April 28, 2005

Mr. M. Nazar
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
NRC INTEGRATED INSPECTION REPORT 05000315/2005002;
05000316/2005002

Dear Mr. Nazar:

On March 31, 2005, the U. S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your D. C. Cook Nuclear Power Plant, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on March 24, 2005, with Mr. J. Jensen 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, three findings of very low safety significance (Green) were identified, all of which involved violations of NRC requirements. However, because of the very low safety significance and because the violations were entered into your corrective action program, the NRC is treating the issues as a Non-Cited Violations in accordance with Section VI.A.1 of the NRC Enforcement Policy.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the D. C. Cook Nuclear Power Plant.

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Sincerely,

/RA/

Robert M. Lerch, Acting Chief
Branch 6
Division of Reactor Projects

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

Enclosure: Inspection Report 05000315/2005002; 05000316/2005002
w/Attachment: Supplemental Information

cc w/encl: J. Jensen, Site Vice President
M. Finissi, Plant Manager
G. White, Michigan Public Service Commission
Michigan Department of Environmental Quality
Emergency Management Division
MI Department of State Police
D. Lochbaum, Union of Concerned Scientists

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-315; 50-316
License Nos:	DPR-58; DPR-74
Report No:	05000315/2005002; 05000316/2005002
Licensee:	Indiana Michigan Power Company
Facility:	D. C. Cook Nuclear Power Plant, Units 1 and 2
Location:	One Cook Place Bridgman, MI 49106
Dates:	January 1 through March 31, 2005
Inspectors:	B. Kemker, Senior Resident Inspector F. Ramirez, Resident Inspector D. Jones, Reactor Engineer R. Ruiz, Reactor Engineer W. Slawinski, Senior Radiation Specialist
Approved by:	Robert M. Lerch, Acting Chief Branch 6 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000315/2005002, IR 05000316/2005002; 01/01/2005-03/31/2005; D. C. Cook Nuclear Power Plant, Units 1 and 2; Problem Identification and Resolution, Event Response.

This report covers a 13-week period of inspection by resident and region-based inspectors. Three Green findings were identified, all of which had an associated Non-Cited Violation (NCV). 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 3, dated July 2000.

A. Inspector-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," associated with a self-revealed event. The licensee failed to perform testing of the Unit 2 West centrifugal charging pump discharge check valve with a procedure that was appropriate to the circumstances. This resulted in operators over-pressurizing the low pressure side of the charging pump and a portion of the pump's suction piping up to and including the isolation valve. The licensee replaced the entire pump and the suction piping up to and including the suction valve and implemented appropriate changes to the test procedure to prevent a recurrence. This finding affected the cross-cutting issue of human performance (personnel).

  The inspectors determined that this finding was more than a minor safety concern because it was associated with the Procedure Quality attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences since the West charging pump was rendered unavailable for an extended period of time to correct the problem. Although this issue affected the availability of the West charging pump, the inspectors concluded that because the East charging pump remained operable and because additional sufficient mitigating capability existed, this issue was of very low safety significance. (Section 4OA2.2.b.1)

Cornerstone: Barrier Integrity

- Green. The inspectors identified a Non-Cited Violation of Technical Specifications (TS) 3.0.4, 3.9.4.c, and 3.9.9 associated with a self-revealed event. The licensee failed to maintain both trains of the Unit 2 containment purge and exhaust isolation valves' automatic isolation function operable during core alterations and commenced core alterations without meeting the applicable TS Limiting Conditions for Operation associated with the automatic isolation function. The licensee restored both trains of the automatic isolation function to an operable status upon discovery and implemented appropriate process controls to prevent a recurrence. This finding affected the cross-cutting issue of human performance (personnel/organization).

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 correctly implement the above TS requirements could reasonably result in a release of radioactivity in the event of a fuel handling accident in the Containment Building prior to identification of the inoperability of the automatic isolation function and manual closure of the valves. Although this issue affected the integrity of the reactor containment during core alterations, the inspectors concluded that because the Unit 2 containment purge and exhaust isolation valves could have been manually closed by operators in the Control Room and because the Containment Building radiation monitors and high radiation alarm function remained operable during this time, this issue was of very low safety significance. (Section 4OA3.1)

C Green. The inspectors identified a Non-Cited Violation of TS 3.0.4, 3.6.1.1, 3.6.1.2, and 3.6.3.1 associated with a self-revealed event. The licensee failed to maintain drain valves between redundant containment isolation valves in the non-essential service water supply and return lines for the Unit 2 containment instrument room east ventilation unit closed as required to meet containment integrity, containment leakage, and containment isolation valve requirements. In addition, the licensee changed operational modes without meeting the applicable TS Limiting Conditions for Operation associated with TS 3.6.1.1 and 3.6.3.1. The licensee restored compliance with the above requirements by closing the inboard containment isolation valves and affected drain valves upon discovery and implemented corrective actions to prevent a recurrence, which included procedure changes to assure continuity of configuration control. This finding affected the cross-cutting issue of human performance (personnel/organization).

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 correctly implement the above TS requirements could reasonably result in a release of radioactivity to the environment in the event of an accident in the Containment Building. Although this issue affected the integrity of the reactor containment, the inspectors concluded that the issue was of very low safety significance because the very small diameter holes in the ventilation unit cooling coils and the small diameter drain lines would be a very small leakage path and would not have a significant impact on the Large Early Release Frequency. (Section 4OA3.2)

B. Licensee Identified Violations

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

REPORT DETAILS

Summary of Plant Status

Unit 1 was operated at or near full power during the inspection period until March 26, 2005, when the licensee conducted a reactor shutdown for the Cycle 20 refueling outage (U1C20). Unit 1 was shut down in Mode 6 (Refueling) at the end of the inspection period.

On January 15, 2005, the licensee received approval of an emergency license amendment to extend the 72-hour allowed outage time of TS 3.5.2 to preclude shutting down Unit 1 until the West charging pump could be restored to an operable status.

Unit 2 was operated at or near full power until January 22, 2005, when the licensee performed a reactor shutdown to troubleshoot and repair a malfunctioning control rod. Following repairs to an electrical cable connector for the control rod and some additional maintenance activities, the licensee performed a reactor startup and synchronized the unit to the grid on January 23, 2005. Unit 2 was operated at or near full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

During post-winterization walkdowns conducted the week of January 24, 2005, the inspectors toured plant areas to monitor the physical condition of cold weather protection features following a period of extended freezing temperatures. The inspectors observed insulation, heat trace circuits, space heater operation, and weatherized enclosures to ensure operability of affected systems. This was considered to be one inspection sample.

The inspectors also reviewed selected condition reports to verify that identified problems associated with cold weather preparation activities were entered into the licensee's corrective action program with the appropriate significance characterization and that corrective actions were appropriate.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial System Walkdowns

a. Inspection Scope

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

- Unit 1 East Component Cooling Water System Train
- Unit 1 West and Unit 2 East Essential Service Water System Trains
- Unit 1 East and West Auxiliary Feedwater System Trains

The inspectors selected these systems based on their risk significance relative to the reactor safety cornerstones. The inspectors reviewed operating procedures, system diagrams, TS requirements, Administrative TSs, 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 were aligned correctly.

In addition, the inspectors verified that equipment alignment problems were entered into the licensee's corrective action program with the appropriate characterization and significance.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed one complete system walkdown of the following risk significant system:

- Unit 2 Auxiliary Feedwater System from January 25, 2005, through March 1, 2005

The inspectors reviewed ongoing system maintenance, open job orders, and design issues for potential effects on the ability of the system to perform its design functions. The inspectors reviewed operating procedures, system diagrams, TS requirements, and applicable sections of the Updated Final Safety Analysis Report (UFSAR) to ensure the correct system lineup. The inspectors verified acceptable material condition of system components, availability of electrical power to system components, and that ancillary equipment or debris did not interfere with system performance.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours

a. Inspection Scope

The inspectors performed ten fire protection walkdowns of the following risk significant plant areas:

- Unit 1 East Main Steam Valve Enclosure (Zone 33)
- Unit 2 East Main Steam Valve Enclosure (Zone 34)
- Unit 1 Essential Service Water Pump Rooms (Zones 29A and B)
- Unit 2 Essential Service Water Pump Rooms (Zones 29C and D)
- Unit 1 and Unit 2 Spent Fuel Pit Heat Exchanger Room (Zone 36)
- Unit 1 Emergency Power System Transformer Room (Zone 42A)
- Unit 2 Emergency Power System Transformer Room (Zone 46A)
- Unit 1 and Unit 2 Valve Gallery Elevation 617 Feet (Zone 37)
- Unit 1 Quadrant 2 Penetration Cable Tunnel Elevation 612 Feet (Zone 38)
- Unit 2 Quadrant 2 Penetration Cable Tunnel Elevation 612 Feet (Zone 39)

The inspectors verified that fire zone conditions were consistent with assumptions in the licensee's Fire Hazards Analysis. The inspectors walked down fire detection and suppression equipment, assessed the material condition of fire fighting equipment, and evaluated the control of transient combustible materials. In addition, the inspectors verified that fire protection related problems were entered into the licensee's corrective action program with the appropriate characterization and significance.

The inspectors also assessed the functionality of the Unit 1 and Unit 2 Control Room cable vault halon systems, specifically verifying the correct piping configuration in the halon fire-extinguishing systems in response to generic concerns described in NRC Information Notice 2005-01, "Halon Fire-extinguishing System Piping Incorrectly Connected," dated February 4, 2005. This was considered to be two additional inspection samples.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors performed one inspection activity related to the licensee's precautions to mitigate the risk from internal flooding events. The following inspection activities were performed:

- The inspectors reviewed the Unit 1 and Unit 2 Flooding Evaluation reports, the UFSAR and other selected design basis documents to identify those areas susceptible to internal flooding.

- The inspectors performed a walkdown of the lower elevations of the Turbine Building and Auxiliary Building to assess the adequacy of watertight doors and verify that drains and sumps were clear of debris and were operable.

- The inspectors reviewed selected operating procedures used to identify and mitigate flooding events and verified that these procedures were adequate.

In addition, the inspectors verified that flood protection related problems were entered into the licensee's corrective action program with the appropriate characterization and significance.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

.1 Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors assessed licensed operator performance and the training evaluators' critique during a licensed operator requalification evaluation in the D. C. Cook plant operations training simulator on February 23, 2005. The inspectors focused on alarm response, command and control of crew activities, communication practices, procedural adherence, and implementation of emergency plan requirements.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Resident Inspector Quarterly Review

a. Inspection Scope

The inspectors evaluated the licensee's handling of selected degraded performance issues involving the following three risk-significant structures, systems, and components (SSCs):

- Unit 1 and Unit 2 Reactor Coolant Pump Seals
- Unit 1 and Unit 2 Boric Acid Transfer Pumps
- Unit 2 Auxiliary Feedwater System Check Valves

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the SSCs. Specifically, the inspectors independently verified the licensee's handling of SSC performance or condition problems in terms of:

- appropriate work practices,
- identifying and addressing common cause failures,
- scoping of SSCs in accordance with 10 CFR 50.65(b),
- characterizing SSC reliability issues,
- tracking SSC unavailability,
- trending key parameters (condition monitoring),
- 10 CFR 50.65(a)(1) or (a)(2) classification and reclassification, and
- appropriateness of performance criteria for SSCs/functions classified (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified (a)(1).

