



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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LISLE, IL 60532-4352

May 10, 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 05000331/2012002**

Dear Mr. Wells:

On March 31, 2012, 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 April 5, 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.

Six NRC-identified findings of very low safety significance (Green) were identified during this inspection. All six findings were determined to involve violations of NRC requirements.

Further, three licensee-identified violations, which were determined to be of very low safety significance, are listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these 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 System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000331/2012002  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 05000331  
License No: DPR-49

Report No: 05000331/2012002

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: January 1 through March 31, 2012

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

Enclosure

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## SUMMARY OF FINDINGS

IR 05000331/2012002, 01/01/2012 – 03/31/2012; Duane Arnold Energy Center; Surveillance Testing, Occupational Dose Assessment, Identification and Resolution of Problems, and Follow-Up of Events and Notices of Enforcement Discretion.

This report covers a three-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Six Green findings were identified by the inspectors. These findings were considered NCVs of NRC requirements. 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 Findings

#### **Cornerstone: Mitigating Systems**

- Green. A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was identified by the inspectors on February 2, 2012, for the licensee's failure to prescribe a procedure appropriate to the circumstances and include appropriate acceptance criteria in Surveillance Test Procedure (STP) 3.5.1-15, "RHR System Water Fill Test," Revision 1. Specifically, STP 3.5.1-15 did not provide guidance for quantifying the size of any voids within the system, such that the effect on system operability could not be readily evaluated, nor did the STP establish criteria for an acceptable as-found condition. The licensee entered this issue into the corrective action program (CAP) as condition report (CR) 1731106 and initiated procedure revisions to provide appropriate acceptance criteria.

The inspectors determined that failing to establish appropriate acceptance criteria for a Technical Specification (TS) surveillance procedure was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The finding was 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 Mitigating Systems Cornerstone. The finding screened as of very low safety significance (Green) because the finding was a qualification deficiency confirmed not to result in loss of operability or functionality. The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting area of Problem Identification and Resolution, having Corrective Action Program components, such that issues potentially affecting nuclear safety are promptly identified (at a low threshold), fully evaluated, and that actions are taken to address safety issues in a timely manner. [P.1(a)] (Section 1R22)

- Green. A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors on January 23, 2012, for the licensee's failure to promptly identify and correct safety-related

direct current (DC) battery system conditions adverse to quality. Specifically, several through-lid cracks on the 1D1 and 1D2 125 volts direct current (VDC), and 1D4 250 VDC batteries, that were considered degraded conditions, were not promptly identified by the licensee. The susceptibility and progression of lid cracking was a known condition; however, monitoring of the condition was not adequate to ensure correction of the conditions prior to impacting the qualification of the batteries. The licensee entered the inspector's issues into the CAP as CRs 01727026, 01727028 and 01727030. The licensee performed prompt operability determinations (PODs) that determined the affected DC electrical subsystems were operable, but degraded, pending restoration of the batteries to full qualification (epoxy repairs).

The inspectors determined that failing to promptly identify and correct battery lid cracking that impacted qualification 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. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, failing to promptly identify and evaluate the operability of a degraded condition would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609.04, Table 4a. Because the finding was a qualification deficiency confirmed not to result in loss of operability (Question 1 under the Mitigating Systems Cornerstone column), the finding screened as 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 Resources components, and involving the licensee maintaining long term plant safety by maintenance of design margin and minimization of long-standing equipment issues. [H.2(a)] (Section 40A2.3)

- Green. A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" was identified by the inspectors on March 7, 2012, following review of apparent cause evaluation (ACE) 01720033 associated with the loss of Low Pressure Coolant Injection (LPCI) loop select capability. Specifically, the inspectors identified several concerns with the implementation of the licensee's corrective action program characterization of CR 01720033 that resulted in the inadequate evaluation of cause, extent of cause and condition; and incomplete corrective actions to prevent recurrence. The licensee entered the issue into the CAP as CR 01742201, and was in the process of revising the original causal evaluation and performing an additional ACE to investigate the CAP implementation issues.

The inspectors determined that failing to properly determine the cause and take corrective actions to prevent recurrence for LPCI loop select instrument failures represented a performance deficiency. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, failing to properly determine the cause and take corrective actions to prevent recurrence for significant conditions adverse to quality would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609.04, Table 4a. Because the inspectors answered "No" to all five screening questions under the Mitigating Systems Cornerstone column, the finding screened as 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-significant or risk-significant decisions using a

systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. [H.1(a)] (Section 4OA3.2)

#### **Cornerstone: Barrier Integrity**

- Green. A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors on February 21, 2012, for the licensee's failure to promptly correct secondary containment (SCT) airlock door interlock system conditions adverse to quality. Specifically, the inspectors identified several instances during 2010 and 2011 where the licensee did not adequately correct interlock system conditions resulting in simultaneous opening of SCT airlock doors. For each occurrence, the interlock system conditions resulted in unplanned inoperability of secondary containment and entries into short-term limiting condition for operation (LCO) action statements. The licensee entered the inspector's concerns into the CAP as CR 01716446 and CR 01737495, and was in the process of performing a condition evaluation and apparent cause evaluation.

The inspectors determined that the licensee's failure to promptly correct SCT airlock door interlock system conditions adverse to quality represented a performance deficiency. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, failing to promptly correct conditions adverse to quality would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609.04, Table 4a. Because the inspectors answered "No" to all questions under the Containment Barrier column, the finding screened as 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-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. [H.1(a)] (Section 4OA2.4)

#### **Cornerstones: Occupational and Public Radiation Safety**

- Green. A finding of very low safety significance and associated NCV of 10 CFR 20.1904(a) was identified by the inspectors on January 31, 2012, due to the licensee's failure to label several containers holding radioactive material in the radioactive waste facility and two sea land containers inside the radiologically controlled area (RCA). In some cases, the licensee also failed to assure that labels were affixed and readable to support the function of providing information to radiation workers in the vicinity. The licensee entered the inspector's issues into the CAP as CR 01730867.

The inspectors determined that the licensee's failure to appropriately affix labels to containers storing radioactive material in the radioactive waste facility and perform periodic reviews of labeling conditions was a performance deficiency. The inspectors determined that the performance deficiency was more than minor and a finding because, if left uncorrected, failing to ensure labeling of radioactive material would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609 Appendix C, "Occupational Radiation Safety Significance Determination Process." The finding was determined to be of very low safety significance (Green) because the performance deficiency did not affect As-Low-As Is-Reasonably-Achievable Planning or Work Controls, did not involve an

overexposure, there was not a substantial potential for overexposure, and the ability to assess dose was not compromised. The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Problem Identification and Resolution, having Self and Independent Assessment components, and involving the licensee not conducting self-assessments at an appropriate frequency and with sufficient depth, objectivity, and critical assessment. [P.3(a)] (Section 2RS8.2)

- Green. A finding of very low safety significance and associated NCV of 10 CFR 71.5 was identified by the inspectors on February 2, 2012, due to the licensee's failure to maintain a licensed material shipment on file for at least one year after the latest shipment, and not providing on request, complete documentation of tests supporting the engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction complied with the Type A specification. Specifically, the licensee maintained a container certificate from the owner of a container that stated the container complied with the specification testing of 49 CFR 173.465, but upon further review, the testing basis for the engineering evaluation could not be produced by the package owner for the use of the shipper and review by the NRC. The licensee entered this issue into the CAP as CR 01730713.

The inspectors determined that the licensee's failure to maintain a licensed material shipment on file for at least one year after the latest shipment, and not providing on request, complete documentation of tests supporting the engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with the Type A specification, was a performance deficiency. The inspectors determined that the performance deficiency was more than minor and a finding because, if left uncorrected, failing to maintain and provide licensed material shipment documentation would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609 Appendix D, "Public Radiation Safety Significance Determination Process." The finding was determined to be of very low safety significance (Green) because the performance deficiency did not involve exceeding a radiation limit, a breach of package during transit, a certificate of compliance, low level ground burial, or failure to make notification or provide emergency information. 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 Practices components, and involving the licensee not ensuring supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported. [H.4(c)] (Section 2RS8.6)

## **B. Licensee-Identified Violations**

Violations of very low safety significance that were identified by the licensee have been reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers are 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 Readiness for Impending Adverse Weather Condition – Geomagnetic Storm Warning due to Heightened Solar Flare Activity

###### a. Inspection Scope

Since geomagnetic storm warnings were issued to the station on March 7 and 8, 2012, the inspectors reviewed the licensee's overall preparations/protection and monitoring for the expected conditions. On March 7, 2012, the inspectors reviewed the site's overall response to the warning and observed performance of abnormal operating procedures (AOPs) to monitor main transformer neutral phase ground current, and the licensee's emergency alternating current power systems, because their safety-related functions could be affected or required as a result of elevated ground currents from the geomagnetic storm or the potential loss of offsite power. The inspectors evaluated the licensee's preparations against the site's procedures and determined that the licensee's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspector's evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for potentially affected equipment, and verified that operator actions were appropriate as specified by plant-specific procedures. The inspectors also reviewed a sample of CAP items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment to this report.

This inspection constituted one readiness for impending adverse weather condition sample as defined in Inspection Procedure (IP) 71111.01-05.

###### b. Findings

No findings were identified.

## 1R04 Equipment Alignment (71111.04)

### .1 Quarterly Partial System Walkdowns

#### a. Inspection Scope

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

- High Pressure Coolant Injection (HPCI) system with the Reactor Core Isolation Cooling (RCIC) system out of service (OOS) for planned maintenance (PM);
- 'A' Standby Diesel Generator (SBDG) and 'A' Emergency Service Water (ESW) subsystem with the 'B' SBDG OOS for planned testing;
- 'A' Core Spray (CS) subsystem with the 'B' RHR subsystem OOS for PM; and
- RCIC system with the HPCI system OOS for PM.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time the systems were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system(s) and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, TS requirements, outstanding work orders (WOs), 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 Corrective Action Program (CAP) with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

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

#### b. Findings

No findings were identified.

