEC refueling outage (RFO), conducted October 23 through December 9, 2010, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During the RFO, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below. Documents reviewed during the inspection are listed in the Attachment to this report.

- Licensee configuration management, including maintenance of defense-in-depth commensurate with the OSP for key safety functions and compliance with the applicable TS when taking equipment out-of-service.
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error.
- Controls over the status and configuration of electrical systems to ensure that TS and OSP requirements were met, and controls over switchyard activities.
- Monitoring of decay heat removal processes, systems, and components.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.
- Maintenance of secondary containment as required by TS.
- Refueling activities, including fuel handling and sipping to detect fuel assembly leakage.
- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the drywell (primary containment) to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing.
- Licensee identification and resolution of problems related to RFO activities.

This RFO inspection constituted one sample as defined in IP 71111.20-05.

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:

- Surveillance Test Procedure (STP) NS160002B; B RHR Service Water Operability Test; Revision 2 (routine);
- STP 3.6.1.1-04; Containment Isolation Valve Leak Tightness Test – Type C Penetrations – Main Steam System; Revision 23 (containment isolation valve);
- STP 3.5.3-02; RCIC System Operability Test; Revision 29 (routine);
- STP 3.8.1-07A; 'A' LOOP-LOCA Test; Revision 5 (routine);
- STP 3.3.5.1-29; Containment Spray Logic System Functional Test and RHR Timer Calibration (routine);
- STP 3.6.4.2-01A; Secondary Containment Isolation Damper Time Test Channel 'A' (routine); and
- STP NS540002A; A ESW Operability Test; Revision 12 (in-service test).

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

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrated operational readiness, and 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 were 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, ASME 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 surveillance testing inspections constituted five routine samples, one containment isolation valve sample, and one in-service testing sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

Since the last inspection of this program area, Emergency Action Level (EAL) and Emergency Plan changes were implemented based on the licensee's determination, in accordance with 10 CFR 50.54(q), that the changes resulted in no decrease in effectiveness of the Plan, and that the revised Plan, as changed, continues to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The inspectors conducted a review of all EAL changes and a sample of the revisions to the Emergency Plan to evaluate for potential decreases in the effectiveness of the Plan, and included a review of the associated 10 CFR 50.54(q) change process documentation. Revisions to the EALs and Emergency Plan reviewed by the inspectors included:

- DAEC Emergency Plan, Section A; Revision 24;
- DAEC Emergency Plan, Section J; Revision 24;
- DAEC Emergency Plan, Section M; Revision 21;
- DAEC Emergency Plan, Section N; Revision 22;
- DAEC Emergency Plan, Section O; Revision 21;
- DAEC Emergency Plan, Appendix 1; Revision 22;
- DAEC Emergency Plan, Appendix 4; Revision 23;
- DAEC Emergency Plan, Appendix 5; Revision 24;
- DAEC Emergency Plan, Appendix 6; Revision 26;
- Emergency Plan Implementing Procedure (EPIP) Form, EAL-01; Revision 8; and
- EPIP Form, EAL-02; Revision 7.

However, this review of the revisions did not constitute formal approval of the changes. Therefore, these EAL and Emergency Plan changes remain subject to future NRC inspection in their entirety. Specific documents reviewed during this inspection are listed in the Attachment to this report.

This EAL and Emergency Plan changes inspection constituted one sample as defined in IP 71114.04-05.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

These inspection activities supplement those documented in Inspection Report 05000331/2010004, and constitute one complete sample as defined in IP 71124.01-05.

.1 Radiological Hazard Assessment (02.02)

a. Inspection Scope

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

The inspectors conducted walk downs 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.

- Dryer/Separator Diving Operations;
- Nozzle Weld Overlays;
- Torus Diving Operations; and
- Refuel Floor Activities.

For these work activities, the inspectors assessed whether the pre-work surveys performed were appropriate to identify and quantify the radiological hazards 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 have included licensee planned entry into non-routinely entered areas subject to previous contamination from failed fuel.);
- the hazards associated with work activities that could have suddenly and severely increased 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 could have resulted 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.

.2 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors selected various containers holding non-exempt licensed radioactive materials that could 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 selected occurrences where a worker's electronic personal dosimeter noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal conditions. The inspectors assessed whether the issues were included in the corrective action program 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

Failure to Comply with Requirements of RWP

Introduction: A finding of very low safety significance (Green) and an associated NCV of Technical Specification 5.4.1 was identified by the inspectors for the failure to implement adequate written procedures regarding the radiation safety program. Specifically, the performance deficiency was that the licensee failed to comply with the requirements of the RWP when retrieving a piece of a highly irradiated boron tube from the reactor cavity to moisture separator/steam dryer storage pit weir wall.

Description: On November 16, 2010, the licensee was performing initial radiological surveys after reactor cavity drain down. While entering the reactor cavity, a radiation protection technician (RPT) received a dose rate alarm of 1630 mrem/hr on his electronic dosimeter at 0419 hours. The RPT discovered elevated dose rates of ~1.2 rem/hr in the area of the reactor cavity to moisture separator/steam dryer storage pit weir wall. The RPT notified his supervisor when he exited the area. There was an outage control center log entry by the site outage director at 0526 hours regarding the elevated dose rates in the moisture separator/steam dryer pit. Although the area did not have a complete radiological characterization, a follow-up survey identified a “hot” metallic object as the source of radiation with on-contact readings of greater than 15000 rem/hr (i.e., the upper limit of the meter used).

The initial radiological information obtained by NRC regional management from the licensee was less than complete. Consequently, two NRC health physicist inspectors were dispatched to the station to assist the resident inspectors in performing Inspection Procedure 71153 “Follow-Up of Events and Notices of Enforcement Discretion” in order to gain a complete understanding of the issues and provide input into determining the need for a Special Inspection.

Once onsite, the inspectors determined that the initial licensee response to the elevated dose rates in the moisture separator/steam dryer storage pit was incomplete. The inspectors determined that less than complete radiation surveys were performed and non-conservative decision making occurred that allowed workers to re-enter the reactor cavity area. Specifically:

- The initial abnormal indications of radiological conditions occurred at 0419 hours on November 16, 2010, with the RPT dose alarm;
- The reactor cavity area was posted as a Locked High Radiation Area at 0500 hours on November 16, 2010;
- The first documented survey of the unknown object in the reactor cavity to moisture separator/steam dryer storage pit weir wall was at 2100 hours on November 16, 2010;
- The radiological dose calculation of the piece of boron tube using Microshield software was completed and ready for review at ~1300 hours on November 17, 2010; and
- Validated dose calculation of the piece of boron tube occurred on November 18, 2010.