In addition, the inspectors verified that problems associated with the effectiveness of plant maintenance were entered into the licensee's corrective action program with the appropriate characterization and significance.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the following six maintenance and operational activities affecting safety-significant equipment:

- Unit 1 West Charging Pump Failure Emergent Maintenance Activity
- Planned Concurrent Maintenance for the Switchyard, Unit 1 West Charging Pump, and Unit 2 Plant Air Compressor/Control Air Compressor
- Planned Concurrent Maintenance for the Switchyard, Unit 1 East Motor Driven Auxiliary Feedwater Pump, and Unit 2 North Non-Essential Service Water Pump
- Planned Maintenance on Unit 2 Reserve Feed Transformer TR201AB
- Planned Maintenance on the Unit 1 'CD' Emergency Diesel Generator
- Unit 2 East Essential Service Water Pump Discharge Strainer Failure Emergent Maintenance Activity

These activities were selected based on their potential risk significance relative to the reactor safety cornerstones. As applicable for each of the above activities, the inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst and/or shift technical advisor, and verified that plant conditions were consistent with the risk assessment assumptions. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify that risk analysis assumptions were valid and applicable requirements were met.

In addition, the inspectors verified that maintenance risk-related problems were entered into the licensee's corrective action program with the appropriate characterization and significance.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Evolutions (71111.14)

.1 Unit 2 Reactor Shutdown Using Boration

a. Inspection Scope

On January 21, 2005, the licensee shut down Unit 2 to correct a problem with control rod H-8. The control rod would drop down whenever the stationary gripper was

de-energized during a rod bank withdrawal or insertion sequence. The licensee determined that there was an open circuit in the movable gripper circuit for rod H-8; consequently, whenever the control rod received a demand to move in or out, the rod would ratchet down. This unit shutdown was unusual because it was performed without using control rods during the power reduction. A special procedure was prepared to shut down the unit by addition of boric acid to the reactor coolant system in lieu of inserting control rods.

The inspectors reviewed the operational decision making involved with this non-routine evolution, reviewed the special procedure, and observed the operators' preparations in the simulator as well as their performance of the actual shut down.

b. Findings

No findings of significance were identified.

.2 Unit 1 Containment Entry at Power for Oil Addition to Reactor Coolant Pumps

a. Inspection Scope

On January 26, 2005, two teams entered the Unit 1 lower containment with the unit at full power to add oil to the #12 and #14 reactor coolant pump motors. The lower oil pot level alarms had been received in the Control Room and no other oil level indication was available. This had become an emergent activity due to temperature spikes observed on the #12 reactor coolant pump lower radial bearing. Two gallons of oil were added to each of the pump's motors and the low level alarms cleared on the control board.

The inspectors reviewed the operational decision making involved with this non-routine evolution and the licensee's preparations to execute the work. Although the licensee had performed this evolution before in 2002, they had not previously performed oil additions with the unit at full power. Several factors went into the licensee's decision not to reduce power for the containment entry including operating experience from other plants that have made containment entries at full power to add oil to reactor coolant pump motors, concerns with potential impact on a known fuel element failure, and concerns with degraded performance of the #12 reactor coolant pump seal.

b. Findings

No findings of significance were identified.

.3 Operator Response to Loss of Component Cooling Water to the Unit 2 Letdown Heat Exchanger

a. Inspection Scope

On February 9, 2005, the digital controller for temperature control valve 2-CRV-470, that regulates component cooling water flow to letdown heat exchanger, failed. Consequently, operators isolated normal letdown and about 10 minutes later, excess letdown was initiated. The unit experienced a rise in pressurizer level. The operators stabilized the plant and slowly brought pressurizer level back to normal. Ultimately the licensee replaced the controller and restored the normal letdown back to service.

The inspectors evaluated the operational decision-making involved with this non-routine evolution. In addition, the inspectors evaluated the operator's communications during the transient and the operator's application and adherence to the operating procedures.

b. Findings

No findings of significance were identified.

.4 Operator Response to Unit 1 Control Room Instrument Distribution 3 Iso-limiter Transformer Failure

a. Inspection Scope

On February 20, 2005, the Unit 1 Critical Reactor Instrumentation Distribution (CRID) 3 alternate power supply iso-limiter transformer failed. One of three transformers apparently overheated in the iso-limiter cabinet. Operators opened the power supply breaker. The onsite fire brigade responded and extinguished or cooled the transformer with two CO2 extinguishers. Off-site fire response was not required. The fire was extinguished within about 10 minutes. The normal power supply to CRID 3 from the battery bus was always available.

The inspectors reviewed the operators' response to this event. Operators appropriately briefed response actions, including reactor trip response, if the normal CRID 3 power supply were lost.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following six condition reports (CRs) to ensure that either the condition did not render the involved equipment inoperable or result in an unrecognized increase in plant risk, or the licensee appropriately applied TS limitations and appropriately returned the affected equipment to an operable status.

- CR 03028016, "Operating Experience - Effects of Post Loss of Coolant Accident Containment Debris on Emergency Core Cooling System Pumps"
- CR 03363011, "A Concern on the Answer to Significant Operating Event Report 97-01, 'Potential Loss of High Pressure Injection and Charging Capability from Gas Intrusion'"
- CR 04106001, "Operability Evaluation for Pressurizer Power Operated Relief Valve 1-NRV-153" and CR 04125132, "Operability Evaluation for Pressurizer Power Operated Relief Valve 1-NRV-151"
- CR 04306016, "System Response Indicates that the Two Refueling Water Storage Tank Water Sides of the Unit 2 West Containment Spray Heat Exchanger that Are Supposed to Be Separated by a Divider Plate Are Communicating"

- CR 05006005, "2-HV-DGS-3, Diesel Engine 2-AB Panel Cooling Fan Thermal Overloads Tripped"
- CR 04275045, "Large Unattended Pile of Clothing Laying on the Deck Inside the Upper Containment"

In addition, the inspectors verified that problems related to the operability of safety-related plant equipment were entered into the licensee's corrective action program with the appropriate characterization and significance.

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

.1 Review of Selected Operator Workarounds

a. Inspection Scope

The inspectors evaluated the issue listed below as a potential operator workaround (OWA) to identify any potential affect on the functionality of mitigating systems or on the operators' response to initiating events:

- CR 05059044, "The #12 RCP, 1-PP-45-2, Seal Leak-off Flow Is Deteriorating"

The inspectors selected this issue to review as a potential OWA in order to understand the conditions causing the reactor coolant pump seal leak-off flow deterioration and the potential effect on continued plant operations. The inspectors interviewed operating department personnel and reviewed selected procedures and documents.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed five post maintenance testing activities associated with the following scheduled maintenance:

- Unit 2 Essential Service Water Pump Coupling Adjustment
- Unit 1 West Charging Pump Rotating Element Replacement
- Unit 1 Turbine Driven Auxiliary Feedwater Pump Maintenance
- Unit 2 Control Rod H-8 Repair
- Unit 2 Reactor Coolant Loop 4 Flow Instrument 2-NFP-241-L Leak Repair

The inspectors reviewed the scope of the work performed and evaluated the adequacy of the specified post maintenance testing. The inspectors verified that the post maintenance testing was performed in accordance with approved procedures, that the procedures clearly stated acceptance criteria, and that the acceptance criteria were met.

The inspectors interviewed operations, maintenance, and engineering department personnel and reviewed the completed post maintenance testing documentation.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20)

.1 Unit 2 Forced Outage

a. Inspection Scope

On January 22, 2005, the licensee entered a planned forced outage on Unit 2 to troubleshoot and repair a malfunctioning control rod. The licensee entered Mode 3 (Hot Standby) to correct the problem. Following repairs to an electrical cable connector for the control rod and some additional maintenance activities, the licensee performed a reactor startup and synchronized the unit to the grid on January 23, 2005.

The inspectors evaluated the conduct of forced outage activities to assess the control of plant configuration and management of risk. The inspectors reviewed configuration management to verify that the licensee maintained defense-in-depth commensurate with the risk plan and reviewed outage work activities to ensure that correct system lineups were maintained for key mitigating systems. The inspectors interviewed operations, engineering, work control, and maintenance department personnel and reviewed selected procedures and documents.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed the following seven surveillance testing activities and/or reviewed the test results to determine whether risk significant systems and equipment were capable of performing their intended safety function and to verify that testing was conducted in accordance with applicable procedural and TS requirements.

- 12-THP-6020-CHM-102, "Accumulators," Data Sheet 1, "Accumulator Boron Surveillance"
- 12-MHP-4030-010-001, "Ice Condenser Basket Weighing Surveillance"
- 1-OHP-4030-STP-11, "Containment Isolation Valve and Inservice Testing Valve Operability Test," Attachment 5, "Radiation Monitor Valve Test"
- 1-OHP-4030-102-016, "Reactor Coolant System Leak Rate Test"
- 2-IHP-4030-SMP-215, "Steam Generator Level Protection Set I Functional Test and Calibration"
- 2-IHP-4030-STP-523, "Reactor Coolant Pump (4KV) Bus Undervoltage Channel Functional Test and Calibration"

- 12-EHP-4030-046-204, "Unit 1 and Unit 2 Personnel Airlock Leak Rate Surveillance"

The inspectors reviewed the test methodology and test results to verify that equipment performance was consistent with safety analysis and design basis assumptions. In addition, the inspectors verified that surveillance testing problems were being entered into the corrective action program with the appropriate significance characterization.

b. Findings

No findings of significance were identified.

1R23 Temporary Modifications (71111.23)

a. Inspection Scope

The inspectors reviewed one temporary modification and verified that the installation was consistent with design modification documents and that the modification did not adversely impact system operability or availability.

- 1-TM-03-106-R2, "Temporary Installation of Pressurizer Level Controller and Cabling"

The inspectors verified that configuration control of the modification was correct by reviewing design modification documents and confirmed that appropriate post-installation testing was accomplished. The inspectors interviewed engineering, operations and maintenance department personnel and reviewed the design modification documents and 10 CFR 50.59 evaluations against the applicable portions of the TS and UFSAR.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems (71122.01)

.1 Inspection Planning

a. Inspection Scope

The inspectors reviewed the licensee's Offsite Dose Calculation Manual (ODCM) and Annual Radioactive Effluent Release Reports for 2002 and 2003, revised liquid effluent data for 2002 submitted with the 2003 annual report, and selected radioactive effluent release data for 2004. The inspectors also verified that technical and/or 10 CFR 50.59 evaluations were completed for modifications to the ODCM since the last inspection, and that effluent radiation monitor setpoint methodology was changed since completion of those modifications, as warranted. The reports, data, and license evaluations were

reviewed to verify that the radioactive effluent control program was implemented as required by the Radiological Effluent TSs and the ODCM, to verify that public dose limits were not exceeded, and to ensure that any anomalies in effluent release data were adequately understood by the licensee and were properly assessed and reported.

