

December 7, 2000

EA-271

Mr. R. P. Powers  
Senior Vice President  
Nuclear Generation Group  
American Electric Power Company  
500 Circle Drive  
Buchanan, MI 49107-1395

SUBJECT: D. C. COOK NUCLEAR POWER PLANT - NRC INSPECTION  
REPORT 50-315/00-22(DRP); 50-316/00-22(DRP)

Dear Mr. Powers:

On November 11, 2000, the NRC completed an inspection at your D. C. Cook Units 1 and 2 reactor facility. The enclosed report documents the inspection findings which were discussed on November 9, 2000, with you and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules, regulations, and the conditions of your license. The inspectors reviewed selected procedures and records, observations of activities, and interviews with personnel. Specifically, this inspection focused on resident inspection activities.

Based on the results of this inspection the NRC has identified three issues of very low safety significance (two green and one no color). These issues were determined to involve violations of NRC requirements. The first violation involved the failure to implement corrective actions for the Radiation Monitoring System when it did not meet goals established in accordance with Section (a)(1) of the Maintenance Rule. The second violation involved failure to implement TS surveillance requirements for the weighing of ice condenser baskets and was identified during closeout review of Licensee Event Report 1998026. The third violation involved the failure to verify the mechanical isolation for a clearance order which contributed to the inadvertent draining of approximately 1800 - 3000 gallons of water from the reactor cavity.

Because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as Non-cited Violations (NCV) in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these non-cited violations, you should provide a response with a basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region III; and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the D. C. Cook facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

*/RA/*

Geoffrey E. Grant, Director  
Division of Reactor Projects

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

Enclosure: Inspection Report 50-315/00-22(DRP);  
50-316/00-22(DRP)

cc w/encl: A. C. Bakken III, Site Vice President  
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**See Previous Concurrences**

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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: 50-315/00-22(DRP); 50-316/00-22(DRP)

Licensee: American Electric Power Company  
1 Cook Place  
Bridgman, MI 49106

Facility: D. C. Cook Nuclear Generating Plant

Location: 1 Cook Place  
Bridgman, MI 49106

Dates: October 1, 2000 through November 11, 2000

Inspectors: B. L. Bartlett, Senior Resident Inspector  
K. A. Coyne, Resident Inspector  
J. D. Maynen, Resident Inspector  
T. J. Madedo, Region III Inspector

Approved by: A. Vogel, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

# NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

- | <b>Reactor Safety</b>   | <b>Radiation Safety</b>   | <b>Safeguards</b>   |
|---|---|---|
| <ul style="list-style-type: none"><li>● Initiating Events</li><li>● Mitigating Systems</li><li>● Barrier Integrity</li><li>● Emergency Preparedness</li></ul> | <ul style="list-style-type: none"><li>● Occupational</li><li>● Public</li></ul> | <ul style="list-style-type: none"><li>● Physical Protection</li></ul> |

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

## SUMMARY OF FINDINGS

IR 05000315-00-22, IR 05000316-00-22, on 10/01-11/11/2000, Indiana Michigan Power Company, D. C. Cook Nuclear Plant Units 1 & 2. Maintenance rule implementation, event follow-up.

The inspection was conducted by resident inspectors. This inspection identified two GREEN and one NO COLOR issue, all of which involved non-cited violations. The significance of most/all findings are indicated by their color (GREEN, WHITE, YELLOW, RED) using IMC 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "NO COLOR" or by the severity level of the applicable violation.

### **Cornerstone: Mitigating Systems**

- GREEN. A non-cited violation was identified for the failure to implement corrective actions for the Radiation Monitoring System (RMS). The RMS had been previously categorized under 10 CFR 50.65 as a Maintenance Rule (a)(1) system with established performance goals. The licensee failed to implement appropriate corrective actions as required by 10 CFR 50.65 (a)(1) after the RMS failed to meet the established performance goals.

The failure to implement corrective actions for the RMS was significant in that the simultaneous loss of both control rooms' RMS control terminals resulted in the loss of all RMS indication and alarm functions. This issue was determined to be of very low risk significance because the simultaneous RMS control terminal failures did not result in an actual loss of a safety function equipment for greater than 24 hours. (Section 1R12.1)

### **Cross-Cutting Issues: Human Performance**

- NO COLOR. A non-cited violation was identified for the failure to verify the mechanical isolation for a clearance and establish energy control measures to ensure worker safety and equipment protection. Between 1,800 and 3,000 gallons of water from the reactor cavity was inadvertently drained to lower containment. The spill resulted in an unplanned radiation dose to the plant workers assigned to the cleanup.

This issue was determined to be of very low risk significance because the actual worker radiation doses received as a result of this event were minimal and did not affect the licensee's ability to assess dose. The failure to establish an adequate mechanical isolation for the work activity was considered an example of a human performance issue. (Section 4OA.4)

## Report Details

### Summary of Plant Status:

Unit 1 remained defueled throughout the inspection period. Licensee restart efforts were concentrated on the completion of modifications and corrective maintenance required to support Unit 1 restart. Major accomplishments during this inspection period included completion of ice loading in the primary containment building, the second "A" Train electrical maintenance outage, open vessel testing, essential service water flow balancing, and completion of component cooling water flow balancing.

Unit 2 operated at or near full power during the inspection period with short duration power level changes for surveillance testing or other operational needs.

## **1. REACTOR SAFETY**

### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors reviewed the implementation of the licensee's winterization program in preparation for the cold weather season. The inspectors walked down the greenhouse area of the plant, which houses the essential service water (ESW) system pumps, and the main steam valve enclosures, which house the main steam isolation valves and the main steam safety valves. The inspectors verified that the design features and implementation of the licensee's procedures protected these systems and components from cold weather effects. The inspectors also reviewed a selection of previous condition reports (CRs) regarding winterization to verify that the conditions were properly addressed.

- 12-IHP [Instrument Head Procedure] 5040.EMP.004, "Plant Winterization and De-Winterization," Revision 0
- Maintenance Self-Assessment SA-2000-003-MNT, "Winterization/Summerization"
- Temporary Modification (TM) 12-TM-00-61-R0, "Winterization/De-winterization TM to Support 12 IHP 5040.EMP.004"
- CR 99-1516, It appears the plant does not have adequate winterization policies or procedures to prevent outside tank vents or bladders from freezing and causing equipment problems
- CR 99-5872, Cook does not have a winterization program in place to prepare the plant for winter
- CR 99-13993, Assessment of maintenance programs has identified the need for a winterization program
- CR 99-24020, Condition reports associated with cold weather and winterization are not being addressed in a timely manner

- CR 99-27050, Winterization program walkdowns revealed many air intrusion issues and other discrepancies which may cause problems this winter
- CR 99-27671, There are still several deficiencies to plant winterization that may cause systems to freeze
- CR 99-28182, Conduct self-assessment SA-2000-MNT-003

b. Issues and Findings

There were no findings identified and documented during this inspection.

1R04 Equipment Alignment

.1 Partial Walkdown of Unit 2 Containment Isolation Valves

a. Inspection Scope

The inspectors walked down portions of the containment isolation system. During the walkdown, the inspectors verified that the position of valves affecting containment integrity were consistent with procedural requirements. The inspectors also assessed the general material condition of containment isolation valves. The inspectors reviewed the following documents during this review:

- 02-OHP [Operations Head Procedure] 4030.STP.010, "Containment Isolation," Revision 9
- Plant Managers Procedure (PMP) 4043.SLV.001, "Sealed/Locked Valves," Revision 2
- Engineering Specification DCC NEMP-306-QCN, "Containment Isolation System Licensing/Design Basis Requirements," Revision 1

b. Issues and Findings

No findings of significance were identified.