These dose assessments were being performed in parallel with worker entries into the reactor cavity in accordance with RWP 10-3014. At briefings, workers were being told to avoid the area of elevated dose rates near the moisture separator/dryer storage pit weir wall. The licensee did not utilize additional physical controls to prevent inadvertent entry into the area containing the uncharacterized source.

The NRC inspectors determined this issue to be a violation of minor safety significance of 10 CFR Part 20, Subpart F, “Surveys and Monitoring.” Specifically, 10 CFR 20.1501(a)(2)(iii) states that, “Each licensee shall make or cause to be made surveys that are reasonable under the circumstances to evaluate the potential radiological hazards.”

Additionally, Technical Specification 5.7.2.e states, in part, that “entry into such areas [in part, High Radiation Areas with dose rates greater than 1.0 rem/hour at 30 centimeters from the radiation source] shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them.”

The inspectors reviewed the circumstances surrounding personnel entries into the reactor cavity when the radiological conditions were not fully characterized and determined that the issues screened as a finding of minor safety significance in accordance with IMC 0612 Appendix B “Issue Screening.”

After being onsite for several hours, the inspectors were able to obtain a complete radiological characterization of the material found in the area around the reactor cavity to moisture separator/dryer storage pit weir wall. Specifically, the inspectors reviewed licensee radiological information that included:

- dose rate data measured on contact, at 30 centimeters, and at 1 meter from the radiation source(s);
- information specific to alpha, beta, and gamma radiation levels;
- information regarding personnel exposure histories; and
- radiological controls that were in place on the reactor cavity, including radiological postings and boundaries.

It was determined that the source of the radiation was a small piece of highly irradiated boron tube, most likely from a previous licensee spent fuel pool clean-up campaign. Contact radiation levels on the piece of boron tube were up to 22,000 rem/hr. The boron tube was located on the weir wall trough shielded by about 8 inches of water.

The NRC inspectors verified that the appropriate radiological controls were in place for the reactor cavity and that informational signage and barriers were in place to keep personnel away from the area of the boron tube. Measured dose rates on the accessible section of the weir wall were approximately 1.2 rem/hr general area (whole body dose rates).

On November 18, 2010, the licensee developed a RWP and retrieval plan to ensure that the object was safely recovered, placed in a shielded cask (“lead pig”), and appropriately stored in the spent fuel pool.

A pre-job briefing was held with the work crew on the evening of November 18, 2010. The workers were briefed on the requirements of their RWP (No. 10-3025). The inspectors identified the work activities and radiological controls as stated in the briefing were not congruent with the written requirements of the RWP. Station Procedure HPP 3101.05, “Administration of Radiation Work Permits,” allows for in-the-field RWP changes (Step 5.8), provided that the changes are in a conservative direction. In this instance, some of the changes were in a conservative direction, while others were not. Specifically, the RWP required “a spray down of the boron shielded pig as it comes out of the water.” This was not completed. Issues of incongruent requirements for area radiation monitors and continuous air samples were also identified by the inspectors. The RWP also had incongruent designations for locked high radiation area controls and conflicting job dose estimates. This represented an issue of concern for the inspectors.

Analysis: The inspectors determined that the issue of concern was a performance deficiency because entry was made into a radiologically controlled area without the radiological controls required by the RWP. The inspectors determined that the cause of the performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented.

The finding was not subject to traditional enforcement since the incident did not have a significant safety consequence, did not impact the NRC's ability to perform its regulatory function, and was not willful.

The inspectors reviewed the guidance in IMC 0612, Appendix E, "Examples of Minor Issues", and did not identify any similar performance issues. Consequently, the inspectors compared the issue to the minor screening questions in IMC 0612, Appendix B "Issue Screening" and determined that the performance deficiency was not an isolated example known to the inspectors, and the performance deficiency was more than minor because, if left uncorrected, the performance deficiency had the potential to lead to a more significant radiological safety concern that could result in unplanned radiological exposures. The finding was reviewed for significance in accordance with IMC 0609, Appendix C, "Occupational Radiation Safety." The inspectors determined the finding to be of very-low-safety significance (Green) because the problem was not an ALARA planning issue, there were no overexposures, nor substantial potential for overexposures, and the licensee's ability to assess dose was not compromised. Additionally, the inspectors determined that the contributing cause of the incident that provided the most insight into the performance deficiency involved a cross-cutting aspect in the human performance area for work practices. Specifically, personnel work practices did not support human performance because the licensee did not effectively communicate expectations regarding procedural compliance and personnel failed to follow procedures. [H.4(b)]

Enforcement: Technical Specification 5.4.1 states, in part, that "Written procedures shall be established, implemented, and maintained covering the following activities: The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978." Regulatory Guide 1.33, Revision 2 includes, in part, radiation safety procedures. Specifically, HPP 3101.05 "Administration of Radiation Work Permits," Revision 42, allowed for in-the-field RWP changes as stated in Step 5.8, provided that "Short term (one shift) changes in the conservative direction (more restrictive) to ... radiological controls may be made without a revision to the RWP if: the changes are documented on a Survey Form, the HP log or the RWP Log." Contrary to the above, on November 18, 2010, workers on the refuel floor failed to comply with the requirements of the RWP (10-3025) when retrieving a piece of highly irradiated boron tube from the reactor cavity to moisture separator/steam dryer pit weir wall. Specifically, the licensee failed to spray down the boron shielded pig as it came out of the water, and failed to clarify issues of incongruent requirements for area radiation monitors and continuous air samples on the RWP. This condition existed for less than one day as the work activities were completed on the evening of November 18, 2010. Immediate corrective actions included lessons learned being shared with the RP staff to ensure compliance with radiological pre-job briefings and RWP requirements. Because this violation was of very low safety significance, was not repetitive or willful, and was entered in the licensee's CAP as CR 596368, this violation is being treated as an NCV, consistent with Section 2.3.2 of the

NRC Enforcement Policy (NCV 05000331/20010005-03, Failure to Comply with Requirements of RWP).

.3 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, radiation work permits, 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 was properly employing 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.