### .2 Semi-Annual Complete System Walkdown

#### a. Inspection Scope

Between January 10 and 13, 2012, the inspectors performed a complete system alignment inspection of the SBDG and ESW systems to verify their functional capabilities. These systems were selected because the systems were considered safety-significant and risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the systems to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, component labeling, component lubrication, component and equipment cooling, hangers

and supports, operability and functionality of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly affected the systems' functions. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment to this report.

These activities constituted one complete system walkdown sample as defined in IP 71111.04-05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Area Fire Plan (AFP) -02; Reactor Building South Corner Rooms;
- AFP-08; Standby Gas Treatment and Motor Generator Set Rooms;
- AFP-71; Startup Transformer 1X3;
- AFP-18; North Turbine Building Ground Floor; and
- AFP-19; South Turbine Building Ground Floor.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for OOS, degraded or nonfunctional fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the licensee's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the 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, that fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

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

- Residual Heat Removal Service Water and ESW system rooms in the Pump House.

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

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On February 7, 2012, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training 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 of the crew:

- licensed operator performance;
- clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;

- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

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

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

b. Findings

No findings were identified.

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

On February 11, 2012, the inspectors observed activities in the control room during a planned power reduction to conduct scram time testing for a single control rod as post-maintenance testing for a hydraulic accumulator replacement. This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas of the crew:

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

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

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

b. Findings

No findings were identified.

.3 Biennial Written Examination and Annual Operating Test Results (71111.11B)

a. Inspection Scope

On June 29, 2010, the licensee identified a failure to provide the NRC with complete and accurate information regarding submittals of NRC Form 396, Personnel Qualification Statement for six licensed operators. On September 17, 2010, the inspectors documented this issue as Unresolved Item (URI) 05000331/2010004-05.

The inspectors reviewed the licensee's corrective actions and documents associated with improper license application submittals. The inspectors reviewed the individual operator licenses and licensed operator medical histories to determine extent of condition.

The inspectors' review of this issue was considered to be a part of the original inspection effort, and as such did not constitute any additional inspection samples.

b. Findings

This URI is closed with an associated licensee-identified violation (Refer to Section 4OA7). No new or additional findings or violations were identified during the closure of URI 05000331/2010004-05.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

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

- RHR system; and
- Secondary Containment (SCT) and Standby Gas Treatment (SBGT) 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 systems, structures, 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 systems. 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 1201 Risk during fuel pool high risk evolution for fuel pool skimmer surge tank inspections;
- Work Week 1202 Risk during A SBDG and ESW PM;
- Work Week 1203 Risk during RCIC PM, B TIP repairs, and condenser area cooler repairs;
- Work Week 1208 Risk during HPCI PM and schedule shift due to emergent river sand buildup issue;
- Emergent work following Reactor Building Ventilation Dampers 1VAD017A3 and 1VAD017B3 failing to fully close; and
- 'B' SBDG flex gear emergent work during biennial maintenance and inspection activities.

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

These activities 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 Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Safety-Related Battery Lid Cracks;
- Reactor Recirculation Loop Riser A/B Low Differential Pressure Switches;
- Degraded Circuit Board Spacers within Turbine Building Steam Tunnel Temperature Indicating Switches; and
- Missing SBTG Reactor Building Supply Isolation Damper Actuator Bolts.

The inspectors selected these potential operability issues based on the risk-significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

These reviews constituted four operability evaluation samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors reviewed the following modification:

- Change in American Society of Mechanical Engineers (ASME) testing procedure for River Water Supply system.

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TS, to verify that the modification did not affect the operability or availability of the affected system. The inspectors observed ongoing and completed work activities to ensure that the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and

that operation of the modifications did not impact the operability of any interfacing systems. As applicable, the inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, engineering, and training personnel to ensure that the individuals were aware of how the operation with the plant modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

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

- RCIC system testing following PM;
- 'A' SBDG testing following PM;
- HPCI system testing following PM;
- 'B' SBDG testing following biennial maintenance and repairs to flex gear;
- Reactor Building Ventilation Damper testing following corrective maintenance; and
- 'A' SBDG testing following room ventilation system maintenance.

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

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

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

- STP 3.3.5.1-22; Recirculation Riser Differential Pressure A > B Instrument Calibration (Routine);
- STP 3.1.7.3-03; Standby Liquid Control System Boron Concentration Test (Routine);
- STP 3.3.6.1-11; Reactor Lo Lo Water Level (Anticipated Transient Without Scram (ATWS) – Recirculation Pump Trip (RPT)/ Alternate Rod Insertion (ARI) Trip/ Reactor Water Cleanup (RWCU) Isolation) and Lo Lo Lo Water Level (Main Steam Line Isolation Trip) Channel Functional Test (Routine); and
- STP 3.5.1-15; RHR System Water Fill Test (Routine).

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

- preconditioning occurred;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria was clearly stated, demonstrated operational readiness, and was consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with 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;
- test results not meeting acceptance criteria, as applicable, were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- reference setting data were accurately incorporated in the test procedure for safety-related instrumentation calibration and/or testing;
- 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 as defined in IP 71111.22, Sections -02 and -05.

b. Findings

(1) Lack of Acceptance Criteria within Emergency Core Cooling System Surveillance Procedure

Introduction: A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was identified by the inspectors on February 2, 2012, for the licensee's failure to prescribe a procedure appropriate to the circumstances and include appropriate acceptance criteria in STP 3.5.1-15, "RHR System Water Fill Test," Revision 1. Specifically, STP 3.5.1-15 did not provide guidance for quantifying the size of any voids within the system such that the effect on system operability could not be readily evaluated, nor did the STP establish criteria for an acceptable as-found condition.

Description: On November 18, 2011, the licensee identified an abnormal amount of air while venting the 'B' LPCI header during performance of STP 3.5.1-15, "RHR Water Fill Test." The licensee documented the issue in CR 01708305. Several follow up actions were taken by the licensee as discussed in Section 40A3.1. One of the actions taken by the licensee was performance of a Technical Assessment of Reportability (TAR) to evaluate past operability of the RHR system (LPCI mode). This evaluation was complicated by the fact that during the performance of STP 3.5.1-15, the operator vented air for several minutes (approximately six minutes according to CR 01708305). The licensee needed to perform several calculations using many assumptions in order to approximate the amount of air to evaluate for system operability. The licensee also performed ACE 01712033 to determine the cause of the voiding identified. The inspectors determined that the difficulties encountered by the licensee in evaluating system operability warranted review of the adequacy of STP 3.5.1-15 by the licensee. The inspectors reviewed ACE 01712033 and noted that it did not discuss the difficulties the licensee encountered in calculating the amount of air that was vented during the STP and, therefore, did not discuss the adequacy of the procedure.

Further, on February 2, 2012, the inspectors reviewed STP 3.5.1-15 and identified that the licensee failed to establish adequate instructions in the surveillance procedure used to monitor the Emergency Core Cooling System (ECCS) for gas accumulation. Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," discusses the importance of procedures being able to record gas volumes and that procedures should ensure that an evaluation be performed if certain criteria are not met. The Generic Letter also states that the Surveillance Requirement (SR) should reasonably ensure that gas has not

affected operability and will likely not accumulate in sufficient quantity to jeopardize operability before the next surveillance.

The licensee used STP 3.5.1-15, "RHR System Water Fill Test" to satisfy the requirements of TS SR 3.5.1.1, to "verify the ECCS subsystem is filled with water..." Section 7.0 of STP 3.5.1-15 was used to vent the discharge piping. Various steps were used to vent different portions of the system, and in each case, the procedure directed the operator to "open [the vent valve] until a solid stream of water is observed, then close [the vent valve]." As long as the operator is able to perform each venting step (the TS required step) satisfactorily, the procedure states that the TS SR is "fully satisfied."

In the "General Instructions" section of the STP, operators are directed to initiate an Action Request (AR) when problems associated with TS items are encountered. The licensee indicated that operators are trained to initiate an AR when voids are identified during performance of the STP. This expectation was not clearly identified in the STP and the licensee relied solely on the knowledge of the operators to recognize an abnormal condition and take appropriate actions. The lack of written instructions to record the as-found condition and know when the STP was satisfactorily completed could result in the licensee's inability to properly assess the effect of a pipe void on ECCS functions (e.g., operability). In addition, the licensee would not be able to demonstrate that the system would remain operable until the next surveillance without understanding from where and how much air was entering the system over a specified period of time.

The licensee initiated CR 01731106 as a result of the inspector's identification of the inadequate procedural issues. Immediate corrective actions included briefing operators on expected system response during venting operations and providing operators with stopping criteria. Additionally, STP 3.5.1-15 was revised to require a CR to be generated if any air was present during venting.

Analysis: The inspectors determined that failing to establish appropriate acceptance criteria for a Technical Specification (TS) surveillance procedure was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the lack of written instructions to record the as-found condition could result in the licensee's inability to determine the effect of a pipe void on ECCS functions (e.g., operability). In addition, the licensee would not be able to demonstrate that the system would remain operable until the next surveillance test without understanding from where and how much air was entering the system over a specified period of time.

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 Mitigating Systems Cornerstone. The finding screened as of very low safety significance (Green) because the finding was a qualification deficiency confirmed not to result in loss of operability or functionality.

The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting area of Problem Identification and Resolution, having Corrective Action Program components, such that issues potentially affecting nuclear safety are promptly identified (at a low threshold), fully evaluated, and that actions are taken to address safety issues in a timely manner. Specifically, the licensee did not identify nor consider the STP inadequacies during the performance of ACE 01712033. [P.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 the procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, as of February 2, 2012, the licensee did not prescribe a procedure of a type appropriate to the circumstances, nor include appropriate acceptance criteria for ECCS venting surveillances. Specifically, STP 3.5.1-15 did not provide guidance for quantifying the size of any voids within the system such that the effect on system operability could not be readily evaluated, nor did the STP establish criteria for an acceptable as-found condition.

Corrective actions included briefing operators on expected system response during venting operations, providing operators with stopping criteria, and revising STP 3.5.1-15 to require a CR to be generated if any air was present during venting.