.2 Partial Walkdown of Unit 2 Component Cooling Water System

a. Inspection Scope

The inspectors performed a partial walkdown of the Unit 2 Component Cooling Water (CCW) system. The inspectors compared the operating status and configuration of the CCW system to the applicable operating procedures, the system valve lineup, and applicable flow diagrams. As part of this inspection, the inspectors reviewed the following documents:

- Flow Diagram OP-2-5135, Component Cooling, Unit 2
- 02-OHP 4021.016.003, "Operation of the Component Cooling Water System During System Startup and Power Operation," Revision 12
- Unit 1 Technical Data Book, Figure 1-19.8, "Safety Related Throttle Valves," Revision 12



- Unit 2 Technical Data Book, Figure 2-19.8, "Safety Related Throttle Valves," Revision 17

b. Issues and Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors performed fire protection walkdowns of the following risk-significant plant areas: the Unit 2 West ESW pump room, the Unit 2 plant and control air compressors, and both units' engineered safeguards ventilation (AES) filter units. The inspectors verified that fire zone conditions were consistent with assumptions in the licensee's fire hazard analysis. The inspectors walked down fire detection and suppression equipment, assessed the material condition of fire control equipment, and evaluated the control of transient combustible materials. The following documents were reviewed during this inspection:

- PMP-2270.CCM.001, "Control of Combustible Materials," Revision 0
- PMP-2270.FIRE.002, "Responsibilities for Cook Plant Fire Protection Program Document Updates," Revision 0
- PMP-2270.WBG.001, "Welding, Burning and Grinding Activities," Revision 0
- Plant Managers Instruction (PMI) 2270, "Fire Protection," Revision 26
- Updated Final Safety Analysis Report (UFSAR) Section 9.8.1, "Fire Protection System"
- D. C. Cook Nuclear Plant Fire Hazards Analysis, Units No. 1 and 2, Revision 8
- D. C. Cook Fire Protection Program Manual, Section 7.6, "Fire Zones 29C, 29D and 29F Unit 2 Essential Service Water Pumps and Motor Control Centers"
- D. C. Cook Nuclear Plant Units 1 and 2 Probabilistic Risk Assessment, Fire Analysis Notebook, February 1995
- CR 002410023, Fire suppression piping static pressure indicated greater than normal system operating pressure

b. Issues and Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

.1 Maintenance Rule Implementation for the Radiation Monitoring System

a. Inspection Scope

The inspectors reviewed the licensee's implementation of 10 CFR 50.65 (the Maintenance Rule) requirements for the radiation monitoring system (RMS). In NRC Inspection Report 50-315-00-20, 50-316-00-20; the NRC identified several non-cited violations associated with the licensee's implementation of Maintenance Rule

requirements. Specifically, the inspectors identified issues associated with identification of maintenance preventable functional failures, monitoring of system unavailability, and scoping of emergency operating procedure functions. The licensee's corrective actions for these issues were still in progress at the time of this inspection.

The inspectors reviewed the licensee's activities to resolve known RMS performance problems. The licensee had identified three major functions of the RMS: (1) provide operators warning of conditions which might lead to a radiation hazard or plant damage, (2) provide automatic actuation signals for certain plant equipment (e.g., isolation of containment purge), and (3) monitor and record plant effluents. The RMS had been previously classified as a Maintenance Rule (a)(1) system due to failure to meet performance criteria. The inspectors reviewed two performance problems; repeated failures of the control room RMS control terminals and plugging of the ESW discharge radiation monitors sample lines. The inspectors reviewed the following documents during this inspection:

- Regulatory Guide 1.160, Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 2
- PMP 4010.OWA.001, "Oversight and Control of Operator Workarounds," Revision 1
- NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2
- Engineering Action Plan 00-512, "Radiation Monitoring"
- Maintenance Rule Expert Panel Meeting No. EP 00-16 Minutes, dated October 21, 2000
- Job Order (JO) C55672, Investigate/Repair cause of failed ESW radiation monitor 1-WRA-4501
- JO C56519, Investigate/Repair ESW radiation monitor 2-WRA-4501
- CR 96-0550, The RMS for both units has experienced repeated maintenance preventable functional failures
- CR 99-6825, There has been a multitude of control terminal (CT) lock-ups for the Eberline RMS Control panels located in the control room of each unit
- CR 99-23108, The Maintenance Rule expert panel determined the RMS should be statused as (a)(1) based on a historical review of the system
- CR 99-19153, Trend condition report to determine the availability of the RMS control terminals
- CR 00-7225, Repetitive Maintenance Preventible Functional Failure of the RMS control terminals identified
- CR 00-7548, Repetitive Maintenance Preventible Functional Failure of the RMS control terminals identified following lock-up of both units
- CR 99-29768, ESW radiation monitors found plugged with mud and silt
- CR 00-5677, A maintenance preventable functional failure was identified due to ESW radiation monitors plugging with sand
- CR 00-5837, Evaluate change to preventative maintenance program for ESW radiation monitor to periodically flush ESW sample lines

b. Issues and Findings

The RMS control terminals (RMS-CTs) provided control room operators with indication and alarm functions for the RMS. Because field radiation monitoring instruments communicate with both the Unit 1 and Unit 2 RMS-CTs, failure of a single RMS-CT would not necessarily result in a loss of RMS indication and alarm functions. Consequently, the licensee defined a functional failure of the RMS-CTs to be a simultaneous failure of the RMS-CT units in both control rooms, which would result in the loss of control room RMS indication and alarm functions. Condition Report 96-0550, initiated in April 1996, documented that an adverse trend in RMS performance was identified and, at that time, the system was dispositioned to monitoring under the requirements of Maintenance Rule paragraph 10 CFR 50.65(a)(1). The RMS-CT monitoring goals established in CR 96-0550 specified that no personnel-induced failures of the RMS-CT units would occur such that the alarm function was lost. The RMS has remained in a Maintenance Rule (a)(1) status since 1996.

In March 1999, the licensee wrote CR 99-6825, to document that the number of RMS control terminal failures that had continued to occur could impact the reliability of the RMS system. The licensee's investigation for CR 99-6825 indicated that limited memory storage capability of the CTs would result in CT failure under certain circumstances. The CR evaluation further noted that the corrective actions taken as a result of CR 96-0550 had not resolved RMS performance problems. Three corrective actions were identified in CR 99-6825: (1) monitor the performance of the RMS, (2) investigate the possibility of performing routine maintenance to clear the RMS-CT memory buffer, and (3) investigate replacing the RMS-CTs.

RMS Performance Monitoring

In accordance with this first corrective action in CR 99-6825, the licensee modified the previously established RMS performance goal to less than or equal to 50 functional failures per system (not to exceed four functional failures per monitor) per 24 months. CR 99-23108 (initiated September 16, 1999) reconfirmed that the RMS should be categorized as Maintenance Rule (a)(1) based on an Expert Panel review of historical RMS performance data. CR 99-23108 also noted that performance of the RMS-CT units exceeded the reliability goal specified in CR 99-6825. The inspectors reviewed the recent performance history of the RMS-CTs and determined that the number of RMS-CT failures that had occurred exceeded this performance goal. During a review of the RMS performance, the inspectors identified the following failures:

- CR 99-19153, Request trending to track problems with the radiation monitoring control terminals. The condition evaluation for this CR, which was approved in March 2000, stated that there had been 127 failures of the Unit 1, Unit 2, or both CTs since 1992 (July 21, 1999)
- CR 00-5992, The Unit 1 and Unit 2 RMS-CTs failed (April 24, 2000)
- CR 00-7225, The Unit 1 and Unit 2 RMS-CTs failed due to communication error. The licensee determined that this occurrence was a repetitive maintenance preventable functional failure (May 18, 2000)

- CR 00-7548, The Unit 1 and Unit 2 RMS-CTs failed while attempting to defeat radiation monitor alarm. The licensee determined that this occurrence was a second repetitive maintenance preventable functional failure (May 25, 2000)
- CR 00-9095, The Unit 1 and Unit 2 RMS-CTs failed coincident with a paper jam in the Unit 1 CT printer. The licensee had previously determined that printer failures could result in filling of the memory buffer and lockup of the CT unit (June 23, 2000)
- CR 00-9332, The Unit 1 and Unit 2 RMS-CTs failed while an operator attempted to change parameter files (June 28, 2000)
- CR 00277011, The Unit 1 and Unit 2 RMS-CT units failed while attempting to place ESW radiation monitor in service (September 27, 2000)
- CR 00284009, The Unit 1 and Unit 2 CTs failed during an unsuccessful attempt to reset the 1-RMS-CT (October 9, 2000)
- CR 00285090, The Unit 1 and Unit 2 RMS-CT units failed during preparations for liquid release (October 11, 2000)
- CR 00311058, The Unit 1 and 2 RMS-CTs failed during work on Unit 1 containment radiation monitor (November 6, 2000)

#### Investigation of Routine Preventive Maintenance

The inspectors reviewed the status of the corrective actions from CR 99-6825 and determined that, as of November 9, 2000, actions to investigate performance of routine preventative maintenance to clear the RMS-CT memory buffer had not been completed. Additionally, the licensee had not made other reasonable changes to the preventative maintenance program to address RMS performance problems.

#### Investigation of Replacing Radiation Monitoring System Control Terminals

The licensee's corrective actions for the RMS-CT failures, originally specified in CR 96-0550, included a long term plan to replace the RMS-CT units in 1997 under DCP-0037. As of November, 2000, this design change had not been completed. However, the corrective actions to investigate the replacement of the RMS-CT units with an improved design continued to be tracked under action 3 of CR 99-6825. As documented in CR 00-9095, the licensee had deferred RMS-CT replacement until after the Unit 1 restart. This decision was based, in part, on the existence of a procedure for resetting the RMS-CT after a failure.

#### Conclusions

The inspectors concluded that the licensee had not taken timely and reasonable corrective actions for RMS-CT performance problems. The RMS-CT continued to experience failures resulting in loss of RMS alarm and indication functions and control room operator distraction.