The inspectors reviewed the following radiation work permits for work within potential airborne radioactivity areas with the potential for individual worker internal exposures:

- RWP 10-3009; Refuel Floor Activities; Revision 0;
- RWP 10-3024; Steam Dryer Tie Bar Replacement Project;
- RWP 10-4210; In-Service Inspection Exams and Support; Revision 0;
- RWP 10-4505; N2 Penetration Work Surface Preparation and Weld Overlay; and
- RWP 10-5380; Torus Proper Work: Maintenance, Inspections and Diving for Coating Inspections and Repairs.

For these radiation work permits, the inspectors evaluated airborne radioactive controls and monitoring, including potential for significant airborne levels (e.g., grinding, grit blasting, system breaches, and 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.

b. Findings

No findings were identified.

.4 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 radiation work permit controls/limits in place, and whether their performance reflected the level of radiological hazards present.

b. Findings

No findings were identified.

.5 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 radiation work permit controls/limits, and whether their performance was consistent with training and qualifications with respect to the radiological hazards and work activities.

b. Findings

No findings were identified.

.6 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 corrective action program. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring and exposure controls. The inspectors assessed the licensee's process for applying operating experience to the facility.

b. Findings

No findings were identified.

2RS2 Occupational As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls (71124.02)

These inspection activities supplement those documented in Inspection Report 05000331/2010004, and constitute a partial sample as defined in IP 71124.02-05.

.1 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors selected the following work activities of the highest exposure significance:

- Dryer/Separator Diving Operations;
- Nozzle Weld Overlays;
- Torus Diving Operations; and
- Refuel Floor Activities.

The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements. The inspectors determined whether the licensee reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

b. Findings

No findings were identified.

.2 Radiation Worker Performance (02.05)

a. Inspection Scope

The inspectors observed radiation worker and radiation protection technician performance during work activities being performed in radiation areas, airborne radioactivity areas, or high radiation areas. The inspectors evaluated whether workers demonstrated the ALARA philosophy in practice (e.g., workers were familiar with the work activity scope and tools to be used, workers used ALARA low-dose waiting areas) and whether there were any procedure compliance issues (e.g., workers were not complying with work activity controls). The inspectors observed radiation worker performance to assess whether the training and skill level was sufficient with respect to the radiological hazards and the work involved.

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 Physical Protection

4OA1 Performance Indicator (PI) Verification (71151)

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures PI for the period from the 4th quarter 2009 through the 3rd quarter 2010. 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 6, dated October 2009, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC Integrated Inspection Reports for the period of October 2009 through September 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index (MSPI) - Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Residual Heat Removal System PI for the period from the 4th quarter 2009 through 3rd quarter 2010. 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 6, dated October 2009, 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 October 2009 through September 2010 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 MSPI residual heat removal system PI inspection constituted one sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index (MSPI) - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Cooling Water Systems PI for the period from the 4th quarter 2009 through 3rd quarter 2010. 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 6, dated October 2009, 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 October 2009 through September 2010 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 MSPI cooling water system PI inspection constituted one sample as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that 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 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 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the six month period of July 2010 through December 2010, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

This semi-annual trend inspection constituted one sample as defined in IP 71152-05.

b. Findings

No findings were identified.

.4 (Closed) Unresolved Item (URI) 05000331/2010004-06: Water Intrusion into Cable Vaults Containing Safety-Related Cables

a. Inspection Scope

The inspectors reviewed additional information concerning URI 05000331/2010004-06 opened during the 3rd quarter 2010 baseline inspection. The inspectors reviewed results from boroscopic inspections of several conduits containing safety-related cables. The licensee performed the inspections to determine if the cables in the conduits were submerged in water. Specific documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

Failure to Identify Water Intrusion into Cable Conduits Containing Safety-Related Cables

Introduction: A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors for the licensee's failure to promptly identify and correct a condition adverse to quality associated with water intrusion into the turbine building cable vault containing safety-related cables. Specifically, the licensee failed to identify that conduits containing safety-related cables were subject to water intrusion following discovery of water filling an adjacent conduit containing non-safety related cables in the same cable vault.

Description: During the inspectors' review of water intrusion issues since 2008, they noted several condition reports documenting water intrusion into the 1A2 non-essential switchgear room, the Turbine Building (TB) east corridor and cable vault, and several exterior manholes containing electrical cables. The NRC issued a Green NCV in IR 05000331/2009005 for failing to maintain safety-related cables in manhole 1MH109 in an environment for which they were designed. This was following an inspection of 1MH109 that found safety-related ESW cables submerged in water. As a result of this finding, the licensee performed Condition Evaluation 07853 and developed several corrective actions to prevent long term cable submergence at the station. Immediate corrective actions included dewatering the manholes; interim corrective actions included the development of periodic inspection work tasks to be performed in manholes that were subject to water intrusion. The periodic inspections were to take place until the final corrective actions could be implemented; including the installation of sleeve extensions (to raise the top of the manhole) to prevent water intrusion, and the installation of sump pumps.

Additional review by the inspectors noted that on October 23, 2009, the licensee generated CAP 070736 which documented the source of water intrusion found in the 1A2 non-essential switchgear room. There had been a trend of water seeping from underneath the 1A2 non-essential switchgear and pooling around the breaker cabinets in the room. Investigation revealed the water was coming through cable conduit K208 leading to the 1A210 breaker (General Service Water Pump 1P-89C). This conduit was

traced back to the TB east cable vault and the cable was found to originate from manhole MH206. The licensee determined that as rain water would fill MH206, water would leak through the cable penetrations in MH206 and back to the TB east cable vault. As water entered the TB east cable vault, the water would enter open conduits, below the penetrations and also fill the floor of the cable vault. The inspectors noted that the CAP 070736 did not identify whether conduits containing safety-related cables were in the vault or if they had been filled with water.

According to corrective action 53855 for CAP 070736, the licensee had established an administrative limit of 6" of accumulated rainfall to initiate a CR in order to inspect the condition of manholes MH206 and 1MH109, and dewater, if necessary. The inspectors questioned the basis for the 6" of rainfall since it was not documented in the corrective action document. Review of all corrective action documents did not indicate what condition the licensee was intending to prevent (i.e., prevent safety-related cables in 1MH109 from becoming submerged or prevent non-safety related cables in MH206 from becoming submerged and, therefore, prevent water from entering the TB).

