



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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January 31, 2012

Mr. Peter Wells  
Vice President  
NextEra Energy Duane Arnold, LLC  
3277 DAEC Road  
Palo, IA 52324-9785

**SUBJECT: DUANE ARNOLD ENERGY CENTER – NRC INTEGRATED INSPECTION  
REPORT 05000331/2011005**

Dear Mr. Wells:

On December 31, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Duane Arnold Energy Center. The enclosed inspection report documents the inspection results which were discussed on January 12, 2012, with you and other members of your staff.

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

One NRC-identified traditional enforcement Severity Level IV violation and two self-revealed findings of very low safety significance (Green) were identified during this inspection. The two findings were determined to also involve violations of NRC requirements. Further, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC Enforcement Policy.

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

If you disagree with a cross-cutting aspect assignment 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.

P. Wells

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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 (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Mark Ring, Branch Chief  
Branch 1  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000331/2011005  
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: 05000331/2011005

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: October 1 through December 31, 2011

Inspectors: L. Haeg, Senior Resident Inspector  
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Branch 1  
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Enclosure

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## SUMMARY OF FINDINGS

IR 05000331/2011005, 10/01/2011 – 12/31/2011; Duane Arnold Energy Center; Operability Determinations and Functionality Assessments and Identification and Resolution of Problems.

This report covers a three-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Severity Level IV violation was identified by the inspectors and two Green findings were self-revealed. The violation and findings were considered 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" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### A. NRC-Identified and Self-Revealed Findings and Violations

#### **Cornerstone: Initiating Events**

- Green. A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on August 11, 2011, when both river water supply subsystems were rendered inoperable following a sediment intrusion event. Specifically, the cause of the event was attributed to the cancellation of a river bed survey that would have identified the increased sediment buildup requiring increased monitoring and corrective actions (dredging, sand pumping, and/or structural repairs). The cancellation of the river bed survey work order was contrary to the requirements of Administrative Control Procedure 1208.3, "Preventive Maintenance Program," that required management approval prior to cancelling the work order that was tied to the corrective action program. This issue of concern was documented in the licensee's corrective action program as condition report 01676836. Corrective actions included revision to affected river survey work orders to ensure that they could not be cancelled without adequate review and approval, and completion of river dredging and repairs to the upstream spur dikes.

The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to meet a procedural requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because it was associated with the Initiating Events Cornerstone attribute of equipment performance, and it affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. The inspectors applied IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," to this finding. Because the finding did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available under the Initiating Events Cornerstone column of Table 4a, the finding was determined to be of very low safety significance (Green). The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Human Performance, having Decision Making components, and involving the licensee making safety or risk-significant decisions using a systematic process, including formally defining the authority and roles for decisions

affecting nuclear safety. Specifically, several decisions were made with respect to spur dike repairs and river monitoring; however, the requisite organizational reviews and approvals associated with the river were not performed to ensure appropriate actions were taken. [H.1(a)] (Section 4OA2.4)

### **Cornerstone: Barrier Integrity**

- Green. A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on October 31, 2011, when operators failed to follow Operating Instruction 999, "Reactor Building Crane." Specifically, this error resulted in the reactor building (RB) crane striking the Independent Spent Fuel Storage Installation (ISFSI) inspection stand. Immediate corrective actions included performing inspections of the dry storage container transfer cask, ISFSI inspection stand, and reactor building crane.

The inspectors determined that attempting to move the crane over the ISFSI work platform while the hand rails were installed was contrary to the RB crane operating instruction and was an issue of concern. Failing to follow the RB crane operating instruction was a performance deficiency because it was the result of the licensee's failure to meet a procedural requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented.

The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. Specifically, not following the RB crane operating instructions could lead to a more significant event or cause damage to safety-related equipment. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," Table 4a for the Barrier Integrity Cornerstone. Because the finding only affected the fuel barrier, the finding was determined to be of very low safety significance (Green). The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Human Performance, having Work Control components, and involving appropriately coordinating work activities by incorporating actions to address the need to keep personnel apprised of work status, the operational impact of work activities, and plant conditions that may affect work activities. Specifically, the licensee did not implement appropriate work controls to ensure the hand rails of the ISFSI inspection stand were removed prior to moving the crane for an activity that was not associated with the ISFSI project. [H.3(b)] (Section 4OA2.5)

### **Cornerstone: Other**

- Severity Level IV. A Severity Level (SL) IV NCV of 10 CFR 50.72(b)(3)(v)(B) was identified by the inspectors for the licensee's failure to report within eight hours a condition that, at the time of discovery, could have prevented the fulfillment of the Residual Heat Removal (RHR) system Low Pressure Coolant Injection (LPCI) safety function. Specifically, on December 2, 2011, a sizable void was identified in the 'B' LPCI discharge injection line resulting in the LPCI mode of RHR being declared inoperable. The licensee documented the issue into their corrective action program (CAP), reported the condition to the NRC on December 8, 2011, and, was in the process of reviewing the cause of the issue to determine additional corrective actions.

The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to meet a regulatory requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. Because the performance deficiency is considered to potentially impede or impact the ability of the NRC to perform its regulatory oversight function, the performance deficiency was dispositioned using the traditional enforcement process. Per NRC Enforcement Policy, Section 6.9.d.9, failing to make a report required by 10 CFR 50.72 is categorized as an example of a Severity Level IV violation. Additionally, because the violation was entered into the licensee's CAP, compliance was restored in a reasonable period of time, and was not repetitive or willful; this violation is being treated as a non-cited SL IV violation, consistent with Section 2.3.2 of the NRC Enforcement Policy. Because the performance deficiency was not considered a finding using IMC 0612, Appendix B, "Issue Screening," and did not impact the Reactor Oversight Process Cornerstones of Safety, a cross-cutting aspect was not assigned. (Section 1R15)

**B. Licensee-Identified Violations**

A violation of very low safety significance that was identified by the licensee was reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's CAP. The violation and condition report is listed in Section 4OA7 of this report.

## **REPORT DETAILS**

### **Summary of Plant Status**

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

#### **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 risk-significant systems from the effects of adverse weather. Documents for the selected systems were reviewed to ensure that the 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 protective components, such as heat tracing and area heaters, were 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 the CAP in accordance with station corrective action 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:

- Control Building and Pump House Heating and Ventilation systems.

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

##### **b. Findings**

No findings were identified.



## 1R04 Equipment Alignment (71111.04)

### .1 Quarterly Partial System Walkdowns

#### a. Inspection Scope

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

- High Pressure Coolant Injection (HPCI) system; and
- 'B' Standby Diesel Generator (SBDG) and 'B' Emergency Service Water (ESW) subsystems during 'A' SBDG 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 (CRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two quarterly partial system walkdown samples as defined in IP 71111.04-05.