10 CFR 50.65 (a)(1), requires, in part, that the holders of an operating license shall monitor the performance or condition of structures, systems, or components (SSCs) within the scope of the rule as defined by 10 CFR 50.65 (b), against licensee-established goals, in a manner sufficient to provide reasonable assurance that such structures, systems, and components, are capable of fulfilling their intended functions.

Such goals shall be established commensurate with safety. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken. Contrary to the above, from September 1999, the licensee did not take appropriate corrective actions when the performance of the RMS-CT units did not meet licensee established goals. Specifically, the licensee determined on September 16, 1999, that the RMS-CT performance did not meet established reliability goals and no changes were made to the preventive maintenance program for the RMS-CT units. The inspectors also reviewed the licensee's implementation of corrective actions for CR 99-6825 and associated condition reports. The inspectors determined that the licensee had not fully implemented the specified corrective actions for the RMS-CT units. The inspectors concluded that the licensee's failure to implement appropriate corrective actions to restore the RMS-CT performance to within the established goals was a **Non-Cited Violation (50-315/00-22-01; 50-316/00-22-01)** of 10 CFR 50.65 (a)(1). This violation is in the licensee's corrective action system as CR 00326097. The failure to implement appropriate corrective actions had a credible impact on safety because a simultaneous failure of the RMS-CT units in both control rooms resulted in the loss of all control room RMS indication and alarm functions. Because RMS indication and alarms provided operators with information concerning the status of functionality of mitigating systems, the inspectors determined that this failure impacted the mitigating systems cornerstone. This issue was screened as GREEN (very low safety significance) after a Phase 1 Significance Determination Process review because none of the individual simultaneous RMS-CT failures resulted in an actual loss of a safety function of equipment for greater than 24 hours.

On September 6, 2000, the licensee initiated Engineering Action Plan 00-512 for RMS to address poor RMS system performance. This action plan identified a number of potential corrective actions for the RMS-CT units, including hardware and software upgrades. The licensee met a vendor representative in October 2000 to obtain additional recommendations for potential corrective actions. Although the licensee had not implemented hardware, software, or preventative maintenance program changes, the inspectors concluded that the licensee's planned corrective actions appeared reasonable.

1R13 Maintenance Risk Assessments and Emergent Work Control

.1 Risk Assessment for Dual Unit 1 Essential Service Water Pump Outage

a. Inspection Scope

On October 23, 2000, the licensee removed both Unit 1 ESW pumps from service to support periodic screen house cleaning. The inspectors reviewed the licensee's risk assessment performed to support this maintenance activity. The loss of the Unit 1 ESW system impacted Unit 2 operating risk because the Unit 1 ESW pumps provided Appendix R safe shutdown backup capability for Unit 2 in addition to supporting spent fuel pool cooling. The inspectors also performed equipment alignment and general material condition walkdowns of risk significant areas to verify that the licensee was

appropriately controlling risk during the ESW outage. The inspectors reviewed the following documents during this inspection:

- JO R88138, Unit 1 screen house diving, cleaning and repairs
- Unit 2 T-1 Look-Ahead Schedule, run date October 16, 2000
- On-Line Risk Management Work Schedule Review and Approval Form, Cycle 34, Week 09, start date October 22, 2000
- CR 00298047, Scaffolding, high energy line break door configuration control, and housekeeping deficiencies identified during performance of on-line maintenance in the auxiliary feedwater pump rooms
- CR 00300071, NRC identified different colored oil in Unit 2 East and West ESW pump motors
- CR 00301027, Oil sample needed for both Unit 2 ESW motor bearings
- CR 00311030, The Unit 2 West ESW pump upper motor bearing lubricating oil needs to be changed based on oil analysis data
- CR 00300065, Railing on seismic scaffolding very close to instrument piping on Unit 2 operable auxiliary feedwater pump
- CR 00301079, Access was being improperly denied to Appendix R guarded Unit 1 East Motor Driven Auxiliary Feedwater pump room

b. Issues and Findings

No findings of significance were identified.

.2 Unit 2 Forced Outage Work Schedule

a. Inspection Scope

The licensee issued PMP 2291.FOT.001, "Work Management Forced Outage Process," to provide the process for identifying and prioritizing outage-related work activities. The inspectors reviewed the licensee's Unit 2 forced outage schedule against the licensee's process. The inspectors verified that, upon identification of an unforeseen situation, the licensee had taken the necessary steps to plan and control the resulting emergent work activities. In addition, the inspectors reviewed the following documents:

- PMP 2291.FOT.001, "Work Management Forced Outage Process," Revision 0
- PMP 2291.OUT.001, "Work Management Process - Outage Management," Revision 0
- PMP 2291.OLR.001, "Online Risk Management," Revision 0
- Unit 2 Forced Outage Book
- Unit 2 Updated Final Safety Analysis Report
- 12-EHP [Engineering Head Procedure] 5040.MOD.001, "Temporary Modifications," Revision 5
- CR 00315070, The temporary modification procedure does not contain requirements for the review or restoration of temporary conditions

b. Issues and Findings

No findings of significance were identified.

## 1R15 Operability Evaluations

### .1 Operability of CD Battery Room During Cold Weather Station Blackout

#### a. Inspection Scope

The inspectors reviewed the operability determination associated with CR 00-10996. This CR was initiated to evaluate degraded roofing insulation for the Unit 1 and Unit 2 CD battery rooms. One of the safety functions of the station batteries was to provide sufficient power during a postulated 4 hour station blackout (SBO). Degradation of the roof insulation could have resulted in battery room temperature decreasing below the minimum allowable functional temperature limit during certain cold weather SBO scenarios. The operability determination evaluated the minimum outside temperature that would allow the CD batteries to meet the SBO safety functions. The inspectors reviewed the engineering basis for the operability determination, assessed compensatory measures for the operable but degraded condition, and discussed the condition with system engineering personnel. The inspectors reviewed the following documents during this review:

- Calculation EVAL-MD-12-SWGV-007-N, "CD Battery Room Minimum Temperature Evaluation," Revision 1
- Calculation MD-12-HV-026-N, "CD Battery Room Steady State and Station Blackout Transient Temperatures," Revision 1
- JO 00277010, Calibrate 2-VTS-809, 2 CD battery room temperature switch
- Condition Report 00-10996, Roof Insulation for the CD Battery Rooms is degraded
- 01 [02]-OHP 4030.STP.030, "Daily and Shiftly Surveillance Checks," Revision 29 [31]
- CR 00-10966, Evaluate degraded roofing insulation for the Units 1 and 2 CD battery rooms
- CR 00287037, NRC identified error in assumed thermal resistance of concrete that resulted in non-conservative results in EVAL-MD-12-SWGV-007-N
- CR 00280059, Inner debris screen for 2-CD Battery room exhaust fan is partially plugged with dust and lint
- CR 00300015, Technical basis could not be identified for procedural steps allowing delay of formal corrective action for up to 12 hours in the event of low battery room temperatures

#### b. Issues and Findings

No findings of significance were identified.

### .2 Operability of Engineered Safeguards Ventilation Single Failure Vulnerability

#### a. Inspection Scope

The licensee modified the bypass damper configuration for the engineered safeguards ventilation (AES) units in order to install more leak tight dampers in order to reduce charcoal filter air bypass leakage. Additionally, the modification changed the bypass

damper configuration from two series dampers to two parallel dampers. On March 31, 2000, the licensee initiated CR 00-4984 to identify that the safety screening and safety evaluation for Design Change Package (DCP) 12-DCP-049 inappropriately concluded that the modification did not result in an increase in probability of occurrence of equipment important to safety. Further investigation by the licensee concluded, that although the control room dose during an accident may have been increased by the failure of a bypass damper to close, this dose increase was bounded by a single failure resulting in the loss of a containment spray pump. The licensee determination concluded that the AES system was operable but degraded. Although no specific compensatory measures were required for the AES system, the licensee evaluation credited compensatory measures associated with an operability determination performed for the control room ventilation systems. These compensatory measures included limitations on dose equivalent iodine, allowable leakage rate from the containment, and emergency core cooling system recirculation leakage. The inspectors reviewed the operability determination and assessed the licensee implementation of compensatory measures. The inspectors reviewed the following documents during this review:

- Administrative Technical Requirement (ATR) 2-CNTMT-1, "Containment"
- ATR 2-RCS-1, "Reactor Coolant System"
- Operations Head Instruction (OHI) 4032, "Leakage Monitoring Program," Revision 0
- Design Information Transmittal (DIT) B-00987-00, Post loss of coolant accident dose consequences of an AES damper failure compared to the worst case single failure
- DIT B-00356-02, Design input for D. C. Cook offsite and control room dose analysis using TID-14844 source term
- CR 99-29182, Operability evaluation for Unit 2 control room ventilation prior to NRC approval of revised dose analysis using NUREG 1465 source term methodology
- 12-DCP-0049, Engineered Safeguards (AES) Filtration System Bypass Damper Replacement
- CR 99-7812, Control systems for AES Charcoal Dampers have potential single failure modes that can shut off ventilation to ESF pump and heat exchanger rooms
- CR 99-8841, There is insufficient assurance AES is capable of meeting its safety and accident mitigation functions
- CR 00-4984, Following a modification to install two parallel charcoal filter bypass dampers in the AES ventilation units, a single active failure could result in a bypass of the charcoal filter

b. Issues and Findings

No findings of significance were identified.