On August 16, 2010, CR 573648 was initiated to document recent intense rains approaching the 6" accumulated rainfall limit, and Work Request (WR) 94007646 was written to remove the manhole covers and inspect for water. On August 31, 2010, the inspectors identified water on the floor of the 1A2 switchgear room and the licensee wrote CR 577166 on September 1, 2010, which again identified the need to inspect manholes MH 206 and 1MH109 (since this was previously identified as the source of water into 1A2), and also noted that WR 94007646 had not yet been completed. On September 2, 2010, the manholes were inspected and revealed that MH206 contained approximately seven feet of water and 1MH109 contained approximately 6 inches of water. The licensee dewatered both manholes and dug a trench to help direct any new rainfall away from the lid of MH206.

On September 9, 2010, the inspectors questioned the licensee on whether the TB east cable vault contained any safety-related cables and what type of environment the cables were exposed to. The licensee wrote CR 579006 on September 10, 2010, to document potential standing water behind Door 112 which accesses the TB east cable vault. Inspection of the TB east cable vault on September 13, 2010 showed approximately two inches of water on the floor of the vault. The inspectors noted that water level in the vault likely had fallen since there was evidence of water seeping into the TB through the vault wall. Additionally, there was evidence of water streaking on the walls of the vault below the cable penetrations. The licensee noted in CR 579006 it is "reasonable to assume that there may be water in some if not all of the conduits exposed to the water coming into the Turbine Building in this vault." The inspectors determined that there were two possible ways that water was entering safety-related conduits. First, as water entered the vault at the cable penetration, it could spray into the "open" conduits located below the cable penetrations. Second, as water filled the bottom of the cable vault, it could submerge the conduit penetration on the floor and leak into the conduit.

In November 2010, the licensee performed inspections of the cable conduits located in the TB east cable vault. The licensee identified several conduits containing safety-related cables that had water inside them (CR 594912, CR 594913, CR 594915, CR 594925, CR 594926 and CR 594823 were written to document water found in cable conduits). The licensee pumped the water out of each affected conduit.

Analysis: The inspectors determined that the licensee's failure to promptly identify and correct a condition which submerged safety-related cables in water was contrary to 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," and was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, it had the potential to lead to a more significant safety concern. Specifically, submerging safety-related cables which are not designed for submergence in water, could lead to cable failures as a result of continued cable degradation. The inspectors concluded this finding was associated with the Mitigating Systems Cornerstone.

The inspectors applied IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," to this finding. Using Table 4a, the inspectors answered "Yes" to Question 1 under the Mitigating Systems Cornerstone column because the finding was considered a qualification deficiency that was confirmed to not result in loss of operability. Therefore, the finding screened as Green. The inspectors determined that the contributing cause that provided the most insight into the performance deficiency affected the cross-cutting area of Problem Identification and Resolution, having corrective action program components, and involving aspects associated with thoroughly evaluating problems such that the resolutions address causes and extent of conditions, as necessary. Specifically, the licensee did not evaluate the extent of condition inside the TB cable vault to determine whether additional conduits were susceptible to water intrusion and therefore, did not identify a condition which had submerged safety-related cables in water. [P.1(c)]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, between October, 2009 and September, 2010, the licensee failed to promptly identify and correct a condition adverse to quality when safety-related cables not designed for submergence in water were submerged when water entered the TB east cable vault and subsequently entered the conduits containing the cables. Specifically, following the discovery of water in the TB and 1A2 switchgear room, the licensee identified that the water source could be traced back through the TB east cable vault; however, the licensee failed to identify that other conduits in the vault were subject to water intrusion and could impact safety-related cables. Interim corrective actions included digging a trench around the cover to manhole MH206, completing shiftly inspections of the TB east cable vault, and planning inspections and dewatering of the conduits containing safety-related cables; planned final corrective actions included installation of manhole cover extensions and installation of sump pumps. Because this violation was of very low safety significance, was not repetitive or willful, and it was entered into the licensee's CAP as CR 577166, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000331/2010005-01, Failure to Identify Water Intrusion into Cable Conduits Containing Safety-Related Cables).

Unresolved Item 05000331/2010004-06 is closed.

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

.1 (Closed) Licensee Event Report (LER) 05000331/2010-002-01: Condition Prohibited by Technical Specifications

a. Inspection Scope

During the inspectors' review and closure of LER 05000331/2010-002-00 in NRC Inspection Report (IR) 05000331/2010003, they identified a Severity Level IV NCV of 10 CFR Part 50.73(a)(2)(v)(A) and (D) for the licensee's failure to report an event or condition that could have prevented the fulfillment of the Turbine Stop Valve Closure and Turbine Control Valve Fast Closure Reactor Protection System (RPS), and End-of-Cycle Recirculation Pump Trip safety functions. Following issuance of IR 05000331/2010003, the licensee supplemented and submitted LER 05000331/2010-002-01 to acknowledge that the event was reportable under 10 CFR Part 50.73(a)(2)(v)(A) and (D), and that the condition did result in a safety system functional failure. The inspectors reviewed LER 05000331/2010-002-01 to verify that the appropriate 10 CFR Part 50 subsections were addressed, as well as whether corrective actions planned or in place were in alignment with the supplemental LER. Documents reviewed as part of this inspection are listed in the Attachment to this report. This LER is closed.

This follow-up of events inspection constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

.2 Elevated Safety Relief Valve Tailpipe Temperature

a. Inspection Scope

On December 3, 2010, tailpipe temperature on PSV-4402 (Main Steam Line B ADS Relief Valve) unexpectedly increased during plant startup following the scheduled refueling outage. The rise in temperature was indicative of leakage through the valve. The inspectors observed plant shutdown on December 3, 2010, and replacement of the pilot assembly for PSV-4402. The licensee requested authorization for an alternate post-maintenance VT-2 examination of the replaced mechanical joints. The NRC gave the licensee verbal approval to perform the required VT-2 post-maintenance examination during the normal plant startup sequence at 940 psig instead of normal operating pressure (approximately 1025 psig). The inspectors observed reactor startup, which commenced on December 5, 2010. The inspectors confirmed that a satisfactory visual examination of PSV-4402 was completed on December 7, 2010, with the reactor at 940 psig. Documents reviewed as part of this inspection are listed in the Attachment to this report.