Because this violation was of very low safety significance and was entered into the licensee's CAP as CR 01731106, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000331/2012002-01, Lack of Acceptance Criteria within Emergency Core Cooling System Surveillance Procedure**).

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 February 29, 2012, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in 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 weaknesses 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 observation sample as defined in IP 71114.06-05.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Occupational and Public Radiation Safety**

2RS8 Occupational Dose Assessment (71124.08)

This inspection constituted one radioactive solid waste processing and radioactive material handling, storage, and transportation sample as defined in IP 71124.08-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the solid radioactive waste system description in the UFSAR, the Process Control Program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope of any quality assurance audits in this area since the last inspection to gain insights into the licensee's performance and inform the "smart sampling" inspection planning.

b. Findings

No findings were identified.

.2 Radioactive Material Storage (02.02)

a. Inspection Scope

The inspectors selected areas where containers of radioactive waste are stored, and evaluated whether the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements," as appropriate.

The inspectors assessed whether the radioactive materials storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection against Radiation." For materials stored or used in the controlled or unrestricted areas, the inspectors evaluated whether the materials were secure against unauthorized removal and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," and 10 CFR 20.1802, "Control of Material Not in Storage," as appropriate.

The inspectors evaluated whether the licensee established a process for monitoring the impact of long term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) that was sufficient to identify potential unmonitored, unplanned releases or nonconformance with waste disposal requirements.

The inspectors selected containers of stored radioactive materials, and assessed for signs of swelling, leakage, and deformation.

b. Findings

(1) Failure to Properly Label and Maintain Labels on Containers in the Radioactive Waste Facility

Introduction: A finding of very low safety significance (Green) and associated NCV of 10 CFR 20.1904(a) was identified by the inspectors on January 31, 2012, due to the licensee's failure to label several containers holding radioactive material in the radioactive waste facility and two sea land containers inside the radiologically controlled area (RCA). In some cases, the licensee also failed to assure that labels were affixed and readable to support the function of providing information to radiation workers in the vicinity.

Description: During an inspection walkdown on January 31, 2012, the inspectors identified that two sea land storage containers brought into the radioactive waste facility RCA were not labeled. The inspectors reported this to licensee supervisory staff. Upon a walkdown two days later in the inspection, the inspectors identified that the containers were not yet labeled in accordance with NRC regulations. Additionally, the inspectors identified five barrels of solid radioactive waste had affixed radioactive materials labels, but the information on the labels had faded and was not readable. The inspectors noted that these barrels had been in storage since the mid 1990's and were located in a walkway to outage equipment and a mixed waste storage area. The licensee entered the inspector's concerns into the CAP as CR 01730867.

Analysis: The inspectors determined that the licensee's failure to appropriately affix labels to containers storing radioactive material in the radioactive waste facility and perform periodic reviews of labeling conditions was a performance deficiency that was within the licensee's ability to foresee and correct and should have been prevented. The inspectors determined that the performance deficiency was more than minor and a finding because, if left uncorrected, failing to ensure labeling of radioactive material would have the potential to lead to a more significant safety concern. The performance deficiency was not similar to examples in Appendix E of IMC 0612. The inspectors determined that the finding was not discovered through a licensee program or process. The finding is not subject to Traditional Enforcement because it did not affect the regulatory process or result in actual safety consequences. The inspectors evaluated the significance of this finding using IMC 0609 Appendix C, "Occupational Radiation Safety Significance Determination Process." The finding was determined to be of very low safety significance (Green) because the performance deficiency did not affect As-Low-As-Reasonably-Achievable Planning or Work Controls, did not involve an overexposure, there was not a substantial potential for overexposure, and the ability to assess dose was not compromised.

The inspectors determined that the contributing cause that provided the most insight into the performance deficiency was associated with the cross-cutting aspect of Problem Identification and Resolution, having Self and Independent Assessment components, and involving the licensee not conducting self-assessments at an appropriate frequency and with sufficient depth, objectivity and critical assessment. Specifically, the inspectors

noted inconsistencies in the level of rigor and the frequency of radioactive material labeling verification at the facility. [P.3(a)]

Enforcement: Title 10 CFR 20.1904(a) requires, in part, that the licensee shall ensure that each container of licensed material in excess of the 10 CFR 20 Appendix C limits bear a durable, clearly visible label, and, the label must provide sufficient information (such as the radionuclide(s) present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

Contrary to the above, on January 31, 2012, the licensee failed to properly label containers of licensed material located in the radioactive waste facility. Specifically, the licensee failed to label several containers holding radioactive material in the radioactive waste facility and two sea land containers inside the RCA.

Corrective actions included affixing appropriate labels to the deficient containers identified, an extent of condition walk down, and enhancements to the licensee's labeling verification process.

Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CR 01730867, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000331/2012002-02, Failure to Properly Label and Maintain Labels on Containers in the Radioactive Waste Facility)**.

.3 Radioactive Waste System Walkdown (02.03)

a. Inspection Scope

The inspectors walked down accessible portions of selected radioactive waste processing systems to assess whether the current system configuration and operation agreed with the descriptions in the UFSAR, Offsite Dose Calculation Manual, and Process Control Program.

The inspectors reviewed administrative and/or physical controls (i.e., drainage and isolation of the system from other systems) to assess whether the equipment which was not serviced or abandoned in place would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors assessed whether the licensee reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments."

The inspectors reviewed the adequacy of changes made to the radioactive waste processing systems since the last inspection. The inspectors evaluated whether changes from what is described in the UFSAR were reviewed and documented in accordance with 10 CFR 50.59, as appropriate, and to assess the impact on radiation doses to members of the public.

The inspectors selected processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers and assessed whether the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were

consistent with the process control program, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification."

For those systems that provide tank recirculation, the inspectors evaluated whether the tank recirculation procedures provided sufficient mixing.

The inspectors assessed whether the licensee's process control program correctly described the current methods and procedures for dewatering and waste stabilization (e.g., removal of freestanding liquid).

b. Findings

No findings were identified.

.4 Waste Characterization and Classification (02.04)

a. Inspection Scope

The inspectors selected the following radioactive waste streams for review:

- Condensate Resin; and
- Reactor Water Clean-up Resin.

For the waste streams listed above, the inspectors assessed whether the licensee's radiochemical sample analysis results (i.e., "10 CFR Part 61" analysis) were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspectors evaluated whether the licensee's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound and based on current 10 CFR Part 61 analysis for the selected radioactive waste streams.

The inspectors evaluated whether changes to plant operational parameters were taken into account to: (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update; and (2) assure that waste shipments continued to meet the requirements of 10 CFR Part 61 for the waste streams selected above.

The inspectors evaluated whether the licensee had established and maintained an adequate quality assurance program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56, "Waste Characteristics."

b. Findings

No findings were identified.

.5 Shipment Preparation (02.05)

a. Inspection Scope

The inspectors observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspectors assessed whether the requirements of applicable transport cask certificate of compliance had been met. The inspectors evaluated whether the receiving licensee was authorized to receive the shipment packages. The inspectors evaluated whether the licensee's procedures for cask loading and closure procedures were consistent with the vendor's current approved procedures.

The inspectors observed radiation workers during the conduct of radioactive waste processing and radioactive material shipment preparation and receipt activities. The inspectors assessed whether the shippers were knowledgeable of the shipping regulations and whether shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to:

- the licensee's response to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," dated August 10, 1979; and
- Title 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training."

Additionally, due to limited opportunities for direct observation, the inspectors reviewed the technical instructions presented to workers during routine training. The inspectors assessed whether the licensee's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

b. Findings

No findings were identified.

.6 Shipping Records (02.06)

a. Inspection Scope

The inspectors evaluated whether the shipping documents indicated the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate Curie content and volume of material; and appropriate waste classification, transport index, and UN number for the following radioactive shipments:

- Radioactive Waste Shipment Number 11-08; Condensate Resin; dated March 8, 2011;
- Radioactive Material Shipment Number 11-09; Type A package; dated March 28, 2011; and
- Radioactive Waste Shipment Number 11-19; Type B package; dated September 15, 2011.

Additionally, the inspectors assessed whether the shipment placarding was consistent with the information in the shipping documentation.

b. Findings

(1) Failure to Maintain Type A Testing Documentation

Introduction: A finding of very low safety significance (Green) and associated NCV of 10 CFR 71.5 was identified by the inspectors on February 2, 2012, due to the licensee's failure to maintain a licensed material shipment on file for at least one year after the latest shipment, and not providing on request, complete documentation of tests supporting the engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction complied with the Type A specification. Specifically, the licensee maintained a container certificate from the owner of a container that stated the container complied with the specification testing of Title 49 CFR Part 173.465, but upon further review, the testing basis for the engineering evaluation could not be produced by the package owner for the use of the shipper and review by the NRC.

Description: During the week of January 30, 2012, the inspectors reviewed the licensee's documentation for the only Type A specification shipment in the last year. The inspectors identified that the licensee maintained a container owner "Container Certification" document for a 1088 container that stated the container complied with Title 49 CFR 173.465. This certification by the container owner was used by the shipper to certify the Type A package. The licensee contacted the container owner to acquire the testing and engineering evaluations used to support the owner's "Container Certification." The engineering evaluation that was received was illegible and the original testing documentation on the comparison container was no longer available. The licensee entered the inspector's issues into the CAP as CR 01730713.

Analysis: The inspectors determined that the licensee's failure to maintain a licensed material shipment on file for at least one year after the latest shipment, and not providing on request, complete documentation of tests supporting the engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with the Type A specification, was a performance deficiency that was within the licensee's ability to foresee and correct and should have been corrected. The inspectors determined that the performance deficiency was more than minor and a finding because, if left uncorrected, failing to maintain and provide licensed material shipment documentation would have the potential to lead to a more significant safety concern. The performance deficiency was not similar to examples in Appendix E of IMC 0612. The inspectors determined that the finding was not discovered through a licensee program or process. The finding is not subject to Traditional Enforcement because it did not affect the regulatory process or result in actual safety consequences. The inspectors evaluated the significance of this finding using IMC 0609 Appendix D, "Public Radiation Safety Significance Determination Process." The finding was determined to be of very low safety significance (Green) because the performance deficiency did not involve exceeding a radiation limit, a breach of package during transit, a certificate of compliance, low level ground burial, or failure to make notification or provide emergency information.