The inspectors reviewed the ODCM to identify the effluent radiation monitoring systems and effluent flow paths including flow measurement devices, and reviewed the description of radioactive waste systems in the UFSAR in preparation for the onsite inspection.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

.2 Onsite Inspection - Walkdown of Effluent Control Systems, System/Program Modifications, and Instrument Calibrations

a. Inspection Scope

The inspectors walked down the major components of the gaseous and liquid release systems (e.g., radiation and flow monitors, demineralizers and filters, tanks, and vessels) to observe current system configuration with respect to the description in the UFSAR, ongoing activities, and to assess equipment material condition.

The inspectors reviewed the technical justification for any changes made by the licensee to the ODCM, as well as to the liquid or gaseous radioactive waste system design, procedures, or operation since the last inspection to determine whether the changes affected the licensee's ability to maintain effluents as-low-as-reasonably-achievable and whether changes made to monitoring instrumentation resulted in non-representative monitoring of effluents.

The inspectors reviewed the most recent records of instrument calibrations for each point-of-discharge effluent radiation monitor and for selected flow measurement devices to determine if they had been calibrated consistent with industry standards and in accordance with station procedures, TSs and the ODCM. Specifically, the inspectors reviewed records of channel calibrations and functional tests for the following effluent radiation detectors and flow measuring devices:

- Unit 1 & 2 Steam Jet Air Ejector Vent Monitors (SRA 1900/2900);
- Unit 1 & 2 Vent Effluent Monitors (VRS 1500/2500) and associated Flow Measuring Devices;
- Unit 1 & 2 Gland Seal Exhaust Monitors (SRA 1800/2800) and associated Flow Measuring Devices;
- Common Unit Liquid Radwaste Effluent Monitor (RRS-1001) and associated Flow Measuring Device;
- Unit 1 & 2 East ®-20) and West ®-28) Essential Service Water Monitors;
- Unit 1 & 2 Steam Generator Blowdown Treatment Monitors ®-24); and
- Unit 1 & 2 Steam Generator Blowdown Monitors ®-19).

The inspectors also reviewed monitor set point methodology and alarm set point values for these monitors to verify their technical adequacy and for compliance with ODCM criteria. Additionally, the inspectors reviewed effluent monitor availability and system health information for 2003 and 2004, and discussed monitor performance and reliability with system engineering staff.

The inspectors reviewed chemistry department quality control data for those instrumentation systems used to quantify effluent releases. Specifically, the inspectors reviewed the most recent efficiency calibration records and lower limit of detection (LLD) determinations for spectroscopy systems used to quantify effluent samples, and the associated quality control records for those instruments.

These reviews represented three inspection samples.

b. Findings

No findings of significance were identified.

.3 Onsite Inspection - Effluent Release Packages, Abnormal Releases, Dose Calculations, and Laboratory Quality Control

a. Inspection Scope

The inspectors selectively reviewed batch liquid effluent release packages and both continuous and batch (containment purge) gaseous effluent data for various periods in 2004 through early January 2005, including results of chemistry sample analyses, the application of vendor laboratory analysis results for difficult to detect nuclides, and the licensee's effluent release procedures and practices. Additionally, the inspectors reviewed the methods for calculating the projected doses to members of the public from these releases. These reviews were performed to verify that the licensee adequately applied analysis results to verify that dose calculations conformed to ODCM methodology and to determine if effluents were released in accordance with the RETS/ODCM and procedural requirements.

The inspectors accompanied two chemistry staff during the weekly replacement and analysis of the particulate and iodine samplers for the Unit 2 vent stack to determine if sampling practices, sampler restoration and analytical techniques were sound and consistent with procedures.

The licensee had not identified any abnormal effluent releases in 2003 or 2004; however, releases had occurred during periods when effluent monitors were inoperable. As a result, the inspectors reviewed the licensee's procedure and practices for compensatory sampling during periods of monitor inoperability to verify compliance with ODCM requirements.

The inspectors reviewed a selection of monthly, quarterly, and annual dose calculations to ensure that the licensee properly calculated the offsite dose from radiological effluent releases and to determine if any annual RETS/ODCM (i.e., Appendix I to 10 CFR Part 50) limits were exceeded.

The inspectors reviewed the results of the quarterly 2003 and 2004 radio-chemistry inter-laboratory cross-check comparisons to verify the quality of radioactive effluent sample analyses performed by the licensee. The inspectors reviewed the licensee's quality control evaluation of any failed inter-laboratory comparison test and the associated corrective actions for any deficiencies identified, as applicable. In addition, the inspectors reviewed the results from the licensee's Performance Assurance (quality assurance) audits and discussed with performance assurance staff its 2005 audit plan to determine whether the licensee met the requirements of the RETS/ODCM and 10 CFR Part 20.

These reviews represented four inspection samples.

b. Findings

No findings of significance were identified.

.4 Air Cleaning System Surveillance Tests

a. Inspection Scope

The inspectors reviewed the most recent test results for both trains of the Unit 1 and Unit 2 Engineered Safety Features (ESF) ventilation system exhaust air filter testing to verify that test methods, frequency, and test results met TSs requirements. Specifically, the inspectors reviewed the test methodology and the results of in-place high efficiency particulate air (HEPA) and charcoal absorber penetration tests, laboratory tests of charcoal absorber methyl iodide penetration, in-place combined HEPA filter and charcoal absorber train pressure drop tests for the ESF system and tests to demonstrate automatic start of the standby fans.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed licensee self-assessments, audits, and Special Reports related to the radioactive effluent treatment and monitoring program since the last inspection to determine if identified problems were entered into the corrective action program for resolution. The inspectors also verified that the licensee's problem identification and resolution program together with its audit and self-assessment program were capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors reviewed corrective action reports related to the radioactive effluent treatment and monitoring program 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; and
- Implementation/consideration of risk significant operational experience feedback.

These reviews represented one inspection sample.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Cornerstone: Public Radiation Safety

.1 Radiation Safety Strategic Area

a. Inspection Scope

The inspectors sampled the licensee's submittals for the performance indicator (PI) listed below for the period indicated. The inspectors used PI definitions and guidance contained in Revision 2 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," to verify the accuracy of the PI data. The following PI was reviewed:

- Radiological Effluent TS/Offsite Dose Calculation Manual Radiological Effluent Occurrence

The inspectors reviewed the licensee's CR database and selected CRs generated in 2003 and 2004, to identify any potential occurrences such as unmonitored, uncontrolled or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent monthly summary data and the results of associated offsite dose calculations for 2004 to determine if indicator results were accurately reported. Additionally, the inspectors discussed with the environmental technical staff its methods for quantifying effluents and determining effluent dose.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As 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 corrective action system at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Some minor issues were entered into the licensee's corrective action system as a result of inspectors' observations but are not discussed in this report.

b. Findings

No findings of significance were identified.

.2 Annual Sample Review

a. Inspection Scope

The inspectors selected the following one issue for in-depth review:

- CR 04276040, "While Performing Centrifugal Charging Pump Check Valve Leak Rate Test, Valve 2-QPI-257-V1 Starting Leaking Water Between Body and Bonnet," October 2, 2004

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

- consideration of the extent of condition, generic implications, common cause and previous occurrences;
- 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 CR evaluations with licensee personnel.

b. Findings

b.1 Charging Pump Suction Header Over-pressurized During Check Valve Testing

Introduction

The inspectors identified a finding of very low safety significance (Green) associated with this self-revealed event. The licensee failed to perform testing of the Unit 2 West centrifugal charging pump discharge check valve with a procedure that was appropriate

to the circumstances. This resulted in operators over-pressurizing the low pressure side of the charging pump and a portion of the pump's suction piping up to and including the isolation valve. The inspectors determined that this issue was a violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and therefore dispositioned this finding as a Non-Cited Violation.

Discussion

On October 2, 2004, operators over-pressurized the low pressure side of the Unit 2 West centrifugal charging pump and a portion of the pump's suction piping up to and including the isolation valve while performing a leak rate test on the pump's discharge check valve. During the test, the West charging pump was removed from service and the East charging pump was operating to supply the high pressure fluid for the test via a common discharge header. The system was aligned in accordance with the test procedure in such a way that the suction side of the pump was isolated from a relief path and became over-pressurized when the check valve leaked. The licensee did not recognize during the work activity risk evaluation performed prior to this test that a failure of the check valve could result in an unrecoverable over-pressurization of the suction side of the pump. Although there was a brief caution note in the test procedure for operators to simultaneously perform steps to close the pump's suction valve and open a vent valve while monitoring pressure to prevent over-pressurizing the suction side of the pump, operators did not fully understand the intent and potential consequences of the caution note. The caution note was not adequately discussed during the pre-job briefing and there was inadequate supervisory involvement with the pre-job briefing and the test evolution. The operator closed the pump's suction valve before opening the vent valve consistent with the sequence of steps in the test procedure. The operator observed a body-to-bonnet leak on the pump's suction pressure gage isolation valve upon closing the pump's suction valve and stopped. The operator then reopened the pump's suction valve and observed the suction pressure gage over-range during the pressure surge due to leakage past the discharge check valve.

At the time of the test, the discharge pressure of the East charging pump was in excess of 2500 pounds per square inch gage (psig). This was significantly higher than the design and hydrostatic test pressures of the low pressure side of the charging pump and suction piping. The charging pump seals were hydrostatically tested to about 1200 psig and the pump suction section was tested to slightly greater than 300 psig. The rated design pressures of the suction piping and suction valve were 145 psig and 150 psig, respectively. The licensee replaced the entire pump assembly and the suction piping up to and including the suction valve because it could not definitively establish an upper bound for the pressure developed during the test sequence when the check valve leaked. Because the suction valve was closed during the pressure transient and the upstream portion of the piping was protected by an installed relief valve, there was no potential for damage to that section of piping due to the over-pressure event.

The inspectors thoroughly examined the licensee's condition evaluation for the event and an apparent cause evaluation performed to assess the human performance issues related to the event. The condition evaluation concluded that the contributing cause was a poorly worded procedure coupled with a potential lack of understanding of the caution note in the procedure and a degraded check valve. The apparent cause evaluation concluded that a non-licensed operator inappropriately performed the test procedure

without fully understanding the intent and potential consequences of actions contained in the caution note. Based on their review of the circumstances surrounding the event, the inspectors concluded that the predominant cause was an inadequate test procedure, which aligned the system in such a way that the suction side of the pump was isolated from a relief path during testing of the check valve. The inspectors also noted that neither evaluation discussed above fully addressed the following contributing causes.

(1) The licensee did not recognize during the work activity risk evaluation performed prior to this test that a failure of the check valve could result in an unrecoverable over-pressurization of the suction side of the pump and therefore considered this to be a "low risk" activity.
(2) The preparation and technical review of the test procedure was inadequate because cognizant engineers allowed the relief path to be isolated and this set up the conditions for over-pressurizing the system when the check valve leaked.
(3) Although the caution note was discussed during the pre-job briefing, the briefing was not adequate because operators did not fully understand the intent and potential consequences in the note.
(4) There was no supervisory involvement with the pre-job briefing. There is a prerequisite step in the test procedure that required the shift manager, unit supervisor, or work control senior reactor operator to participate in a briefing; however, the senior reactor operator received a separate briefing on the test.
(5) There was inadequate field supervisory involvement during the test evolution.