This follow-up of events inspection constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

.3 Loss of Shutdown Cooling

a. Inspection Scope

On November 10, 2010, with the plant operating in Mode 5 during a refueling outage, the 'A' RHR pump tripped while operating in the shutdown cooling mode, causing a loss of the primary method of decay heat removal for approximately 30 minutes. The inspectors reviewed causal information and corrective actions for the event.

This follow-up of events inspection constituted one sample as defined in IP 71153-05.

b. Findings

Inadequate Procedure Results in a Loss of Shutdown Cooling

Introduction: A finding of very low safety significance (Green) and associated NCV of TS 5.4.1 was self-revealed during the performance of Operating Instruction (OI) 358, "Reactor Protection System," Revision 58. Specifically, while transferring the 'B' Reactor Protection System to its alternate power supply, the common suction isolation valve for both trains of shutdown cooling closed, causing a loss of shutdown cooling.

Description: On November 10, 2010, with the plant operating in Mode 5 during a refueling outage, the 'A' RHR pump tripped while operating in the SDC mode, causing a loss of the primary method of decay heat removal for approximately 30 minutes. The licensee was performing procedure OI 358 to transfer the 'B' RPS power supply to its alternate source. The licensee failed to isolate control power to MO-1909, the outboard SDC common suction isolation valve, which automatically closed when power was restored to the valve motor due to a PCIS that was still present after power to the 'B' RPS had been transferred. The closure of MO-1909 caused the operating pump to trip on low suction head and prevented both trains of RHR from providing their decay heat removal function for approximately 30 minutes. During the loss of SDC, the Reactor Water Cleanup and Fuel Pool Cooling systems remained available for decay heat removal. Time-to-boil was 33.6 hours and the reactor vessel cavity was flooded during the event.

Licensee investigation determined that procedure OI 358 was inadequate and identified a procedure revision in 2007, which unknowingly removed a step to de-energize control power to the breaker for valve MO-1909. Failure to de-energize control power to the valve breaker allowed the PCIS logic to remain "sealed-in" and the valve automatically closed when direct current power to MO-1909 was restored.

Analysis: The inspectors determined that not adequately maintaining OI 358 was contrary to TS 5.4.1, and was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because it was associated with the procedure quality attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown.

The inspectors applied IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," Table 1, "Losses of Control," and Checklist 7 of Attachment 1, "BWR Refueling Operation with RCS Level >23'." The inspectors determined that the finding was of very low significance (Green) because the event did not result in a loss of

control or an actual loss of decay heat removal. Further, the calculated time to boil was greater than 30-hours and the shutdown cooling alignment was restored within about 30-minutes. As such, Appendix G did not require the significance of the finding to be quantified by a Phase 2 or Phase 3 analysis.

The inspectors did not identify a cross-cutting aspect associated with this finding since it did not reflect current performance. Procedure OI 358 was last revised in July, 2007.

Enforcement: Technical Specification 5.4.1 states, in part, that “Written procedures shall be established, implemented, and maintained covering the following activities: The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978.” Paragraph 4(y) of Regulatory Guide 1.33 states, in part, that “procedures for the Reactor Protection System shall be prepared and activities shall be performed in accordance with these procedures.” The licensee maintained OI 358, “Reactor Protection System,” Revision 58, as the implementing procedure for operation of the Reactor Protection System.

Contrary to the above, on November 10, 2010, the licensee performed an inadequately maintained procedure OI 358, Revision 58, for the reactor protection system. Specifically, OI 358 did not direct the operator to remove control power for MO-1909, RHR common suction isolation valve, eventually causing the valve to close, resulting in a loss of shutdown cooling. Immediate corrective actions included revision to OI 358, including steps to remove control power for MO-1909 during the RPS power supply transfer evolution. Because this violation was of very low safety significance, was not repetitive or willful, and it was entered into the licensee’s CAP as CR 593949, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000331/2010005-02; Inadequate Procedure Results in Loss of Shutdown Cooling).

.4 Highly Radioactive Material Found in Dryer/Separator Pit

a. Inspection Scope

On November 16, 2010, while performing the initial survey of the reactor cavity following drain down, a licensee RPT received a dose rate alarm in the moisture separator/steam dryer pit. The area of the alarm was located and the licensee identified a metallic object under 8.5 inches of water in the moisture separator/steam dryer pit that had measured on-contact dose rates exceeding 15,000 rem/hr. The licensee posted the area as a locked high radiation area and made plans to remove the object, place it in a canister, and move it into the spent fuel pool. Licensee calculation showed the object to have between 3 and 6 Ci of activity. On November 18, the licensee successfully moved the metal object within a steel canister into the spent fuel pool. The inspectors reviewed the licensee’s initial response to the issue and coordinated further inspection with regional specialists.

This follow-up of events inspection constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

.5 Follow-Up of Highly Radioactive Material Found in Dryer/Separator Pit

a. Inspection Scope

A regional radiation safety specialist assisted the resident staff in obtaining an understanding of refuel floor radiological controls, equipment/personnel performance and plant management decisions to assist NRC management in making an informed evaluation of plant conditions. The inspectors observed plant parameters and implementation of radiological controls. Information sources included drawings, calculations, surveys, radiation work permits, plant logs, and licensee personnel. The inspectors evaluated whether the licensee appropriately resolved event issues by attending meetings and briefings.

The inspectors assisted regional management in reviewing the deterministic criteria for radiation safety as defined in NRC Inspection Manual Chapter 0309 "Reactive Inspection Decision Basis for Reactors" to ensure compliance with Management Directive (MD) 8.3, "NRC Incident Investigation Program."

This follow-up of events inspection constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 2009005-04: Changes to Duane Arnold Energy Center Action Level Notification Form, NOTE-05

The inspectors previously reviewed changes made to the notification form used to notify state and local counties of an emergency event classification and other event-related information such as meteorological data, release status, and protective action recommendations. The changes implemented to the "Duane Arnold Energy Center Action Level Notification Form, NOTE-05," were reviewed for a potential decrease in effectiveness of the notification information provided to offsite agencies relative to event-related release-in-progress information. The issue of concern was considered a URI because more information was necessary from the licensee to fully understand the changes and to determine if the changes to the notification form were a decrease in effectiveness that would require prior NRC approval, and therefore, constituted a violation. The URI was documented in Inspection Report 05000331/2009005.