#### b. Findings

No findings were identified.

## 1R05 Fire Protection (71111.05)

### .1 Routine Resident Inspector Tours (71111.05Q)

#### a. Inspection Scope

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

- Area Fire Plan (AFP) 03 and 07; Reactor Building – HPCI, Reactor Core Isolation Cooling (RCIC); and Elevation 786' Corridor and Laydown Area;
- AFP 74 and 79; Switchyard; and ISFSI;

- AFP 4, 5 and 6; Reactor Building North Control Rod Drive (CRD) Module Area, CRD repair and CRD Cable Rooms; Reactor Building South CRD Module Area and Offgas Recombiner Rooms and Railroad Airlock; and Reactor Building RHR Valve Room Elevation 757'6";
- AFP 10, 11 and 12; Main Exhaust Fan Room, Heating Hot Water Pump Room and the Plant Air Supply Fan Room; Reactor Building Laydown Area Elevation 833'-6"; and Reactor Building Decay Tank and Condensate Phase Separator Rooms; and
- AFP 20; Aux Boiler Room, Emergency Diesel Generator Rooms and Generator Day Tank Rooms Elevation 757'6".

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or non-functional fire protection equipment, systems, or features in accordance with the licensee's fire plan.

The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event.

Using the documents listed in the Attachment to this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On October 27, 2011, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations 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. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

The inspectors evaluated the following:

- DAEC Cycle 22 Periodic Evaluation; March 2, 2009, through December 9, 2010; and
- Feedwater Heater and Moisture Separator Drain Tank level control systems.

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

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

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

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

b. Findings

No findings were identified.

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

a. Inspection Scope

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

- Work Week 1140 risk management during RHR system maintenance, Electro-Hydraulic Control pump replacement, and ISFSI operations;
- Work Week 1141 risk management during switchyard maintenance;
- 161 kV Tiffin Hills line out of service for transmission system operator modifications;
- Feedwater Heater and Moisture Separator Drain Tank operational decision making issue;
- RHR system LPCI function declared inoperable due to air voiding found in LPCI injection piping; and
- Inability to retract 'B' Traversing In-core Probe (TIP) from reactor vessel.

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

This inspection constituted six maintenance risk assessments and emergent work control samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

## 1R15 Operability Determinations and Functionality Assessments (71111.15)

### .1 Operability Evaluations

#### a. Inspection Scope

The inspectors reviewed the following issues:

- Operability evaluation for 'A' SBDG system exhaust manifold leak;
- Prompt Operability Determination (POD) for corroded Standby Gas Treatment subsystem drain piping;
- Intake structure ventilation system issues and impact on River Water Supply (RWS) system;
- River level instrumentation and intake structure sand gate position impact on ultimate heat sink and RWS system operability; and
- Void found in 'B' RHR system LPCI discharge piping.

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 with 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 CRs to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This inspection constituted five operability determinations and functionality assessment samples as defined in IP 71111.15-05.

#### b. Findings

##### (1) Failure to Make Required Eight Hour Event Report per 10 CFR 50.72(b)(3)(v)(B)

Introduction: A Severity Level IV NCV of 10 CFR 50.72(b)(3)(v)(B) was identified by the inspectors for the licensee's failure to report within eight hours a condition that, at the time of discovery, could have prevented the fulfillment of the RHR system LPCI safety function.

Description: On November 18, 2011, the licensee performed a monthly surveillance test to verify that the RHR system was full of water. The test consisted of, in part, static venting of various portions of the system. During the venting, an abnormal amount of air was vented from the 'B' RHR LPCI injection piping. The licensee documented the condition in the CAP and initiated a technical assessment for reportability (TAR) to review past operability and reportability of the condition. At approximately 1300 hrs on December 2, 2011, the licensee performed an ultrasonic examination of the 'B' RHR LPCI injection piping as part of the TAR evaluation and identified a 2-3 ft<sup>3</sup> void within the

pipings. After quantifying the void, the operations shift manager declared the LPCI function of RHR inoperable and entered Technical Specification LCO 3.5.1, Condition B for one low pressure emergency core cooling system subsystem inoperable (7 day completion time to restore to an operable status). On December 4, 2011, while the licensee continued to evaluate the significance of the void and determine corrective actions, the inspectors were concerned that the void condition resulting in LPCI being declared inoperable represented a condition that, at the time of discovery, could have prevented the fulfillment of the RHR system LPCI safety function. Further, if it was a condition that, at the time of discovery, could have prevented the fulfillment of the RHR system LPCI safety function, the inspectors questioned why it wasn't reported to the NRC within the eight-hour timeliness requirement of 10 CFR 50.72(b)(3)(v). The licensee documented the inspector's questions and concerns in the CAP as CR 01714014, subsequently agreed that the condition was subject to an NRC report, and made the report on December 8, 2011.

Analysis: The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to meet a regulatory requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. Because the performance deficiency could potentially impede or impact the ability of the NRC to perform its regulatory oversight function, the performance deficiency was dispositioned using the traditional enforcement process. Per NRC Enforcement Policy, Section 6.9.d.9, failing to make a report required by 10 CFR 50.72 is categorized as an example of a Severity Level IV violation. Because the performance deficiency was not considered a finding using IMC 0612, Appendix B, "Issue Screening," and did not impact the Reactor Oversight Process Cornerstones of Safety, a cross-cutting aspect was not assigned.

Enforcement: Title 10 CFR Part 50.72(b)(3)(v)(B), requires, in part, that operating reactor licensees shall notify the NRC within eight hours of the occurrence of any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of systems that are needed to remove residual heat. Contrary to this requirement, on December 2, 2011, the licensee failed to report the void condition that at the time of discovery could have prevented the fulfillment of the RHR system LPCI safety function to the NRC within eight hours. Because the violation was entered into the licensee's CAP, compliance was restored in a reasonable period of time, and was not repetitive or willful; this violation is being treated as a non-cited Severity Level IV violation, consistent with Section 2.3.2 of the NRC Enforcement Policy.

**(NCV 05000331/2011005-01, Failure to Make Required Eight Hour Event Report per 10 CFR 50.72(b)(3)(v)(B)).**

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:

- TIP primary containment isolation valve testing;
- Standby and T1 transformers, and 'M' breaker testing;
- Main feedwater Leading Edge Flow Meter (LEFM) system testing; and
- Intake structure ventilation system testing.