## 1R16 Operator Workaround

### a. Inspection Scope

The inspectors reviewed the cumulative effect of Operator Workarounds (OWAs) on equipment availability, initiating event frequency, and the ability of the operators to implement abnormal or emergency operating procedures. The inspectors also interviewed the Workaround Coordinator regarding the oversight and control of operator workarounds. As part of this inspection, the inspectors reviewed the following licensee documents:

- PMP 4010.OWA.001, "Oversight and Control of Operator Workarounds," Revision 1
- Workaround Review Board meeting summary for October, 2000
- Workaround list for Unit 1, 2, and common
- Operator Workaround Aggregate Effect Report for Unit 2, dated October 28, 2000

### b. Issues and Findings

No findings of significance were identified.

## 1R19 Post Maintenance Testing

### 1. Review of Post Maintenance Testing for Emergency Core Cooling Valve Modifications

#### a. Inspection Scope

The inspectors reviewed the PMT performed following implementation of DCP-4705, motor operated valve (MOV) modifications to the Unit 1 emergency core cooling system (ECCS). The modifications performed under DCP-4705 resolved various operability issues associated with ECCS MOVs, including actuator torque, thrust capability, and valve pressure locking. The inspectors reviewed the applicable DCP package, associated job orders, and engineering procedures relating to post modification testing.

In particular, the inspectors reviewed the post maintenance testing conducted for the following ECCS valves: 1-ICM-305, Recirculation Sump to East RHR/CTS Pumps Suction, and 1-IMO-330, East Residual Heat Removal to Upper Containment. Both of these motor operated valves were double disc gate valve designs that were susceptible to hydraulic pressure locking. Modifications to these valves included installation of a pressure equalizing line in ICM-305, drilling of the upstream disc in IMO-330, and changes to the valve actuator gear ratio. The inspectors reviewed the following documents:

- NRC Safety Evaluation Report on Electric Power Research Institute Topical Report TR-103237, "EPRI MOV Performance Prediction Program"
- 01-EHP 4030.STP.203, "Type B and C Leak Rate," Revision 4
- Engineering Head Instruction (EHI) 5071, "Inservice Testing Program Implementation," Revision 1

- PMI-5071, "Inservice Testing," Revision 0
- 1-DCP-4705, Unit 1 Motor Operated Valve Modifications, Emergency Core Cooling System
- JO C57230, Refurbish 1-IMO-330 Actuator and perform corrective maintenance
- JO C55723, Repair body to bonnet leak on 1-IMO-330
- JO C206188, Machine stem and drill disc of 1-IMO-330 for DCP-4705
- JO C57192, Refurbish 1-ICM-305 Actuator
- JO C206698, Upgrade 1-ICM-305, machine stem, and install equalizing line in accordance with DCP-4705
- CR 00298075, The post maintenance leakage test for 1-IMO-330 was closed without the leak test being performed
- CR 00299082, Procedure 1-EHP 4030.STP.203 could potentially allow bypass of 10 CFR 50.59 procedure change process

b. Issues and Findings

No findings of significance were identified.

.2 Ice Condenser

a. Inspection Scope

The inspectors reviewed and observed post-maintenance testing following routine and emergent maintenance activities in the Unit 1 ice condenser. The inspectors assessed procedural compliance, communication, worker performance, and work control associated with the post-maintenance test performance. The following documents were reviewed during this inspection:

- 12-EHP 4030.STP.262, "Ice Condenser Surveillance and Operability Assessment," Revision 0
- 12-MHP [Maintenance Head Procedure] 4030.010.002, "Ice Condenser Flow Passage Surveillance," Revision 1a
- 12-MHP 4030.010.001, "Ice Condenser Basket Weighing Surveillance," Revision 3a
- 12-MHP 4030.010.007, Ice Condenser Ice Basket Surveillance," Revision 0
- 12-MHP 4030.010.003, "Ice Condenser Lower Inlet Door Surveillance," Revision 0a
- 12-MHP 4030.010.004, "Ice Condenser Intermediate Deck Door 18-Month Surveillance," Revision 0
- 12-MHP 4030.010.005, "Ice Condenser Top Deck Door Surveillance," Revision 0

b. Issues and Findings

No findings of significance were identified. Additional discussion regarding the results of the ice condenser inspection is in Section 4OA5, below.

## 1R20 Refueling Outage

### .1 New Fuel Receipt Inspection

#### a. Inspection Scope

The inspectors observed portions of the licensee's receipt inspections of new fuel assemblies for the upcoming Unit 1 core reload. The observed activities included preparation and removal of fuel assemblies from shipping containers and inspection by quality assurance personnel. The inspectors assessed the licensee's procedural compliance, adequacy of foreign material exclusion controls, radiation protection controls, and adequacy of quality assurance inspection activities. The inspectors also reviewed applicable normal and emergency procedures associated with fuel handling activities. The inspectors reviewed the following documents during this review:

- 12-OHP 4022.018.007, "New Fuel Assembly Damage in Spent Fuel Storage Area - Local Actions," Revision 0
- 12-OHP 4022.018.009, "Dropped or Damaged New Fuel Assembly - Control Room Actions," Revision 0
- Maintenance Head Instruction (MHI)-4051, "Limitations and Precautions for Handling New Fuel Assemblies," Revision 1
- 12-MHP 4050.FDF.001, "Receipt and Storage of New Fuel Assemblies," Revision 5
- 12-QHP 4050.QC.001, "Receipt, Inspection and Storage of New Fuel Assemblies and Inserts," Revision 1
- CR 00263041, Metallic debris identified on fuel assemblies during new fuel receipt inspection

#### b. Issues and Findings

No findings of significance were identified.

## 1R22 Surveillance Testing

### .1 Surveillance Test on Unit 1 Ice Condenser

#### a. Inspection Scope

The inspectors assessed the surveillance tests associated with operability of the Unit 1 ice condenser. The inspectors assessed procedural compliance, communication, worker performance, and work control associated with the surveillance test performance. The following documents were reviewed during this inspection:

- 12-EHP 4030.STP.262, "Ice Condenser Surveillance and Operability Assessment," Revision 0
- 12-MHP 4030.010.002, "Ice Condenser Flow Passage Surveillance," Revision 1a
- 12-MHP 4030.010.001, "Ice Condenser Basket Weighing Surveillance," Revision 3a
- 12-MHP 4030.010.007, "Ice Condenser Ice Basket Surveillance," Revision 0

- 12-MHP 4030.010.003, "Ice Condenser Lower Inlet Door Surveillance", Revision 0a
- 12-MHP 4030.010.004, "Ice Condenser Intermediate Deck Door 18-Month Surveillance," Revision 0
- 12-MHP 4030.010.005, "Ice Condenser Top Deck Door Surveillance," Revision 0

b. Issues and Findings

No findings of significance were identified. Additional discussion regarding the results of the ice condenser inspection is in Section 4OA5, below.

.2 Surveillance Test on Unit 1 Essential Service Water

a. Inspection Scope

The inspectors assessed the surveillance tests associated with operability of the Unit 1 Essential Service Water system (ESW). In order to verify ESW system operability and satisfy TS 4.7.4.1.b surveillance testing requirements, the licensee performed a flow balance of the Essential Service Water system. The inspectors reviewed the associated surveillance test procedure, acceptance criteria, supporting documentation, and completed test data. The inspectors verified that the test methodology and acceptance criteria were consistent with TS and design basis requirements. The inspectors reviewed the following documents:

- 01-EHP 4030.119.241, "ESW Flow Balance," Revision 0
- DIT B-00949-01, "ESW Process and Flow Element Uncertainties," Revision 1
- Calculation 1-UNC-125, "ESW to CCW Heat Exchanger Flow," Revision 0
- EVAL-MD-02-ESW-089-N, "Reduction in ESW Temperature to Accommodate Reduced Flow Rate to ESW Components," Revision 0
- I&C Engineering Guide EG-IC-004, "Instrument Setpoint/Uncertainty," Revision 3
- DIT B-00944-04, "ESW Flow Balance Test Acceptance Criteria Summary for 01-EHP 4030.119.241"
- DIT S-00503-03, "Error Corrected Minimum Operability Limits for the ESW Pumps"
- Performance Assurance Field Observation FO-00-J-124, "Review of ESW Flow Balance Test Procedure"
- CR 00304079, NRC identified error in ESW Flow Balance Acceptance Criteria for Emergency Diesel Generators
- CR 00306051, NRC identified that instrument uncertainty not appropriately accounted for in diesel generator acceptance criteria for ESW flow balance
- CR 00307083, ESW Flow Balance test acceptance criteria selection not consistent with intended method
- CR 00-4744, Evaluate past operability associated with surveillance testing method for CCW heat exchanger ESW outlet valves
- CR 00314038, Condition evaluation for CR 00-4744 was inadequate in that it failed to identify historical failure to meet technical specification testing requirements

b. Issues and Findings

No findings of significance were identified.