The licensee had made several changes to the notification form to more clearly determine when a release was in progress which was due to the classifiable event. The inspectors reviewed the most recent revisions of the NOTE-05 notification form, the most recent revision to 10 CFR 50.54(q) supporting the changes implemented, and the Emergency Response Organization training elements for personnel designated to complete and approve the NOTE-05 notification form. Each of the implemented changes was evaluated separately to determine if any decreases in effectiveness from the approved Emergency Plan existed.

The first item revised on the notification form was Block #5. The wording was changed from "Release in progress due to this event" to "Abnormal release in progress due to this

event,” and clarification was added to the criteria used to determine if a release due to the event was in progress. Additionally, an annotation block was added to allow reporting the fact that an abnormal release due to the event had occurred, but was subsequently terminated.

The second item revised on the notification form was Block #6. The criteria used to determine if any abnormal release which occurred due to the event was either below, or at or above the Federal Limits, was changed to correlate with the KAMAN HI-HI alarm setpoint versus the KAMAN HI alarm setpoint.

The first change incorporated a change to the release determination criteria. The original definition relied upon licensed operator judgment to determine if a release was occurring specifically due to the event. Following the revision, this determination is based upon receiving either a KAMAN HI alarm or a field team report detecting elevated radiation levels. As part of implementing the revisions, the licensee changed the alarm setpoint values for the Normal Range KAMAN HI alarms. The KAMAN HI-HI alarm setpoints values remained unchanged, and continued to be set at values equal to the Federal Limits. The Normal Range KAMAN HI alarm setpoints were changed from values equal to 10 percent of the Federal Limits to values nominally 40 times lower than the previous alarm setpoint. The new alarm setpoint values are equal to approximately 50 times the yearly average normal release level for each specific KAMAN. These thresholds are statistically different from the normal release levels to avoid false positive alarms, yet still low enough to alert station personnel of an abnormal release level in the effluent pathway, potentially due to any classifiable event in progress. Additionally, the notification form changes have no effect on the offsite agencies’ responses, since the alarm setpoint values are well below the thresholds for required offsite actions.

The second change incorporated a change to the criteria used to determine if any airborne release is “at or above,” or “below” Federal Limits. On the original notification form, this determination was based upon whether or not a KAMAN HI alarm (values set at 10 percent of the Federal Limits) had been received. On the revised version of the notification form, the KAMAN HI-HI alarm setpoint values, which are actually set at the Federal Limit values, now indicate whether a release is actually “at or above” Federal Limits.

The inspectors determined that, based upon the changes to the “Duane Arnold Energy Center Action Level Notification Form, NOTE-05,” no decreases in effectiveness have resulted in the approved DAEC Emergency Plan. These changes to the notification form, supported by the most recent revision to 10 CFR 50.54(q), do not require NRC approval prior to being implemented, and therefore no violation of NRC requirements occurred. This URI does not require any further action and is closed. Documents reviewed are listed in the Attachment to this report.

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 11, 2011, the inspectors presented the inspection results to C. Costanzo, 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:

- The results of the inservice inspection with K. Kleinheinz, Engineering Director, on November 17, 2010.
- The results from the annual review of EAL and Emergency Plan changes, as well as the resolution of URI 05000331/2009005-04, were discussed via telephone with D. Curtland, Plant General Manager, and other members of the licensee staff on December 13, 2010.
- Follow-Up of Events (IP 71153) in the Occupational Radiation Safety Cornerstone Program by telephone, with T. Byrne, J. Karrick, and other members of the licensee staff on December 22, 2010.
- Radiological Hazard Assessment and Exposure Controls and Occupational ALARA Planning and Controls with C. Costanzo, Site Vice President, on November 5, 2010.
- The licensed operator requalification training annual operating test results were discussed with Mr. J. Ruth, Operations Training Manager, via telephone on December 22, 2010.

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

C. Costanzo, Site Vice President
D. Curtland, Plant General Manager
G. Young, Nuclear Oversight Manager
S. Catron, Licensing Manager
B. Murrell, Licensing Engineer Analyst
K. Kleinheinz, Engineering Director
B. Kindred, Security Manager
B. Simmons, Training Manager
G. Pry, Operations Director
G. Rushworth, Assistant Operations Manager
P. Giroir, Operations Support Manager
J. Ruth, Operations Training Manager
R. Porter, Chemistry & Radiation Protection Manager
M. Davis, Emergency Preparedness Manager
M. Lingenfelter, Design Engineering Manager
R. Wheaton, Maintenance Director
J. Karrick, General Supervisor Radiation Protection
R. Schlueter, Health Physics Foreman ALARA Coordinator
W. Render, Instructor, DAEC Operator Training
F. Lucas, Design Engineer
A. Lee, ISI Program Owner
F. Dohmen, NDE Level III
D. Barta, Licensing

Nuclear Regulatory Commission

K. Feintuch, Project Manager, NRR
K. Riemer, Chief, Reactor Projects Branch 2

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000331/2010005-01	NCV	Failure to Identify Water Intrusion into Cable Conduits Containing Safety-Related Cables (40A2.4)
05000331/2010005-02	NCV	Inadequate Procedure Results In A Loss of Shutdown Cooling (40A3.3)
05000331/2010005-03	NCV	Failure to Comply with Requirements of RWP (2RS1.2)

Closed

05000331/2010005-01	NCV	Failure to Identify Water Intrusion into Cable Conduits Containing Safety-Related Cables (40A2.4)
05000331/2010005-02	NCV	Inadequate Procedure Results In A Loss of Shutdown Cooling (40A3.3)
05000331/2010005-03	NCV	Failure to Comply with Requirements of RWP (2RS1.2)
05000331/2010004-06:	URI	Water Intrusion into Cable Vaults Containing Safety-Related Cables (40A2.4)
05000331/2009005-04	URI	Changes to Duane Arnold Energy Center Action Level Notification Form, NOTE-05 (40A5.1)
05000331/2010-002-01	LER	Condition Prohibited by Technical Specifications (40A3.1)

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.