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 Practices components, and involving the licensee not ensuring supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported. Specifically, the inspectors noted a lack of oversight regarding the maintenance of documentation for a licensed material shipment . [H.4(c)]

Enforcement: Title 10 CFR 71.5 requires, in part, that licensees comply with the applicable requirements of the Department of Transportation (DOT) regulations in Title 49 CFR Parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport. Title 49 CFR Part 173.415, authorizing Type A packages, states, in part, that each offer of a Specification 7A package must maintain on file for at least one year after the latest shipment, and shall provide to DOT on request, complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that specification.

Contrary to the above, as of February 3, 2011, the licensee did not retain on file for one year after the shipment of a Specification 7A package a complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that specification. Specifically, the licensee offered for shipment a Type A quantity of radioactive material on March 28, 2011, and did not have the specified documentation available at the time of inspection.

Licensee corrective actions were in the process to obtain the appropriate shipping documentation at the end of the inspection period.

Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CR 01730713, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000331/2012002-03, Failure to Maintain Type A Testing Documentation).**

.7 Identification and Resolution of Problems (02.07)

a. Inspection Scope

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were being identified by the licensee at an appropriate threshold, were properly characterized, and were properly addressed for resolution in the licensee corrective action program. Additionally, the inspectors evaluated whether the corrective actions were appropriate for a selected sample of problems documented by the licensee that involve radioactive waste processing, handling, storage, and transportation.

The inspectors reviewed results of selected audits performed since the last inspection of this program and evaluated the adequacy of the licensee's corrective actions for issues identified during those audits.

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### Cornerstone: Initiating Events

#### 4OA1 Performance Indicator Verification (71151)

##### .1 Unplanned Scrams per 7000 Critical Hours

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours Performance Indicator (PI) for the period from the first quarter 2011 through the fourth 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, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC Inspection Reports for the period of January 1, 2011, through December 31, 2011, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one unplanned scrams per 7000 critical hours sample as defined in IP 71151-05.

###### b. Findings

No findings were identified.

##### .2 Unplanned Scrams with Complications

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications PI for the period from the first quarter 2011 through the fourth 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, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC Integrated Inspection Reports for the period of January 1, 2011, through December 31, 2011, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one unplanned scrams with complications sample as defined in IP 71151-05.

###### b. Findings

No findings were identified.

.3 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours PI for the period from the first quarter 2011 through the fourth 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, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, maintenance rule records, event reports, and NRC Integrated Inspection Reports for the period of January 1, 2011, through December 31, 2011, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one unplanned transients per 7000 critical hours sample as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

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

a. Inspection Scope

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

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

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

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

b. Findings

No findings were identified.

.3 Selected Issue Follow-Up Inspection: Safety-Related Battery Lid Cracking Issues

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized condition reports documenting lid cracking on safety-related battery cells. The inspectors elected to review the history of the battery lid cracking issue at the station and how ongoing degradation was being identified and corrected.

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

b. Findings

(1) Battery Conditions Adverse to Quality Not Promptly Identified

Introduction: A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors on January 23, 2012, for the licensee's failure to promptly identify and correct safety-related DC battery system conditions adverse to quality.

Description: During the week of January 16, 2012, the inspectors performed a review of battery lid cracking issues that were first identified by the licensee in 2010.

The inspectors reviewed CRs, PODs, causal evaluations, corrective actions, and monitoring plans to determine whether the conditions were well understood and being promptly monitored and corrected. Since the cracking conditions were ongoing, the inspectors particularly focused on whether the licensee was proactively monitoring and correcting the conditions that would, in some cases, result in a reduction in the qualification of the battery cells that represented an operable but degraded battery system. The inspectors identified approximately 16 CRs from June 2010 through November 2011, documenting lid cracks on the 1D1 and 1D2 125 VDC, and 1D4 250

VDC batteries. When first identified by the licensee, a POD was performed that determined a through-lid crack (a crack in which light could pass through) represented a degraded condition and reduced the qualification of the battery cell. This degradation, if left uncorrected, could result in hydrogen gas generated by the cell bypassing the battery cell flash arrestor, intrusion of foreign material, or potential undesired leakage of electrolyte. Based on the initial POD and after talking with the battery vendor, the licensee generated work orders to seal the cracks on an as-identified basis with an epoxy compound. Formal monitoring was performed via quarterly battery surveillance testing, and informal monitoring was performed by the system engineer on an approximately monthly basis.

The inspectors noticed that no new battery lid cracks had been identified by the licensee in the CAP since November 7, 2011. On January 23, 2012, the inspectors performed an inspection of the 1D1, 1D2 and 1D4 battery cells and identified approximately seven cells with through-lid cracks (one cell on 1D1, three cells on 1D2, and three cells on 1D4). The inspectors notified the operations shift manager who promptly informed the system engineer. The system engineer inspected the cells of concern identified by the inspectors and generated CRs 01727026, 01727028 and 01727030. A POD was performed and concluded that the cracks represented degraded conditions with the affected batteries being below full qualification. Corrective actions were generated to monitor the cracks at an increased frequency until epoxy repairs were made. Since the inspectors were able to readily identify the conditions, the inspectors questioned whether the licensee's formal and informal monitoring was adequate to promptly identify and correct the known and continually degrading conditions adverse to quality. The licensee generated an additional CR 01728378 to review the adequacy of the monitoring practices. The inspectors also noted that longer term corrective actions were being planned by the licensee to upgrade the batteries with models that were not susceptible to lid cracking.

Analysis: The inspectors determined that the battery lid monitoring issues 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. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, failing to promptly identify and evaluate the operability of a degraded or non-conforming condition would have the potential to lead to a more significant safety concern. Specifically, if the performance deficiency was left uncorrected, the operability of the safety related battery systems could be impacted if hydrogen gas generated by the cells bypassed the flash arrestors, if foreign material was introduced into the battery internals, or if excessive corrosion occurred from leakage of electrolyte. The inspectors evaluated the finding in accordance with IMC 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a. Because the finding was a qualification deficiency confirmed not to result in loss of operability (Question 1 under the Mitigating Systems Cornerstone column), the finding screened as 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 Resources components, and involving the licensee maintaining long term plant safety by maintenance of design margin and minimization of long-standing equipment issues. Specifically, the actions taken by the licensee to

monitor the continually degraded condition for the safety related batteries were not rigorous to minimize the long standing equipment issues. [H.2(a)]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected.

Contrary to the above, as of January 23, 2012, the licensee failed to assure that safety-related battery lid conditions adverse to quality were being promptly identified and corrected. Specifically, the inspectors identified through-lid cracks on the 1D1 and 1D2 125 VDC, and 1D4 250 VDC batteries that had not been previously identified by the licensee, despite formal and informal monitoring to do so.

Corrective actions included enhanced monitoring of the battery cells and epoxy repairs.

Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CRs 01727026, 01727028 and 01727030, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000331/2012002-04, Battery Conditions Adverse to Quality Not Promptly Identified**).

.4 Selected Issue Follow-Up Inspection: Secondary Containment (SCT) Airlock Door Issues

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized condition reports documenting unplanned secondary containment (SCT) TS entries due to concurrent openings of SCT airlock doors. The inspectors elected to review the history of the SCT airlock door issues at the station and how the conditions were being identified and corrected.

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

b. Findings

(1) Secondary Containment Airlock Door Interlock System Conditions Adverse to Quality Not Promptly Corrected

Introduction: A finding of very low safety significance and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors on February 21, 2012, for the licensee's failure to promptly correct secondary containment (SCT) airlock door interlock system conditions adverse to quality.

Description: During the week of February 13, 2012, the inspectors performed a review of unplanned entries into Technical Specification 3.6.4.1.A due to SCT airlock doors being momentarily opened at the same time. The inspectors noted that all SCT airlock doors had interlock systems installed to prevent simultaneous opening of more than one door of an airlock. The door airlock interlock systems are designed to ensure that SCT integrity is maintained during personnel traffic and/or moving of equipment through the SCT barrier by ensuring that both airlock doors may not be opened simultaneously.

The inspectors reviewed licensee procedures, CRs, causal evaluations, work orders, design and licensing bases, and corrective actions since January 1, 2010, to determine whether the SCT airlock door interlock system conditions adverse to quality were being promptly corrected. Specifically, the inspectors noted three instances since January 2, 2010, where the licensee identified that the SCT airlock door interlock systems did not perform their design function. Specifically, in each case, more than one SCT door was opened simultaneously in an airlock:

- CR 00343806 (issued February 3, 2010), SCT doors 225 (access control/reactor building airlock) and 227 (north stairwell/airlock);
- CR 01646504 (issued April 29, 2011), SCT doors 225 and 227; and
- CR 01704438 (issued November 8, 2011), SCT doors 225 and 227.

For each instance above, the control room was notified (by workers at/in the airlock or by door alarm reports from Security) and the Operations Shift Manager entered TS 3.6.4.1.A for SCT being considered inoperable due to Surveillance Requirement 3.6.4.1.2 not being met. After dispatching an operator to verify at least one SCT airlock door closed, TS 3.6.4.1.A was promptly exited. Additionally, for each instance, as part of the immediate follow-up, the licensee attempted to open the doors simultaneously and determine if the interlock system degraded condition was readily apparent. For each instance, the licensee was not able to open both doors simultaneously. The inspectors reviewed the corrective actions taken for each of the above listed condition reports:

- CR 00343806 – the licensee decided not to pursue further due, in part, to “the condition being evaluated several times and no acceptable solutions found.” The CR was closed to trend.
- CR 01646504 – the licensee decided not to pursue further due, in part, to issues with the airlock door being “caused by building and outside air pressure changes.” However, the recommended actions were to troubleshoot and repair the interlock, as needed. The CR was closed to work request (WR) 94023215. The inspectors reviewed this closed WR and determined that it did not document what was identified or corrected (if anything).
- CR 01704438 - the recommended actions were for electrical maintenance to verify the condition of the interlock. However, no work request was identified for this activity.