The inspectors reviewed the licensee's corrective actions for the event and concluded that although the actions were generally appropriate to address the causes discussed above, they were limited. The actions included replacement of the entire pump assembly and the suction piping up to and including the suction valve, changes to the test procedure to ensure adequate relief protection for the low pressure portion of the system in case the check valve leaks past its seat, an extent of condition review of other test procedures for conditions that could lead to potential over-pressurization, and operator training. The operator training was limited to "lessons learned" type materials included in an Operations Crew Notification of a Noteworthy Event that was circulated within the operations department and an action to consider possible inclusion of information into the licensed operator re-qualification and initial license training curriculums. There appeared to be no actions to address weaknesses in the work activity risk evaluation process, the cognizant engineering preparation and technical review of the test procedure, and supervisory effectiveness.

The inspectors noted that the licensee's performance assurance (i.e., quality assurance) organization also reviewed the human performance apparent cause evaluation and found that the evaluation was narrowly focused and actions taken in response to the evaluation may not have done enough to reduce the likelihood of a repeat event. Performance assurance concluded that the evaluation did not adequately evaluate the organizational and programmatic failures and did not consider whether the skills and training for operators performing the engineering test procedure were sufficient.

The inspectors concluded that the issues associated with this event were a licensee performance deficiency warranting a significance evaluation. The inspectors also concluded that this finding affected the cross-cutting issue of human performance (personnel).

Analysis

The inspectors assessed this finding using the Significance Determination Process (SDP). The inspectors reviewed the samples of minor issues in NRC Inspection Manual Chapter (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 Disposition Screening," the inspectors determined that this finding was more than a minor safety concern because it was associated with the Procedure Quality attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences because the West charging pump was rendered unavailable for an extended period of time to correct the problem.

Because Unit 2 was in Mode 4 (Hot Shutdown) at the time of this event, the inspectors reviewed the guidance in IMC 0609, "Significance Determination Process," Appendix G, "Shutdown Operations Significance Determination Process," including Checklist 2, "Pressurized Water Reactor Cold Shutdown Operation: Reactor Coolant System Closed and Steam Generators Available for Decay Heat Removal." Based on this guidance, the inspectors concluded that the finding did not require a quantitative assessment. Although this issue affected the availability of the West charging pump, the inspectors concluded that because the East charging pump remained available and additional sufficient mitigating capability existed during the time, this issue was of very low safety significance.

Enforcement

10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Contrary to the above, the licensee failed to provide a procedure that was appropriate to the circumstances for testing the Unit 2 West charging pump discharge check valve (2-CS-299W), which is an activity affecting quality. Specifically, the instructions contained in 2-EHP-4030-203-238, "Centrifugal Charging Pump Check Valves Leak Rate Test," Revision 1, aligned the system in such a way that the suction side of the pump was isolated from an over-pressure relief path during the test. This issue was self-revealed on October 2, 2004, when operators over-pressurized the low pressure side of the charging pump and a portion of the pump's suction piping up to and including the isolation valve when the check valve leaked. Because of the very low safety significance, this violation is being treated as a Non-Cited Violation consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000316/2005002-01). The licensee entered this violation into its corrective action program as CR 04276040.

4OA3 Event Response (71153)

.1 Unit 2 Containment Ventilation Isolation Function Rendered Inoperable During Core Alterations

a. Inspection Scope

While investigating an apparent malfunction affecting two charging system valves during the performance of emergency diesel generator load sequencing and engineered safety features surveillance testing on October 9, 2004, and the subsequent unexpected repositioning of these valves on October 10, 2004, the licensee identified that power had been removed from the solid state protection system (SSPS) output bay relays. In addition to creating the problem during testing, this action also disabled the containment ventilation isolation function. The inspectors reviewed the circumstances associated with this event, including the root cause evaluation and corrective actions.

b. Findings

(Closed) Licensee Event Report (LER) 50-316/2004-003-00: "Failure to Comply With Containment Ventilation Operability Requirements Specified in TSs 3.0.4, 3.9.4, and 3.9.9."

Introduction

The inspectors identified a finding of very low safety significance (Green) associated with a self-revealed event. The licensee failed to maintain both trains of the Unit 2 containment purge and exhaust isolation valves' automatic isolation function operable during core alterations and commenced core alterations without meeting the applicable TS Limiting Conditions for Operation associated with the automatic isolation function. This finding was dispositioned as a Non-Cited Violation.

During an extent of condition review for this event, the licensee discovered that two similar historical events occurred on Unit 1 affecting the operability a single train of containment purge and exhaust isolation valves' automatic isolation function. A licensee-identified Non-Cited Violation is documented in Section 4OA7.1 of this report associated with these two events.

Discussion

On October 9, 2004, at 1:30 p.m., an equipment clearance was established for maintenance that opened the power supply breakers to both SSPS train outputs. This disabled the automatic actuation of both trains of the containment ventilation isolation and the manual phase "A" containment isolation functions. At 2:41 p.m. on October 9, 2004, the licensee commenced the movement of fuel from the reactor vessel to the spent fuel pool. At that time, the requirements of TS 3.9.4.c and 3.9.9 which required the automatic containment purge and exhaust isolation valves to be operable during core alterations were not met. In addition, TS 3.0.4 which required Limiting Conditions for Operation to be met for the mode being entered was not met.

The licensee did not recognize that this condition constituted a failure to meet the Limiting Conditions for Operation for TS 3.9.4.c and TS 3.9.9 and failed to comply with

the applicable action requirements to immediately suspend all operations involving core alterations or movement of irradiated fuel in the Containment Building and to close each of the purge and exhaust penetrations providing direct access from the containment atmosphere to the outside atmosphere, respectively. The licensee discovered this non-compliance on October 11, 2004, during its investigation into the unexpected response of two charging system valves during testing. The licensee reported this event as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to control the release of radioactive material in accordance with 10 CFR 50.73(a)(2)(v)(C) and as a condition which was prohibited by the plant's TSs in accordance with 10 CFR 50.73(a)(2)(i)(B). The clearance was lifted and the SSPS output relay power supply breakers were closed, restoring the automatic isolation function to an operable status.

The licensee determined that the root causes for this event were the failure to properly identify and sequence the clearance order into the refueling outage schedule to preclude conflict with other incompatible outage activities and the failure of the clearance issuer to identify the adverse impact of the clearance on the plant. The inspectors concluded that the root cause evaluation was thorough and that corresponding corrective actions appropriately addressed the causes. Specific corrective actions to prevent recurrence related to the direct human performance aspects of the event included:

- modification of the electronic clearance order system to activate and utilize an existing program feature that will identify and provide information regarding the TSs impacted for clearance points contained on clearance orders; and

- establishment of formalized procedure controls for coordination between scheduling, clearance, and work groups to ensure plant impacts from clearances are identified and entered into the schedule with the appropriate logic ties to prevent conflicts or incompatibility of scheduled work.

The licensee subsequently performed an extent of condition evaluation, including a review of clearance orders from 1995 through 2004 looking for similar TS non-compliance issues and discovered that two similar events had occurred on Unit 1. The licensee identified that the Unit 1 containment purge and exhaust isolation valves' automatic isolation function was inoperable during core alterations on May 11, 2002 through May 13, 2002, and on October 26, 2003, through October 30, 2003. On both occasions; however, only one train of the automatic isolation function was rendered inoperable and therefore the safety function was not fully lost.

The inspectors concluded that the issues associated with this event were a licensee performance deficiency warranting a significance evaluation. The inspectors also concluded that this finding affected the cross-cutting issue of human performance (personnel/organization).

Analysis

The inspectors assessed this finding using the SDP. 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 Disposition Screening," the inspectors determined that the failure to comply with TS 3.0.4, 3.9.4.c, and 3.9.9 could become a more significant safety concern if left uncorrected and was therefore more than a minor concern. Specifically, the failure to correctly implement the above TS requirements could reasonably result in a release of radioactivity in the event of a fuel handling accident in the Containment Building prior to identification of the inoperability of the automatic isolation function and manual closure of the valves. Because the finding represented an actual open pathway in the physical integrity of reactor containment during core alterations, the inspectors concluded that this issue was associated with the Barrier Integrity Cornerstone. The inspectors reviewed the guidance in IMC 0609, "Significance Determination Process," Appendix G, "Shutdown Operations Significance Determination Process," including Checklist 4, "Pressurized Water Reactor Refueling Operation - Reactor Coolant System Level Greater Than 23 Feet or Shutdown Operation with Time to Boil > 2 Hours and Inventory in the Pressurizer." Based on this guidance, the TSs for core alterations should be met, if applicable and no specific guidance is provided in the checklist for a finding requiring a quantitative assessment under the "Containment Controls Guidelines". Although this issue affected the integrity of the reactor containment during core alterations, the inspectors concluded that because the Unit 2 containment purge and exhaust isolation valves could have been manually closed by operators in the Control Room and because the Containment Building radiation monitors and high radiation alarm function remained operable during this time, this issue was of very low safety significance.

Enforcement

Unit 2 TS 3.9.4.c, states that each containment penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either: (1) Closed by an isolation valve, blind flange, manual valve, or equivalent, or (2) Be capable of being closed by an operable automatic containment purge and exhaust isolation valve. This requirement is applicable during core alterations or movement of irradiated fuel within the containment. With the above requirement not satisfied, immediately suspend all operations involving core alterations or movement of irradiated fuel in the Containment Building. In addition, TS 3.9.9 states that the containment purge and exhaust isolation system shall be operable during core alterations or movement of irradiated fuel within the containment. With the containment purge and exhaust isolation system inoperable, close each of the purge and exhaust penetrations providing direct access from the containment atmosphere to the outside atmosphere. Contrary to the above, the licensee failed to maintain both trains of the Unit 2 containment purge and exhaust isolation valves' automatic isolation function operable during core alterations on October 9 and 10, 2004. This is a violation of TS 3.9.4.c and TS 3.9.9.

Unit 2 TS 3.0.4 states, in part, that when a Limiting Condition for Operation is not met, entry into an operational mode or other specified condition in the applicability shall only be made when the associated actions to be entered permit continued operation in the operational mode or other specified condition in the applicability for an unlimited period of time. Contrary to the above, at 2:41 p.m. on October 9, 2004, the licensee commenced the movement of fuel from the reactor vessel to the spent fuel pool without satisfying the Limiting Conditions for Operation of TS 3.9.4.c and TS 3.9.9. This is a violation of TS 3.0.4.

Because of the very low safety significance, the licensee's failure to comply with the requirements of TS 3.0.4, TS 3.9.4.c, and TS 3.9.9 is being treated as a Non-Cited Violation consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000316/2005002-02). The licensee entered this violation into its corrective action program as CR 04285009. This LER is closed.