Section 1R01

NG-270K; Plant Winterization Checklist; Revision 3
OP-AA-102-1002 (DAEC); Seasonal Readiness; Revision 3
WR 94010034; AO7508B Inoperative
CR 582294; Cold Weather Seasonal Readiness Item Could Not Be Completed
CR 579400; Vibe Switch Does Not Trip 1K011Y-M
CR 585188; Heat Trace on Core Spray Suction Pipe at 1T5A Needs Replaced
Abnormal Operating Procedure (AOP) 903; Severe Weather; Revision 30
CR 590045; Tornado Hazards and Industrial Safety Issues Found in Yard
CR 590537; An Empty Plastic Tank and Aluminum Decking Wind Hazard

Section 1R04

OI 416A1; RHRSW System Electrical Lineup; Revision 6
OI 416A2; "A" RHRSW System Valve Lineup and Checklist; Revision 11
OI 416A6; RHRSW System Control Panel Lineup; Revision 5
BECH-M113; RHR Service Water & Emergency Service Water Systems; Revision 55
OI 454A4; "B" ESW System Valve Lineup and Checklist; Revision 11
OI 454A1; "B" ESW System Electrical Lineup; Revision 5
OI 324A10; SBDG Standby/Readiness Condition Checklist; Revision 13
OI 324A1; SBDG 1G-31 System Electrical Lineup; Revision 2
OI 324A7; SBDG 1G-31 System Control Panel Lineup; Revision 5
OI 324A3; SBDG 1G-31 System Valve Lineup and Checklist; Revision 10

Section 1R05

Fire Plan, Volume 1, Program; Revision 57
Administrative Control Procedure (ACP) 1412.2; Control of Combustibles; Revision 36
AFP 03; Reactor Building HPCI, RCIC & Radwaste Tank Rooms; Revision 26
AFP 04; Reactor Building North CRD Module Area, CRD Repair and CRD Cable Rooms;
Revision 28
AFP 05; Reactor Building South CRD Module Area and Offgas Recombiner Rooms and
Railroad Airlock; Revision 26
AFP 06; Reactor Building RHR Valve Room Elevation 757'-6"; Revision 24
CR 1602040; Insulation Found Stored in the 3rd Floor Scaffold Area
AFP 28; Pump House ESW/RHRSW Pump Rooms and Main Pump Room; Revision 29
AFP 29; Pump House Fire Pump and Fire Pump Day Tank Rooms; Revision 27
AFP 30; Pump House Safety-Related Piping Area Elevation 747'-6"; Revision 26
AFP 10; Main Exhaust Fan Room, Heating Hot Water Pump Room and the Plant Air Supply
Fan Room; Revision 24
AFP 12; Reactor Building Decay Tank and Condensate Phase Separator Rooms; Revision 24

AFP 11; Reactor Building Laydown Area- El. 833'-6"; Revision 25
AFP 17; Condenser Bay, Heater Bay and Steam Tunnel; Revision 24

Section 1R08

ACP 1211.1; Written Practice for Qualification and Certification of NDE Personnel; Revision 15
ACP 1211.9; Ultrasonic Examination of Ferritic Piping Welds; Revision 6
ACP 1211.3; NDE Procedure for Liquid Penetrant (Visible Dye and Water Washable) PT-1;
Revision 12
ACP 1211.5; Nondestructive Examination Procedure Magnetic Particle (Dry or Wet Visible)
MT-1; Revision 1
CR 589748; Hanger Rod slightly Bent; October 25, 2010
CR 591023; Linear Indications Revealed While Performing PT; October 29, 2010
CR 591469; PT Indication Exceeds ASME Code Acceptance; October 31, 2010
CR 591448; PT Indication Exceeds ASME Code Acceptance; October 31, 2010
CR 592455; Snubber Not Installed Per Drawing; November 4, 2010
CR 592583; Hanger Rod Does Not Have Full Thread Engagement; November 4, 2010
CR 592119; Loose Nut on Pipe Clamp; November 3, 2010
CR 591178; Linear Indication Revealed While Performing UT on Recric; dated October 29,
2010
CR 593111; Linear Indications Revealed In Nozzle to Head Weld; November 6, 2010
CR 593181; Hanger Is 14.3 percent Over Design DW Load; November 7, 2010
CR 592838; Torus Inspection – Two Pits Are Greater Than Acceptance Crit; November 7, 2010
OEE 00352571; UT Indications Found In Two Inch Reactor Coolant Pipe Segment (Beaver
Valley); May 26, 2010
General Welding Specification; FP-PE-WLD-02; Revision 6
Welding Procedure Specification; FP-PE-B31-P1P1-GTSM-001; Revision 2
Procedure Qualification Record; KNPP-GMP 102-311-GS-PQR; Revision 0
Procedure Qualification Record; PAL- SM-1-1(1); Revision 0
Procedure Qualification Record; PBNP-WP-6; Revision 0
NS490003A; A RHR System Leakage Inspection Walkdown; Revision 1
Weld Checklist; WO No. 1146528; Weld 6 MT; January 13, 2009

Section 1R11

ACP 110.1; Conduct of Operations; Revision 24
Integrated Plant Operating Instruction (IPOI) 2; Startup; Revision 120
IPOI 5; Reactor Scram Immediate Actions; Revision 10
OI 693; Main Turbine And Turbine Control; Revision 78
AOP 693; Main Turbine/EHC Failures; Revision 12
Emergency Operating Procedure 1; [Reactor Pressure Vessel] Control; Revision 16
Emergency Plan Implementing Procedure 1.1; Determination of Emergency Action Levels;
Revision 28
CR 598100; Simulator Does Not Respond As Expected During Startup Session
Results; Licensed Operator Annual Operating Test

Section 1R12

CR 596639; Abnormal Indications During STP NS540002B
CR 598575; ESW Operability Test NS540002B Required Adjustment
CR 339653; 068703 CAQ – CV1956A Failed To Open When ‘A’ ESW Pump Started
CR 339758; 068808 CAQ – CV1956A, Indications Of Stem Galling
CR 576584; NRC Questions On ESW Operability Test NS540002
CR 338994; 068044 CAQ – V13-0121 Found Stuck Open
CR 65287; Insulation Fell Off Piping
CR 73239; Pipe Support Pulled Away From Wall
OI 454; Emergency Service Water System; Revision 60
STP NS540002A; Emergency Service Water Operability Test; Revision 12
USAR Section 9.2.3; RHR Service Water and Emergency Service Water Systems
Shift Log Entries; dated January 2008 through December 2010
Maintenance Rule Unavailability Database; ESW System
Performance Criteria Basis Document, Essential Service Water, SUS 54.00; Revision 2
River Water Supply System Health Report 10/1/2010 – 12/31/2010
Performance Criteria Basis Document, River Water Supply, SUS 9.00, 10.01, 10.02, 10.03;
Revision 3
CR 574625; ‘D’ RWS Pump Differential Pressure Was Not Within Limits
CR 587242; 1P-117A Fails NS100102A
CR 587534; HBD68 RWS Buried Piping UT Results Documentation and Evaluation
CR 587617; 1P117C Is Close to Lower ASME Limit of 22.0 PSID

