UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

April 24, 2009

Mr. Joseph Jensen
Senior Vice President and
Chief Nuclear Officer
Indiana Michigan Power Company
Nuclear Generation Group
One Cook Place
Bridgman, MI 49106

SUBJECT: D. C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2, INTEGRATED INSPECTION REPORT 05000315/2009002; 05000316/2009002

Dear Mr. Jensen:

On March 31, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your D.C. Cook Nuclear Plant, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 13, 2009, with Mr. L. Weber and other members of your staff.

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

Based on the results of this inspection one finding of very low safety significance (Green) was identified. The finding did not involve a violation of NRC requirements. If you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at the D. C. Cook Nuclear Power Plant. In addition, if you disagree with the cross-cutting aspect of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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

Sincerely,

/RA/
Jamnes L. Cameron, Chief
Projects Branch 6
Division of Reactor Projects

Docket Nos. 50-315; 50-316
License Nos. DPR-58; DPR-74

Enclosure: Inspection Report No. 05000315/2009002; 05000316/2009002
w/Attachment: Supplemental Information

cc w/encl: L. Weber, Site Vice President
J. Gebbie, Plant Manager
O. Isiogu, Michigan Public Service Commission
Michigan Department of Environmental Quality
Planning Manager, Emergency Management and Homeland Security Division, Michigan State Police Department
T. Strong, State Liaison Officer

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Letter to J. Jensen from J. Cameron dated April 24, 2009

SUBJECT: D. C. COOK NUCLEAR POWER PLANT, UNITS 1 AND 2 INTEGRATED INSPECTION REPORT 05000315/2009002; 05000316/2009002

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REGION III

Docket Nos:	50-315; 50-316
License Nos:	DPR-58; DPR-74
Report Nos.	05000315/2009002; 05000316/2009002
Licensee:	Indiana Michigan Power Company
Facility:	D. C. Cook Nuclear Power Plant, Units 1 and 2
Location:	Bridgman, MI
Dates:	January 1 through March 31, 2009
Inspectors:	J. Lennartz, Senior Resident Inspector P. LaFlamme, Resident Inspector G. Wright, Project Engineer J. Jacobson, Reactor Engineer R. Jones, Reactor Engineer M. Phalen, Health Physicist F. Tran, Reactor Engineer N. Valos, Senior Operations Engineer
Approved by:	J. Cameron, Chief Branch 6 Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000315/2009002, 05000316/2009002; 01/01/2009 – 03/31/2009; D.C. Cook Nuclear Power Plant, Units 1 & 2; Problem Identification and Resolution.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance was identified by the inspectors for the failure to follow the work control process during the execution of a work order associated with the Unit 1 turbine repair project. Specifically, failure to follow established processes resulted in workers cutting into a pressurized control air system line. The primary cause of this finding was related to the cross-cutting area of Human Performance because licensee personnel failed to appropriately coordinate work activities by incorporating actions to address the impact of changes to the work scope (H.3(b)).

  The finding was determined to be more than minor because the failure to follow the work control process could under different circumstances adversely affect safety-related systems and personnel safety. The issue was of very low safety significance because the safety function guidelines for core heat removal, inventory control, power availability, containment integrity, and reactivity control were satisfied. No violation of NRC requirements occurred. (Section 4OA2.3)

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

Summary of Plant Status

Unit 1 remained in Mode 5, Cold Shutdown, during the entire inspection period.

Unit 2 operated at or near full power until March 25 when the unit was shut down to Mode 3, Hot Standby, to commence Cycle 18 refueling outage. Unit 2 was in Mode 6, Refueling, when the inspection period ended.

1. REACTOR SAFETY

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

On February 19, 2009, high wind conditions and wave heights greater than 8 feet on Lake Michigan were predicted in the vicinity of the plant. The inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. The inspectors walked down the screen house and the turbine building to verify that contingency actions specified in plant procedures had been initiated to address the potential for excessive debris loading on the traveling water screens that could result from the rough lake conditions. The inspectors reviewed licensee procedures and discussed potential contingency measures with control room personnel. The inspectors focused on the following plant systems due to their risk significance or susceptibility to the impending adverse weather:

- Main Feedwater Pumps
- Traveling Water Screens
- Essential Service Water Pumps

The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP. Specific documents reviewed during this inspection are listed in the Attachment.

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

b. Findings

No findings of significance 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:

- Unit 2 West Containment Spray
- Unit 1 AB Emergency Diesel Generator
- Unit 1 Boron Injection Subsystem

The inspectors selected these systems based on their risk significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report (UFSAR), Technical Specification (TS) requirements, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings of significance were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On January 20 - 23, 2009, the inspectors performed a complete system alignment inspection of the Unit 2 auxiliary feed water system to verify the functional capability of the system. This system was selected because it was considered both safety-significant and risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding work orders (WOs) was performed to determine whether any deficiencies significantly affected the system function. The inspectors also reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. In addition, the inspectors used Operating Experience Smart Sample (OpESS) FY2009-02, Negative Trend and Recurring Events Involving Feedwater Systems, as additional guidance in conducting the inspection. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings of significance 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:

- Fire Zone 71/72, Unit 1/2 Plant Computer Rooms
- Fire Zone 41, Unit 1 Engineering Safety System and Motor Control Center Room
- Fire Zone 44S, Unit 1/2 Auxiliary Building South 609 foot elevation
- Fire Zone 60, Unit 2 Switchgear Room Cable Vault
- Fire Zone 17D, Unit 1 East Auxiliary Feed Pump Room
- Fire Zone 107, Unit 2 Auxiliary Feed Water Battery Room

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 had implemented adequate compensatory measures for out-of-service, degraded, or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their 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. The inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

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

- Auxiliary Building 573 foot elevation

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

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the individual Job Performance Measure operating tests, and the simulator operating tests (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee from February 2009 through March 2009 as part of the licensee's operator licensing requalification cycle. These results were compared to the thresholds established in Inspection Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," and IP 71111.11, "Licensed Operator Requalification Program." The documents reviewed during this inspection are listed in the attachment.

This inspection constituted one inspection sample as defined in IP 71111.11.

b. Findings

No findings of significance were identified.