.2 Unit 2 Containment Integrity and Automatic Isolation Function for Non-essential Service Water Supply and Return Lines to Containment Instrument Room East Ventilation Unit Rendered Inoperable

a. Inspection Scope

On November 14, 2004, with Unit 2 in Mode 1 (Power Operation), the licensee identified that drain valves between redundant containment isolation valves in the non-essential service water supply and return lines for the containment instrument room east ventilation unit were open. As a result, TS 3.6.1.1, 3.6.1.2, and 3.6.3.1 requirements for containment integrity, containment leakage and containment isolation valves, respectively, were not met. The inspectors reviewed the circumstances associated with this event, including the root cause evaluation and corrective actions.

b. Findings

(Closed) Licensee Event Report (LER) 50-316/2004-004-00: "Failure to Comply With Containment Integrity Requirements Specified in TSs 3.0.4, 3.6.1.1, 3.6.1.2, and 3.6.3.1."

Introduction

The inspectors identified a finding of very low safety significance (Green) associated with a self-revealed event. The licensee failed to maintain drain valves between redundant containment isolation valves in the non-essential service water supply and return lines for the Unit 2 containment instrument room east ventilation unit closed. As a result, TS 3.6.1.1, 3.6.1.2, and 3.6.3.1 requirements for containment integrity, containment leakage and containment isolation valves, respectively, were not met. In addition, the licensee changed operational modes without meeting the applicable TS Limiting Conditions for Operation associated with TS 3.6.1.1 and 3.6.3.1. This finding was dispositioned as a Non-Cited Violation.

Discussion

On October 29, 2004, with Unit 2 in Mode 5 (Cold Shutdown), an equipment clearance was established for maintenance on the containment instrument room East ventilation unit to repair leaking coiling coils, which drained the non-essential service water supply and return piping to the ventilation unit. On November 6, 2004, operators opened two drain valves between redundant containment isolation valves in the non-essential service water supply and return lines (2-NSW-416-4 and 2-NSW-421-4) to drain the piping after flushing the ventilation unit. These two drain valves had previously been verified sealed closed in preparation for a plant heat-up and operational mode change at the end of the refueling outage. No additional controls were in place to ensure that the drain valves would be re-closed and sealed after the flushing and before raising plant temperature and changing operational modes. At 2:20 p.m. on November 6, 2004,

Unit 2 entered Mode 4 (Hot Shutdown). With the drain valves open, the requirements of TS 3.6.1.1, 3.6.1.2, and 3.6.3.1, for containment integrity, containment leakage, and containment isolation valves, respectively, were not met. The licensee subsequently determined that the combined containment leakage rate would be exceeded at the analyzed containment pressure and that the outboard containment isolation valves were incapable of fulfilling their safety function with the drain valves open. In addition, TS 3.0.4 which required Limiting Conditions for Operation to be met for the mode being entered was not met. Unit 2 ascended from Mode 5 to Mode 1 without the licensee satisfying the requirements of TS 3.6.1.1 and 3.6.3.1 and exceeded 200 degrees Fahrenheit reactor coolant system temperature without the licensee satisfying the requirements of TS 3.6.1.2. The licensee restored compliance with the above requirements by closing the inboard containment isolation valves and the affected drain valves upon discovery.

The licensee discovered this non-compliance on November 14, 2004, during its investigation into a potential leakage path from inside to outside containment because containment pressure had not been vented at the expected frequency. The licensee reported this event as a condition which was prohibited by the plant's TSs in accordance with 10 CFR 50.73(a)(2)(i)(B). The licensee determined that the root causes for this event were the failure to have a comprehensive process in place to provide positive control of containment integrity or containment closure components through all modes of plant operation and inadequate reviews of active clearance orders prior to operational mode changes. Contributing causes included inappropriately changing the refueling outage schedule to allow restoring the equipment clearance after Mode 4 was entered, inadequate follow-up and communications between operators who opened the drain valves and senior reactor operators regarding the need for the valves to be re-closed prior to the mode change, and the use of "no tag" components on equipment clearances which did not provide adequate configuration control of the drain valves. The inspectors concluded that the root cause evaluation was thorough and that corresponding corrective actions appropriately addressed the causes.

The inspectors concluded that the issues associated with this event were a licensee performance deficiency warranting a significance evaluation. The inspectors also concluded that this finding affected the cross-cutting issue of human performance (personnel/organization).

Analysis

The inspectors assessed this finding using the SDP. 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 Disposition Screening," the inspectors determined that the failure to comply with TS 3.0.4, 3.6.1.1, 3.6.1.2, and 3.6.3.1 could become a more significant safety concern if left uncorrected and was therefore more than a minor concern. Specifically, the failure to correctly implement the above TS requirements could reasonably result in a release of radioactivity to the environment in the event of an accident in the Containment Building. Because the finding represented an actual open pathway in the physical integrity of reactor containment, the inspectors concluded that this issue was associated with the Barrier Integrity Cornerstone. The inspectors reviewed the guidance in IMC 0609, "Significance Determination Process," Appendix H,

"Containment Integrity SDP," and determined the finding was a Type "B" finding. Type "B" findings have no impact on the determination of Core Damage Frequency (CDF) and therefore they are not processed through the CDF based SDP. These findings; however, are potentially important to Large Early Release Frequency (LERF) determinations. The inspectors concluded during initial screening of the finding using Table 4.1, "Containment Related SSCs Considered for LERF Implications," that the issue was of very low safety significance because the very small diameter holes in the cooling coils and the small diameter drain lines would be a very small leakage path and would not have a significant impact on LERF.

Enforcement

Unit 2 TS 3.6.1.1, states that primary containment integrity shall be maintained in Modes 1, 2, 3 and 4. With the above requirement not satisfied, restore containment integrity within 1 hour or be in at least Hot Standby within the next 6 hours and in Cold Shutdown within the following 30 hours. In addition, TS 3.6.3.1, states in part, that each containment isolation valve shall be operable in Modes 1, 2, 3 and 4. With the above requirement not satisfied, maintain at least one isolation valve operable in each affected penetration that is open and either restore the inoperable valve(s) to operable status within 4 hours, or isolate the affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or be in at least Hot Standby within the next 6 hours and in Cold Shutdown within the following 30 hours. Contrary to the above, the licensee failed to maintain primary containment integrity and failed to maintain operable containment isolation valves in the non-essential service water supply and return lines for the Unit 2 containment instrument room east ventilation unit (2-WCR-961 and 2-WCR-963) from November 6, 2004, at 2:20 p.m. to November 14, 2004, at 7:23 a.m. This is a violation of TS 3.6.1.1 and TS 3.6.3.1.

Unit 2 TS 3.0.4 states, in part, that when a Limiting Condition for Operation is not met, entry into an operational mode or other specified condition in the applicability shall only be made when the associated actions to be entered permit continued operation in the operational mode or other specified condition in the applicability for an unlimited period of time. Contrary to the above, at 2:20 p.m. on November 6, 2004, Unit 2 entered Mode 4 without satisfying the Limiting Conditions for Operation of TS 3.6.1.1 and TS 3.6.3.1. In addition, from November 7, 2004 to November 9, 2004, Unit 2 ascended from Mode 4 to Mode 1. This is a violation of TS 3.0.4.

Unit 2 TS 3.6.1.2, states in part, that the containment leakage rate shall be limited to a combined leakage rate of #0.60 L_a for all penetrations and valves subject to Type B and C tests when pressurized to P_a. With the measured combined leakage rate for all penetrations and valves subject to Type B and C tests exceeding 0.60 L_a, restore the overall combined leakage rate to #0.60 L_a prior to increasing the reactor coolant system temperature above 200 degrees Fahrenheit. Contrary to the above, at 2:20 p.m. on November 6, 2004, the licensee failed to restore the Unit 2 overall combined leakage rate to #0.60 L_a. prior to increasing Unit 2 reactor coolant system temperature above 200 degrees Fahrenheit. This is a violation of TS 3.6.1.2.

Because of the very low safety significance, the licensee's failure to comply with the requirements of TS 3.0.4, 3.6.1.1, 3.6.1.2, and 3.6.3.1 is being treated as a Non-Cited Violation consistent with Section VI.A of the NRC Enforcement Policy

(NCV 05000316/2005002-03). The licensee entered this violation into its corrective action program as CR 04319004. This LER is closed.

.3 (Closed) LER 50-316/2003-001-01: "Supplemental LER for Unit 2 Shutdown in Accordance With TS 3.8.1.1, A. C. Sources, Action b," Supplement 1. The inspectors reviewed the original LER in NRC Inspection Report 05000315/316/2003006 and concluded that the licensee's failure to assure that corrective actions were taken to preclude repetition of load swings on the Unit 2 CD emergency diesel generator was a finding of very low safety significance and a violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." The licensee submitted Supplement 1 to LER 50-316/2003-001-00 to provide additional information concerning the analysis of the event, the cause, and the corrective actions. The inspectors determined that the information provided in Supplement 1 to LER 50-316/2003-001-00 did not raise any new issues or change the conclusion of the initial review. This LER is closed.

.4 (Closed) LER 50-316/2003-003-01: "Supplemental LER for Unit 2 TS 3.7.1.2 Limiting Condition for Operation Exceeded for Auxiliary Feedwater System," Supplement 1.

(Closed) LER 50-316/2003-003-02: "Supplemental LER for Unit 2 TS 3.7.1.2 Limiting Condition for Operation Exceeded for Auxiliary Feedwater System," Supplement 2.

The inspectors reviewed the original LER in NRC Inspection Report 05000315/316/2003010 and concluded that the licensee's failure to accurately measure, machine and install a replacement coupling during a planned maintenance activity on the Unit 2 West motor driven auxiliary feedwater pump was a finding of very low safety significance. The performance deficiency resulted in the unavailability of the pump significantly beyond the original 18-hour planned maintenance period and the licensee was granted enforcement discretion for TS 3.7.2.1.a to preclude a plant shutdown when the 72-hour allowed outage time was exceeded. The licensee submitted Supplement 1 to LER 50-316/2003-003-00 to provide additional information concerning the analysis of the event, the cause, and the corrective actions. The licensee submitted Supplement 2 to LER 50-316/2003-003-00 to correct information regarding the root cause of the event based on comments provided by the inspectors. The inspectors determined that the information provided in Supplements 1 and 2 to LER 50-316/2003-001-00 did not raise any new issues or change the conclusion of the initial review. These LERs are closed.

.5 (Closed) LER 50-316/2003-002-01: "Supplemental LER for Unit 2 Reactor Trip Due to Instrument Rack 24 Volt Power Supply Failure," Supplement 1. The inspectors reviewed the original LER in NRC Inspection Report 05000315/316/2003006 and concluded that the licensee's failure to take effective corrective actions to address age-related failures of reactor control instrumentation power supplies to prevent repetition of power supply failures was a finding of very low safety significance and a violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." The licensee submitted Supplement 1 to LER 50-316/2003-002-00 to provide additional information concerning the analysis of the event, the cause, and the corrective actions. The inspectors determined that the information provided in Supplement 1 to LER 50-316/2003-002-00 did not raise any new issues or change the conclusion of the initial review. This LER is closed.

4OA4 Cross-Cutting Aspects of Findings

.1 Cross-Reference to Human Performance Findings Documented Elsewhere in the Report

Section 4OA2.2.b.1 of this report describes a finding wherein human performance errors contributed to over-pressurizing the Unit 2 West centrifugal charging pump during check valve leak rate testing (personnel).