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

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

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

- Surveillance Test Procedure (STP) 3.8.1-04B; B Standby Diesel Generator Operability Test (Slow Start from Normal Starting Air) (Routine);
- STP 3.6.1.6-01; Pressure Suppression Chamber to Reactor Building Vacuum Breaker Operability Test (In-service test);
- STP 3.7.4-01B; B Standby Filter Unit – Logic System Functional Test and Simulated Automatic Actuation (Routine);
- STP NS300002; Tracer Gas Test of Control Building Envelope (Routine); and
- STP 3.5.3-04; RCIC Simulated Auto Actuation Test (Routine).

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 was in accordance with TSs, the UFSAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers Code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

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

a. Inspection Scope

Since the last NRC inspection of this program area, revisions of the Emergency Plan and of the Emergency Action Levels 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 continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The inspectors conducted a sampling review of the Emergency Plan changes and a review of the Emergency Action Level changes made between December 2010 and September 2011 to evaluate for potential decreases in effectiveness of the Plan. However, this review does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety.

This inspection constituted one emergency action level and emergency plan changes inspection sample as defined in IP 71114.04-05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on November 9, 2011, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Control Room Simulator and the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This inspection constituted one emergency preparedness drill inspection sample as defined in IP 71114.06-05.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Occupational and Public Radiation Safety**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

This inspection constituted one complete radiological hazard assessment and exposure controls sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

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

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors determined if there had been any changes to plant operations since the last inspection that could have resulted in a significant new radiological hazard 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 the radiological hazard(s).

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

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

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

- Entry into Heater/Condenser Bay.

For these work activities, the inspectors assessed whether the pre-work surveys performed were appropriate to identify and quantify the radiological hazard(s) 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;
- the hazards associated with work activities that could suddenly and severely increase radiological conditions and that the licensee had established a means to inform workers of changes that could have significantly impacted 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.

.3 Instructions to Workers (02.03)

a. Inspection Scope

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

The inspectors reviewed the following radiation work permits used to access high radiation areas and evaluated the specified work control instructions or control barriers.

- In-Service Project – N2 Penetration Work;
- Segregation of Hot Trash and Vacuum Cleaner High Efficiency Particulate Air Filter Change Out; and
- Traversing In-core Probe Room Maintenance.

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

The inspectors reviewed selected occurrences where a worker's electronic personal dosimeter noticeably malfunctioned or alarmed. The inspectors evaluated whether workers had responded appropriately to the off-normal condition. The inspectors assessed whether the issue was 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

No findings were identified.

.4 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

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

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

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

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

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

b. Findings

No findings were identified.

.5 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors evaluated ambient radiological conditions (e.g., radiation levels or potential radiation levels) during tours of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, 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 dosimeters were placed in the location of highest expected dose or that the licensee properly employed an NRC-approved method of determining effective dose equivalent.

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

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

- Segregation of Hot Trash and Vacuum Cleaner High Efficiency Particulate Air Filter Change Out;
- Dry Fuel Storage Project; and
- Cask Pit Clean-up and Transport of Tri-Nuc 260 Hoses and Filters.

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, entry into tanks, cubicles, and reactor cavities). The inspectors assessed barrier (e.g., tent or glove box) integrity and temporary high-efficiency particulate air ventilation system operation. The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and other storage pools. The inspectors assessed whether appropriate controls (i.e., administrative and physical controls) were in place to preclude inadvertent removal of these materials from the pool.

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

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors discussed with the radiation protection manager the controls and procedures for high-risk high radiation areas and very high radiation areas.

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

The inspectors discussed the controls in place for special areas that have the potential to become very high radiation areas during certain plant operations with first-line health physics supervisors (or equivalent positions having backshift health physics oversight authority). The inspectors assessed whether these plant operations required communication beforehand with the health physics group, so as to allow corresponding timely actions to properly post, control, and monitor the radiation hazards including re-access authorization.

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

b. Findings

No findings were identified.

.7 Radiation Worker Performance (02.07)

a. Inspection Scope

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

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

b. Findings

No findings were identified.

.8 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

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

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

b. Findings

No findings were identified.

.9 Problem Identification and Resolution (02.09)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's 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 their plant.

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 one complete occupational ALARA planning and controls sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed pertinent information regarding plant collective exposure history, current exposure trends, and ongoing or planned activities in order to assess current performance and exposure challenges. The inspectors reviewed the plant's three year rolling average collective exposure.

The inspectors reviewed the site-specific trends in collective exposures (using NUREG-0713, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities," and plant historical data) and source term (average contact dose rate with reactor coolant piping) measurements (using Electric Power Research Institute) TR-108737, "BWR Iron Control Monitoring Interim Report," issued December 1998, and/or plant historical data, when available).

The inspectors reviewed site-specific procedures associated with maintaining occupational exposures ALARA, which included a review of processes used to estimate and track exposures from specific work activities.

b. Findings

No findings were identified.

.2 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors compared the results achieved (dose rate reductions, person-rem used) with the intended dose established in the licensee's ALARA planning for these work activities. The inspectors compared the person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements, and evaluated the accuracy of these time estimates. The inspectors assessed the reasons (e.g., failure to adequately plan the activity, failure to provide sufficient work controls) for any inconsistencies between intended and actual work activity doses.

The inspectors determined whether post-job reviews were conducted and if identified problems were entered into the licensee's corrective action program.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

**Cornerstones: Mitigating Systems and Barrier Integrity**

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index - Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Residual Heat Removal System Performance Indicator (PI) for the period from the fourth quarter 2010 through the third quarter 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, was used. The inspectors reviewed the licensee's operator narrative logs, condition reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 2010 through September 2011 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI residual heat removal system sample as defined in IP 71151-05.

b. Findings

No findings were identified.



.2 Mitigating Systems Performance Index - 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 fourth quarter 2010 through the third quarter 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, was used. The inspectors reviewed the licensee's operator narrative logs, condition reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 2010 through September 2011 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI cooling water system sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures PI for the period from the fourth quarter 2010 through the third quarter 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, 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, condition reports, event reports and NRC Integrated Inspection Reports for the period of October 2010 through September 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's CAP to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

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

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

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

##### a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that 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 June 2011 through November 2011, 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 inspection constituted one semi-annual trend review sample as defined in IP 71152-05.

b. Findings

No findings were identified.

.4 Selected Issue Follow-Up Inspection: Root Cause Evaluation 01676836, "Both River Water Supply (RWS) Subsystems Inoperable"

a. Inspection Scope

As a follow-up to the unplanned shutdown of the plant on August 11, 2011, due to the RWS system being declared inoperable, the inspectors reviewed the root cause evaluation (RCE) performed by the licensee. This review was to determine whether the causal factors, contributing factors, and corrective actions were appropriate for the circumstances surrounding the event. Based on the inspectors' review of the RCE several issues of concern were noted, one of which represented a self-revealed performance deficiency discussed below. Overall, the inspectors concluded that the root cause evaluation was performed in a thorough, probing manner; and several corrective actions were identified that should be appropriate to prevent recurrence of the event.