.2 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On March 5, 2009, and March 13, 2009, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate; evaluators were identifying and documenting crew performance problems; and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

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

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

These inspections constituted two quarterly licensed operator requalification program samples as defined in IP 71111.11. Two samples were completed this quarter because next quarter's licensed operator training cycle may not include meaningful inspection opportunities with respect to licensed operator requalification training.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

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

- Turbine building structure, including Unit 1 main turbine structural supports, following Unit 1 main turbine high vibration event on September 20, 2008.
- Motor control centers, circuit breakers, and interfaces.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and

independently verified the licensee's actions to address system performance or condition problems in terms of the following:

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

The inspectors reviewed licensee documents associated with failures of motor control center, circuit breakers, and interfaces utilizing guidance from NRC's Operating Experience Smart Sample (OpESS) FY 2009-01, Inspection of Electrical Connections for Motor Control Center, Circuit Breakers, and Interfaces. The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified that maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization, and that the licensee had received and entered Information Notice 2007-34, Operating Experience Regarding Electrical Circuit Breakers, into their corrective action and operating experience programs. 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 of significance 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:

- Planned maintenance during the week of January 19, 2009, on Unit 2 west component cooling water pump, Unit 2 west centrifugal charging pump, and the capacitor bank in the 69 kilo-volt switchyard.
- Planned maintenance during the week of February 9, 2009, on the Unit 2 east essential service water pump discharge strainer, Unit 2 CD emergency diesel generator room ventilation, and surveillance testing on Unit 2 CD emergency diesel generator and Unit 2 east containment spray system.
- Planned maintenance during the week of March 9, 2009, on 69 kilo-volt transformer 12-EP.

- Planned maintenance during the week of March 16, 2009, on Unit 1 west residual heat removal pump and Unit 1 traveling water screens; and, emergent maintenance on Unit 2 east containment spray heat exchanger essential service water outlet valve, 2-WMO-714, and Unit 2 north non-essential service water pump discharge strainer.
- Planned maintenance on March 28 – 31, 2009, to drain, clean, and inspect the Unit 12 AB fuel oil storage tank.

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.

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

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following Action Requests (AR) for documented issues:

- AR 00846104, 2-GFW-L-252, Auxiliary Feed Water Piping Support Discrepancies during VT-3 Exam.
- AR 00844641, Mechanical Interlock was Out of Adjustment for Unit 2 Containment Lower Airlock Inner Door.
- AR 09047064, Auxiliary Feed Pump Room Cooler Tubes Found Plugged With Lake Debris.
- AR 00847181, Non-Seismic Scaffold Built Adjacent to TS Equipment.

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

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

This operability inspection constituted four samples as defined in IP 71111.15-05

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification(s):

- U1 Component Cooling Water System Temporary Water Purification Skid Installation

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation information against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system. The inspectors also compared the licensee's information to operating experience information to ensure that lessons learned from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modifications were installed as directed; the modifications operated as expected; modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary modification in place could impact overall plant performance.

This inspection constituted one temporary modification sample as defined in IP 71111.18-05.

b. Findings

No findings of significance were identified.

.2 Permanent Plant Modifications

a. Inspection Scope

The following engineering design package was reviewed and selected aspects were discussed with engineering personnel:

- Elimination of the 650 Elevation Auxiliary Missile Blocks from the Design of Units 1 and 2 (EC049191)

This document and related documentation were reviewed for adequacy of the associated 10 CFR 50.59 safety evaluation screening, consideration of design parameters, implementation of the modification, post-modification testing, and relevant procedures, design, and licensing documents were properly updated. The modification permanently removed the auxiliary missile blocks located in front of the containment equipment hatches on Units 1 and 2.

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

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- Unit 2 east essential service water pump coupling gap adjustment;
- Unit 1 north control room air conditioning unit preventative maintenance;
- Unit 1 CD emergency diesel generator preventive maintenance;
- Unit 12 supplemental diesel generator preventive maintenance;
- Unit 2 engineered safety features fan 1 backdraft damper repairs; and,
- Unit 2 east containment spray heat exchanger essential service water outlet valve, 2-WMO-714, corrective 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 (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion), and test documentation was properly evaluated. The inspectors evaluated the activities against TS, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. 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 of significance were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

On March 25, 2009, Unit 2 was shut down and Cycle 18 refueling outage commenced. The inspectors began refueling outage inspection activities, which are expected to be completed and documented during the next inspection period. An inspection sample was not completed this inspection period.

b. Findings

No findings of significance were identified.

.2 Unit 1 Forced Outage

a. Inspection Scope

Unit 1 was maintained in Mode 5, Cold Shutdown, following the main turbine high vibration event on September 20, 2008. The inspectors conducted outage inspection activities, which included: assessing the licensee's control of plant configuration and management of shutdown risk; reviewing configuration management to verify that the licensee maintained defense-in-depth with respect to shutdown risk; and verified that systems required for decay heat removal were appropriately controlled and maintained. Outage inspection activities will be completed when Unit 1 is returned to service.

An inspection sample was not completed during this inspection period.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

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:

- Unit 2 Ice Condenser Intermediate Deck Door Weekly Surveillance (routine)
- Unit 1 East Essential Service Water Flow Verification Surveillance (routine)
- Unit 1 Train A/B Pressurizer Power Operated Relief Valve Actuation Channel Operational Test at Low Temperature Overpressure Protection (routine)
- Unit 2 West Containment Spray System Test (in-service test)
- Unit 1 East Component Cooling Water System Surveillance (in-service test)
- Main Steam Safety Valve Setpoint Testing With Lift Assist Device (in-service test)
- Unit 2 Reactor Coolant System Leak Rate Test (reactor coolant system leakage detection)

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

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

Documents reviewed are listed in the Attachment to this report.

This inspection constituted three routine surveillance testing samples, three in-service testing samples, and one reactor coolant system leak detection surveillance test sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on March 5, 2009, which required emergency plan implementation. Licensee emergency preparedness personnel had pre-designated that the opportunities for the Shift Manger to classify the event would be evaluated and included in the performance indicator data regarding drill and exercise performance.

The inspectors verified that the Shift Manager classified the emergency condition in an accurate and timely manner as required by the Emergency Plan implementing procedures. The inspectors also attended the licensee's drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

2PS2 Radioactive Material Processing and Transportation (71122.02)

.1 Radioactive Waste System

a. Inspection Scope

The inspectors reviewed the liquid and solid radioactive waste system description in the UFSAR for information on the types and amounts of radioactive waste (radwaste) generated and disposed. The inspectors reviewed the scope of the licensee's audit program with regard to radioactive material processing and transportation programs to verify that it met the requirements of 10 CFR 20.1101(c).

This inspection constituted one sample as defined in IP 71122.02–5.

b. Findings

No findings of significance were identified.