Section 4OA3.1 of this report describes a finding wherein human performance errors affected the operability of both trains of the Unit 2 containment purge and exhaust isolation valves' automatic isolation function during core alterations (personnel/organization).

Section 4OA3.2 of this report describes a finding wherein human performance errors contributed to a configuration control event in which the licensee failed to maintain drain valves between redundant containment isolation valves in the non-essential service water supply and return lines for the Unit 2 containment instrument room east ventilation unit closed as required to meet containment integrity, containment leakage, and containment isolation valve requirements (personnel/organization).

4OA6 Meetings

.1 Resident Inspectors' Exit Meeting

The inspectors presented the inspection results to Mr. J. Jensen and other members of licensee management at the conclusion of the inspection on March 24, 2005. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. Proprietary information was examined during this inspection, but is not specifically discussed in this report.

.2 Interim Exit Meeting

Interim exits were conducted for:

- Radiation Protection (RETS/ODCM) inspection with Mr. J. Jensen on January 13, 2005, and a followup telephone conversation with Mr. M. Scarpello and other licensee staff on January 21, 2005.

4OA7 Licensee-Identified Violation

The following violation of very low safety significance was identified by the licensee and was a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a Non-Cited Violation.

.1 Unit 1 TS 3.9.4.c, states that each containment penetration providing direct access from the containment atmosphere to the outside atmosphere shall be either: (1) Closed by an isolation valve, blind flange, manual valve, or equivalent, or (2) Be capable of being closed by an operable automatic containment purge and exhaust isolation valve. This requirement is applicable during core alterations or movement of irradiated fuel within

the containment. With the above requirement not satisfied, immediately suspend all operations involving core alterations or movement of irradiated fuel in the Containment Building. In addition, TS 3.9.9 states that the containment purge and exhaust isolation system shall be operable during core alterations or movement of irradiated fuel within the containment. With the containment purge and exhaust isolation system inoperable, close each of the purge and exhaust penetrations providing direct access from the containment atmosphere to the outside atmosphere. Contrary to the above, the licensee failed to maintain the Unit 1 containment purge and exhaust isolation valves' automatic isolation function operable during core alterations on May 11, 2002 through May 13, 2002 and on October 26, 2003 through October 30, 2003. This is a violation of TS 3.9.4.c and TS 3.9.9. Because of the very low safety significance, this violation is being treated as a Non-Cited Violation consistent with Section VI.A of the NRC Enforcement Policy. This issue was discussed in Section 4OA3.1 of this report. The licensee entered this violation into its corrective program as CR 04303052

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

H. Etheridge, Regulatory Affairs Engineer
D. Fadel, Vice President Engineering
M. Finissi, Plant Manager
D. Foster, Environmental Specialist
J. Gebbie, Engineering Programs Manager
R. Gillespie, Operations Director
J. Jensen, Site Vice President
T. McCool, Operations Senior License Holder
R. Meister, Regulatory Affairs Engineer
M. Nazar, Senior Vice President, Chief Nuclear Officer
M. Scarpello, Compliance Supervisor
R. Serocke, Radiation Protection Manager
S. Simpson, Learning Organization Manager
R. Story, Radiation Protection General Supervisor, Production
T. Summers, Chemistry Superintendent
S. Vasquez, Systems Engineering Manager
J. Waddell, Maintenance Manager
L. Weber, Work Control Manager
J. Zwolinski, Safety Assurance Director

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000316/2005002-01	NCV	Inadequate test procedure for testing the Unit 2 West centrifugal charging pump discharge check valve (Section 4OA2.2.b.1)
05000316/2005002-02	NCV	Unit 2 containment ventilation isolation function rendered inoperable during core alterations (Section 4OA3.1)
05000316/2005002-03	NCV	Unit 2 containment integrity and automatic isolation function for non-essential service water supply and return lines to containment instrument room east ventilation unit rendered inoperable (Section 4OA3.2)

Closed

05000316/2005002-01	NCV	Inadequate test procedure for testing the Unit 2 West centrifugal charging pump discharge check valve (Section 4OA2.2.b.1)
50-316/2004-003-00	LER	Failure to Comply With Containment Ventilation Operability Requirements Specified in TSs 3.0.4, 3.9.4, and 3.9.9 (Section 4OA3.1)
05000316/2005002-02	NCV	Unit 2 containment ventilation isolation function rendered inoperable during core alterations (Section 4OA3.1)
50-316/2004-004-00	LER	Failure to Comply With Containment Integrity Requirements Specified in TSs 3.0.4, 3.6.1.1, 3.6.1.2, and 3.6.3.1 (Section 4OA3.2)
05000316/2005002-03	NCV	Unit 2 containment integrity and automatic isolation function for non-essential service water supply and return lines to containment instrument room east ventilation unit rendered inoperable (Section 4OA3.2)
50-316/2003-001-01	LER	Supplemental LER for Unit 2 Shutdown in Accordance With TS 3.8.1.1, A. C. Sources, Action b," Supplement 1 (Section 4OA3.3)
50-316/2003-003-01	LER	Supplemental LER for Unit 2 TS 3.7.1.2 Limiting Condition for Operation Exceeded for Auxiliary Feedwater System," Supplement 1 (Section 4OA3.4)
50-316/2003-003-02	LER	Supplemental LER for Unit 2 TS 3.7.1.2 Limiting Condition for Operation Exceeded for Auxiliary Feedwater System," Supplement 2 (Section 4OA3.4)

50-316/2003-002-01	LER	Supplemental LER for Unit 2 Reactor Trip Due to Instrument Rack 24 Volt Power Supply Failure (Section 4OA3.5)

Discussed

None

LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection. Inclusion on this list does not imply the NRC inspectors 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 in 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

- CR 04364053, "Herculite Used to Cover 1-HV-MSE-D6 When the Winterization Cover Blew Off Was Not Approved in Accordance with PMP-4030-001-002," December 29, 2004
- CR 04354007, "Unplanned TS Limiting Condition for Operation Action Entry and Unit 1 Secondary Transient Caused by Low Area Temperatures As a Result of a Winterization Cover Blowing Off," December 19, 2004

1R04 Equipment Alignment

- D. C. Cook Units 1 and 2 TSs and Bases
- D. C. Cook Updated Final Safety Analysis Report, Revision 19
- OP-1-5135-41, "Flow Diagram CCW Pumps and CCW Heat Exchangers," Revision 41
- 01-OHP-4021-016-001, "Filling and Venting the Component Cooling Water System," Revision 12
- SD-01600, "Component Cooling Water System," Revision 1
- 01-OHP-4030-STP-017E, "East Motor Driven Auxiliary Feedwater System Test," Lineup Sheet 1, "East MDAFP Valve Lineup," Revision 13
- 01-OHP-4030-STP-017W, "West Motor Driven Auxiliary Feedwater System Test," Lineup Sheet 1, "West MDAFP Valve Lineup," Revision 13
- OP-1-5106A-58, "Flow Diagram Aux-Feedwater Unit 1," Revision 58
- 12-OHP-4021-019-001, "Operation of the Essential Service Water System," Revision 29
- OP-1-5113-84, "Flow Diagram Essential Service Water," Revision 84
- OP-2-5113-75, "Flow Diagram Essential Service Water," Revision 75
- OP-1-5113A-6, "Flow Diagram Essential Service Water," Revision 6
- OP-2-5113A-8, "Flow Diagram Essential Service Water," Revision 8
- SD-05600, "Auxiliary Feedwater System," Revision 2
- OP-2-5106A, "Flow Diagram Aux Feedwater Unit 2," Revision 53
- CR 05034039, "Unit 2 Auxiliary Tour discovered 2-FW-127 TDAFP 2-PP-4 Emergency Leakoff to CST shutoff Valve unsealed, but Open," February 3, 2005
- System Health Report for Auxiliary Feedwater System, 4th Quarter 2004
- CR 04318014, "2-FW-132-3, East Motor Driven Auxiliary Feed Pp 2-PP-3E Supply to S.G. #3 Check Valve, appears to be leaking past the seat," November 13, 2004
- 02-OHP-4021-056-001, "Filling and Venting Auxiliary Feedwater System," Lineup Sheet 1, "Unit 2 Auxiliary Feedwater," Revision 18
- Unit 2 Technical Data Book, Figure 19.8 "Safety Related Throttled Valves," Revision 32
- CR 0000572, "The Non-Safety Grade Condensate Storage Tank (CST) is relied upon to store the preferred and only readily available inventory for the Safety Grade Auxiliary Feedwater (AFW) System to mitigate Design Basis Accidents (DBA)," January 12, 2000

1R05 Fire Protection

- D. C. Cook Fire Hazards Analysis, Units 1 and 2, Revision 10
- D. C. Cook UFSAR, Section 9.8.1, "Fire Protection System", Revision 19
- 12-PPP-4030-066-017, "Inspection of Fire Barrier Penetration Seals," "Penetration Surveillance Inspection," Data Sheet 1, October 18, 2005
- C OP-12-5154A-10, "Flow Diagram Halon Fire Protection Unit 1 & 2," Revision 10
- C OP-12-5154B-7, "Flow Diagram Halon Fire Protection Unit 1 & 2," Revision 7
- C NRC Information Notice 2005-01, "Halon Fire-extinguishing System Piping Incorrectly Connected," February 5, 2005

1R06 Flood Protection Measures

- D. C. Cook Nuclear Plant Updated Final Safety Analysis Report Section 14.4.2.7,
- "Flooding," Revision 19
- Cook PRA Internal Flooding Analysis Notebook, Section 5, "Quantification of Internal Flooding to Core Damage," April 29, 1992
- 02-OHP-4024-218, "Annunciator #218 Response: Main and FPT," Revision 9
- CR 03171057, "Flooding Discovered from Cable Penetrations on East Side of U-2 Condenser Pit while Overboarding Condensate During the U-2 Startup", June 20, 2003
- CR 04196055, "Water Flowing from Electrical Conduit in East Wall of Condenser Pit onto Ventilation Ducting," July 14, 2004
- CR 04361020, "Door Seal Leaks on 1-DR-TUR1000 Turbine Building 579' Elevation Condenser Pit to 569' Sub-Basement Access Passageway Door," December 26, 2004
- CR 04361022, "Door Seal Leaks on 2-DR-TUR1004 Turbine Building 579' Elevation Condenser Pit to 569' Sub-Basement Access Passageway Door," December 26, 2004

1R12 Maintenance Effectiveness

- PMI-5035, "Maintenance Rule Program," Revision 11
- Maintenance Rule Evaluation Desktop Guide, Revision 1
- C Maintenance Rule Scoping Document for Auxiliary Feedwater System, Revision 2
- C Maintenance Rule Scoping Document for Chemical Volume Control System, Revision 2
- C Auxiliary Feedwater System Health Report, 3rd Quarter 2004
- C Job Order 04029059-01, "2-FW-128, Disassemble and Inspect Valve for Leak-by," October 24, 2004
- C Job Order 03351050-01, "2-FW-132-3, Disassemble/Inspect/Repair Check Valve," October 14, 2004
- C Job Order 04217052-01, "1-PP-46-1, Repair Oil Leak at Inboard Bearing," November 18, 2004
- C Job Order 40217052-05, "1-PP-46-1, Rebuild Mechanical Seal," November 29, 2004
- C CR 04318014, "2-FW-132-3, East Motor Driven Auxiliary Feedwater Pump Supply to Steam Generator #3 Check Valve, Appears to Be Leaking Past the Seat," November 13, 2004
- C CR P-00-07258, "Internal Examination of 2-FW-138-1 Identified Problems Which Could Prevent the Valve From Seating Consistently," May 19, 2000
- C CR 03306038, "Improper Clearances of Valve Internals," November 2, 2003
- C CR 03351050, "Auxiliary Feedwater Line to #23 Steam Generator from the East Motor Driven Auxiliary Feedwater Pump Is Warmer than Ambient by Approximately 20 Degrees," December 17, 2003

