April 28, 2000

Mr. R. P. Powers
Senior Vice President
Nuclear Generation Group
American Electric Power Company
1 Cook Place
Bridgman, MI 49106

SUBJECT: D. C. COOK INSPECTION REPORT 50-315/2000001(DRP); 50-316/2000001(DRP)

Dear Mr. Powers:

This refers to the inspection conducted on February 26, 2000, through April 1, 2000 at the D. C. Cook Units 1 and 2 reactor facilities. The inspection was an examination of activities conducted under your license as they relate to compliance with the Commission rules and regulations and with the conditions of your license. Areas reviewed included Operations, Maintenance, Engineering, and Plant Support. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. The inspectors also reviewed observations and findings as they related to the NRC Manual Chapter 0350 Case Specific Checklist for D. C. Cook. The enclosed report presents the results of that inspection.

During this inspection period, we noted that progress has been made in preparing the plant for core reload. Several safety-related systems to support core reload were tested, including flow balances of the component cooling water system and the essential service water system. Overall, we found that the testing was well conducted. Therefore, Case Specific Checklist Item 1, “Programmatic Breakdown in Surveillance Testing,” consisting of subitems 1A through 1E, is closed based on the surveillance test inspection documented in NRC Inspection Report 50-315/316/99033 and evaluation of several extensive surveillance activities during this current inspection. In addition, Item C.4e, “Adequacy of Surveillance Tests/Test Program,” of Enclosure 2 to our September 17, 1999, letter updating the Case Specific Checklist is also closed.

However, we did note isolated problems while reviewing the essential service water system flow balance test. The inclusion of incorrect acceptance criteria into the procedure and lack of adequate documentation for justifying the assumptions used demonstrated inadequate control in the development of the procedure.

Based on the results of this inspection, the NRC has determined that two violations of NRC requirements occurred involving inadequate design control over the development of acceptance criteria for the essential service water flow balance test and the failure to follow the Unit 2 emergency diesel generator load sequence surveillance test procedure. These violations are being treated as Non-Cited Violations (NCV), consistent with Section VII.B.1.a of the Enforcement Policy. These NCVs are described in the subject inspection report. If you contest the violations or severity level of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region III; and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Electronic Reading Room (PERR) link at the NRC homepage, http://www.nrc.gov/NRC/ADAMS/index.html.

Sincerely,

/RA/

John A. Grobe, Director
Division of Reactor Safety

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

Enclosures: Inspection Report 50-315/2000001(DRP);
50-316/2000001(DRP)

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REGION III

Docket Nos:	50-315; 50-316
License Nos:	DPR-58; DPR-74
Report No:	50-315/2000001(DRP); 50-316/2000001(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:	February 26, 2000 through April 1, 2000
Inspectors:	B. L. Bartlett, Senior Resident Inspector M. E. Bielby, Region III Inspector K. A. Coyne, Resident Inspector E. R. Duncan, Senior Resident Inspector - LaSalle M. J. Farber, Region III Inspector R. G. Krsek, Resident Inspector - Palisades J. D. Maynen, Resident Inspector D. L. Pelton, Resident Inspector - Braidwood H. Peterson, Region III Inspector N. Shah, Region III Inspector
Approved by:	A. Vegel, Chief Reactor Projects Branch 6 Division of Reactor Projects

EXECUTIVE SUMMARY

D. C. Cook Units 1 and 2
NRC Inspection Report 50-315/2000001(DRP); 50-316/2000001(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 5-week period of resident inspection activities and includes follow-up to issues identified during previous inspection reports.

Operations

- The inspectors identified that several steps of the Unit 2 emergency diesel generator load sequence surveillance test procedure had been performed out of order, contrary to Technical Specification 6.8.1. A Non-Cited Violation was identified for the failure to follow the surveillance procedure. (Section O1.2)

Maintenance

- Unit 2 ice basket loading and weighing activities were well controlled. The procedures reflected the correct Technical Specifications and workers followed the procedures. (Section M1.1)

- Case Specific Checklist Item 1, “Programmatic Breakdown in Surveillance Testing,” consisting of subitems 1A through 1E, is closed based on the inspection documented in NRC Inspection Report 50-315/316/99033 and evaluation of several extensive surveillance activities. In addition, Item C.4e, “Adequacy of Surveillance Tests/Test Program,” of Enclosure 2 to the September 17, 1999, letter updating the Case Specific Checklist is also closed. (Section M2.1)

- The licensee performed testing on the essential service water, safety injection, component cooling water, and emergency diesel generator systems. The component cooling water and emergency diesel generator systems performed as designed. The licensee was investigating issues associated with the essential service water and safety injection systems at the end of this inspection period. (Section M2.2)

Engineering

- Workers performed modifications to enhance containment recirculation sump water availability in accordance with the associated design change packages. The workers obtained appropriate reviews and approvals when field deviations occurred. (Section M1.1)

- Implementation of Design Change Package 4261, “Modification of Auxiliary Feedwater Pump Rooms Ventilation System,” was performed in accordance with design requirements except for one pipe support that was not installed per design. The licensee initiated a field change notice to modify the support to correct the condition. (Section M1.2)

- The licensee inappropriately deferred a condition report until after restart of Unit 2. The condition report identified a non-conservative error associated with the elevation of an essential service water pump discharge pressure gauge that affected acceptance

criteria for the quarterly in-service testing. The licensee stated that revision of the associated procedures were in progress and the condition would have been resolved prior to restart. (Section E2.1)