The inspectors reviewed the various licensee corrective action program (CAP) procedures. The inspectors noted that failure to further pursue resolution of significance level 2 CRs would only be appropriate if the corrective action were simple and known. For the instances discussed above, the inspectors were concerned that no corrective actions for the interlock system were taken.

In addition to the above concerns, the inspector noted concerns with the licensee following its internal procedures. Specifically, CR 00343806 and CR 01646504 were categorized by the licensee as significance level 2 (or level B) conditions adverse to quality. Per the licensee’s procedure PI-AA-204, “Condition Identification and Screening Process,” significance level 2 conditions would require apparent cause evaluations (ACEs). However, in each instance, the licensee made the decision to not perform

ACEs, apparently because the issue had previously been evaluated without arriving at a conclusion. However, the licensee's procedure does not provide for a previous evaluation being performed as a reason to not perform an ACE.

The inspectors also identified another example where a reactor building to supply fan room secondary containment interlock failed (CR 00392569.) While it is not included in this NCV because it is a different interlock and there did not appear to be an ongoing problem with the associated interlock system, the inspector noted that the licensee also did not follow, in part, its internal procedures in regard to this CR.

The licensee initiated CR 01716446 and CR 01737495 to capture the inspectors' concerns. At the end of the inspection period, the licensee was in the process of performing a condition evaluation to review SCT airlock door and interlock equipment performance and enhancements, and an ACE to review the CAP deficiencies noted by the inspectors.

Analysis: The inspectors determined that the CAP implementation 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. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, failing to promptly correct conditions adverse to quality would have the potential to lead to a more significant safety concern. Specifically, if the performance deficiency was left uncorrected, not promptly correcting conditions adverse to quality would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a. Because the inspectors answered "No" to each question under the Barrier Integrity Cornerstone column, the finding screened as 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-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected conditions, to ensure safety is maintained. Specifically, the licensee made several decisions associated with the correction of ongoing SCT door interlock system degraded conditions without using the systematic CAP processes. [H.1(a)]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected.

Contrary to this requirement, as of November 8, 2011, the licensee failed to assure that ongoing SCT door interlock system conditions adverse to quality were promptly corrected. Specifically, the inspectors identified that SCT door interlock system non-conformances had been ongoing since at least January 1, 2010, as revealed by multiple instances where both airlock doors were able to be opened simultaneously, and the licensee had not taken corrective actions to restore the functionality of the interlock system that was designed to prevent both airlock doors from being opened simultaneously.

Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CR 01737495, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000331/2012002-05, Secondary Containment Airlock Door Interlock Conditions Adverse to Quality Not Promptly Corrected).**

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

.1 (Closed) Licensee Event Report (LER) 05000331/2012-001-00: Inoperability of Low Pressure Coolant Injection Due to Discharge Line Voiding

a. Inspection Scope

On December 2, 2011, the licensee declared LPCI inoperable following an ultrasonic test of the 'B' RHR injection line, which identified a void in the line of approximately 1.5-2 cubic feet. On December 3, 2011, after the licensee conducted dynamic flushing and venting of the system, performed an engineering evaluation, and performed an additional ultrasonic test exam with acceptable results, LPCI was declared operable. The licensee identified that the RHR system high point vents were not located at the true system high points. The licensee conducted an ACE, performed an immediate extent of condition, and determined that the 'A' RHR subsystem also did not have its vent located at the system high point. Additionally, the licensee determined that the fill and vent procedure following maintenance activities for the RHR system was not adequate to ensure voids were cleared from all portions of the system. Corrective actions for this issue included installing vents at the system high points (completed for the 'B' RHR subsystem on December 9, 2011, and planned for the 'A' RHR subsystem at the end of the inspection period) and completing procedural revisions to the fill and vent procedure following maintenance. The licensee completed a Technical Assessment of Reportability (TAR) to evaluate past operability of the system assuming voids had existed since maintenance was last completed in October, 2011. Calculations used by the licensee determined that the system was always capable of performing its safety function. A licensee-identified Green finding and NCV of 10 CFR 50, Appendix B, "Design Control," was also identified and is documented in Section 40A7 of this report. Documents reviewed as part of this inspection are listed in the Attachment to this report. This LER is closed.

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

b. Findings

One licensee-identified violation is documented in Section 40A7 of this report.

.2 (Closed) Licensee Event Report (LER) 05000331/2012-002-00: Loss of Low Pressure Coolant Injection Safety Function due to Inoperable Instrumentation

a. Inspection Scope

On December 29, 2011, LPCI loop select capability was lost for approximately 1.6 hours during the performance of LPCI loop select – recirculation riser differential pressure instrument testing and calibration. The inspectors reviewed the licensee's POD, TAR, and ACE associated with the adverse conditions. The finding documented below discusses the chronology of the issue, the apparent cause, and corrective actions taken

or planned by the licensee. In addition, a licensee-identified Green finding and NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was also identified and is documented in Section 4OA7 of this report. Documents reviewed as part of this inspection are listed in the Attachment to this report. This LER is closed.

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

b. Findings

(1) Loss of RHR System LPCI Safety Function due to Inoperable ECCS Instrumentation – Inspector Review of LER and Apparent Cause Evaluation

Introduction: A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" was identified by the inspectors on March 7, 2012, following review of an ACE associated with the loss of LPCI loop select capability.

Description: On the evening of December 27, 2011, the licensee commenced performance of STP 3.3.5.1-22, "Recirculation Riser D/P A>B Instrument Calibration." This STP functionally tested the LPCI loop select – recirculation riser differential pressure (d/p) instruments (PDIS-4641, 4642, 4643, and 4644) to verify trip setpoints within a required d/p range as defined in TS Table 3.3.5.1-1. The STP rendered each channel inoperable as test equipment was attached, and was structured so that each instrument channel was tested sequentially such that any issues encountered could be resolved prior to moving on to the next instrument channel. However, entry into associated limiting conditions for operation could be delayed for up to six hours solely for performance of required surveillance testing of each channel per Note 2 of the TS 3.3.5.1 Surveillance Requirements, as long as loop selection capability was maintained. The licensee first removed PDIS-4641 from service at 16:58 hrs on December 27, 2011. During testing of PDIS-4641, a microswitch internal to the channel's d/p instrument was found closed and would not reset. At 1742 hrs on December 27, 2011, the licensee entered TS 3.3.5.1.A and C which required restoration of the channel to an operable status within 24 hours. During calibration of the instrument per I.PDIS-I204-01, "Barton Models 278, 288A, 288C & 289A Differential Pressure Indicating Switches," the microswitch reset; however, the licensee elected to replace the microswitch. Following replacement and satisfactory testing of PDIS-4641, the licensee exited TS 3.3.5.1.A and C at 0122 hrs on December 28, 2011, and resumed STP 3.3.5.1-22 for the remaining instruments at 0801 hrs on December 29, 2011. During testing of PDIS-4643, the licensee encountered similar issues with the internal microswitch being found closed and unable to reset. At 1022 hrs on December 29, 2011, the licensee again entered TS 3.3.5.1.A and C and implemented I.PDIS-I204-01 to calibrate the instrument. During the calibration of PDIS-4643, the microswitch reset, the instrument calibrated, and the licensee elected to perform testing to determine the adequacy of the calibration. Following satisfactory testing of the calibrated instrument, the licensee exited TS 3.3.5.1.A and C at 1449 hrs on December 29, 2011, and resumed STP 3.3.5.1-22 for PDIS-4642 at 1521 hrs on December 29, 2011. The testing of PDIS-4642 was successful with TS surveillance acceptance criteria met. At 1917 hrs on December 29, 2011, the licensee began testing of PDIS-4644 and subsequently identified similar issues as PDIS-4641 and PDIS-4643 with the internal microswitch being found closed and unable to reset. At 2009 hrs on December 29, 2011, the licensee again entered TS 3.3.5.1.A and C and elected to

replace the microswitch. Following replacement and satisfactory testing of PDIS-4644, the licensee exited TS 3.3.5.1.A and C at 2356 hrs on December 29, 2011.

Based on the DAEC LPCI loop select – recirculation riser d/p logic, at least one instrument channel in each trip system (i.e., Channel A is comprised of PDIS-4641 and PDIS-4642; Channel B is comprised of PDIS-4643 and PDIS-4644) must be operable in order for the LPCI mode of RHR safety function to be accomplished. During the aggregate failures of the instruments during the testing activities that occurred, the licensee made an 8-hour non-emergency notification to the NRC per 10 CFR 50.72(b)(3)(v)(D) at 0134 hrs on December 30, 2011, for a condition, at the time of discovery, that could have prevented the RHR function of LPCI. The licensee entered the concern into the CAP as CR 01720033 and began bench testing of the microswitches that were removed. On December 30, 2011, the licensee identified that the PDIS-4641 microswitch was degraded and required mechanical agitation to loosen the closed switch. The licensee also identified that the PDIS-4641 d/p indication was cycling appropriately, but the associated relay was not cycling as expected. The licensee subsequently replaced the entire PDIS-4641 instrument and later identified an improperly adjusted plunger screw associated with the microswitch.

As part of the longer term evaluation of CR 01720033, the licensee performed a TAR and ACE. The TAR identified that reasonable assurance of operability for PDIS-4641 did not exist at the beginning of STP 3.3.5.1-22 considering that the actual cause of the test failure was due to a loose linkage screw. Since this condition was not resolved prior to removing PDIS-4642 from service between 1521 and 1659 hrs on December 29, 2011, LPCI loop select capability was lost. As part of the ACE, the licensee determined that I.PDIS-I204-01 did not adequately address verification of microswitch plunger screw adjustment as described in available vendor manuals. Refer to Section 4OA7 of this report which documents a Green licensee-identified finding and NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," related to the inadequate calibration procedure I.PDIS-I204-01.

Corrective actions included a revision to I.PDIS-I204-01 to include appropriate vendor manual information, performance of STP 3.3.5.1-22 at an increased frequency, and longer term actions to replace the instruments with a different design and/or pursuit of a TS amendment to broaden the trip setpoints to reduce cycling of the instruments and switches.