- C CR 03353056, "Discovered Piping from a Point on the Discharge Side of 2-FW-132-3 and the Auxiliary Feedwater Tie to the Main Feedwater Piping Exceeds the Analyzed Temperature for the L-14 Class Pipe at this Location," December 19, 2003
- C CR 04285022, "During Inspection of 2-FW-132-2, Numerous Deficiencies Were Noted," October 11, 2004
- C CR 04288061, "The Gap Between the Disc Arm and Bushing on Check Valve 2-FW-138-3 Did Not Meet the Minimum Vendor Indicated 0.031 Inches on Both Sides of the Disc Arm," October 14, 2004
- C CR 04288081, "During Inspection of 2-FW-132-3 the Disc Was Found to Over-travel and Make Contact with the Valve Body Due to the Hanger Arm Travel Stop Being Approximately 1/4 Inch Under-sized," October 14, 2004
- C CR 04293001, "2-FW-138-3 Travel Stop on the Disc Arm Was Repaired by Having a Weld Buildup Installed and the Disc Travel Was Not Measured to Confirm It Meets the Vendor's Design Criteria After the Weld Buildup," October 18, 2004
- C CR 04253069, "Number 2 Boric Acid Transfer Pump Differential Pressure Below Action Limit," September 9, 2004
- C CR 04350017, "Delays in Completing Maintenance Activity on 1-PP-46-1 and Maintenance Rework Has Contributed to Using Up 67 Percent of the Chemical an Volume Control System Maintenance Rule Unavailability Hours in One Event," December 15, 2004
- C CR 04324001, "Number 1 Boric Acid Transfer Pump Makes Metallic Ping Sound When Running With an Irregular Repetition," November 19, 2004
- C CR 04228003, "Number 3 Boric Acid Transfer Pump Has a Mechanical Seal Leak," August 15, 2004
- C CR 05034033, "An Equipment Apparent Cause Evaluation Needs to Be Performed by Engineering on CR 04318014," February 3, 2005
- C PMP-5035-MRP-001, "Maintenance Rule Program Administration," Revision 4
- C SD-00201, Reactor Coolant Pump System, Revision 2
- C CR 05059044, "The #12 RCP, 1-PP-45-2, seal leak-off flow is deteriorating. Procedurally, it is not known if dilutions can be performed while operating demineralizers," February 28, 2005

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

- D. C. Cook Units 1 and 2 TSs and Bases
- D. C. Cook Updated Final Safety Analysis Report, Revision 19
- Unit 1 and Unit 2 Control Room Logs, February 2, 2005
- Unit 1 and Unit 2 Control Room Logs, February 10, 2005
- Shift Manager's Logs, January 14, 2005 through January 16, 2005
- PMP-2291- OLR-001, "On-Line Risk Management," Revision 5
- C PMP-2291-OLR-001, "On-Line Risk Management," Data Sheet 1, "Work Schedule Review and Approval Form," Cycle 53, Week 2, January 9 through January 15, 2005
- PMP-2291-WAR-001, "Work Activity Risk Management Process," Revision 1, March 31, 1994
- PMP-2291-WAR-001, "Work Activity Risk Management Process," Revision 2, January 17, 2005
- 12-OHP-5030-057-001, "Screenhouse Vulnerability Determination," April 21, 2004
- OHI-4101, "Operations Aggregate Risk Review Process," Revision 0, April 28, 2004
- OHI-4101-1, "Operations Aggregate Risk Review Process," Revision 0, February 2, 2005
- SD-02000-001, "Systems Descriptions - Non-Essential Service Water," Revision 4

- CR 05039030, "Two High Risk Activities in Unit 1 POD were scheduled with a 2 hour overlap - contrary to PMP-2291", February 8, 2005
- OHI-4101-1, "Operations Aggregate Risk Review Process," Revision 0, February 10, 2005
- C Letter from C. F. Lyon, USNRC to Mano K. Nazar, Indiana and Michigan Power Company, Subject: "Donald C. Cook Nuclear Plant, Unit 1 - Issuance of Emergency Amendment Regarding One-Time Allowed Outage Time Extension for West Centrifugal Charging Pump (TAC NO. MC3377)," January 16, 2005
- C Letter from J. N. Jensen, Indiana and Michigan Power Company to the USNRC, Subject: "Donald C. Cook Nuclear Plant Unit 1 Emergency License Amendment Request for One-Time Extension of Allowed Outage Time for Inoperability of the Unit 1 West Centrifugal Charging Pump," January 15, 2005

1R14 Personnel Performance During Non-Routine Plant Evolutions

- C D. C. Cook Unit 2 TSs and Bases
- D. C. Cook Updated Final Safety Analysis Report, Revision 19
- 2-OHP-SP-254, "Power Reduction Without Control Rod Movement," Revision 0
- PMI-4090, "Criteria For Conducting Infrequently Performed Tests of Evolutions," Revision 7a
- C Infrequently Performed Testing/Evolution Briefing Guide for 1-PP-45-2 and 1-PP-45-4 Oil Addition at Power, January 19, 2005
- C PMP-4010-ODM-001, "Operational Decision Making," Data Sheet 1, "Operational Decision Making Checklist for Reactor Coolant Pump 2 and 4 Lower Oil Pot Low Levels," January 16, 2005
- C Infrequently Performed Testing/Evolution Briefing Guide for Power Reduction Without Control Rod Movement, January 18, 2005
- C 02-OHP-SP-254, "Power Reduction Without Control Rod Movement," Revision 1
- C Job Order 050160001-01, "1-PP-45-2 MTR, Check/Adjust Oil Level," January 25, 2005
- C Job Order 050160018-01, "1-PP-45-4 MTR, Check/Adjust Oil Level," January 25, 2005

1R15 Operability Evaluations

- C D. C. Cook Units 1 and 2 TSs and Bases
- C PMP 7030-OPR-001, "Operability Determinations," Revision 8
- C D. C. Cook Nuclear Plant Updated Final Safety Analysis Report, Revision 18
- C 02-OHP-SP-251, "Draining Unit 2 West CTS Heat Exchanger," Revision 1
- C 02-OHP-4030-209-007W, "West Containment Spray System Test," Revision 9
- C SOD-00900, "Containment Spray and Hydrogen Recombiner System," Revision 1
- CR 04306016, "System Response Indicates that the Two RWST Water Sides of the U-2 West CTS Heat Exchanger that are Supposed to be Separated by a Divider Plate are Communicating," November 01, 2005
- C CR 03363011, "A Concern on the Answer to SOER 97-01, 'Potential Loss of High Pressure Injection and Charging Capability form Gas Intrusion,'" December 29, 2003
- C CR 04336038, "2-RH-152, Identified Gas Pockets in Eight Inch Residual Heat Removal Piping Near Vent," December 1, 2004
- C CR 01074045, "Response to SOER 97-01 Recommendation 2 Was Considered to Be Weak by the Peer Reviewer," March 15, 2001
- C CR 03206013, "Topical Report TR3-24, 'Gas Voids Continue to Impact PWR Safety Related System,'" July 25, 2003

- CR 04275045, "Discovered a Large Unattended Pile of Anti-C Clothing Laying on the Deck in Unit 2 Upper Containment," October 4, 2004
- CR 05006005, "2-HV-DGS-3, Diesel Engine 2-AB Panel Cooling Fan Thermal Overload Tripped," January 6, 2005
- CR 03028016, "Operating Experience - Effects of Post Loss of Coolant Accident Containment Debris on Emergency Core Cooling System Pumps," January 28, 2003
- CR 04106001, "Operability Evaluation for Pressurizer Power Operated Relief Valve 1-NRV-153," March 4, 2005
- CR 04125132, "Operability Evaluation for Pressurizer Power Operated Relief Valve 1-NRV-151," March 4, 2005

1R16 Operator Workarounds

- PMP 4010-OWA-001, "Oversight and Control of Operator Workarounds," Revision 1
- Workaround Review Board Meeting Minutes, August 30, 2004
- Just In Time Training Record, RQ-J-0004, "Deborating Demineralizer Operation," March 7, 2005
- 01-OHP-4021-001-001, "CVCS Demineralizer Operation," Revision 16

1R19 Post Maintenance Testing

- D. C. Cook Updated Final Safety Analysis Report, Revision 19
- 01-OHP-4030-156-017T, "Turbine Driven Auxiliary Feedwater System Test," Revision 0
- Unit 1 Technical Data Book Figure 15.1, "Safety Related Pump Inservice Test Hydraulic Reference," Revision 81
- Unit 1 Technical Data Book Figure 15.2, "Safety Related Pump Inservice Test Vibration Reference," Revision 75
- Unit 1 Technical Data Book Figure 19.1, "Power Operated Valve Stroke Time Limits," Revision 71
- Design Information Transmittal DIT-S-01458-00, "Evaluation of the Replacement of Unit 1 West Centrifugal Charging Pump Rotating Assembly for its Impact on the TS Charging Pump Flow Balance," Revision 0
- Technical Data Book Figure 1-15.1, "Safety Related Pump Inservice Test Hydraulic Reference," Revision 81
- Technical Data Book Figure 1-15.2, "Safety Related Pump Inservice Test Vibration Reference," Revision 75
- CR05054013, "Power Supply Output Voltage Out of Tolerance on 1-TDAFP-OSM-PS," February 23, 2005
- CR05054018, "Need New Scale Ordered to Rescale 1-FPI-253," February 23, 2005
- 01-OHP-4030-STP-052W, "West Centrifugal Charging Pump Operability Test," Revision 13
- 02-OHP-5030-012-001, "Control Rod Testing in Mode 3," Revision 1
- 02-OHP-4030-219-022E, "East Essential Service Water Test", Attachment 8, "East Essential Service Water Pump Performance Data," Revision 4
- Unit 2 Technical Data Book Figure 15.2, "Safety Related Pump Inservice Test Vibration Reference," Revision 59
- Job Order 05013003-20, "1-PP-50W, Post Maintenance Leak Inspection," January 16, 2005
- Job Order 05013003-10, "1-PP-50W, Post Maintenance Pump Run for Operability," January 16, 2005
- Job Order 04336124-10, "2-CRDM-H8, Perform Coil Polarity Testing," January 22, 2005

- Job Order 04336124-11, "2-CRDM-H8, Perform Pre-startup Resistance Checks," January 22, 2005
- Job Order 04336124-02, "2-CRDM-H8, Inspect/Clear/Replace Connector," January 22, 2005