This inspection constituted one selected issue follow-up sample as defined in IP 71152-05.

b. Findings

(1) Cancellation of River Survey Work Order Causes Inoperability of River Water Supply System

Introduction: A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on August 11, 2011, when both river water supply subsystems were rendered inoperable following a sediment intrusion event.

Description: On August 11, 2011, the licensee entered a forced outage after declaring the RWS system inoperable due to a sand intrusion event that rendered both intake structure travelling screens non-functional (see NRC Inspection Report 05000331/2011004 for additional information). The licensee performed a RCE for the event and determined several causal factors were involved. The inspectors reviewed the RCE, specifically focusing on the two root causes that were determined by the licensee. Root Cause #1 involved the decision to cancel a July 2011 river survey that would have detected the degrading conditions of the ultimate heat sink. Root Cause #2 involved the failure to establish preventive maintenance in the form of a river survey following high river flow or level conditions.

The inspectors focused their review of the licensee's evaluation of Root Cause #1 and its contributing causes since it represented a self-revealed issue of concern and should have been prevented. The evaluation determined that the July 2011 river survey would have identified the increased sediment buildup upstream of the intake due to degradation of upstream spur dikes. This survey would have triggered increased monitoring and corrective actions in the form of dredging, sand pumping, and/or structural repairs to the spur dikes themselves. The RCE also determined that the July 2011 river survey WO 40056778 was cancelled without receiving review and approval per the requirements of Administrative Control Procedure (ACP) 1208.3, "Preventive Maintenance Program". This procedure specifically required that management approval was required prior to cancelling any work order that was tied to the corrective action program. In the case of WO 40056778, it was a corrective action to prevent recurrence from a RCE performed in 2003.

Analysis: The inspectors determined that the issue of concern represented a performance deficiency because it was the result of the licensee's failure to meet a procedural requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because it was associated with the Initiating Events Cornerstone attribute of equipment performance, and it affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. The inspectors applied IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," to this finding. Because the finding did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available under the Initiating Events Cornerstone column of Table 4a, the finding was determined to be of very low safety significance (Green).

The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of

Human Performance, having Decision Making components, and involving the licensee making safety or risk-significant decisions using a systematic process, including formally defining the authority and roles for decisions affecting nuclear safety. Specifically, risk-significant decisions were made with respect to cancelling a river survey and deferring repairs to the spur dikes; however, the requisite organizational reviews and approvals associated with the ultimate heat sink were not performed to ensure appropriate actions were taken. [H.1(a)]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. Procedure ACP 1208.3, "Preventive Maintenance Program", establishes, in part, the licensee's implementing procedure for approving and cancelling work at the facility.

Contrary to the above, on July 19, 2011, the licensee failed to accomplish ACP 1208.3, Section 3.11, which required, in part, Management Review Committee review of WO 40056778 prior to voiding the WO for any reason. Corrective actions included revision to affected river survey work orders to ensure that they could not be cancelled without adequate review and approval, and completion of river dredging and repairs to the upstream spur dikes. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CR 01676836, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000331/2011005-02, Cancellation of River Survey Work Order Causes Inoperability of River Water Supply System**).

.5 Selected Issue Follow-Up Inspection: Reactor Building Crane Strikes ISFSI Inspection Stand

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a condition report documenting displacement and potential damage to the ISFSI inspection stand and reactor building (RB) crane control cab. The inspectors followed the licensee's immediate corrective actions, including their follow up inspections, since a loaded ISFSI transfer cask was in the process of vacuum drying. The inspectors also followed the licensee's assessment of damage to the RB crane structural integrity prior to the licensee releasing the RB crane for use. The inspectors also reviewed a RCE conducted by the licensee for the event.

This inspection constituted one selected issue follow-up sample as defined in IP 71152-05.

b. Findings

(1) Procedural Non-Compliance Results in RB Crane Striking the ISFSI Inspection Stand

Introduction: A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on October 31, 2011, when operators failed to follow Operating Instruction (OI) 999, "Reactor Building Crane". Specifically, this error resulted in the RB crane striking the ISFSI inspection stand.

Description: On October 31, 2011, the licensee was in the midst of a several month long ISFSI loading campaign. Following completion of the main work activities for the day, a decision was made to move a storage cabinet from the first floor of the reactor building to the refuel floor, where most of the ISFSI project activities were taking place. Prior to moving the cabinet, operators and a contract supervisor held an informal pre-job brief to discuss the lift. The work activity being performed was not governed by a work order to perform the task. Later investigation revealed that due to the equipment used for the evolution and the area the work was taking place, the work activity could be considered minor maintenance and require a minor maintenance work request and order, at a minimum. Following the informal brief, a crane operator went to the refuel floor to get ready to lift the storage cabinet. In order to make the lift, the operator needed to move the crane from the north end of the refuel floor to the south end. While traversing the crane from north to south, the operator noticed that the hand rails for the ISFSI inspection stand were installed. Unfortunately, the crane cab was only a couple feet from the platform when the operator noticed this, and the operator was not able to stop the crane before it struck the ISFSI inspection stand hand rails. The ISFSI inspection stand was displaced several inches and was stopped by the dry storage canister (DSC) transfer cask, which was recently loaded with spent fuel undergoing a vacuum drying process. Subsequently, the licensee verified the drying process was uninterrupted and the DSC transfer cask was not damaged. They also performed inspections of the inspection stand and made repairs necessary to ensure personnel safety. Inspections of structural integrity were also performed for the RB crane prior to additional crane operations.

The licensee performed a RCE for the event and noted that the inspection stand hand rail interference was first identified in 2003. Corrective actions for the interference included adding a caution statement to OI 999, "Reactor Building Crane," and performance of a periodic inspection of the RB crane. In addition, the licensee placed an information tag on the control panel of the crane to warn operators of the potential inspection stand hand rail interference. This information tag was removed at one point and not in place at the RB crane control panel prior to the event.

The inspectors questioned why the RCE did not specifically identify the apparently ineffective corrective actions from 2003 as either a root or contributing cause. Although the RCE discussed the ineffective corrective actions from 2003, the inspectors concluded that the inadequate controls in place to maintain the information tag was a contributing cause to the event. Also, the inspectors noted that the placement of the information tag in the crane cab was not identified as a long-term corrective action and following the ISFSI campaign in 2003, the tag was removed. There was no requirement added to have the tag reinstalled when the ISFSI inspection stand was erected for the 2011 ISFSI campaign.