.3 Open Vessel Testing

a. Inspection Scope

As part of the testing required for restarting Unit 1, the licensee performed a series of ECCS full flow tests with the reactor vessel head removed and the refueling cavity filled. The licensee referred to this series of ECCS tests as open vessel testing. The inspectors reviewed the following Unit 1 boron injection system and safety injection system surveillance tests associated with open vessel testing.

- 01-EHP 4030.103.208, "ECCS Flow Balance - Boron Injection System," Revision 1
- 01-EHP 4030.108.208, "ECCS Flow Balance - Safety Injection System," Revision 0
- 01-EHP SP.126, "ECCS Recirculation Leakage Test," Revision 0
- PMP 4043.SLV.001, "Sealed/Locked Valves," Revision 2
- PMP 4043.VLU.001, "Valve Lineups and Position Control," Revision 1
- Unit 1 Technical Specification 4.5.2, ECCS Subsystems -  $T_{avg} \geq 350^{\circ}F$
- UFSAR Chapter 6.2, "Emergency Core Cooling Systems," and Chapter 14.3, "Reactor Coolant System Pipe Rupture (Loss of Coolant Accident)"
- Job Order R0032658,
- CR 00296011, During performance of 01-EHP 4030.108.208, it was determined that the acceptance criteria of steps 5.1.4 and 5.2.4 could not be met for refueling water storage tank head correction
- Design Information Transmittal (DIT) S-001578-00, "Transmittal of ECCS Flow Test Correction Value for Use in Reconciling the Difference Between the Static Head of the Design Basis LOCA Conditions and the Test Conditions Used in ECCS Flow Balance Test Procedures"

b. Issues and Findings

No findings of significance were identified.

.4 Calibration of Unit 2 Power Range Drawer N-41

a. Inspection Scope

The inspectors observed the licensee perform portions of the calibration of power range nuclear instrument drawer N-41. This calibration was performed following routine in-core flux mapping to satisfy the requirements of Technical Specification (TS) 4.3.1.1.1, "Reactor Trip System Instrumentation." The inspectors assessed procedural use and adherence, equipment response, and effectiveness of control room operator actions to minimize on-line risk during the calibration procedure. The inspectors reviewed the following documents:

- JO R207058, Perform Power Range Calibration of 2-N-41
- Memorandum from R. Hennen providing Incore/Excore Power Range Data for Unit 2, dated October 3, 2000
- 02-IHP [Instrument Head Procedure] 4030.SMP.231, "Power Range Nuclear Instrumentation Functional Test and Calibration," Revision 0
- CR 00280023, Instrumentation and Controls technician did not exercise power range drawer potentiometers in accordance with procedural requirements during calibration

b. Issues and Findings

No findings of significance were identified.

1R23 Temporary Modifications

a. Inspection Scope

The inspectors performed a detailed review of Temporary Modification 2-TM-00-45, Revision 0, "Installation of Temporary Pump in Lieu of Failed Heater Drain Sump in the Unit 2 Turbine Building." This temporary modification was selected based upon its potential impact to internal flooding risks and because the heater drain pumps are listed as vital secondary equipment in the licensee's on-line risk assessment procedures. The inspectors reviewed the temporary modification and associated 10 CFR 50.59 screening against the system design bases documentation, including the UFSAR and the TSs. In addition, the inspectors verified that the temporary modification was installed in accordance with the required documentation and that configuration control was maintained. The inspectors reviewed the following documents:

- Unit 2 Temporary Modification 2-TM-00-45, "Installation of Temporary Pump in Lieu of Failed Heater Drain Sump in the Unit 2 Turbine Building," Revision 0
- 12-EHP 5040.MOD.001, "Temporary Modifications," Revision 5
- Flow Diagram OP-12-5125, Station Drainage - Turbine Room
- Flow Diagram OP-12-5125A, Station Drainage - Turbine Room
- CR 00287036, Temporary modification procedure internally inconsistent regarding drawing changes for TMs installed greater than 30 days
- CR 00292064, Temporary modification tag not attached to Unit 1 flow diagram
- CR 00292062, Temporary modification did not contain pump lubrication requirements and active TMs do not recommend preventive maintenance

b. Issues and Findings

No findings of significance were identified.

### 3. SAFEGUARDS

#### Cornerstone: Physical Protection (PP)

##### 3PP4 Security Plan Changes

###### a. Inspection Scope

Using inspection procedure 71130.04, the inspectors reviewed Revision 0 to the D. C. Cook Nuclear Plant (CNP) Physical Security Plan to verify that the changes did not decrease the effectiveness of the submitted plan. Revision 0, replaced the current revision of the CNP Modified Amended Security Plan in its entirety, and was submitted by licensee letter dated October 16, 2000.

###### b. Issues and Findings

The document noted above was submitted in a timely manner, and the changes did not appear to reduce the effectiveness of the previous security plan. Inspector review of Revision 0 identified multiple examples of security plan language changes that required additional clarification by the licensee to ensure adherence to regulatory requirements. Those issues were specifically discussed with licensee security management personnel during a site visit on October 30, 2000. The licensee agreed to resubmit a security plan change that will address and resolve the items that required clarification. This issue will be tracked as an **Unresolved Item (50-315/00-22-02; 50-316/00-22-02)** until the change is reviewed by a Region III Safeguards Inspector.

### 4. OTHER ACTIVITIES (OA)

##### 4OA1 Performance Indicator Verification

###### a. Inspection Scope

Using inspection procedure 71151, the inspectors reviewed the licensee's program for the gathering and submittal of data for the High Pressure Injection System portion of the Mitigating Systems cornerstone. The inspectors utilized the following documents during this review:

- PMP 7110.PIP.001, "Regulatory Oversight Program Performance Indicators," Draft
- PMI 7110, "Regulatory Oversight Program," Draft
- JO R100320, Lubricate and clean motor of the Unit 2 West Centrifugal Charging Pump (CCP)
- Action Request A199643, Drain and refill the speed increaser reservoir of the Unit 2 West CCP
- D. C. Cook Regulatory Oversight Performance Indicators, Third Quarter 2000
- CR 00306054, NRC identified inaccurate performance indicator data that the unavailable hours for the centrifugal charging pumps as submitted for the

- Revised Reactor Oversight Process (RROP) did not reflect an event on September 20, 2000 which rendered the Unit 2 West CCP unavailable  
CR 00307080, NRC identified inaccurate performance indicator data that the unavailable hours for the Safety Injection pumps as submitted to RROP did not reflect an event on June 6, 2000 which rendered the Unit 2 North Safety Injection Pump unavailable.

b. Issues and Findings

Due to the extended plant shutdown, the licensee had not gathered historical data required for the calculation of certain PIs. For the PI selected for review, the licensee lacked data from the previous 12 quarters. The lack of historical data resulted in the selected PI being "not applicable" or GRAY. Until the collected data covers at least 12 quarters the PI would remain N/A. Following restart of Unit 2, the licensee began collecting data and the inspectors reviewed the collected data for the second and third quarters of 2000. The inspectors' review of the submitted PI data identified the following minor discrepancies:

- The required hours for three of the four trains of equipment was inaccurate. The required hours for the Safety Injection pumps for the second quarter was listed as the time from entry into Mode 4, Hot Shutdown until the end of the quarter. The Safety Injection pumps were not required to be available until Mode 3. This represented a difference of 127 hours. In addition, while in Mode 4, only one train of CCP was required to be operable, yet the required hours for the pump was listed from Mode 4. Again, the difference was 127 hours.
- The Unit 2 West CCP was listed as having zero planned unavailability hours for the third quarter of 2000. The inspectors determined that on September 20, 2000, the pump was removed from service for an oil change of the speed increaser and the pump bearings. The 7.5 hours required for this preventive maintenance activity was not recorded as planned unavailability hours.
- The Unit 2 North Safety Injection pump was listed as having zero unplanned unavailability hours and zero fault exposure hours for the second quarter of 2000. The inspectors determined that on June 16, 2000, the Unit 2 North Safety Injection pump was removed from service to repair a leak of the seal water heat exchanger. The pump was out of service for approximately 12 hours to repair the leak, but this time was not recorded as unplanned unavailability. In addition, the time the pump was leaking prior to the unplanned unavailability was not evaluated against fault exposure criteria.