Section 1R13

OM-AA-101-1000 (DAEC); Shutdown Risk Management; Revision 3
NextEra Energy, DAEC, RFO-22 Shutdown Risk Plan, Revision 1
OP-AA-102-1003 (DAEC); Guarded Equipment; Revision 8
OI 149A8; RHR System Protected System Placards for SDC; Revision 5
CR 589914; Entering LCO 3.5.2 (ECCS Shutdown) During Cavity Flood; 10/26/2010
CR 594386; N2A Weld Overlay Risk Evaluation Characterized Incorrectly
RFO 22 Shutdown Risk Map; Revision 3 and 3a
Work Planning Guideline (WPG)-1; Work Process Guidelines; Revision 42
WPG-2; On-line Risk Management Guideline; Revision 56
OP-AA-104-1007; Online Aggregate Risk; Revision 1
STP 3.8.1-06; ‘A’ Standby Diesel Generator Operability Test (Fast Start); Revision 8
IPOI 2; Startup; Revision 120
AOP 683; Abnormal Safety Relief Valve Operation; Revision 10
CR 0159896; PSV 4402 Has Elevated Temperature Indication
WO 40055197-08; PSV 4402 Pilot Replacement and Main Valve Inspection

Section 1R15

CR 592096; Required Plant Conditions for ESW Flow Adjustment NS540002A
OI 454; Emergency Service Water System; Revision 59
NS540002A; ‘A’ Emergency Service Water Operability Test; Revision 11
OI 442; Circulating Water System; Revision 83
BECH-M142; Circulating Water System; Revision 89
BECH-M146; Service Water System Pumphouse; Revision 83
BECH-M113; RHR Service Water and Emergency Service Water Systems; Revision 66

CR 01599356; Check Torque On CR Drives
CR 01599211; M&TE Q842 Air Torque Wrench As Found Data Was OOT
CR 01599493; An Incorrect Number Was Listed In Attachment to CR 1599374
CR 01599374; CRDMs As-Left Torque Potentially Lower Than Required
Immediate Operability Evaluation for CR # 1599374; dated December 5, 2010
Prompt Operability Determination for CR # 1599374; dated December 8, 2010
CR 594231; Seismic Adequacy Of 1T-217
CR 591202; 1T0217 SBLC Test Tank Seismic Question (NRC EN-46372)
Engineering Evaluation for CR 591202-01; dated November 10, 2010
STP 3.1.7-01; SBLC Pump Operability Test; Revision 30
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CR 1598954; Handswitch Found In Unexpected Position
CR 586989; Weaknesses in the Implementation of ACP 1410.15
CR 594912; AR 594823 Identified Conduits Containing SR Cables with Water
CR 594913; AR 594823 Identified Conduits Containing SR Cables with Water
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CR 0159896; PSV 4402 Has Elevated Temperature Indication
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Shift Log Entries; dated December 3, 2010 through December 7, 2010
WO 40055205; PMT Perform LLRT STP 3.6.1.2-01
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AR 00595411; Unidentified Object Discovered in D/S Pit; November 16, 2010
AR 00595457; Documentation of LHRA Controls for the Refuel Floor; November 16, 2010
Form HP-21; HP Briefing Checklist Summary; Revision 08
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Form HP-55IN; Radiological Work Screening Form Internal Exposure Control; Revision 04
HPP 3101.05; Administration of Radiation Work Permits; Revision 42
HPP 3102.03; Radiation Protection Job Planning; Revisions 31 and 32
HPP 3104.01; Control of Access to High Radiation Areas and Above; Revision 52
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Radiation Work Permit 10-3014; R1: All Cavity Work with the Vessel Filled to the RPV Flange – RFO-22; Revision 00
Radiation Work Permit 10-3025; R1: Boron Tube Recovery from Dryer Separator Pit – RFO-22; Revision 00
Radiological Engineering Calculation 94-009R; Radwaste Characterization of Irradiated Scraps; May 12, 1994
Radiological Engineering Calculation 10-005A; Dose Rate Study of Activated Boron Tube Located in Dryer Separator Pit RFO-22; November 18, 2010
RFO-22 Health Physics Staffing Matrix; Revision 10
Various Logs, Including the Refuel Floor, Outage Control Center, and Radiation Protection; November 14, through November 18, 2010

LIST OF ACRONYMS USED

ACP	Administrative Control Procedure
ADAMS	Agencywide Document Access Management System
AFP	Area Fire Plan
ALARA	As-Low-As-Is-Reasonably-Achievable
AOP	Abnormal Operating Procedure
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
DAEC	Duane Arnold Energy Center
DRP	Division of Reactor Projects
DRU	Digital Reference Unit
EAL	Emergency Action Level
ECCS	Emergency Core Cooling System
EPIP	Emergency Plan Implementing Procedure
ESW	Emergency Service Water
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPOI	Integrated Plant Operating Instruction
IR	Inspection Report
ISI	Inservice Inspection
LER	Licensee Event Report
LHRA	Locked High Radiation Area
LOCA	Loss of Coolant Accident
LOOP	Loss of Off-site Power
LPCI	Low Pressure Coolant Injection
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OI	Operating Instruction
OOS	Out-of-Service
OSP	Outage Safety Plan
PARS	Publicly Available Records System
PCIS	Primary Containment Isolation System
PI	Performance Indicator
PT	Penetrant Examination
RCIC	Reactor Core Isolation Cooling
RFO	Refueling Outage
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
RP	Radiation Protection
RPS	Reactor Protection System
RPT	Radiation Protection Technician
RWP	Radiation Work Permit
SBDG	Standby Diesel Generator

SBLC	Standby Liquid Control
SDC	Shutdown Cooling
SLC	Standby Liquid Control
STP	Surveillance Test Procedure
TB	Turbine Building
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Examination
WO	Work Order
WPG	Work Planning Guideline
WR	Work Request

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Sincerely,

/RA/

Kenneth Riemer, Chief
Branch 2
Division of Reactor Projects

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