Analysis: The inspectors determined that attempting to move the crane over the ISFSI work platform while the hand rails were installed was contrary to OI 999 and was an issue of concern. Failing to follow OI 999 was a performance deficiency because it was the result of the licensee's failure to meet a procedural requirement, and the cause was reasonably within the licensee's ability to foresee and correct and should have been prevented. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern. Specifically, not following OI 999 could lead

to more significant event or cause damage to safety-related equipment. The inspectors concluded this finding was associated with the Barrier Integrity Cornerstone.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," Table 4a for the Barrier Integrity Cornerstone. Because the finding only affected the fuel barrier, the finding was determined to be of very low safety significance (Green).

The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Human Performance, having Work Control components, and involving appropriately coordinating work activities by incorporating actions to address the need to keep personnel apprised of work status, the operational impact of work activities, and plant conditions that may affect work activities. Specifically, the licensee did not implement appropriate work controls to ensure the hand rails of the ISFSI inspection stand were removed prior to moving the crane for an activity that was not associated with the ISFSI project. [H.3(b)]

**Enforcement:** Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. Contrary to this, on October 31, 2011, an operator failed to accomplish an activity affecting quality in accordance with procedures. Specifically, the operator failed to comply with procedure OI 999, Revision 39, "Reactor Building Crane", which contained a caution statement indicating that the crane cab would not clear the handrails of the ISFSI work platform when the cask work platform is installed. Immediate corrective actions included performing inspections of the DSC transfer cask, vacuum drying operations, ISFSI inspection stand, and RB crane. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as CR 1701934, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000331/2011005-03, Procedural Non-Compliance Results in RB Crane Colliding with ISFSI Inspection Stand**).

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

##### .1 Reactor Feedwater Pump Area Deluge Inadvertent Actuation

###### a. Inspection Scope

The inspectors reviewed the plant's response to an inadvertent initiation of a deluge system in the reactor feed pump area of the turbine building on October 22, 2011. The inspectors walked down affected equipment that was wetted in the area and verified the plant's actions to address potential impacts to indicated reactor power levels were appropriate. Documents reviewed in this inspection are listed in the Attachment to this report.

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

###### b. Findings

No findings were identified.

.2 (Closed) Licensee Event Report (LER) 05000331/2011-002-0: Loss of Ultimate Heat Sink and Completion of Technical Specification Required Shutdown

a. Inspection Scope

On August 11, 2011, with the plant operating at full power, the RWS system was declared inoperable after both intake structure traveling screens became non-functional. With both RWS subsystems inoperable, the licensee entered TS 3.7.2, Condition B, which required the reactor to be in Mode 3 within 12 hours and Mode 4 within 36 hours. Following reactor shutdown, the licensee identified a significant amount of sand/sediment intrusion in the intake (this event is further discussed in Inspection Report 05000331/2011004). This LER documented four events or conditions subject to an LER per 10 CFR 50.73. The inspectors verified that the events and conditions reported in the LER were appropriate, that the safety significance was properly evaluated, and that corrective actions planned or in place were appropriate to address the causes of the event. The inspectors did not identify any new or additional issues of concern during their review of the LER. Documents reviewed are listed in the Attachment to this report. This LER is closed.

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

b. Findings

No findings were identified.

4OA5 Other Activities

.1 Operation of an Independent Spent Fuel Storage Installation at Operating Plants (60855.1)

a. Inspection Scope

The inspectors observed and evaluated select licensee loading, processing, and transfer operations of the fifth and sixth canisters during the licensee's 2011 dry fuel storage campaign to verify compliance with the applicable certificate of compliance conditions, the associated TS, and ISFSI procedures. Specifically, the inspectors observed: heavy loads practices associated with handling of the Transfer Cask; non-destructive evaluations of welds on the DSC lid; transfer of the DSC to the ISFSI pad; insertion of the DSC into a Horizontal Storage Module (HSM); and surveys being performed at the ISFSI pad.

The inspectors performed tours of the ISFSI pad to assess the material condition of the pad and HSMs. The inspectors reviewed the licensee's evaluations of flammable materials near the ISFSI and the radiation monitoring program. Additionally, the inspectors performed independent radiation surveys around the ISFSI pad and HSMs and verified that the contamination and radiation levels from the Transfer Cask were well below the regulatory limits.

The inspectors reviewed select documents, in part, after the licensee completed certain loading activities and a review of the fuel selection documentation was performed to verify the fuel placed in the DSC met the TS requirements. The inspectors observed the licensee perform crane operations and reviewed the applicable procedures for



compliance with the control of heavy loads program. In addition, the inspectors reviewed condition reports and the associated corrective actions to verify the licensee took adequate corrective actions in a timely manner to correct the issues. The inspectors also reviewed 72.48 screenings and changes to the licensee's 10 CFR 72.212 evaluations since the last ISFSI inspection.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 12, 2012, the inspectors presented the inspection results to Mr. P. Wells, 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 Emergency Preparedness program inspection were discussed with Mr. M. Davis via telephone on October 13, 2011.
- The ISFSI operational inspection concluded with an interim exit meeting on November 17, 2011. The inspector presented the inspection results to Mr. C. Conklin and other members of the licensee management and staff. Licensee personnel acknowledged the information presented.
- Radiological Hazard Assessment and Exposure Controls and Occupational ALARA Planning and Controls with Mr. P. Wells on December 2, 2011.

The inspectors confirmed that none of the potential report input discussed was considered proprietary.

Any proprietary material received during the inspection was returned to the licensee.

4OA7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section 2.3.2 of the NRC Enforcement Policy, for being dispositioned as an NCV.

The licensee identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to adequately implement post-maintenance testing of the 'A' intake structure ventilation subsystem temperature controller. Specifically, on November 7, 2011, maintenance technicians incorrectly performed WO 40039255 for a replacement temperature controller. The testing was intended to demonstrate functionality of the 'A' intake structure ventilation subsystem; however, human performance errors resulted in the test not revealing improper installation issues with the controller. On November 16, 2011, the licensee identified the performance deficiency

and declared the 'A' intake structure ventilation subsystem non-functional and the 'A' RWS subsystem inoperable, entered the issue into the CAP as CR 1707561, and restored the 'A' intake structure ventilation subsystem to a functional status. Because the 'A' RWS subsystem remained available throughout the period of time the temperature controller was incorrectly installed, reasonable assurance existed to support the conclusion that the RWS safety function was not impacted.

This failure to meet the requirements of WO 40039255 was a performance deficiency. The performance deficiency was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of configuration control and human performance, and its objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, had the licensee not identified the condition, environmental or operating conditions could have occurred which could have challenged availability of the 'A' RWS system or impacted operability. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," Table 4a. Because the inspectors answered "No" to all five questions under Mitigating Systems Cornerstone column, the inspectors screened the finding as very low safety significance (Green).