The licensee entered the inspector identified discrepancies into the corrective action system as CRs 00306054 and 00307080.



#### 4OA3 Event Follow-up

##### .1 Licensee Event Reports

###### a. Inspection Scope

The inspectors reviewed the corrective actions associated with the following licensee event reports.

###### b. Issues and Findings

- b.1 (Closed) Licensee Event Report 50-316/98005-01: Potential for high energy line break to degrade component cooling water system. Revision 0 of this LER was also formerly Unit 2 Restart Action Matrix (RAM) Item R1.14. This RAM item was closed in NRC Inspection Report 50-315/316/2000007.

(Closed) Licensee Event Report 50-316/98007-01: High energy line break effects on auxiliary feedwater system. Revision 0 of this LER was also formerly Unit 2 RAM Item R1.24. This RAM item was closed in NRC Inspection Report 50-315/316/2000007.

(Closed) Licensee Event Report 50-315/98058-01: Postulated high energy line break could result in condition outside the design bases for auxiliary feedwater.

In October 1999, the licensee recognized that, based on a large number of high energy line break (HELB) scenarios, a larger programmatic problem existed with the HELB program. Licensee Event Report 50-315/99026-00, "High Energy Line Break Programmatic Inadequacies Result in Unanalyzed Conditions," was written to capture the overall HELB programmatic issues and develop corrective actions. The inspectors reviewed the three LERs listed above and noted that each LER documented a separate HELB scenario which would result in plant equipment being placed outside its design bases. The licensee wrote supplements to these scenario-specific LERs to close them to Licensee Event Report 50-315/99026-00.

The overall HELB program was included on the Unit 2 RAM as Item R1.35. In early 2000, this RAM item was inspected and found to be acceptable to support the Unit 2 restart. NRC Inspection Report 50-315/00-07 and 50-316/00-07 documented the inspection of the HELB programmatic issues and the closure of Unit 2 RAM Items R1.14, R1.24, and R1.35. The risk associated with postulated HELB events was evaluated and documented in NUREG-1728, "Assessment of Risk Significance Associated With Issues Identified at D. C. Cook Nuclear Power Plant." Therefore, based on the previous inspection and closure of the HELB programmatic issues, these LERs are closed.

- b.2 (Closed) Licensee Event Report 50-315/98026-00: Technical Specification Surveillance Requirement 4.6.5.1.b.2 not met due to failure to accurately transfer requirements into plant procedure. Licensee personnel had determined that TS surveillance requirements had not been met for the weighing of ice condenser baskets. Specifically, the average weight of a group of 21 baskets was not statistically analyzed separately from the

remainder of the basket weight data. The licensee entered the failure to comply with TSs in the corrective action system.

Inspection of the ice condenser and the licensee's corrective actions were documented in Inspection Report 50-315/99026 and 50-316/99026. Additional detail regarding the closure of Restart Action Matrix item R.1.1, ice condenser is in Section 4OA3 below. The inspectors determined that the failure to statistically analyze 21 baskets separately from the remainder of the basket weight data was a violation of TS Surveillance Requirement 4.6.5.1.b.2. This violation is being treated as a **Non-Cited Violation (50-315/00-22-03)**, consistent with Section VI.A of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as CRs 98-0388, 0537, 0721, 1058, 1077, and 1833. This LER and NCV are closed.

The inspectors considered the failure to appropriately weight ice condenser baskets to be an issue which suggested a programmatic problem and had a credible potential to impact safety due to the finding by the licensee of the large number of underweight ice condenser baskets. The inspectors determined that the failure to appropriately weigh ice condenser baskets to have a direct effect upon the operability, availability, and reliability of a mitigating system. Therefore the inspectors concluded that this issue affected the "Mitigating Systems Cornerstone." The NRC performed a risk assessment of the issues associated with the extended licensee shutdown, including those items identified on the ice condenser. Licensee Event Report 50-315/98026 was included in that assessment which was documented in NUREG - 1728, "Assessment of Risk Significance Associated with Issues Identified at D. C. Cook Nuclear Plant." The assessment determined that there was very low risk significance associated with LER 50-315/98026, due to a licensee engineering evaluation which determined that enough ice was available to perform its intended function. Licensee Event Report 50-315/98026 was also screened to GREEN (very low risk significance) after a Phase 1 Significance Determination Process review for the same reasons.

- b.3 (Closed) Licensee Event Report 50-315/98034-01: Flow rates to containment spray headers lower than design basis values. On June 23, 1998, the licensee identified that the calculations used to predict post-accident flow rates for the CTS contained non-conservative assumptions which resulted in a lower postulated post-accident peak containment pressure.

The issue described in the LER was also included on the Unit 2 RAM as Item R.2.10.3, which was closed in NRC Inspection Report 50-315/99029 and 50-316/99029. In March 1999, the licensee revised the CTS design basis flow rate calculation using improved assumptions which accounted for actual plant conditions. The licensee's analysis showed that the resulting calculated post-accident peak containment pressure was higher than the previously calculated value. However, the licensee's Updated Final Safety Analysis Report Chapter 14 accident analysis bounded the revised CTS design basis flow rates. The inspectors concluded that the failure to properly calculate the CTS design basis flow rate constituted a minor violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." The inspectors reviewed the LER and did not identify any significant findings. This LER is closed.

- b.4 (Closed) Licensee Event Report 50-316/99003-01: Fuses not installed for cable passing through containment penetration. Unit 2 License Condition 2.C. (3)(m) required the licensee to modify the Unit 2 600 VAC containment electrical power penetration circuits to meet the requirements of Regulatory Guide 1.63, "Electric Penetration Assemblies in Containment Structures for Light-Water-Cooled Nuclear Power Plants." The modification consisted of the installation of redundant fuses and fuse holders. On September 26, 1999, the licensee identified that the fuses and fuse holders associated with Unit 2 containment penetration 2-CEP-3P3 had never been installed.

The issue described in this LER was also included on the Unit 2 RAM as Item R.1.31. This RAM item was closed in NRC Inspection Report 50-315/00-13 and 50-316/00-13 which noted that fuses were installed and that the issue had been corrected. The inspectors concluded that the failure to install fuses to provided redundant electrical protection for Unit 2 containment penetration 2-CEP-3P3 constituted an isolated, minor violation of Unit 2 License Condition 2.C. (3)(m). The inspectors reviewed the licensee's supplement to the LER and did not identify any significant findings. This LER is closed.

#### 4OA4 Human Performance Issues

##### .1 Inadequate Clearance Resulted in Draining of Unit 1 Reactor Cavity to Lower Containment

###### a. Inspection Scope

On October 31, 2000, an inadvertent drain down of the Unit 1 reactor cavity occurred during the disassembly of 1-CS-325, the chemical and volume control system (CVCS) charging to pressurizer spray check valve, for maintenance. The licensee estimated that between 1,800 and 3,000 gallons of water drained from the reactor cavity before the leak path was isolated. Unit 1 was defueled at the time of the event, but the reactor cavity was filled. The inspectors assessed this event and reviewed the following documents:

- Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2
- PMP 2110.CPS.001, "Clearance permit System," Revision 3
- 12-OHP 2110.CPS.001, "Clearance Permit," Revision 0
- Clearance 1003996, CVCS Charging to Pressurizer Auxiliary Spray Check Valve
- JO R72607, Disassemble 1-CS-325 for SOER 86-03 Internal Exam
- Unit 1 Control Room Logs, October 31, 2000 through November 1, 2000
- CR 00306007, Inadequate clearance provided flowpath from refueling cavity to containment sump at approximately 5 gpm for over 8 hours
- CR 00305084, Two maintenance workers were contaminated when breaching valve 1-CS-325
- CR 00307078, The temporary modification procedure was not used to place foreign material exclusion covers on the Unit 1 lower containment and recirculation sump screens

b. Issues and Findings

On October 31, 2000, two maintenance workers began disassembly of 1-CS-325 in accordance with JO R72607 for a routine internal inspection. During the valve bonnet disassembly, water issued from the work area, wetting both maintenance workers, and causing water to accumulate on the lower containment floor. The workers, along with the supporting radiation protection technician, exited the work area and notified an auxiliary equipment operator of the leak at 1-CS-325. Due to a communication error, control room operators were not aware that water continued to issue from the 1-CS-325 work area until approximately 8 hours after the event began. Once the Unit 1 control room staff identified that reactor cavity inventory was being lost through the 1-CS-325 work area, operations personnel isolated the work area to stop the leakage and initiated CR 00306007. The licensee established a rapid event response team to investigate the event.