.2 Radioactive Waste System Walkdowns

a. Inspection Scope

The inspectors performed walkdowns of the liquid and solid radwaste processing systems to verify that the systems agreed with the descriptions in the UFSAR and the Process Control Program and to assess the material condition and operability of the systems. The inspectors reviewed the status of radwaste processing equipment that was not operational and/or was abandoned in place. The inspectors reviewed the licensee's administrative and physical controls to ensure that the equipment would not contribute to an unmonitored release path or be a source of unnecessary personnel exposure.

The inspectors reviewed changes to the waste processing system to verify that the changes were reviewed and documented in accordance with 10 CFR 50.59 and to assess the impact of the changes on radiation dose to members of the public. The inspectors reviewed the current processes for transferring waste resin into shipping containers to determine if appropriate waste stream mixing and/or sampling procedures were utilized. The inspectors also reviewed the licensee's methods for waste concentration averaging to determine if representative samples of the waste product were provided for the purposes of waste classification, as required by 10 CFR 61.55.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

.3 Waste Characterization and Classification

a. Inspection Scope

The inspectors reviewed the licensee's radiochemical sample analysis results for each of the licensee's waste streams, including dry active waste (DAW), spent resins, and filters. The inspectors also reviewed the licensee's use of scaling factors to quantify difficult-to-measure radionuclides (e.g., pure alpha or beta emitting radionuclides). The reviews were conducted to verify that the licensee's program assured compliance with 10 CFR 61.55 and 10 CFR 61.56, as required by Appendix G of 10 CFR Part 20. The inspectors also reviewed the licensee's waste characterization and classification program to ensure that the waste stream composition data accounted for changing operational parameters and thus remained valid between the annual sample analysis updates.

This inspection constituted one sample as defined in IP 71122.02–5.

b. Findings

No findings of significance were identified.

.4 Shipment Preparation and Shipment Manifests

a. Inspection Scope

The inspectors reviewed the documentation of shipment packaging, radiation surveys, package labeling and marking, vehicle inspections and placarding, emergency instructions, determination of waste classification/isotopic identification, and licensee verification of shipment readiness for six non-excepted material and radwaste shipments made in 2007 and 2008. The shipment documentation reviewed consisted of:

- Five Low Specific Activity-II (LSA-II) and One Surface Contaminated Object-II (SCO-II) Shipments to Waste Processors, including the shipments for the Unit 1 and 2 Reactor Heads.

For each shipment, the inspectors determined if the requirements of 10 CFR Parts 20 and 61 and those of the Department of Transportation (DOT) in 49 CFR Parts 170–189 were met. Specifically, records were reviewed and staff involved in shipment activities were interviewed to determine if packages were labeled and marked properly, if package and transport vehicle surveys were performed with appropriate instrumentation, if radiation survey results satisfied DOT requirements, and if the quantity and type of radionuclides in each shipment were determined accurately. The inspectors also determined whether shipment manifests were completed in accordance with DOT and NRC requirements; if they included the required emergency response information; if the recipient was authorized to receive the shipment; and if shipments were tracked as required by 10 CFR Part 20, Appendix G.

This inspection constitutes one sample as defined by IP 71122.02–5.

Selected staff involved in shipping a Crosby valve back to the vendor were observed and interviewed by the inspectors to determine if they had adequate skills to accomplish shipment related tasks and to determine if the shippers were knowledgeable of the applicable regulations to satisfy package preparation requirements for public transport with respect to NRC Bulletin 79–19, “Packaging of Low-Level Radioactive Waste for Transport and Burial,” and 49 CFR Part 172 Subpart H. Also, safety training and function specific training records for radiation protection technicians and environmental employees were reviewed for compliance with the hazardous material training requirements of 49 CFR 172.704.

This inspection constitutes one sample as defined by IP 71122.02–5.

b. Findings

No findings of significance were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed condition reports, audits and self-assessments that addressed radioactive waste and radioactive materials shipping program deficiencies since the last inspection to verify that the licensee had effectively implemented the corrective action program and that problems were identified, characterized, prioritized and corrected. The inspectors also verified that the licensee's self-assessment program was capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors reviewed corrective action reports from the radioactive material and shipping programs since the previous inspection, interviewed staff, and reviewed documents to determine if the following activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- Initial problem identification, characterization, and tracking;
- Disposition of operability/reportability issues;
- Evaluation of safety significance/risk and priority for resolution;
- Identification of repetitive problems;
- Identification of contributing causes;
- Identification and implementation of effective corrective actions;
- Resolution of Non-Cited Violations tracked in the corrective action system; and
- Implementation/consideration of risk significant operational experience feedback.

This inspection constituted one sample as defined in IP 71122.02–5.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

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 Unit 1 and Unit 2 for the period from the first quarter 2008 through the fourth quarter 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 5, were used. The inspectors reviewed the licensee’s control room logs, issue reports, Licensee Event Reports, and NRC Inspection Reports for the period of January 1, 2008, through December 31, 2008, to validate the accuracy of the submittals. The inspectors also reviewed the licensee’s corrective action program database to determine if any problems had been identified with the PI data collected or

transmitted for this indicator. None were identified. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications PI for both units for the period from the first quarter 2008 through the fourth quarter 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's control room logs, licensee event reports, and NRC Integrated Inspection Reports for the period of January 1, 2008, through December 31, 2008, 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 two unplanned scrams with complications samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.3 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors verified the Unplanned Transients per 7000 Critical Hours performance indicators for both units. The inspectors reviewed power history data for both operating units for the period from January 1, 2008, through December 31, 2008, to determine the number of power changes greater than 20 percent of full power that occurred, to evaluate each of the power changes against the PI criteria, and to verify the licensee's calculation of critical hours for both units. The inspectors also reviewed the licensee's corrective action program 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 two unplanned transients per 7000 critical hours samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.4 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Radiological Occurrences PI for the period from the first quarter of calendar year 2008 through December 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's assessment of the PI for occupational radiation safety to determine if indicator related data was adequately assessed and reported. To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with radiation protection staff, the scope and breadth of its data review, and the results of those reviews. The inspectors independently reviewed electronic dosimetry dose rate and accumulated dose alarm and dose reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. The inspectors also conducted walkdowns of numerous locked high and very high radiation area entrances to determine the adequacy of the controls in place for these areas. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one occupational radiological occurrences sample as defined in IP 71151-05.

b. Findings

No findings of significance 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. Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: the complete and accurate identification of the problem; that timeliness was commensurate with the safety significance; that 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 attached List of Documents Reviewed.

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

b. Findings

No findings of significance were identified.