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

P. Wells, Site Vice President  
D. Curtland, Plant General Manager  
K. Kleinheinz, Site Engineering Director  
S. Catron, Licensing Manager  
G. Young, Nuclear Oversight Manager  
G. Pry, Operations Director  
R. Wheaton, Maintenance Site Director  
R. Porter, Chemistry & Radiation Protection Manager  
B. Kindred, Security Manager  
B. Simmons, Training Manager  
M. Davis, Emergency Preparedness Manager  
B. Murrell, Licensing Engineer Analyst  
D. Barta, Licensing Engineer/Analyst  
C. Conklin, Project Manager  
C. Harberts, Refuel Floor Project Manager  
K. Peveler, Nuclear Oversight Supervisor

#### Nuclear Regulatory Commission

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

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

05000331/2011005-01	SLIV	Failure to Make Required Eight Hour Event Report per 10 CFR 50.72(b)(3)(v)(B) (Section 1R15)
05000331/2011005-02	NCV	Cancellation of River Survey Work Order Causes Inoperability of River Water Supply System (Section 4OA2.4)
05000331/2011005-03	NCV	Procedural Non-Compliance Results in Reactor Building Crane Colliding with ISFSI Inspection Stand (Section 4OA2.5)

### Closed

05000331/2011005-01	SLIV	Failure to Make Required Eight Hour Event Report per 10 CFR 50.72(b)(3)(v)(B) (Section 1R15)
05000331/2011005-02	NCV	Cancellation of River Survey Work Order Causes Inoperability of River Water Supply System (Section 4OA2.4)
05000331/2011005-03	NCV	Procedural Non-Compliance Results in Reactor Building Crane Colliding with ISFSI Inspection Stand (Section 4OA2.5)
05000331/2011-002-0	LER	Loss of Ultimate Heat Sink and Completion of Technical Specification Required Shutdown

### Discussed

None.

## LIST OF DOCUMENTS REVIEWED

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

### 1R01

OP-AA-102-1002 (DAEC); Seasonal Readiness; Revision 5  
OP-AA-102-1002; Seasonal Readiness; Revision 0  
Abnormal Operating Procedure 903; Severe Weather; Revision 33  
OP-AA-102-1002 (DAEC); Seasonal Readiness; Revision 5  
CR 01688945; Track Seasonal Readiness Items to Completion Prior to 10/31  
DAEC Certification Letter for 2011 Cold Weather Readiness Period  
NG-270K; Plant Winterization Checklist; Revision 5

### 1R04

OI 152A2; HPCI System Valve Lineup and Checklist; Revision 16  
OI 152A4; HPCI System Control Panel Lineup; Revision 5  
OI 152A1; HPCI System Electrical Lineup; Revision 3  
OI 152; High Pressure Coolant Injection System; Revision 99  
CR 01706756; While Performing Routine Auxiliary Operator Rounds, a Loud Squeal Was Discovered on 1VAC014B HPCI Room Cooling Unit  
OI 324A10; SBDG Standby/ Readiness Condition Checklist; Revision 14  
OI 454A4; 'B' ESW System Valve Lineup and Checklist; Revision 13

### 1R05

ACP 1203.53; Fire Protection; Revision 14  
ACP 1412.4; Impairments to Fire Protection Systems; Revision 64  
DAEC Fire Plan – Volume 1, Program; Revision 61  
AFP 03; Reactor Building HPCI, RCIC & Radwaste Tank Rooms; Revision 26  
AFP 07; Reactor Building Laydown Area, Corridor and Waste Tank Area and Spent Resin Tank Room EL. 786'; Revision 30  
AFP 74; Switchyard; Revision 5  
AFP 79; Spent Fuel Storage Facility; Revision 2  
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 EL. 757'-6"; Revision 24  
AFP-10; Main Exhaust Fan Room, Heating Hot Water Pump Room and the Plant Air supply Fan Room; Revision 24  
AFP-11; Reactor Building Laydown Area EL. 833'-6"; Revision 25  
AFP-12; Reactor Building Decay Tank and Condensate Phase Separator Rooms; Revision 24  
Fire Protection Impairment Permit FPR-09-7320; The DAEC NFPA-805 Transition Project has Identified Multiple Spurious Operations Vulnerabilities for the RB1 Area  
Fire Protection Impairment Permit CMP-11-5115; Dry Fuel Storage Campaign

AFP 20; Aux Boiler Room, Emergency Diesel Generator Rooms and Generator Day Tank Rooms El. 757'6"; Revision 29

#### 1R06

Abnormal Operating Procedure-902; Flood; Revision 39

#### 1R11

Simulator Exercise Guide 2011E-02S; Revision 0

#### 1R12

DAEC Maintenance Rule Program; Cycle 22 Cyclic Report; March 4, 2009 – December 9, 2010  
CR 01687326; LIC-1319 Outside Normal Range During STP 3.0.0-02  
WO 40112070; LIC-1319 Outside Normal Range During STP 3.0.0-02  
CR 01698275; CV-1321, 1E003B Feedwater Heater Dump Valve, Could Not Maintain Feedwater Heater Level  
CR 01698276; Trend – Step Changes in Feedwater Heater 4A and 6B Pressures  
CR 01698288; Received 1C06 (D-8) 1E4B Hi-Hi Level Without Receiving the Hi Level System Level Performance Criteria Basis Document; Feedwater and Condensate; Revision 0

#### 1R13

Work Planning Guideline -1; Work Process Guideline; Revision 47  
Work Planning Guideline-2; Online Risk Management Guideline; Revision 59  
OP-AA-104-1007; Online Aggregate Risk; Revision 2  
WM-AA-1000; Work Activity Risk Management; Revision 11  
WM-AA-1000 (DAEC); Work Activity Risk Management (DAEC); Revision 0  
OP-AA-102-1003; Guarded Equipment; Revision 3  
OP-AA-102-1003 (DAEC); Guarded Equipment (DAEC Specific Information); Revision 19  
Work Week 1140 Work Activity Risk Management Summary and Weekly Probabilistic Risk Analysis

#### 1R15

EN-AA-203-1001; Operability Determinations/ Functionality Assessments; Revision 5  
OP-AA-100-1000; Conduct of Operations; Revision 5  
TAR 01680290-01; 'A' EDG Exhaust Leak at Opposite Control Side from Cylinders 10, 11, and 12 Exhaust Header Plug  
Condition Evaluation (CE) 01680290-02; 'A' EDG Exhaust Leak at Opposite Control Side Exhaust Header – Cylinders 10, 11, and 12  
CR 01700990; Standby Gas Treatment Sump Piping is Corroded  
Prompt Operability Determination (POD) 01700990-01; Standby Gas Treatment Sump Piping is Corroded  
OI 710; Intake Structure HVAC System; Revision 15  
CR 01718078; OI 710 Provides No Guidance for Intake Unit Heaters Per ARP  
Operations Shift Logs; November 7, 2011 through November 17, 2011  
CR 01716448; NRC Questions TAR 1707561 Conclusion