The licensee initial investigation determined that the clearance supporting maintenance on 1-CS-325 did not adequately isolate the work area from the reactor coolant system and reactor cavity. Specifically, the initial clearance failed to isolate the normal spray flow path from the work area. Consequently, when valve 1-CS-325 was breached, a flow path between the reactor cavity and lower containment was established. The licensee estimated that up to 3,000 gallons of water were drained from the reactor cavity before the drain path was isolated. Following this event, the licensee modified clearance 2003996 to isolate 1-CS-325 from the normal spray flow path. Plant Managers Procedure 2110.CPS.001, Section 3.1.9 stated that qualified operators were responsible for writing the clearance to establish the required configuration of plant systems and/or components to provide electrical and mechanical isolation for the clearance and establish energy control measures to ensure worker safety and equipment protection. Additionally, Section 3.1.6 of PMP 2110.CPS.001 stated that senior reactor operators (SRO) were responsible for verifying that clearances establish energy control measures to ensure worker safety and equipment protection. Step 4.2.1 of 12-OHP 2110.CPS.001 required an independent SRO review of each clearance permit for accuracy and completeness. The failure to provide adequate mechanical isolation of the 1-CS-325 work area was not identified during the clearance preparation or review process.

Technical Specification 6.8.1 required, in part, that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, February 1978, Appendix A, recommended, in part, that procedures be written to cover equipment control (e.g., locking and tagging). Procedure PMP 2110.CPS.001 was written in accordance with Regulatory Guide 1.33 to provide guidelines for equipment control, specifically the clearance permit system for equipment tagging. The inspectors determined that the failure to provide adequate clearance isolation for the 1-CS-325 maintenance activity constituted a violation of TS 6.8.1, in that, contrary to PMP 2110.CPS.001, the operator writing the clearance failed to verify the mechanical isolation for the clearance and establish energy control measures to ensure worker safety and equipment protection. This violation is being treated as a

**Non-Cited Violation (50-315/00-22-04)** consistent with Section VI.A. of the NRC Enforcement Policy. This issue was entered into the licensee's corrective action program as CR 00306007.

The inspectors considered the inadvertent draining of the Unit 1 reactor cavity to be a violation of more than minor concern in that, if left uncorrected, the failure to provide adequate clearance isolation for work activities would become a more significant safety concern. The inspectors determined that the failure to provide an adequate barrier between the reactor cavity water inventory and the 1-CS-325 maintenance area involved elements of human performance deficiencies which had the potential to adversely affect personnel safety resulting in a significant unintended or unplanned dose. Because the actual worker radiation doses received as a result of this event were minimal and did not affect the ability to assess dose, this issue was screened as NO COLOR (very low risk significance) after a Phase 1 Significance Determination Process review. This NCV is closed.

.2 Stop Work Order on Design Engineering Approval of Engineering Products

On October 4, 2000, the licensee wrote CR 00278060 to document inconsistencies in the quality of design engineering calculations. These inconsistencies were identified by the NRC, the Design Review Board (DRB), and Performance Assurance. On November 10, 2000, design engineering management determined that more formal actions were required to understand and correct the human performance issues associated with design engineering product quality. In accordance with PMP 7030.SWO.001, "Stop Work Orders," Revision 0, design engineering management issued a stop work order for design engineering approval of the following:

- Design Change Packages
- Temporary Modifications
- Calculations and Evaluations
- Engineering Control Packages, Information Change Packages, and Instrument Configuration Documents
- Design Evaluations for Use-As-Is Determination
- Engineering Studies
- Specifications/Guidelines/Design Standards
- Design Information Transmittals

Condition Report 00315025 documented the stop work order and listed the interim corrective actions which were established to review design engineering products to ensure quality. Specifically, these actions included reinforcing management expectations to design engineering personnel and requiring DRB review and approval of additional design engineering products. Condition Report 00315025 was categorized as a Level 2 CR which will require a root cause analysis prior to resolution.

#### 4OA5 Other

(Closed) Restart Action Matrix Item 1.1, Unit 1 Ice Condenser Restoration - Observe Ice Condenser Ice Load and Surveillance Testing: The NRC had previously identified issues related to surveillance testing, material condition, and the design and licensing bases of the ice condensers. These issues were documented in Inspection Report 50-315/98005 and 50-316/98005. Subsequently inspections were conducted of the Unit 2 ice condenser to verify that the licensee took adequate corrective actions to address these issues as documented in Inspection Report 50-315/99026 and 50-316/99026. The licensee's corrective actions related to the restoration of the design and licensing basis of the Unit 2 ice condenser were applicable to both units. The programmatic elements of the material condition issues and surveillance testing issues were also assessed during NRC inspections of Unit 2 restart readiness.

During this inspection period, the inspectors focused on assessing Unit 1 specific surveillance testing and ice loading activities. The inspectors performed routine tours and assessments of the Unit 1 ice condenser and noted substantial improvement in the ice condenser material condition. The ice condenser had been completely thawed, and ice baskets had been removed and reinstalled to facilitate ice basket replacement or repair work. Specific material condition improvements included; new covers, belts, drain piping, flex hoses and wiring for the air handling units, ice basket segments with no observable dents or missing screws (new screws), ice basket bottom assemblies with new hold down bar welds, grid assemblies, and galvanizing, new intermediate deck doors and protective door covers, new metallic air box shock absorbers, new lower inlet door channels and seals, resealed floor joints, new top deck doors, new runs of heat trace wiring, new supports and new insulation for glycol piping. Condition Reports reviewed during this inspection included:

- Restart Action Plan Number 6, "Resolution of Ice Condenser Issues"
- CR 99-22974, Maintenance "Control of Contractors" was Identified as an area in need of development and improvement
- CR 98-0326, About 10 to 20 percent of the ice condenser flow passages were found to be blocked
- CR 98-0388, Damage to ice baskets
- CR 98-0500, Ice condenser ice weights used to determine compliance with TS may not constitute a representative sample
- CR 98-0537, Some ice baskets in both units, predominantly in radial row 9, but also in radial row 8 and azimuthal row 5, show ice loss due to sublimation
- CR 98-0721, Damage to ice baskets resulting from contractor control problems
- CR 98-1058, Ice baskets damaged by contractors performing 12-EHP 4030.STP.211
- CR 98-1059, 12-EHP 4030.STP.211 was revised without proper proceduralized control
- CR 98-1060, 12-EHP 4030.STP.211 lack of margin in maximum weight acceptance criteria
- CR 98-1061, 12-EHP 4030.STP.250 inadequate instructions
- CR 98-1077, Contract employee observed damaging a basket during basket weighing activities
- CR 98-1764, Ice condenser flow passage surveillances may not be adequate

- CR 98-3152, Ice condenser shock absorbers in an unanalyzed condition includes torn or worn shock absorber bags, torn mesh and broken or dislodged foam
- CR 98-5014, Inspection procedure 12-EHP 4030.STP.212, “Ice Basket Inspection,” does not include a requirement to inspect the lower ice basket area

#### Ice Condenser Flow Passage Surveillance Testing

The inspectors reviewed procedures 12-EHP 4030.STP.262, Revision 0, “Ice Condenser Surveillance and Operability Assessment,” and 12-MHP 4030.010.002, Revision 1a, “Ice Condenser Flow Passage Surveillance.” The inspectors determined by a review of the above procedures and selected condition reports that issues related to the selection and inspection of ice condenser flow passages had been adequately addressed. The inspectors also performed observations of flow passage cleaning and flow passage inspections by licensee personnel. In addition, random samples of flow passages were selected and independently assessed by the inspectors. No flow passage blockage or foreign material was identified.

#### Ice Condenser Ice Basket Weight Surveillance Testing

The inspectors reviewed procedures 12-MHP 4030.010.001, Revision 3a, “Ice Condenser Basket Weighing Surveillance,” and the applicable portions of 12 EHP 4030.STP.262. The inspectors determined by a review of the above procedures and selected condition reports that issues related to the selection and weighing of ice condenser baskets had been adequately addressed. The inspectors also performed observations of ice basket weighing. In addition, random samples of ice baskets were inspected to determine if there were voids or other conditions which could contribute to low weight baskets. None was identified.

#### Ice Condenser Ice Basket Surveillance Testing

The inspectors reviewed procedure 12-MHP 4030.010.007, Revision 0, “Ice Condenser Ice Basket Surveillance,” and verified that the TS requirements to inspect the accessible portions of the lower basket assembly were included. Various ice baskets were selected by the inspectors and assessed to determine if there was damage or signs of detrimental wear, cracks, corrosion or any other noticeable damage. No damaged ice baskets were identified.

#### Ice Condenser Door Surveillance Testing

The inspectors reviewed procedures 12-MHP 4030.010.003, Revision 0a, “Ice Condenser Lower Inlet Door Surveillance,” 12-MHP 4030.010.004, Revision 0, “Ice Condenser Intermediate Deck Door 18-Month Surveillance,” and 12-MHP 4030.010.005, Revision 0, “Ice Condenser Top Deck Door Surveillance.” The inspectors determined by a review of the above procedures and selected condition reports that issues related to the ice condenser doors had been adequately addressed. In addition the inspectors observed selected

portions of the setting of intermediate deck door support steel and inspected a sampling of doors. No significant issues were identified.