.2 Daily Corrective Action Program Reviews

a. 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 of significance were identified.

.3 Selected Issue Follow-Up Inspection: Apparent Cause Evaluation for Cutting Energized Control Air Line

a. Scope

The inspectors reviewed apparent cause evaluation, AR 00844022, which was completed after workers cut into a pressurized control air line while attempting to remove interferences associated with the Unit 1 turbine repair project. The inspectors reviewed the licensee's work control process; reviewed the corrective actions taken; and, interviewed selected plant personnel to gain a better understanding of the details surrounding the problem and the effectiveness of lessons learned that were communicated to the site.

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

b. Findings

Introduction:

One self-revealing finding of very low safety significance (Green) was identified for the failure to follow the work control process while executing a work order associated with the Unit 1 turbine repair project. Specifically, failure to follow established processes resulted in workers cutting into a pressurized control air system line.

Description:

On January 2, 2009, with Unit 1 in cold shutdown, workers identified three pressure instruments, ¼ inch control air lines, and associated structures as potential interferences to an upcoming lift on the low pressure turbine "A" lower exhaust hood, to support the Unit 1 turbine repair project. However, the work package to remove the interferences did not include the air lines. Consequently, while performing the work on January 3, all the interferences were removed except the air lines. Therefore, a work planner developed an additional work package to remove the air lines.

The work planner and craft supervisor performed a pre-job walkdown to assess the proposed work and incorrectly determined that the additional work to remove the air lines was not a change in work scope. This incorrect determination contributed to the failure to identify that the work was not within the clearance boundary established to remove the other interferences and the failure to notify operations as required by PMP-2291-PLN-001, Work Control Activity Planning Process, for a change in work scope. Consequently, operations personnel were not aware of the work and therefore did not verify the cut location prior to the work as required by PMP-2110-CPS-001, Clearance Permit System, Attachment 5, Preparations for Cutting into Piping Systems. As a result, when the control air lines were cut and removed, the workers noticed air coming from one line, which was pressurized, and the workers immediately notified operations personnel who subsequently isolated the air leak.

The inspectors concluded that the failure to follow the work control process that resulted in workers cutting into an energized system was a licensee performance deficiency that warranted an evaluation in accordance with the significance determination process.

Analysis:

The inspectors reviewed the samples of minor issues in IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," and determined that there were no examples related to this issue. Consistent with the guidance in IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," the inspectors determined that this issue could become a more significant safety concern if left uncorrected and was therefore more than a minor concern. Specifically, the failure to follow the work control process resulted in workers cutting into an energized system, which under different circumstances could adversely affect safety-related systems and personnel safety.

Because Unit 1 was shut down, the inspectors utilized Checklist 4 contained in Attachment 1 of IMC 0609, Appendix G, and Shutdown Operations SDP, and determined that the finding did not require a Phase 2 or Phase 3 analysis because

the plant had appropriately met the safety function guidelines for core heat removal, inventory control, power availability, containment integrity, and reactivity control. The issue did not need a quantitative assessment and screened as Green using Figure 1.

Cross-cutting Aspect:

The inspectors concluded that this finding has a cross-cutting aspect in the area of human performance in work control. Licensee personnel failed to appropriately coordinate work activities by incorporating actions to address the impact of changes to the work scope, which resulted in operations personnel not being notified of the work to cut the control air lines. (IMC 0305 H.3 (b)).

Enforcement: Enforcement action does not apply because the performance deficiency was associated with work on nonsafety-related equipment; therefore no violation of regulatory requirements occurred. The issue was entered into the licensee's corrective action program (AR 00844022). Because this finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as a finding (FIN 05000315/2009002-01; 05000316/2009002-01).

.4 Selected Issue Follow-Up Inspection: Corrective Actions for Fire Protection Problems During September 20, 2008, Unit 1 Main Turbine High Vibration Event

a. Scope

The inspectors reviewed selected condition reports to verify that corrective actions had been implemented for fire protection problems identified during the September 20, 2008, turbine failure event. The inspectors also reviewed corrective actions for fire protection related problems note in Inspection Report 05000315/2008009; 05000316/2008009 pertaining to the special inspection conducted for the Unit 1 turbine high vibration event that occurred on September 20, 2008.

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

b. Findings and Observations

(1) Identification of Potential Underground Pipe Interactions

A contributing cause towards the fire protection piping coupling failure experienced during the turbine failure event was the presence of an unidentified pipe resting above fire protection yard loop piping entering the turbine building. The inspectors reviewed the corrective actions documented in AR 00839907, Unidentified Pipe Identified in the Yard West of the Turbine. The corrective actions included use of ground penetrating radar to verify that there were no potential underground piping interactions at other locations where fire protection yard loop piping entered the turbine building. The inspectors did not identify any concerns associated with these corrective actions.

No findings of significance were identified.

(2) Fire Protection System Fill and Vent Procedure

The lack of a fire protection system fill and vent procedure was identified in Inspection Report 05000315/2008009; 05000316/2008009 as a violation having minor safety significance. For corrective actions, the licensee developed procedure 12-FPP-2270-066-031; Fire Protection Water Supply System Fill and Vent. The inspectors reviewed the procedure and did not identify any concerns.

No findings of significance were identified.

(3) Operator Response Procedure Issues

The failure to provide adequate operator response procedures was identified in Inspection Report 05000315/2008009; 05000316/2008009 as a finding having very low safety significance. During the turbine failure event, operator response procedures inadequacies contributed towards operators not recognizing that a break in the fire protection system piping had occurred and the need to monitor fire protection tank water levels.

For corrective actions, the licensee revised procedures 1(2)-OHP-4024-101(201), Annunciator #101(201) Response: Plant Fire System, for the 101(201) annunciator panels in the control rooms to provide guidance to the operators. The guidance was provided for water-based fire suppression systems to inform operators of the number of pumps that were expected to be running and that an abnormal condition existed if more than the expected number of fire pumps were running. However, the licensee did not revise similar annunciator response procedures.

Specifically, Procedures 1(2)-OHP-4024-102(202), Annunciator #102(202) Response: Miscellaneous Areas Fire System, were not revised to reflect improved guidance for the 102(202) annunciator panels in the control rooms. The inspectors noted that if a water-based suppression system annunciator did alarm for the 102(202) panels, at least one fire pump running annunciator would also be expected to alarm on the 101(201) panels. The fire pump running annunciator response procedures did contain the revised guidance concerning the expected number of pumps running. Therefore, the inspectors considered the procedure revisions to provide additional guidance to the operators to recognize abnormal fire pump system conditions to be adequate, if not consistent. The licensee initiated AR 09062059, FP Annunciator Response Procedure Revision, to enter the issue into their corrective action program for further evaluation.