## 1R19

ACP 1408.1; Work Order Task(s); Revision 169  
WO 40075137; Functional Check and Calibration of Transducer  
WO 40076624; Oil Circuit Breaker Major Service and Inspection  
WO 40079157; Transformer Condition (Diagnostic Electrical Testing)  
OI 831.4; Plant Process Computer System (PPC); Revision 74  
CR 01699097; LEFM Indicating Bad Inputs  
CR 01699182; Degraded LEFM Affecting Indicated Reactor Power

## 1R22

ACP 107; Surveillance Tests; Revision 13  
STP 3.6.1.6-01; Pressure Suppression Chamber to Reactor Building Vacuum Breaker Operability Test; Revisions 7 and 8  
STP 3.8.1-04B; B Standby Diesel Generator Operability Test (Slow Start from Normal Starting Air); Revision 17  
CR 01693756; 1C08B (A-2) B diesel to 1A4 breaker 1A411 Trip Alarm Cycling  
CR 01692424; 3.6.1.6-01 – Pressure Suppression Chamber to Reactor Building  
STP 3.7.4-01B; B Standby Filter Unit – Logic System Functional Test and Simulated Automatic Actuation; Revision 2  
STP 3.6.1.6-01; Pressure Suppression Chamber to Reactor Building Vacuum Breaker Operability Test; Revisions 7 and 8  
STP 3.8.1-04B; B Standby Diesel Generator Operability Test (Slow Start from Normal Starting Air); Revision 17  
CR 01693756; 1C08B (A-2) B diesel to 1A4 breaker 1A411 Trip Alarm Cycling  
CR 01692424; 3.6.1.6-01 – Pressure Suppression Chamber to Reactor Building

## 1EP4

10 CFR 50.54(q) Evaluation Package; Emergency Plan Implementing Procedure (EPIP) Form EAL-01; Emergency Action Level Matrix; Revision 8  
10 CFR 50.54(q) Evaluation Package; EBD F; Fission Product Barrier Degradation; Revision 10  
10 CFR 50.54(q) Evaluation Package; EBD H; Hazards & Other Conditions Affecting Plant Safety; Revision 7  
10 CFR 50.54(q) Evaluation Package; EPIP 1.2; Notifications; Revision 40  
10 CFR 50.54(q) Evaluation Package; EPIP 2.1; Activation and Operation of the Operational Support Center (OSC); Revision 17  
10 CFR 50.54(q) Evaluation Package; EPIP 2.4; Activation and Operation of the ORAA; Revision 15  
10 CFR 50.54(q) Evaluation Package; EPIP 2.8; Security Threat; Revision 8  
10 CFR 50.54(q) Evaluation Package; EPIP 3.1; In-Plant Radiological Monitoring; Revision 22  
10 CFR 50.54(q) Evaluation Package; EPIP 3.1; In-Plant Radiological Monitoring; Revision 23  
10 CFR 50.54(q) Evaluation Package; EPIP 3.2; Field Radiological Monitoring; Revision 19  
10 CFR 50.54(q) Evaluation Package; EPIP Form EOF-08; Rad & EOF Manager Checklist; In-Plant Radiological Monitoring; Revision 13  
10 CFR 50.54(q) Evaluation Package; EPIP Form EOF-09; EOF Ops Liaison Checklist; Revision 9  
10 CFR 50.54(q) Evaluation Package; EPIP Form MIDAS-01; MIDAS Operability Test; Revision 3

10 CFR 50.54(q) Evaluation Package; EPIP Form NOTE-05; EAL Notification Form; Revision 13  
 10 CFR 50.54(q) Evaluation Package; EPIP Form NOTE-07; Basic Notification Flowpath; Revision 11  
 10 CFR 50.54(q) Evaluation Package; EPIP Form NOTE-02; ERO Notification – Alphanumeric Paging System Callout; Revision 8  
 10 CFR 50.54(q) Evaluation Package; EPIP Form OSC-011; Emergency Assignment Staffing Board Duties; Revision 4  
 10 CFR 50.54(q) Evaluation Package; EPIP Form OSC-12; External Exposure Limits; Revision 1  
 10 CFR 50.54(q) Evaluation Package; EPIP Form TSC-04; Technical & Engineering Supervisor Checklist; Revision 7  
 10 CFR 50.54(q) Evaluation Package; EPIP Form TSC-07; TSC Administrative Supervisor Checklist; Revision 5  
 10 CFR 50.54(q) Evaluation Package; EPIP Form TSC-01; TSC Emergency Coordinator Checklist; Revision 13  
 10 CFR 50.54(q) Evaluation Package; EPIP Form EOF-07; Emergency Response & Recovery Director; Revision 13

## 2RS1

ACP 1411.13; Control of Locked High Radiation Areas and Above; Revision 30  
 ACP 1411.23; Equipment and Material Controls in Radiological Controlled Areas; Revision 28  
 ACP 1411.27; Rules for Conduct of Work in Radiologically Controlled Areas; Revision 34  
 CR 01651746; High Radiation Area Swing-gate Malfunction  
 CR 01654201; Issues Identified during Low Level Walkdown  
 CR 01666708; Waste Drum Storage Area Improvements  
 CR 01666722; Quality Assurance Finding-Oversight of Radioactive Waste Activities  
 CR 01677279; Sealed Source Leak Test Did Not Meet Schedule Adherence  
 CR 01685973; Energy Solutions Cask Drive Enters Radiologically Restricted Area Without an Electronic Dosimeter  
 CR 01688541; Radiologically Restricted Area High Efficiency Particulate Air Filter Vacuum Storage Room Inventory Control  
 HPP 3104.01; Control of Access to High Radiation Areas and Above; Revision 54  
 HPP3104.09; Drywell Initial Entry and Start-up/Shut-down Entries; Revision 24  
 HPP 3105.09; Personnel Dosimetry for External Exposure; Revision 26  
 HPP 3107.04; Radioactive Source Inventory, Control, Leak Check; Revision 16  
 HPP 3107.05; Release of Items from the Radiologically Restricted Area; Revision 17  
 RP-AA-100-1001; Radiation Protection Conduct of Operations Guideline; Revision 1  
 RFO 22; Department Report-Radiation Protection and ALARA; Revision 0  
 RWP 10-3014; All Cavity Work with the Vessel Filled to the Flange; Revision 00  
 RWP 10-3016; Pool Work RDO-22; Revision 1  
 RWP 10-3024; Steam Dryer Tie Bar Replacement; Revision 1  
 RWP 10-3025; Boron Tube Recovery from Dryer Separator Pit; Revision 00  
 RWP 10-4213; In-Service Project N2 Penetration Work; Revision 2  
 RWP 10-4252; Source Range Monitor and Intermediate Range Monitor Removals; Revision 00  
 RWP 11-22; Management Planning, and Routine Engineering Inquiries; Revision 00  
 RWP 11-182; Cask Pit Clean-up; Revision 02  
 RWP 11-206; High Radiation Area/Locked High Radiation Area; Revision 00  
 RWP 11-249; Dry Fuel Storage Project  
 WO 0138219; Sealed Source Leakage Test