#### Control of Contractors

The inspectors assessed the adequacy of the licensee control of contractor personnel during observations of the activities listed above. Licensee managers and supervisors were observed to maintain adequate oversight of the contractors. The inspectors identified several small pieces of foreign material that reasonably should have been identified by the licensee but the items were few and limited in number.

#### Conclusions

Overall, the licensee had implemented adequate corrective actions for previously identified issues related to surveillance testing of the ice condenser. Based upon inspector review of procedures, observations of selected activities, and independent sampling, RAM Item 1.1 is closed.

(Open) Restart Action Matrix Item C.4.a, Operability of Technical Specification Systems Specifically Those With Identified Operational, Design, and Maintenance Issues and (Open) SGRA Item C.4.e, Adequacy of Surveillance Tests/Test Program: The inspectors verified selected surveillance tests were performed in accordance with TS and design basis methodology as part of the ongoing assessment of SGRA Item C.4.a. Those items reviewed and any inspector observations were documented above in Section 1R22, Surveillance Testing.

(Open) Restart Action Matrix Item C.4.f, Significant Hardware Issues Resolved (i.e., equipment with poor material condition, equipment aging, modifications): The inspectors reviewed the licensee implementation of permanent plant modifications for the emergency diesel generators and auxiliary feedwater pump rooms. These modifications were developed to address operability and design basis issues. The diesel generator modification replaced the diesel generator air system with safety-related air compressors and piping. The AFW pump rooms were sealed to provide high energy line break protection and provided with room coolers. The inspectors reviewed the associated design change, supporting drawings, and walked down portions of the modifications.

- 1-DCP-548, EDG [Emergency Diesel Generator] 1CD Starting Air Compressor Replacement
- 1-DCP-4595, Modification of Auxiliary Feedwater Pump Rooms Ventilation System
- CR 00307077, NRC identified that Unit 1 CD Diesel Generator starting air compressor #1 discharge piping is in contact with structural support, contrary to design drawing

(Open) Restart Action Matrix Item C.4.j, Adequacy of Plant Housekeeping and Equipment Storage: The inspectors conducted frequent walkdowns of the Unit 1 containment, auxiliary building, and turbine building areas to assess the general conduct



of maintenance with regard to control of transient materials, radiological control practices, and housekeeping. Although conditions were generally adequate, the inspectors noted the following deficiencies during these walkdowns:

- On October 18, 2000, during a walkdown of the Unit 1 containment building, the inspectors identified that a piece of lead shielding had fallen from a reactor coolant loop and that a high surface contamination rope barrier had fallen. The licensee initiated CR 00292087 and took prompt action to correct these discrepancies.
- The inspectors noted that housekeeping conditions in the containment building were poor as evidenced by the amount of transient materials, including tools, procedures, piping insulation, and other equipment temporarily stored in containment. At the time of the walkdown, the reactor was filled for open vessel testing and foreign material exclusion controls were enacted. The inspectors identified three ropes hanging over the refueling cavity and dirt and debris in locations that could potentially result in foreign material falling into the cavity area.
- During a walkdown of the auxiliary feedwater pump areas on October 23 and 24, the inspectors noted scaffolding, high energy line break door configuration control, and housekeeping deficiencies during performance of on-line maintenance activities in the auxiliary feedwater pump rooms. The deficiencies included potential interference between safety-related equipment and scaffolding, tools and other equipment stored on or near safety related equipment, and blocking of high energy line break doors. After these issues were identified, the licensee stopped work in progress, removed transient material that could impact safety-related equipment and briefed maintenance department personnel on management expectations for the conduct of maintenance activities in the vicinity of operable, safety-related equipment. The licensee initiated CR 00298047 to document this issue.

#### 4OA6 Management Meetings

The inspectors presented the inspection results to licensee management listed below on November 9, 2000. The licensee acknowledged the findings presented. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

C. Bakken, Site Vice President  
 R. Ebright, Plant Engineering  
 R. Gaston, Regulatory Affairs  
 J. Gebbie, Plant Engineering  
 S. Greenlee, Engineering  
 R. Godley, Plant Engineering  
 M. Hoskins, System Engineering  
 S. Lacey, Director, Engineering  
 B. McIntyre, Regulatory Affairs  
 J. Mathis, Regulatory Affairs  
 R. Meister, Regulatory Affairs  
 J. Molden, Director, Maintenance  
 T. Noonan, Director, Performance Assurance  
 R. Powers, Senior Vice President  
 T. Quaka, Engineering  
 M. Rencheck, Engineering Vice President  
 L. Weber, Manager, Operations

LIST OF INSPECTIONS PERFORMED

The following inspectable-area procedures were used to perform inspections during the report period. Documented findings are contained in the body of the report.

Inspection Procedure		Report Section
Number	Title	
71111-01	Cold Weather Preparation	1R01
71111-04	Equipment Alignments	1R04
71111-05	Fire Protection	1R05
71111-12	Maintenance Rule Implementation	1R12
71111-13	Maintenance Risk Assessment and Emergent Work Evaluation	1R13
71111-15	Operability Evaluations	1R15
71111-16	Operator Workarounds	1R16
71111-19	Post-maintenance Testing	1R19
71111-20	Refueling Outage	1R20
71111-22	Surveillance Testing	1R22
71111-23	Temporary Modifications	1R23
71130-04	Security Plan Changes	3PP4
71151	Performance Indicator Verification	4OA1
71153	Event Followup	4OA3

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

50-315/00-22-01 50-316/00-22-01	NCV	Failure to take corrective actions for radiation monitoring system failures (Section 1R12.1)
50-315/00-22-02 50-316/00-22-02	URI	Security plan change (Section 3PP4)
50-315/00-22-03	NCV	Technical Specification 4.6.5.1.b.2 violation for failure to statistically analyze 21 baskets separately from the remainder of the basket weight data (Section 4OA3.2)
50-315/00-22-04	NCV	Failure to provide adequate clearance isolation for the 1-CS-325 maintenance activity (Section 4OA4.1)

### Closed

50-316/98005-01	LER	Potential for high energy line break to degrade component cooling water system (Section 4OA3.3)
50-316/98007-01	LER	High energy line break effects on auxiliary feedwater system (Section 4OA3.3)
50-315/98026-00	LER	Technical Specification Surveillance requirement 4.6.5.1.b.2 not met due to failure to accurately transfer requirements into plant procedure (Section 4OA3.3)
50-315/98034-01	LER	Flow rates to containment spray headers lower than design basis values (Section 4OA3.3)
50-315/98058-01	LER	Postulated high energy line break could result in condition outside the design bases for auxiliary feedwater (Section 4OA3.3)
50-316/99003-01	LER	Fuses not installed for cable passing through containment penetration (Section 4OA3.3)
50-315/00-22-01 50-316/00-22-01	NCV	Failure to take corrective actions for radiation monitoring system failures (Section 1R12.1)
50-315/00-22-03	NCV	Technical Specification 4.6.5.1.b.2 violation for failure to statistically analyze 21 baskets separately from the remainder of the basket weight data (Section 4OA3.2)
50-315/00-22-04	NCV	Failure to provide adequate clearance isolation for the 1-CS-325 maintenance activity (Section 4OA4.1)

### Discussed

None

## LIST OF ABBREVIATIONS

AES	Engineered Safety Features Ventilation
AFW	Auxiliary Feedwater System
CCW	Component Cooling Water
CR	Condition Report
CT	Control Terminals
CTS	Containment Spray
DIT	Design Information Transmittal
DRB	Design Review Board
DRP	Division of Reactor Projects
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EHI	Engineering Head Instruction
EHP	Engineering Head Procedure
ESF	Engineered Safety Features
ESW	Essential Service Water
JO	Job Order
HELB	High Energy Line Break
IHP	Instrument Head Procedure
LER	Licensee Event Report
MHI	Maintenance Head Instruction
MHP	Maintenance Head Procedure
MOV	Motor Operated Valve
NCV	Non-Cited Violation
OHI	Operations Head Instruction
OHP	Operations Head Procedure
OSO	Operations Standing Order
OWA	Operator Work Around
PDR	Public Document Room
PI	Performance Indicator
PMI	Plant Manager's Instruction
PMP	Plant Manager's Procedure
PMT	Post-maintenance Testing
RAM	Restart Action Matrix
RHR	Residual Heat Removal
RMS	Radiation Monitoring System
RROP	Revised Reactor Oversight Program
SA	Self Assessment
SGRA	Staff Guidelines for Restart Approval
SRO	Senior Reactor Operator
SSC	Structures, Systems, and Components
TM	Temporary Modification
URI	Unresolved Item
UFSAR	Updated Final Safety Analysis