With respect to providing guidance for monitoring level in the fire protection water tanks, the inspectors noted that operator response procedures had not been revised. When this issue was brought to the licensee's attention, the licensee revised 12-OHP-4024-144, Annunciator #144 Response: Fire Protection Pump House 12-FHP, to monitor fire protection water tank levels in response to low level alarms. The omission of such guidance was specifically identified as part of the finding associated with inadequate operator response procedures in Inspection Report 05000315/2008009; 05000316/2008009. Because the in-service fire protection water tank was emptied and a fire pump was damaged due to a break in the fire protection piping during the turbine failure event, the inspectors considered the licensee's failure to incorporate guidance for monitoring fire tank levels into response procedures a performance deficiency.

However, other revised annunciator response procedures would alert operators to abnormal conditions associated with multiple fire pumps running, which would prompt the operators to monitor fire protection water tank levels. For normal design conditions (i.e., no significant pipe breaks in the fire protection system), a single fire protection water tank would provide several hours of water supply and fire protection systems would either be secured or operators would monitor tanks levels prior to a tank being drained. Therefore, the inspectors determined that the performance deficiency was of minor safety significance and did not warrant a documented finding as described in IMC 0612.

No findings of significance were identified.

.5 Selected Issue Follow-Up Inspection: Root Cause for Unit 1 Main Turbine High Vibration Event

a. Inspection Scope

The inspectors selected the following action request for in-depth review:

- Root Cause Analysis Report, Unit 1 Main Turbine Generator Trip, September 20, 2008, Condition Report (CR) 00838932

The inspectors verified the following attributes during their review of the licensee's corrective actions for the above action request and other related action requests:

- complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- consideration of the extent of condition, generic implications, common cause, and previous occurrences;
- evaluation and disposition of operability/reportability issues;
- classification and prioritization of the resolution of the problem, commensurate with safety significance;
- identification of the root and contributing causes of the problem; and
- identification of corrective actions, which were appropriately focused to correct the problem.

The inspectors discussed the corrective actions and associated action request evaluations with licensee personnel and attended corrective action review board meetings on March 11 and 12, 2009. The inspectors noted that while the licensee's and its contractor's (Performance Improvement International (PII)) root cause analyses were complete, the Siemen's (turbine manufacturer) root cause evaluation had not been completed. The inspection verified that along with the corrective actions derived from its root cause analysis, the licensee had included a corrective action to review its root cause analysis against the final Siemen's analysis when available.

For additional information related to this event refer to Section 4OA3.2 of this report.

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

b. Findings

No findings of significance were identified.

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

.1 (Closed) Licensee Event Report (LER) 05000315/2008-001-00 Unit 1 Manual Reactor Trip

The inspectors reviewed the events and circumstances surrounding the February 2, 2008, Unit 1 manual reactor trip. The inspectors reviewed control room logs and the apparent cause evaluation that was documented in AR 00825512, Elevated Vibrations on Main Turbine Bearings 5Y and 6Y, to verify that the event was accurately reported.

On February 2, 2008, the Unit 1 operators initiated a manual reactor trip from 93 percent power in accordance with plant procedures due to elevated bearing vibrations on the main turbine. The licensee's apparent cause evaluation determined that the elevated vibrations were caused by a combination of an unintentional cooldown of the main turbine lube system to low in the operating band, coupled with bearing loading on 5Y and 6Y being light, but within tolerance. The licensee further determined that the unintentional cooldown of the lube oil system was a result of the automatic start of two standby non-essential service water pumps that operated per design, a lake temperature drop, and non-functioning oil temperature control valve requiring manual control of the main turbine lube oil system. The inspectors verified that the reactor trip was uncomplicated, all major components functioned as designed, and that operator actions were appropriate.

This LER is closed

This inspection constitutes 1 sample as defined in IP 71153-05.

.2 (Closed) LER 05000315/2008-006-00 Unit 1 "Manual Reactor Trip due to Main Turbine High Vibration"

The inspectors reviewed the events and circumstances surrounding the September 20, 2008, Unit 1 manual reactor trip. The inspector's initial response and a detailed review of the event are documented in Inspection Reports 05000315/2008004 and 05000315/2008009 (ML 083080369 and ML090260032 respectively). The current review was limited to the root cause analysis and the licensee's corrective action review board actions associated with the root cause analysis. The inspector's reviewed the licensee's root cause analysis titled "Unit 1 Main Turbine Generator Trip September, 20, 2008, Condition Report (CR) 00838732," dated March 9, 2009. In addition the inspector's reviewed the PII equipment root cause analysis titled "D. C. Cook Unit 1 Main Turbine Damage Event, 9/20/08," dated March 10, 2009.

The inspector's noted that the licensee's root cause evaluation served as the mechanism to put the PII analysis in the licensee's format for root cause analyses. The inspector's also noted that the Siemen's (turbine manufacturer) root cause analysis had not been completed at the time of the inspection. The licensee's corrective actions included a line item to compare Siemen's analyses to PII's analysis once the Siemen's report was completed.

The licensee's root cause analysis concluded that turbine high vibration condition and subsequent failure of the D.C. Cook Unit 1 turbine on September 20, 2008, was caused by a blade rotor system design which failed to provide adequate stress margin in at least three L-0 blades. Specifically, the analyses concluded that the # 40 blade on the "B" low pressure rotor had failed due to high cycle fatigue. Following failure of the #40 blade, high rotor vibrations, caused by the mass imbalance when the #40 blade failed, caused two additional blades, which also exhibited high cycle fatigue symptoms, to fail. Two additional blades, that did not show signs of high-cycle fatigue, failed due to overload conditions during the event. Based on reviewing the data presented in the two root cause analyses, the inspectors concluded that the licensee's conclusion was reasonable.

This LER is closed.

This inspection constitutes 1 sample as defined in IP 71153-05.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 13, 2009, the inspectors presented the inspection results to Mr. L. Weber and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- The results of the radioactive material processing and transportation program inspection with Mr. J. Jensen, Chief Nuclear Officer, on January 09, 2009.

- The results of the Identification and Resolution of Problems selected issue follow-up inspection were discussed with Mr. L. Weber, Site Vice-President on March 4, 2009.

- The licensed operator requalification training program annual inspection results with Mr. W. Nichols, Senior Operations Training Instructor, via telephone on March 23, 2009.