Based on the inspector's review of the ACE 01720033, several additional concerns regarding the implementation of the licensee's CAP were identified by the inspectors:

- On January 3, 2012, the licensee inappropriately categorized CR 01720033 as a significance level 2 condition adverse to quality (CAQ) and assigned an ACE to the issue. In accordance with PI-AA-204, "Condition Identification and Screening Process," CR01720033 was required to be characterized as a significance level 1 significant condition adverse to quality (SCAQ) because CR 01720033 represented a potential complete loss of a TS system safety function that resulted in a licensee Event Report (LER);
- Following determination of the loss of LPCI loop select capability per TAR 01720033 on January 27, 2012, CR 01720033 was not re-screened by the licensee to verify that the correct significance level, causal evaluation, and type

of corrective actions were appropriate. Re-screening of issues under evaluation as new or changing information is determined was specifically required under various sections of PI-AA-204 and PI-AA-205, "Condition Evaluation and Corrective Action;" and

- The causal analysis within ACE 01720033, once completed on February 22, 2012, was incomplete in that several prudent questions remained unanswered associated with the apparent cause and extent of cause/condition.

The licensee entered the above concerns into the CAP as CR 01742201. The licensee also upgraded CR 01720033 to a significance level 2 SCAQ and was in the process of performing a root cause evaluation at the end of the period.

Analysis: The inspectors determined that the CAP implementation 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. The performance deficiency was determined to be more than minor and a finding because, if left uncorrected, failing to properly determine the cause and take corrective actions to prevent recurrence for significant conditions adverse to quality would have the potential to lead to a more significant safety concern. The inspectors evaluated the finding in accordance with IMC 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a. Because the inspectors answered "No" to all five screening questions under the Mitigating Systems Cornerstone column, the finding screened as 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-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. Specifically, the licensee's decisions to not classify CR 01720033 as a SCAQ; to not incorporate new information (loss of LPCI loop select capability for 1.63 hours) when it became available that required upgrading the CAQ to a SCAQ; and to not determine the cause and corrective actions to prevent recurrence (CAPRs) for the condition, were made without using the systematic CAP process. [H.1(a)]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that the cause of a significant condition adverse to quality is determined, corrective action is taken to preclude repetition, and the identification, cause, and corrective action taken be documented and reported to appropriate levels of management.

Contrary to the above, on February 22, 2012, the licensee failed to assure that the cause of the loss of LPCI loop select capability was determined and that corrective actions were taken or in progress to preclude repetition. Specifically, based on several known or discovered aspects of the loss of LPCI loop select capability (reportability, loss of LPCI safety function), the condition met the licensee's definition of a significant condition adverse to quality; however, the cause and corrective actions to preclude recurrence were not sufficiently determined.

The licensee was in the process of revising ACE 01720033 and performing an additional ACE to investigate the CAP implementation issues.

Because this violation was of very low safety significance and was entered into the licensee's corrective action program as CR 01742201, the violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000331/2012002-06, Inadequate Causal Evaluation and Corrective Actions for Loss of RHR System LPCI Safety Function due to Inoperable ECCS Instrumentation)**.

40A5 Other Activities

.1 Temporary Instruction (TI) -2515/182 - Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks

a. Inspection Scope

Leakage from buried and underground pipes has resulted in ground water contamination incidents with associated heightened NRC and public interest. The industry issued a guidance document, NEI 09-14, "Guideline for the Management of Buried Piping Integrity," (ADAMS Accession No. ML1030901420) to describe the goals and required actions (commitments made by the licensee) resulting from this underground piping and tank initiative. On December 31, 2010, NEI issued Revision 1 to NEI 09-14, "Guidance for the Management of Underground Piping and Tank Integrity," (ADAMS Accession No. ML110700122), with an expanded scope of components, which included underground piping that was not in direct contact with the soil and underground tanks. On November 17, 2011, the NRC issued TI-2515/182, "Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks," to gather information related to the industry's implementation of this initiative.

The inspectors reviewed the licensee's programs for buried pipe, underground piping and tanks in accordance with TI-2515/182 to determine if the program attributes and completion dates identified in Sections 3.3 A and 3.3 B of NEI 09-14 Revision 1 were contained in the licensee's program and implementing procedures. For the buried pipe and underground piping program attributes with completion dates that had passed, the inspectors reviewed records to determine if the attribute was, in fact, complete and to determine if the attribute was accomplished in a manner which reflected good or poor practices in program management.

Based upon the scope of the review described above, Phase 1 of TI-2515/182 was completed.

b. Observations

The licensee's buried piping and underground piping and tanks program was inspected in accordance with Paragraphs 03.01.a through 03.01.c of TI-2515/182 and was found to meet all applicable aspects of NEI 09-14 Revision 1, as set forth in Table 1 of the TI.

c. Findings

No findings were identified.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On April 5, 2012, the inspectors presented the inspection results to Mr. P. Wells, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

##### .2 Interim Exit Meetings

Interim exits were conducted for:

- Closure of URI 05000331/2010004-05 with Mr. R. Murrell, Licensing Engineer Analyst, via telephone on January 26, 2012.
- The inspection results for the area of radioactive solid waste processing and radioactive material handling, storage, and transportation with Mr. P. Wells, Site Vice President, on February 3, 2012, and by telephone with Mr. S. Catron, Licensing Manager and Mr. R. Porter, Radiation Protection Manager, on March 13, 2012.
- The Review of the Industry Initiative to Control Degradation of Underground Piping and Tanks (TI -2515/182) with Mr. G. Pry, Plant Manager (Acting), and other members of the licensee staff on March 7, 2012.

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

#### 4OA7 Licensee-Identified Violations

The following Green findings and violations, or Severity Level IV violations, were identified by the licensee and are violations of NRC requirements, which meet the criteria of the NRC Enforcement Policy for being dispositioned as NCVs.

##### **Cornerstones: Initiating Events and Mitigation Systems**

- The licensee identified a Severity Level (SL) IV NCV of 10 CFR 50.9, "Completeness and Accuracy of Information," on June 29, 2010, after it was discovered that six operator licenses did not have medical restrictions for use of Continuous Positive Airway Pressure (CPAP) devices. This issue was reviewed by the inspectors on September 17, 2010, and exited as an URI 05000331/2010004-05, pending further review by NRC and NRC doctors. Corrective actions included re-submittal of NRC Form 396 for the effected operators, documenting the issue in the corrective action program as CR 00580281, and performing an ACE. The licensee also developed a checklist of questions for licensed operators to answer semi-annually regarding the operator's use of prescribed medication and reporting of medical conditions. On October 12, 2010, the NRC amended six reactor operator licenses to include the license condition, "must use therapeutic devices as prescribed to maintain medical qualifications."

The failure to include medical condition restrictions within six operator licenses was a performance deficiency. 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 6.4, failing to include medical condition restrictions within operator licenses, which did not adversely affect their ability to safely operate the facility was categorized as an example of a SL IV violation. Additionally, the control room operator's performance was monitored and they continued to be evaluated as satisfactory during periodic testing and requalification testing. 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. The performance deficiency was not considered a finding using IMC 0612, Appendix B, "Issue Screening," and did not impact the Reactor Oversight Program Cornerstones of Safety.

The inspectors' review of this issue was considered to be a part of the original inspection effort, and as such did not constitute any additional inspection samples. URI 05000331/2010004-05 is considered closed.

- 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," on December 29, 2011, when sequentially-performed functional tests of the LPCI recirculation riser differential pressure instruments failed. Section 4OA3.2 documents the chronology of the instrument conditions and apparent cause. Corrective actions included a revision to I.PDIS-I204-01 to include appropriate vendor manual information, performance of STP 3.3.5.1-22 at an increased frequency, and longer term actions to replace the instruments with a different design and/or pursuance of a TS amendment to broaden the trip setpoints to reduce cycling of the instruments and switches.

The failure to assure that I.PDIS-I204-01 was appropriate to the circumstances was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because it was associated with the procedure quality attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, LPCI loop select availability and capability was not ensured for approximately 1.6 hours due to I.PDIS-I204-01 not including available vendor manual information.

The inspectors evaluated the finding in accordance with 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," Table 4a. In the Mitigating Systems Cornerstone, the inspectors answered "Yes" to the screening question "Does the finding represent a loss of system safety function?" Therefore, the finding required further risk evaluation. Since the SDP Phase 2 risk tools are being replaced with tools based on the plant-specific Standardized Plant Analysis Risk (SPAR) models, the Region III Senior Risk Analysts (SRAs) performed a Phase 3 risk evaluation using the SPAR model.

The risk evaluation was performed using SAPHIRE Version 8.0.7.18 and the Duane Arnold SPAR model (Version 8.18). The increase in core damage frequency (CDF) was analyzed assuming the safety function of LPCI during design basis loss of coolant accidents (LOCAs) was lost. The exposure time was assumed to be 1.6 hours since this was the duration when the ability of the LPCI loop select logic scheme to select the correct loop for injection was nonfunctional.

For the performance deficiency, CDF was only affected during LOCA scenarios. The SRAs used updated LOCA frequency data for large, medium, and small LOCAs from the 2010 reactor operational database maintained by Idaho National Laboratory. The SRAs performed a bounding assessment for the change in CDF by setting all four RHR/LPCI pump fail-to-run values to "True" (i.e., failed) and solving the LOCA scenarios. The resultant  $\Delta$ CDF was 8.9E-8/yr for an exposure time of one year. The actual risk significance is considerably less considering the short exposure time of only 1.6 hours. Based on this Phase 3 analysis, the inspectors determined that the finding was of very low safety significance (Green).

- The licensee identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the failure to adequately review the design of the RHR system to ensure vents were located at system high points and to ensure that design basis requirements were translated into procedures. Specifically, the licensee's original design reviews in response to Generic Letter 2008-01 did not identify that vents were not located at the actual system high points, and design reviews failed to identify portions of the system which would not receive adequate flow during fill and vent operations following maintenance. Corrective actions for this issue included installing vents at the system high points (completed for the 'B' RHR subsystem and planned for the 'A' RHR subsystem). In addition, the licensee plans to review RHR, Core Spray, RCIC and HPCI system flow paths to ensure the systems are adequately vented during fill and vent procedures following maintenance. The issue was entered into the CAP as CR 01712033.