WO 40060312; Sealed Source Leakage Test  
11 DFS; Dry Fuel Storage Campaign Number 2 ALARA Plan; Revision 0  
11-R-004; Reactor Water Clean-up Resin Shipment ALARA Plan; Revision 0  
11-1206; Survey Spent Fuel Pool Cask Pit; dated September 12, 2011  
11-1065; Survey Drywell 805; dated August 17, 2011

## 2RS2

ALARA Review 10-N2; Post Job ALARA Review N2A Nozzle Weld Overlay; dated March 9, 2011  
DAEC 5 Year ALARA Plan; Revision 1  
10-4163; Survey Drywell 757, BRAC Point Survey; dated November, 19, 2011  
10-4164; Survey Drywell 742, BRAC Point Survey; dated November, 19, 2011

## 4OA1

MSPI Design Basis Document, Revisions 12, 13  
NRC PI Data Calculation Review and Approval Packages for MSPI Cooling Water 4<sup>th</sup> Quarter 2010 through 3<sup>rd</sup> Quarter 2011  
NRC PI Data Calculation Review and Approval Packages for MSPI SSFF 4<sup>th</sup> Quarter 2010 through 3<sup>rd</sup> Quarter 2011  
NRC PI Data Calculation Review and Approval Packages for MSPI Residual Heat Removal 4<sup>th</sup> Quarter 2010 through 3<sup>rd</sup> Quarter 2011  
MSPI Unavailability Index Cooling Water Derivation Report; October 2010 through September 2011  
MSPI Unavailability Index Residual Heat Removal Derivation Report; October 2010 through September 2011  
MSPI Unreliability Index Cooling Water Derivation Report; October 2010 through September 2011  
MSPI Unreliability Index Residual Heat Removal Derivation Report; October 2010 through September 2011

## 4OA2

ACP 1410.15; Plant Status Control Program; Revision 6  
PI-AA-103-1000; Human Performance Program Error Reduction Tools; Revision 1  
ACP 1410.2; LCO Tracking and Safety Function Determination Program; Revision 28  
CR 01701934; Cask Service Platform Out of Position

## 4OA3

CR 01699090; Deluge Initiation Feed Pump Area, Fire Brigade Activated  
CR 01699098; Deluge #3 Failed  
CR 01699097; LEFM Indicating Bad Inputs

## 4OA5

ACP 103.4; 10 CFR 72.48 Screening Process; Revision 13  
ACP 103.5; 10 CFR 72.48 Evaluation Process; Revision 10  
DFS 104; Ancillary Equipment Receipt Inspections and Pre-Op Testing; Revision 5  
EC-156669; Reactor Building Crane Trolley Restraints; Revision 3

DBD-F16-001; Duane Arnold Energy Center Design Basis Document for the Dry Spent Fuel Storage Program; Revision 11  
DAEC-1FJF-11-106; Irradiated Fuel Assembly Selection for Duane Arnold Energy Center 2011 ISFSI Campaign; Revision 3  
RFP 403; Performance of Fuel Handling Activities; Revision 45  
DFS 203; Dry Shielded Canister Sealing Operations; Revision 27  
DFS 301; Loaded Dry Shielded Canister / Transfer Cask from Refueling Floor to ISFSI Operations; Revision 13  
DFS 302; Dry Shielded Canister from Transfer Cask to Horizontal Storage Module Transfer Operations; Revision 13  
VNDR-11-017I; Spent Fuel Cask Welding: 61BT NUHOMS Canisters; Revision 0  
7248SCRN-10079; DFS-203 – Dry Shielded Canister Sealing Operations, PCR 01700974; November 11, 2011  
7248SCRN-9830; DFS-203 – Dry Shielded Canister Sealing Operations, PCR 01624499  
CR 00343343; HSM Dimensional Tolerances Reduced due to Base Mat Settling  
CR 00566670; Additional Actions to Restore Full Qualification of ISFSI  
CR 01687477; Cut 480 Cable Supplying the HPU  
CR 01700575; Dust on DSC Outer Lid may Interfere with PT of Weld  
CR 01700996; NRC ISFSI Inspection Regarding Reactor Building Crane  
CR 01701934; Cask Service Platform Out of Position  
CR 01703042; Areas for Improvement Identified by NRC ISFSI Inspector  
CR 01704968; Inadequate 72.48 Review for Deletion of Helium Leak Test

#### 40A7

CR 01707561; Work Order Error on Input to TC7715B  
WO 40039255; TC7715A Tubing Correction and Operability Testing

## 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
ARP	Annunciator Response Procedure
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
DAEC	Duane Arnold Energy Center
DRP	Division of Reactor Projects
DSC	Dry Storage Canister
EPIP	Emergency Plan Implementing Procedure
ESW	Emergency Service Water
HPCI	High Pressure Coolant Injection
HSM	Horizontal Storage Module
HVAC	Heating, Ventilation and Air Conditioning
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ISFSI	Independent Spent Fuel Storage Installation
LEFM	Leading Edge Flow Meter
LER	Licensee Event Report
LPCI	Low Pressure Coolant Injection
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OI	Operating Instruction
OSC	Operational Support Center
PARS	Publicly Available Records System
PI	Performance Indicator
RB	Reactor Building
RCE	Root Cause Evaluation
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RWS	River Water Supply
SDP	Significance Determination Process
SL	Severity Level
STP	Surveillance Test Procedure
TAR	Technical Assessment for Reportability
TIP	Traversing Incore Probe
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order

P. Wells

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Sincerely,

**/RA/**

Mark Ring, Branch Chief  
Branch 1  
Division of Reactor Projects

Docket No. 50-331  
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Letter to P. Wells from M. Ring dated January 31, 2012

SUBJECT: DUANE ARNOLD ENERGY CENTER – NRC INTEGRATED INSPECTION  
REPORT 05000331/2011005

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