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

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

L. Bush, Operations Manager
D. Foster, Environmental General Supervisor
J. Gebbie, Plant Manager
C. Graffenius, Emergency Preparedness Coordinator
R. Hruby, Vice President Site Support Services
J. Jensen, Chief Nuclear Officer
C. Hutchinson, Manager Emergency Preparedness and Site Protective Services
C. Lane, Engineering Programs Manager
Q. Lies, Engineering Director
J. Long, Environmental Specialist
C. Moeller, Radiation Protection Manager
J. Newmiller, Licensing Activities Coordinator
W. Nichols, Senior Operations Training Instructor
J. Nimtz, Licensing Activities Coordinator
P. Schoepf, Manager Nuclear Regulatory Compliance
L. Weber, Site Vice President

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000315/2009002-01 05000316/2009002-01	FIN	Failure to Follow the Work Control Process. (Section 4OA2.3)

Closed

05000315/2008-001-00	LER	Unit 1 Manual Reactor Trip
05000315/2008-006-00	LER	Unit 1 Manual Reactor Trip due to Main Turbine High Vibration
05000315/2009002-01 05000316/2009002-01	FIN	Failure to Follow the Work Control Process (Section 4OA2.3)

LIST OF DOCUMENTS REVIEWED

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

1R01 Adverse Weather Protection

- 12-OHP-4022-057-001, Screen House Forebay Degraded Condition, Revision 6
- 12-OHP-5030-057-001, Screen House Vulnerability Determination, Revision 18

1R04 Equipment Alignment

- 12-OHP-4021-005-001, Boric Acid Transfer System Operation Revision 49, March 10, 2009
- 1-OHP-4021-032-008AB, Operating DG1AB Subsystems, Revision 8
- 2-OHP-4021-009-001, Placing The Containment Spray System in Standby Readiness, Revision 12
- 2-OHP-4021-056-001, Filling and Venting Auxiliary Feedwater System, Revision 23
- AR 00824771, Missing Plug on 2-FPI-254
- AR 00825226, Voluntary Closure of CTS-116
- AR 00829183, PS-1-92057-8 Did Not Match Actual Field Wiring
- AR 00830240, 1-FW-134 Damage Identified
- AR 00836096, 2-FRV-247 Limit Switches Arm Lengths Too Long
- AR 00840067, Evaluate Operation with Multiplexer Test Switch in the A+B
- AR 00841629, Light Pounding Noise and a Little Shaking from Piping
- AR 00842268, 1-CFI-415 is Reading High
- AR 09039010, Portion of Wall Surface in E CTS Pump Room Loosing Wall Covering
- Condition Report P-99-10935, Emergency Diesel Generator
- DB-12-AFWS, Design Basis Document for the Auxiliary Feedwater System, Revision 4
- EC 48564, Unit 2 TDAFP Room Cooler 2-HV-AFP-T1AC Drain Pan and Drain Line Installation, February 29, 2008
- OP-12-5131-45, Flow Diagram CVCS-Boron Make-up Unit 1 and 2, revision 45, January 3, 2008
- OP-2-5106A-54, Flow Diagram Aux Feedwater Unit 2, Revision 54
- OP-2-5144-57, Flow Diagram Containment Spray Unit 2, Revision 57
- OP-2-98210-15, 250 VDC TR “N” Battery Distribution Elementary Diagram, Revision 15
- Safe Shutdown Capability Assessment, Revision 13
- WOT 55321204-2, 2-PP-3W MDAFP PMT Leak Test, September 11, 2008
- WR 06359854, Spare Connection on 2-FPI-254, January 22, 2008

1R05 Fire Protection

- 12-FPP-4030-066-012, Fire Protection Yearly Valve Cycle and Lineup Verification, Revision 6, October 10, 2008
- AR 00844554, 12-FP-264 Did Not Trip During Test
- AR 09013005, Masked Alarms on Fire Protection Systems
- AR 09042019, Fire Hose Reel Station 1-FHC-218 Removal Mod Request
- AR 09059002, Fire Hose Reel 1-FHC-3-V2 is Blocked by Scaffolding
- DWG 12-5980-4, Fire Hazard Analysis Sections D-D, E-E, and F-F Units 1 and 2, Revision 4

- Fire Hazards Analysis, Revision 13
- Fire Pre-Plan, Revision 4

1R06 Flooding

- 1-OHP-4024-124, Annunciator #124 Response: Containment, Revision 7
- AR 00808969, Review of NRC Information Notice 2007-01, Recent Operating Experience for Applicability
- AR 00812793, SD-061206-001 Revision 0 Contains an Error
- CR 05158054, Review of NRC Information Notice 2005-11 for Applicability
- DCC-PV-12-MC17-N, Flood Protection Features, Revision 0
- NRC Information Notice 2007-01, Recent Operating Experience Concerning Hydrostatic Barriers, January 31, 2007
- SD-061206-001, Flooding Evaluation Report, Revision 1
- WO 55294845-01, 12-DLA-700 Clean/Inspect and Functional Check, January 25, 2008

1R11 Licensed Operator Requalification Program

- Annual Operating Examination Crew Simulator Evaluation, C-Shift, March 5, 2009
- Requalification Examination Results/Calendar Year 2009
- RO-O-A082, Respond to a malfunction of the CCW system, Revision 0, March 13, 2009
- RO-O-E107C, Restore Power to EP bus from Supplemental Diesel Generators, Revision 0, March 13, 2009
- RQ-E-ANN-26, Licensed Operator Requalification Annual Operating Examination Simulator, Scenario 26, Revision 0
- RQ-E-ANN-38, Licensed Operator Requalification Annual Operating Examination Simulator, Scenario 38, Revision 0

1R12 Maintenance Effectiveness

- AR 00825512-01, Equipment Apparent Cause Evaluation
- AR 00838732-09, Unit 1 Main Turbine Generator Trip – Maintenance Rule Evaluation
- D. C. Cook Unit 1, Main Turbine Damage Event, 9/20/2008, Equipment Root Cause Analysis
- Drawing 1-3500, 1, 2, 3, 4, and 5, U1 Turbine-Generator Foundation Plan – Masonry
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- UFSAR Change Request (UCR) 1820
- UFSAR Section 2.9.2, Classification of Structures and Equipment
- UFSAR Section 2.9.4, Seismic Design Criteria for Class I, Class II and Class III Structures

- UFSAR Section 2.9.5, General Design Considerations for Building Structures
- UFSAR Section 5.2.2.3, Design Stress Criteria
- Unit 1 Turbine Fault Event, Turbine Building Structural Assessment, Summary Report, October 2008