The failure to adequately review the design of the RHR system to ensure vents were located at system high points and to ensure that design basis requirements were translated into procedures was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because it was associated with the design control, procedure quality, and human performance attributes of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee did not identify the design inadequacy of the RHR system vent location during review of the system, and procedures used to vent the RHR system following maintenance did not ensure that all gas voids were vented. The finding screened as of very low safety significance (Green) because the finding involved a design or qualification deficiency that did not result in a loss of operability.

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  
E. Sorenson, Supervisor, Inspection and Materials  
B. Murrell, Licensing Engineer Analyst

#### Nuclear Regulatory Commission

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

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

05000331/2012002-01	NCV	Lack of Acceptance Criteria within Emergency Core Cooling System Surveillance Procedure (Section 1R22)
05000331/2012002-02	NCV	Failure to Properly Label and Maintain Labels on Containers in the Radioactive Waste Facility (Section 2RS8)
05000331/2012002-03	NCV	Failure to Maintain Type A Container Design Tests (Section 2RS8)
05000331/2012002-04	NCV	Battery Conditions Adverse to Quality Not Promptly Identified (4OA2.3)
05000331/2012002-05	NCV	Secondary Containment Airlock Door Interlock System Conditions Adverse to Quality Not Promptly Corrected (Section 4OA2.4)
05000331/2012002-06	NCV	Inadequate Causal Evaluation and Corrective Actions for Loss of RHR System LPCI Safety Function due to Inoperable ECCS Instrumentation (Section 4OA3.2)

### Closed

05000331/2010004-05	URI	Medical Records Do Not Reflect use of Continuous Positive Airway Pressure (CPAP) Devices used by Licensed Operators (Section 4OA7)
05000331/2012002-01	NCV	Lack of Acceptance Criteria within Emergency Core Cooling System Surveillance Procedure (Section 1R22)
05000331/2012002-02	NCV	Failure to Properly Label and Maintain Labels on Containers in the Radioactive Waste Facility (Section 2RS8)
05000331/2012002-03	NCV	Failure to Maintain Type A Container Design Tests (Section 2RS8)
05000331/2012002-04	NCV	Battery Conditions Adverse to Quality Not Promptly Identified (4OA2.3)
05000331/2012002-05	NCV	Secondary Containment Airlock Door Interlock System Conditions Adverse to Quality Not Promptly Corrected (Section 4OA2.4)
05000331/2012002-06	NCV	Inadequate Causal Evaluation and Corrective Actions for Loss of RHR System LPCI Safety Function due to Inoperable ECCS Instrumentation (Section 4OA3.2)

### 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 05  
OP-AA-102-1002; Seasonal Readiness; Revision 0  
AOP 903; Severe Weather; Revision 34  
OP-AA-102-1002 (DAEC); Seasonal Readiness; Revision 05  
CR 01675192; Elevated Main Transformer Neutral Ground DC Current  
AOP 304; Grid Instability; Revision 29  
Shift Operating Logs: March 7 through March 9, 2012  
OI 304.2; 4160V/480V Essential Electrical Distribution System

### 1R04

OP-AA-102-1003; Guarded Equipment; Revision 03  
OP-AA-102-1003 (DAEC); Guarded Equipment (DAEC Specific Information); Revision 20  
OI 152A2; HPCI System Valve Lineup and Checklist; Revision 16  
OI 152A1; HPCI System Electrical Lineup; Revision 3  
OI 152A4; HPCI System Control Panel Lineup; Revision 5  
OI 324A10; SBDG Standby/ Readiness Checklist; Revision 14  
OI 454A2; "A" ESW System Valve Lineup and Checklist; Revision 12  
OI 151A2; "A" Core Spray System Valve Lineup and Checklist; Revision 4  
OI 151A1; Core Spray System Electrical Lineup; Revision 3  
OI 150A1; RCIC System Electrical Lineup; Revision 2  
OI 150 A2; RCIC System Valve Lineup and Checklist; Revision 12  
OI 150 A4; RCIC System Control Panel Lineup; Revision 3

### 1R05

Administrative Control Procedure (ACP) 1203.53; Fire Protection; Revision 15  
ACP 1412.4; Impairments to Fire Protection Systems; Revision 64  
DAEC Fire Plan – Volume 1, Program; Revision 61  
AFP-08; Standby Gas Treatment System and MG Set Rooms El. 786'; Revision 25  
AFP-71; Startup Transformer 1X3; Revision 3  
AFP-18; Turbine Building North Building Ground Floor and Tube Pulling Area, El. 757'-6";  
Revision 29  
AFP-19; Turbine Building South Turbine Building Ground Floor; Revision 25

### 1R06

AOP-902; Flood; Revision 41

## 1R11

Evaluation Scenario Guide 146; Revision 0  
Reactivity Management Plan; Downpower and Control Rod Sequence Exchange;  
February 2012  
STP 3.3.2.1-04; Control Rod Movement Verification; Revision 4  
STP 3.1.4-01; Scram Insertion Time Test; Revision 20

## 1R12

Reactor Building HVAC and SBT System Health Report  
CR 01733283; Trend- Rollup of Secondary Containment Damper Issues  
CR 01713721; 1VAD017A3 Indicates Dual During STP 3.6.4.2-01A  
CR 01719760; 1VAD017A3 Indication did not Change when Group 3 Inserted  
CR 01726074; 1VAD017A3 Secondary Cont Isolation Damper to Close on Group 3  
CR 01658545; Additional Information Concerning AR 1652783  
CR 01652783; Closed System Ductwork Passing Through Secondary Containment  
POD associated with CR 01658545; Closed System Ductwork Passing Through Secondary  
Containment  
POD associated with CR 01700990; Corroded SBT Sump Piping  
CR 01737489; NRC Observation on POD 1700990  
CR 01735232; Supplemental Information Regarding POD 1700990

## 1R13

Work Planning Guideline-1; Work Process Guideline; Revision 51  
Work Planning Guideline-2; Online Risk Management Guideline; Revision 60  
OP-AA-104-1007; Online Aggregate Risk; Revision 001  
WM-AA-1000; Work Activity Risk Management; Revision 11  
WM-AA-1000 (DAEC); Work Activity Risk Management (DAEC); Revision 00  
OP-AA-102-1003; Guarded Equipment; Revision 03  
OP-AA-102-1003 (DAEC); Guarded Equipment (DAEC Specific Information); Revision 20  
WO 01282144; Inspect 1T061A&B Tank Internals  
OP-AA-104-1010 (DAEC); Fuel Pool Risk Management Guideline; Revision 2  
OP-AA-104-1010; Spent Fuel Pool Risk Management Guideline (Fleet); Revision 1  
CR 01721567; Fuel Pool Risk Assessment  
Work Week 1201 WARM Summary and Weekly PRA  
Work Week 1202 WARM Summary and Weekly PRA  
Work Week 1203 WARM Summary and Weekly PRA  
Work Week 1208 WARM Summary and Weekly PRA  
WO 40071660; Complete Mechanical Inspection [of A SBDG]  
CR 01737307; Guarding ADS when HPCI is Inoperable  
CR 01739497; 1VAD017B3 Indicates Dual While Performing a Group 3 'B' STP  
CR 01739632; Damper 1VAD017A3 Failed to Indicate Full Closed With a Group 3A  
Operations Shift Logs for February 29, 2012

## 1R15

EN-AA-203-1001; Operability Determinations/ Functionality Assessments; Revision 006  
OP-AA-100-1000; Conduct of Operations; Revision 006  
CR 01720033; PDIS4644 – Failure of Switch to Reset During Calibration  
CR 01731664; Brown Rubber Grommets Melting on PC Boards  
CR 01741454; 1VAD017 Actuator Bolting  
POD associated with CR 01741454-01; SBTG Supply Isolation Dampers (1VAD017A and B)  
as-found bolting configuration is not what is analyzed in CAL-M84-014  
Calculation M84-14; Seismic Stress Analysis Hills-McCanna Damper Actuators R-2000FS

## 1R18

FP-E-MOD-03; Temporary Modifications; Revision 10  
ACP 103.2; 10 CFR 50.59 Screening Process; Revision 37  
WO 40132679-02; AV2909B – Mech Install Temp Flange and Valve Assembly  
WO 40138367-01; Install Temp Flange in for ASME Testing 1P117B

## 1R19

ACP 1408.1; Work Order Task(s); Revision 173  
WO 40079538; Perform a Functional Check of SBDG Room HVAC  
WO 40112626; DO7001A2 – Repair/ Replace Positioner for Damper Operator  
CR 01727134; DO7002A3 Not Cycling Due to Leak Out “P” Port of Positioner  
CR 01727125; TC7000A Does Not Have Full Output, Found During PWO 40079538  
CR 01690128; DO7001A2 Ventilation Fan 1V-SF-20 Damper Leaks Inside Cover  
CR 01690130; SV7000A is leaking out Exhaust Port  
CR 01690132; SV7002A Constantly Leaks Out of the Exhaust Port  
CR 01690143; DO7001A1 Leaking Air Inside of Cover  
TP 3.5.1-05; HPCI System Operability Test; Revision 56  
OI 324A10; SBDG Standby/ Readiness Condition Checklist; Revision 14  
STP 3.8.1-06B; B SBDG Operability Test (Fast Start); Revision 15  
CR 01746636; B SBDG CMM Blower Flex Drive Gear Is Not Flexing  
WO 40112626-01; DO7001A2, 'A' SBDG Return Air Damper Positioner, Repair/Replace  
WO 40112628-01; SV7002A, 'A' SBDG HVAC Exhaust Damper Solenoid Valve, Replacement  
WO 40112629-01; DO7001A1'A' SBDG Return Air Damper Positioner Repair/Replace  
STP 3.8.1-04A; A SBDG Operability Test (Slow Start); Revision 15