1R20 Refueling and Outage Activities

- D. C. Cook Unit 2 TSs
- D. C. Cook UFSAR, Revision 19

1R22 Surveillance Testing

- D. C. Cook Unit 2 TSs
- Technical Data Book Figure 2-15.1, "Safety Related Pump Inservice Test Hydraulic Reference," Revision 67
- Technical Data Book Figure 2-15.2, "Safety Related Pump Inservice Test Vibration Reference," Revision 56
- 1-OHP-4030-102-016, "Reactor Coolant System Leak Rate Test," Revision 3
- 2-OHP-4030-202-016, "Reactor Coolant System Leak Rate Test," Revision 5
- 2-IHP-4030-SMP-215, "Steam Generator Level Protection Set I Functional Test and Calibration Channel Operational Test and Calibration," Revision 1
- 2-PAC-001, "Reactor Protection Cabinet 1," Sheet 1 of 26
- 12-THP-6020-CHM-102, Data Sheet 1, "ECCS Accumulator Surveillance," Revision 4b
- 1-OHP-4030-STP-011, Attachment 5, "Radiation Monitor Valve Test," Revision 24a
- 2-IHP-4030-STP-523, "Reactor Coolant Pump (4KV) Bus Undervoltage Channel Functional Test and Calibration," Revision 1
- 12-EHP-4030-046-204, "Unit 1 and Unit 2 Personnel Airlock Leak Rate Surveillance," Revision 3

1R23 Temporary Modifications

- 12-EHP-5040-MOD-001, "Temporary Modifications," Revision 11
- PMP-2350-SES-001, "10 CFR 50.59 Reviews," Revision 3
- 1-TM-03-106-R2, "Temporary Installation of Pressurizer Level Controller and Cabling," Revision 2
- Job Order 03330009-01, "1-XL-157, Implement Temporary Modification 1-TM-03-106," November 30, 2003

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

- PMP-6010-OSD-001; Offsite Dose Calculation Manual; Revision 17a
- Annual Radioactive Effluent Release Report for Calendar Years 2002 and 2003; March 27, 2003 and March 24, 2004
- Monthly Dose Calculations and Dose Projections Due to Liquid and Gaseous Effluents for Calendar Year 2004
- 12-THP-6010-RPC-817; Eberline Radiation Monitoring System Mid and High Range Noble Gas Calibration; Revision 1
- 12-THP-6010-RPC-815; Eberline Radiation Monitoring System Particulate and Low Range Noble Gas Calibration; Revision 2
- 12-THP-6020-CHM-308; Effluent Batch Releases; Revision 7
- 12-THP-6020-CHM-322; Vent Stack Gaseous Sampling; Revision 4

- 12-THP-6010-RPI-805; Radiation Monitoring System Setpoints; Revision 19
- Data Sheet 3 of 12-THP-6010-RPI-805; RMS High Alarm Setpoint for Monitors R-19, R-20, R-24, R-28 (dated in various periods of 2001 - 2004)
- Data Sheet 1 and 2 of 12-THP-6010-RPC-810; RMS Channel Restoration Data; Data Sheet 2 of 12 THP-6010-RPC-817 Mid/High Range Noble Gas Calibration Data; and Form RP-8021; Detector Calibration Verification (dated in various periods of 2003 - 2004 for monitors RRS-1001, VRS 1500/2500, SRA 1800/2800, SRA 1900/2900, R-19, R-20, R-24 and R-28 (as applicable))
- 02-IHP-4030-213-028; Steam Jet Air Ejector Monitor Channel Functional Test; December 30, 2004
- 01-IHP-4030-113-018; Unit Vent Effluent Monitor Low/High Range Noble Gas and Sample Flow Channel Functional Test; December 21, 2004
- 02-IHP-4030-213-018; Unit Vent Effluent Monitor Low/High Range Noble Gas and Sample Flow Channel Functional Test; January 3, 2005
- 01-IHP-4030-113-028; Steam Jet Air Ejector Monitor Channel Functional Test; November 19, 2004
- 01/02-IHP-4030-SMP-403; Steam Jet Air Ejector Effluent Flow Functional Test; November 17, 2004 (Unit 1), and December 30, 2004 (Unit 2)
- 01/02-IHP-4030-125/225-001; Steam Generator Blowdown Liquid Process Radiation Monitor Channel Functional Test; October 21, 2004 (Unit 1), and December 16, 2004 (Unit 2)
- 12-IHP-6030-IMP-012; Radiation Monitoring System Calibration Air-Liquid-Gas (Monitor R-19; January 12, 2005, and Monitor R-24; January 11, 2005)
- 01/02-IHP-4030-SMP-301/401; Gland Steam Exhaust Condenser Vent Effluent Flow Functional Test; November 19, 2004 (Unit 1), and November 17, 2004 (Unit 2)
- 12-IHP-4030-STP-405; Liquid Waste Effluent Monitor Surveillance Test; November 11, 2004
- 12-IHP-6030-IMP-040; Waste Liquid Sample and Discharge Flow Radiation Indication Calibration; November 10, 2004
- 01/02-IHP-4030-119/219-002; West Essential Service Water Process Radiation Monitor Channel Functional Test; January 6, 2005 (Unit 1), and December 29, 2004 (Unit 2)
- 01/02-IHP-4030-119/219-001; East Essential Service Water Process Radiation Monitor Channel Functional Test; November 24, 2004 (Unit 1), and September 24, 2004 (Unit 2)
- 01/02-IHP-4030-125/225-002; Steam Generator Blowdown Treatment Process Radiation Monitor Channel Functional Test; October 12, 2004 (Unit 1), and December 16, 2004 (Unit 2)
- 01/02-IHP-4030-STP-091/191; Gland Steam Condenser Vent Monitor Channel Functional Test; dated November 19, 2004 (Unit 1), and November 17, 2004 (Unit 2)
- Efficiency Calibration, LLD Determinations and Quality Control Data for Gamma Spectroscopy Systems No. 2, 3, 4, and 5; dated in various periods of 2004
- Results of Radiochemistry Cross Check Program; Fourth Quarter 2003 - Third Quarter 2004
- 2-HV-AES-1/2; Engineered Safety Feature Ventilation Surveillance; July 2, 2004 (Train 1), and September 9, 2004 (Train 2)
- 1/2-HV-AES-1/2; NCS Corporation Radioiodine Retention/Penetration Test Report; September 21, 2004 (Unit 1, Train 2 and Unit 2, Train 2), January 5, 2005 (Unit 1 Train 1), July 16, 2004 (Unit 2, Train 1)
- Performance Assurance Audit PA-03-07 and PA-04-07; Radiation Protection; March 11, 2003, and March 12, 2004

- Quick Hit Self-Assessment Report; Effluent Inspection Readiness Review; December 17, 2004
- Chemistry Self Assessment; Chemistry Count Room; March 3, 2004
- CR 03111055, "Inaccurate Sample Results Used by Chemistry for Release of Gas Decay Tank," April 21, 2003
- CR 03144002, "Setpoints for Vent Stack Flow Alarms May Have Been Entered Incorrectly," May 24, 2003
- CR 04153026, "One Hour Contingency Sampling Requirement Not Met Due to Rain Water in Sample Lines," May 30, 2004

4OA1 Performance Indicator Verification

- Summary of Monthly Dose Calculations and Dose Projections from Liquid & Gaseous Effluents for 2004

4OA2 Problem Identification and Resolution

C CR 04276040, "While Performing Centrifugal Charging Pump Check Valve Leak Rate Test, Valve 2-QPI-257-V1 Starting Leaking Water Between Body and Bonnet," October 2, 2004
C CR 04293045, "Human Performance Issues Associated With the October 2, 2004 Over-pressurization of the Unit 2 Charging Pump Suction Piping," October 19, 2004
C CR 04277007, "2-QPI-257 Likely Over-ranged During Testing," October 3, 2004
C 2-EHP-4030-203-238, "Centrifugal Charging Pump Check Valves Leak Rate Test," Revisions 1 and 2
C Performance Assurance Field Observation FO-05-A-009, "Human Performance Issues Associated With the October 2, 2004 Over-pressurization of the Unit 2 Charging Pump Suction Piping," January 21, 2005

4OA3 Event Response

C Shift Manager's Logs, November 14, 2004
C Event Notification Worksheet 41111, [No Title], October 11, 2004
C LER 50-316/2004-003-00, "Failure to Comply With Containment Ventilation Operability Requirements Specified in TSs 3.0.4, 3.9.4, and 3.9.9," December 8, 2004
C LER 50-316/2003-001-01, "Supplemental LER for Unit 2 Shutdown in Accordance With TS 3.8.1.1, A. C. Sources, Action b," February 2, 2005
C LER 50-316/2003-003-01, "Supplemental LER for Unit 2 TS 3.7.1.2 Limiting Condition for Operation Exceeded for Auxiliary Feedwater System," June 23, 2004
C LER 50-316/2003-003-02, "Supplemental LER for Unit 2 TS 3.7.1.2 Limiting Condition for Operation Exceeded for Auxiliary Feedwater System," February 2, 2005
C LER 50-316/2004-004-00, "Failure to Comply With Containment Integrity Requirements Specified in TSs 3.0.4, 3.6.1.1, 3.6.1.2, and 3.6.3.1," January 13, 2005
C CR 04319004, "Redundant Containment Integrity Isolation Capability Loss at 2-CPN-73," November 14, 2004
C CR 04285009, "Containment Purge and Exhaust Isolation System Was Unavailable as Required per TS 3.9.9," October 11, 2004

- CR 04222047, "Supplemental LER 50-316/2003-003-01 Contains the Wrong Root Causes for the Event," August 9, 2004
- CR 04285009, "Containment Purge and Exhaust Isolation System Was Unavailable as Required per TS 3.9.9," October 11, 2004
- CR 04303052, "Root Cause Extent of Condition Identifies Previously Unidentified Instances During an Outage of Clearance Impacting Containment Ventilation Isolation During Core Alterations," October 29, 2004
- CR 04285005, "Unexpected Valve Repositioning When Restoring Clearance 2-R-4KVAC-4KVB-1119," October 11, 2004

LIST OF ACRONYMS USED

ADAMS	Agency-wide Documents and Management System
CCW	Component Cooling Water
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CR	Condition Report
CRID	Critical Reactor Instrumentation Distribution
CRDM	Control Rod Drive Mechanism
ECCS	Emergency Core Cooling System
EHP	Engineering Head Procedure
ESF	Engineered Safety Features
HEPA	High Efficiency Particulate Air
IMC	Inspection Manual Chapter
KV	Kilovolt
LERF	Large Early Release Frequency
LER	Licensee Event Report
NRC	Nuclear Regulatory Commission
OA	Other Activities
ODCM	Offsite Dose Calculation Manual
OHP	Operations Head Procedure
OWA	Operator Workaround
PARS	Publically Available Records
PI	Performance Indicator
PMI	Plant Manager's Instruction
PMP	Plant Manager's Procedure
psig	Pounds Per Square Inch Gage
RETS	Radiological Effluent Technical Specifications
SDP	Significance Determination Process
SSCs	Structures, Systems, and Components
SSPS	Solid State Protection System
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report