1R13 Maintenance Risk Assessments and Emergent Work Control

- Control room logs, January 19 – 23, February 9 -13, March 9 – 10, March 17 – 24 and March 28 -31
- DTG-OPS-042, Desk Top Guide, Outage Risk Assessment and Management, Revision 1
- PMP-2291-OLR-001, On-Line Risk Management, Unit 2 Part 1 Configuration Risk Assessment, January 19 – 23, February 9 -13, March 9 – 10, and March 17 – 24
- PMP-4100-SDR-001, Plant Shutdown Safety and Risk Management, Revision 19
- Schedule of daily work activities, January 19 – 23, February 9 -13, March 9 – 10, and March 17 – 24

1R15 Operability Evaluations

- AR 00846104, 2-GFW-L-252 , AFW Piping Support Discrepancies during VT-3 Exam
- AR 00847181, Non-Seismic Scaffold Built Adjacent to TS Equipment
- AR 05080044, West Aux Feed Pump Room Cooler Tubes Plugged
- AR02135035, West Aux Feed Pump Room Cooler Tubes Plugged
- AR05326062, West Aux Feed Pump Room Cooler Tubes Plugged
- AR09014011, Worker Unable to Operate Unit 2 Airlock
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- DC-D-02-CS-08, Piping and Pipe Support Analysis, May 25, 1997
- DWG 2-FW-32, AFW Support Diagram, Revision 12
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- WO 55310077-07, Perform VT-3 Examination on FW Component 2-GFW-L-252

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- 2008-0290-00, 50.59 Evaluation for Units 1 and 2 Auxiliary Missile Block Removal Project, Revision 0
- AR 09058064, Auxiliary Missile Block Project Lessons Learned
- PRA-DOSE-CSSEAH, Radiation Protection for Concrete Shadow Shield for Equipment Access Hatch, Revision 0

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- 1-OHP-4021-032-001CD, DG1CD Operation, Revision 16, January 15, 2009
- 2-OHP-4030-219-022E, East Essential Service Water System Test, Revision 17, January 14, 2009
- AR 00808434, ESW Strainer DP PS Auto Slide Gate Transfer Functional Test
- AR 09013051, 1-HV-ACRA-1 Has High Vibes
- AR 09015076, Jacket Water Surge Tank Float Valve Failed
- AR 09018008, Oil is weeping from the Floor of AB EDG
- AR 09018014, Fuel Oil Leaking From Strainer

- AR 09022003, Inboard Fan Belt Loose
- AR 09048044, 2 Left Bank Turbochargers Failed Inspection
- AR 09040031, No PMT Task Created for Safety Related Repair
- PMP-2291-PMT-001, Work Management Post Maintenance Testing Matrices, Revision 10
- WO 55296043, 2-HV-BD-AES-1 Backdraft Damper, February 5, 2009
- WO 55338415, 2-WMO-714 East Containment Spray Heat Exchanger Outlet Valve, March 23, 2009
- WO 55330550, AES Fan 1 Air Filter Test, February 5, 2009
- WO 55226632-02, PMT Leak Check on 1-SV-204, January 17, 2009
- WO 55233278-04, PMT Leak Check on 1-HV-ACR-1 Following Calibration, January 17, 2009
- WO 55246655, 2-PP-7E, Uncouple, Check Gap, Recouple, January 14, 2009
- WO 55257225-02, Post Maintenance Leak Check, February 18, 2009
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- WO 55259600-01, Replace Cooling Water Temperature Regulator on 12-OME-250-SDG2, February 16, 2009
- WO 55263273-03, PMT for 1-LSO-245, January 15, 2009
- WO 55263274-03, PMT for 1-LSO-246, January 15, 2009
- WO 55297166, 1-DGCD, Adjust Start Fuel Limit Potentiometer, January 15, 2009
- WO 55314827-02, 12-OME-250-SDG1, Post Maintenance Leak Check, February 18, 2009
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- WO 55322563-01, Investigate and Repair 1-QH-407N, January 17, 2009
- WO 55331709, 1-DG-255C, Perform Leak Inspection, January 15, 2009
- WO-55322149-01, 12-OME-250-SDG1 Fill Valve, Disassemble, Clean, Inspect, Reseal, Reassemble, Union, February 16, 2009
- WR 06367448, U2 North CRAC Humidifier Feed Leak

1R22 Surveillance Testing

- 12-EHP-4030-051-256, Main Steam Safety Valve Setpoint Verification With Lift Assist Device, Revision 13, March 24, 2009
- 12-MHP-4030-010-008, Ice Condenser Intermediate Deck Door Weekly Surveillance, February 19, 2009
- 1-IHP-4030-102-010A, Train A Pressurizer Power Operated Relief Valve (PORV) Actuation Channel Operational Test (COT), Revision 3, March 11, 2009
- 1-IHP-4030-102-010B, Train B Pressurizer PORV Actuation COT, Revision 3, March 11, 2009
- 1-OHP-4030-116-020E, East Component Cooling Water Loop Surveillance Test, Revision 9, March 10, 2009
- 1-OHP-4030-119-022FV, ESW Flow Verification Revision 15, March 5, 2009
- 2-OHP-4030-202-016, Reactor Coolant System Leak Rate Test, March 2 - 6, 2009
- 2-OHP-4030-209-007W, Attachment 1, West Containment Spray System Operability and Group B Pump Test, January 30, 2009
- AR 00845948, Leak Rate Spreadsheet Does Not Match Leak Rate Procedures
- AR 08231064, 2-MS- Steam Generator OME-3-2 Safety Valve 2B-2-SV-2B-2
- AR 09029006, Wrong Train Called Out in Procedure for CTS Inoperability
- AR 09033022, Procedure Does not Address Unavailability Time for CTS Pumps
- AR 09048016, 1-PP-10E approaching DP High Action
- AR 09050053, FME Found in U2 Ice Condenser
- AR 09063009, Unit 2 West ESW Pump Discharge Strainer indicates 0 D/P
- AR 09063069, ESW Valve Position Hand Wheel Turn Repeatability Improvement
- AR 09064020, 1-WMO-733 Safety Injection Position as Found Not Correct
- Furmanite Calibration Check Report, March 23, 2009

- TT-04006, QA-4 Trevitest Procedure, Revision 0, March 22, 2009
- WR 06364472, Safety Valve 2-SV-2B-2 Is Leaking By and Overflowing Drain Cup