## 1R22

ACP 107; Surveillance Tests; Revision 13  
STP 3.1.7-03; Standby Liquid Control System Boron Concentration Test; Revision 24  
WO 40099176; STP 3.1.7-03 SBLC boron Concentration Test  
CR 01726408; Independent Verification Not Performed Correctly  
STP 3.3.6.1-11; Reactor Lo Lo Water Level (ATWS-RPT/ ARI Trip/ RWCU Isolation) and Lo Lo  
Lo Water Level (Main Steam Line Isolation Trip) Channel Functional Test; Revision 11  
WO 40102829; STP 3.3.6.1-11 Rx Lo Lo Water Lev and LoLoLo Chan Funct  
WM-AA-1000; Work Activity Risk Management; Revision 11  
WM-AA-1000 (DAEC); Work Activity Risk Management (DAEC); Revision 000  
CR 01732877; NRC Question on WM-AA-1000  
ASME Pump Databook; Revision 155

STP 3.5.3-02; RCIC System Operability Test; Revision 34  
EMP 1E201-HT; RHR Heat Exchangers 1E-201A & B Heat Transfer Test; Revision 4  
STP 3.5.1-15; RHR System Water Fill Test; Revisions 1-4  
CR 01731106; Proposed Improvements to ECCS Monthly Venting Surveillances  
ACE 01731106; Failure to Provide ECCS Venting Acceptance Criteria

#### 1EP6

DAEC ERO Training Drill 1 Controller Package; Revision 0  
CR 01739697; 12TD1EOF – Did Not Immediately Recognize TEDE Limit Exceeded  
CR 01739744; 12TD1TSC – Critical Information Not Communicated From Control Room to TSC

#### 2RS8

CR 00577505; LVWR- Review/Delete Radwaste Shipping Procedures  
CR 00595027; Radioactive Material Found on Equipment Coming on Site  
CR 01611376; Investigate the 2005 Boral Coupon Shipment  
CR 01654201; Issues Identified during Low Level Walkdown  
CR 01666710; Shipping Paperwork Issues Identified  
CR 01666719; Inventory of Accumulated Radioactive Waste Stored in January  
CR 01693122; Transport the 2 Radioactive Sealands Inside the PA  
CR 01730713; Container Certification File Not Complete  
CR 01730867; Labeling Discrepancies in the Rad Waste Building  
HPP 3013.03; Radiological Area Postings and Surveillances; Revision 55  
RA-AA-108-1002; Shipment of Radioactive Material; Revision 0  
RA-AA-108-1003; Radioactive Materials Surveys for Shipment; Revision 0  
RA-AA-108-1004; Packaging of Radioactive Materials for Shipment; Revision 0  
RWH 3406.6; Characterizing Radioactive Material for Transport; Revision 9  
RWH 3409.2; Sampling Instructions and Analysis of Radwaste Streams; Revision 11  
RWH 3410.1; Process Control Program; Revision 17  
10 CFR Part 61 Compliance Data Technical Basis for DAEC Condensate Resin; Approved  
October 26, 2010  
10 CFR Part 61 Compliance Data Technical Basis for DAEC Reactor Water Clean-up Resin;  
Approved June 10, 2008  
UFSAR Chapter 11.4; Solid Waste Management System; Revision 21  
Iowa Electric Light and Power Company Response to NRC IE Bulletin 79-19; dated  
September 14, 1979  
Radioactive Material Shipment Number 10-34; Control Rod Drive Mechanisms; dated  
November 29, 2010  
Radioactive Waste Shipment Number 11-08; Condensate Resin; dated March 8, 2011  
Radioactive Material Shipment Number 11-09; Type A Package; dated March 28, 2011  
Radioactive Waste Shipment Number 11-19; Type B Package; dated September 15, 2011

#### 4OA1

Operations Shift Logs, January 1, 2011, through December 31, 2011

#### 4OA2

ACP 1410.15; Plant Status Control Program; Revision 007  
PI-AA-101-1000; Focused Self-Assessment Planning, Conduct and Reporting; Revision 008  
ACP 1410.2; LCO Tracking and Safety Function Determination Program; Revision 28  
ACP 1410.5; Clearance Program; Revision 104  
ACP 101.01; Procedure Use and Adherence; Revision 51  
PI-AA-204; Condition Identification and Screening; Revision 16  
PI-AA-100-1007; Apparent Cause Evaluation; Revision 05  
CR 00394695; Cracks in 1D1 Cell Covers and Post Seals  
CR 00394743; Cracks in 1D2 Cell Covers  
CR 00364144; Cracks in 1D4 Cell Covers  
CR 00574554; Trend CR – Battery Lid Cracking Trending  
CR 00587174; New Hairline Crack Discovered on 1D1 – Cell 31  
CR 00591438; 1D1 Cells 4 and 10 Hairline Cracks Require Epoxy Repair  
CR 01629845; 1D1 Epoxy Repairs Appear to Have Discolored  
CR 01663144; 1D1 Has Numerous Cells with Cracking in the Lids  
CR 01663146; 1D4 Has Numerous Cell Lids Cracking  
CR 01681138; 1D4 Battery Lid Cracking Identified STP 3.8.4-05C  
CR 01687715; 1D1 Station Battery Lid Crack  
CR 01688013; 1D4 Has Cells That Are Cracked  
CR 01700792; New 1D1 Battery Lid Cracks During Battery Checks STP  
CR 01702086; 1D2 Cracks on Top of Jars  
CR 01704220; Two Previously Unidentified 1D1 Battery Lid Cracks Found  
125V/24V/250V DC Power System Performance Monitoring Plan; August 24, 2011  
CR 01727026; 1D1 Battery Lid Cracking  
CR 01727028; 1D2 Battery Lid Cracking  
CR 01727030; 1D4 Battery Lid Cracking  
CR 01728378; Methodology to Detect and Identify Battery Cell Lids  
NS13F002; Fire Door and Frame Inspection; Revision 27  
CE 5926; CAQ-Airlock Interlocks Intermittent Operation Not Properly Addressed Since 1996  
CR 01716446; Unplanned Secondary Containment LCO – Airlock Doors  
CR 00343806; 072858 CAQ – Momentary Secondary Containment Violation  
CR 0039269; Two Secondary Containment Doors Were Open Simultaneously  
CR 01646504; Doors 225 and 227 Were Inadvertently Opened at the Same Time  
CR 01704438; Two Airlock Doors Reportedly Open Simultaneously  
CR 01737495; NRC Finding – Secondary Containment Air Lock Doors  
GMP-MECH-20; General Repair Guidelines for Quality Level 1 Doors and/or Fire Doors  
STP 3.6.4.1-02; Secondary Containment Airlock Verification; Revision 13

#### 4OA3

CR 01735445; Deficiency Identified in Barton Microswitch Replacement  
CR 01742201; Barton Switch Failure Evaluation Comments  
I.PDIS-I204-01; Barton Models 278, 288A, 288C & 289A Differential Pressure Indicating  
Switches; Revision 28  
STP 3.3.5.1-22; Recirculation Riser D/P A > B Instrument Calibration; Revision 2  
CR 01720033; PDIS4644 – Failure of Switch to Reset During Calibration  
CR 01745622; ACE 1720033-08 Did Not Pass E-CARB Review  
Shift Operations Logs; December 27, 2011 through December 30, 2011

#### 4OA5

ER-AA-102; Buried Piping Program: Revision 3  
Report No. 1000995; Duane Arnold energy Center Site Specific Risk Analysis; Revision 0  
ER-AA-102-1000; Buried Piping Examination Procedure; Revision 1  
ENG-ER-AA-102; Common ESP Training Guide; Revision 0  
ACP 1211.16; Ultrasonic Thickness Measurement using Digital Thickness Gages; Revision 6  
Duane Arnold Energy Center Underground Piping and Tanks Examination Plan; Revision 1  
Report No. 1000995.401; APEC Survey – Duane Arnold Energy Center, Inspection Date:  
August 22, 2011; Revision 0

#### 4OA7

ACE associated with CR 580281-01; Untimely Submittal of NRC Form 396 – CPAPs  
QF 1090-02, Semi-Annual Assessment of Medical Conditions and/or Prescriptions for Licensed  
Operators; Revision 0; January 20, 2011  
CR 00580281; CPAP Reporting Issue Identified by the NRC

## LIST OF ACRONYMS USED

ACE	Apparent Cause Evaluation
ACP	Administrative Control Procedure
ADAMS	Agencywide Document Access Management System
AFP	Area Fire Plan
AOP	Abnormal Operating Procedure
AR	Action Request
ARI	Alternation Rod Intrusion
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient without Scram
CAP	Corrective Action Program
CDF	Core Damage Frequency
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CPAP	Continuous Positive Airway Pressure
CR	Condition Report
DAEC	Duane Arnold Energy Center
DC	Direct Current
DOT	Department of Transportation
DRP	Division of Reactor Projects
ECCS	Emergency Core Cooling System
ESW	Emergency Service Water
HPCI	High Pressure Cooling Injection
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LPCI	Low Pressure Coolant Injection
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OOS	Out of Service
PARS	Publicly Available Records System
PI	Performance Indicator
PM	Planned or Preventative Maintenance
POD	Prompt Operability Determination
PRA	Probabilistic Risk Analysis
RCA	Radiologically Controlled Area
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RPT	Recirc Pump Trip
RWCU	Reactor Water Cleanup
SBGT	Standby Gas Treatment
SCAQ	Significant Condition Adverse to Quality
SCT	Secondary Containment
SDP	Significance Determination Process
SL	Severity Level

SPAR	Standardized Plant Analysis RiskS
SR	Surveillance Requirement
SRA	Senior Reactor Analyst
STP	Surveillance Test Procedure
TAR	Technical Assessment of Reportability
TI	Temporary Instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VDC	Volts Direct Current
WARM	Work Activity Risk Management
WO	Work Order

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

Sincerely,

**/RA/**

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

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Letter to P. Wells from M. Ring dated May 10, 2012

SUBJECT: DUANE ARNOLD ENERGY CENTER – NRC INTEGRATED INSPECTION  
REPORT 05000331/2012002

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