2PS2 Radioactive Material Processing and Transportation

- 12-THP-6010-RPP-900, Preparation of Radioactive Shipments, Revision 21
- 12-THP-6010-RPP-902, Dewatering of High Integrity Containers, Revision 04
- 12-THP-6010-RPP-903, Activity Determination and Waste Classification, Revision 06
- 12-THP-6010-RPP-905, Solid Waste Handling and Packaging, Revision 11
- 12-THP-6010-RPP-908, Surveys, Inventory and Inspection of Stored Radioactive Waste, Revision 05
- 12-THP-6010-RPP-913, Scaling Factor Determination, Revision 02
- 12-THP-6010-RPP-914, Preparation of Non-Waste Radioactive Equipment, materials, and Empty Packages for Shipment, Revision 05
- 2007 Scaling Factor Determination Report, dated March 2008
- Annual Radioactive Effluent Release Reports for 2006 and 2007, Tables Summarizing Radioactive Material and Waste Shipments, dated March 28, 2007 and March 29, 2008
- AR 00821430, AREVA RVCH Equipment Not Loaded IAW Procedure, dated October 2007
- AR 00838781, Radioactive Shipment Incorrectly Shipped from Vendor, dated September 2008
- AR 00840704, Package received from Offsite vendor Above DOT Limits, dated October 2008
- Clearance Report Greater Than 90 Days, Rad Waste Systems, dated January 2009
- Environmental/Radiation Protection Technician and Staff Training Records, Radioactive Waste and DOT, dated January 2009
- NUPIC Audit 19895, Studsvik Processing Facility Memphis, LLC, dated January 2008
- NUPIC Audit PA-07-18, dated November 2007
- Performance Assurance Audit PA-08-02, Radiation Protection, undated
- PMP-6010-PCP-900, Radioactive Waste Process Control Program, Revision 09
- RWP-072107, U2C17-Reactor Vessel Channel Head Replacement, Revision 00
- Shipment Manifest, Radiological Surveys and Associated Documentation for Shipment ENV-07-024 (U1 Reactor Head), dated June 2007
- Shipment Manifest, Radiological Surveys and Associated Documentation for Shipment ENV-07-049, dated August 2007
- Shipment Manifest, Radiological Surveys and Associated Documentation for Shipment ENV-08-009, dated January 2008
- Shipment Manifest, Radiological Surveys and Associated Documentation for Shipment ENV-08-067 (U2 Reactor Head); dated July 2008
- Shipment Manifest, Radiological Surveys and Associated Documentation for Shipment ENV-08-083; dated September 2008

4OA1 Performance Indicator Verification

- 1-OHP-4022-055-003, Loss of Condensate to Auxiliary Feedwater Pumps, Revision 8
- 1-OHP-4023-ES-0-1, Reactor Trip Response, Revision 25
- 1-OHP-4023-FR-H-1, Response to Loss of Secondary Heatsink, Revision 18
- AR 00800109, NRC Safety System Functional Failure Performance Indicator
- AR 00807276, Data for Reactor Oversight Process not entered by due date
- AR 00810230, Present RCS-01 MPFF to Expert Panel for A1 Consideration
- AR 00830610, Thru Wall Leak on Piping Upstream of 1-NFP-222-V2
- AR 00844459, Declining Trend: Unplanned Scrams ROP Performance Indicator
- D.C. Cook Nuclear Plant Updated Final Safety Analysis Report, Revision 21.2

- Licensee Event Report 315/2008-001-00, Unit 1 Manual Reactor Trip due to Main Turbine Vibrations, April 1, 2008
- Licensee Event Report 315/2008-004-00, Non-Isolable Reactor Coolant System Pressure Boundary Leak, June 23, 2008
- Licensee Event Report 315/2008-006-00, Manual Reactor Trip due to Main Turbine High Vibration, November 13, 2008
- Licensee Event Reports, January 1, 2008 through December 31, 2008
- Nuclear Energy Institute 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 5
- OP-1-98508-14, Steam Generator Logic Diagram, Sheet 3 of 3
- PIG-002, Performance Improvement Group Desktop Guide Administrative Functions of the Performance Improvement Group, Revision 03
- PMP-7110-PIP-001, Regulatory Oversight Program Performance Indicators and Monthly Operating Report Data, Revision 12
- Unit 1 and Unit 2 Control Room Logs, January 1, 2008 through December 31, 2008

1EP6 Drill Evaluation

- AR 09104013, Time Clock Used in Simulator for EAL Declaration was in Error
- Emergency Plan Performance indicator Data Sheet (Simulator), Scenarios RQ-E-ANN-38 and RQ-E-ANN-26, March 5, 2009
- EMD-32a, Michigan State Police, Nuclear Plant Event Notification, March 5, 2009
- PMP-2080-EPP-101, Emergency Classification, Revision 12

4OA2 Problem Identification and Resolution

- 12-FPP-2270-066-031, Fire Protection Water Supply System Fill and Vent, Revision 01
- 12-OHP-4024-144, Annunciator #144 Response: Fire Protection Pump House 12-FHP, Revision 03
- 12-OHP-4024-144, Annunciator #144 Response: Fire Protection Pump House 12-FHP, Revision 04
- 1-OHP-4024-101, Annunciator #101 Response: Plant Fire System, Revision 20
- 1-OHP-4024-102, Annunciator #102 Response: Miscellaneous Areas Fire System, Revision 04
- 2-OHP-4024-201, Annunciator #201 Response: Plant Fire System, Revision 22
- 2-OHP-4024-202, Annunciator #202 Response: Miscellaneous Areas Fire System, Revision 13
- AR 00839907, Unidentified pipe identified in the yard west of the Turbine, October 8, 2008
- AR -00844022, Unit 1 Forced Outage Stop Work Order
- AR 00844957, WMP-001 Procedure Violation Leads to Stop Work Order
- AR 09062059, FP Annunciator Respose Procedure Revision, March 3, 2009
- Case Study For Work On An Un-isolated Control Air Line, Revision 1
- CR 00838930, Separation of Fire Water Header Pipe Coupling Following Turbine Failure
- PMP-2291-PLN-001, Work Control Activity Planning Process, Revision 33
- WO 55331804-82, Condenser Transmitter, Remove Transmitter Piping, January 3, 2009

LIST OF ACRONYMS USED

ADAMS	Agency Documents Access and Management System
AR	Action Request
CAP	Corrective Action Program
CFR	Code of Federal Regulations
IMC	Inspection Manual Chapter
LER	Licensee Event Report
NRC	U.S. Nuclear Regulatory Commission
OpESS	Operating Experience Smart Sample
PARS	Publicly Available Records
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order