- The inspectors identified two errors in the essential service water flow balance test acceptance criteria. The first error involved the specification of a minimum essential service water flow rate to the emergency diesel generators being less than required. The second error involved the failure to test the essential service water outlet valve from the component cooling water heat exchangers in both the open and close directions. The licensee corrected these errors prior to performing the essential service water flow balance test. (Section E2.2)

- The inspectors identified that the licensee failed to provide adequate design control over the development of acceptance criteria for the essential service water flow balance test. The design information transmittal used to provide acceptance criteria failed to provide adequate documentation of assumptions and their bases. This condition was contrary to requirements contained in licensee design control procedures which resulted in a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." (Section E3.1)

Plant Support

- The inspectors identified weaknesses in the design interface between the engineering and radiation protection departments. Specifically, there was no formal guidance for the conduct of an ALARA review of a design change package. (Section R3.1)

Report Details

Summary of Plant Status

Unit 1 remained defueled throughout the inspection period. The licensee completed all heavy lifts associated with the steam generator replacement project and continued associated work inside the Unit 1 containment.

Unit 2 remained defueled throughout the inspection period. The licensee completed loading and weighing the Unit 2 ice condenser ice baskets and continued flow passage and lower inlet door work. In addition, the licensee tested several safety-related systems to support core reload, including flow balances of the component cooling water system and the essential service water system. At the end of the inspection period, the licensee had completed load sequence and engineered safety features response time testing on the “B” Train equipment.

I. Operations

O1 Conduct of Operations

O1.1 General Comments

The inspectors conducted frequent observations of control room activities and equipment operation during the extended outage of both reactor units. Overall, plant operations were performed using approved operating procedures and reflected good operating practices. Noteworthy observations and findings are detailed in the report sections which follow.

O1.2 Command and Control of “B” Train Load Sequence Testing (Unit 2)

a. Inspection Scope (71707, C.4.a)

The inspectors observed portions of the Unit 2 “B” Train emergency diesel generator (D/G) load sequence and engineered safety features (ESF) response time testing. The inspectors reviewed the surveillance procedure and observed portions of the testing. The inspectors also assessed the testing activities as they related to NRC Restart Action Plan 0350 Item C.4.a, ”Operability of Technical Specification Systems.”

b. Observations and Findings

On March 27, 2000, the licensee began performing Engineering Head Procedure (EHP) 02-EHP 4030.232.217B, “DG2AB Load Sequence & ESF Testing,” Revision 0. This procedure tested the Unit 2 AB (“B” Train) emergency diesel generator (D/G) load sequencing and ESF response times. During the test, the inspectors noted that the test engineer and lead test director were continuously present in the control room. In addition, the Operations Manager, representing plant management, and a Performance Assurance department observer were frequently in the control room to monitor the testing.

On March 28, 2000, the inspectors identified that several steps of the test procedure were completed prior to reaching the point in the procedure where those steps were intended to be performed. Operators signed off steps in the “Restorations” sections of Attachments 8 and 9 to 02-EHP 4030.232.217B; however, Procedure Steps 4.1.119 and 4.1.120, which directed the operators to perform the “Restorations” sections, had not yet been reached. The inspectors notified the Shift Manager about the error, and testing was stopped.

The inspectors discussed the procedure error with the shift test engineer, the lead test director, and the Operations Manager. The test engineer and lead test director concluded that the error did not invalidate the remainder of the test because the D/G and ESF timing data had already been collected. The Operations Manager stated that the number of people in the control room created a distracting environment and could have contributed to the procedure error. The inspectors counted, at one point, 32 people present in the control room. The inspectors discussed the impact of the number of people in the control room with the Operations Manager, and the Operations Manager directed the Unit Supervisor to have all non-essential personnel to leave the control room and wait in the Technical Support Center until needed. The Operations Manager then directed the lead test director to brief the relieving shift about the error and the importance of maintaining command and control during complex testing. The licensee also wrote Condition Report 00-4776 to document the procedure error.

Over the next 2 days, the inspectors observed additional sections of the “B” Train load sequence testing. The inspectors noted that control room activity was kept to a minimum, and the completion of individual procedure steps was directly controlled by the lead test director with the Unit Supervisor’s concurrence. At the end of the report period, the licensee had successfully completed the “B” Train load sequence testing.

Technical Specification (TS) 6.8.1 requires, in part, that written procedures shall be established, implemented and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide (RG) 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 provide direction on procedure adherence. Plant Managers Procedure (PMP) 2010.PRC.003, “Procedure Use and Adherence,” Revision 1, provided management expectations regarding procedure use and adherence.

Step 3.2.6 of PMP 2010.PRC.003 required that the procedure action steps of a “continuous use” procedure must be performed in sequence unless specifically allowed by the procedure to use a different or simultaneous performance sequence. Contrary to the above, on March 28, 2000, the inspectors identified that several action steps of Surveillance Procedure 02-EHP 4030.232.217B, “DG2AB Load Sequencing & ESF Testing,” designated as a “continuous use” procedure, were performed out of sequence. The “Restorations” sections of Attachments 8 and 9 to the surveillance procedure were accomplished prior to being directed by the procedure and a different or simultaneous performance sequence was not allowed.

The inspectors determined that the failure to follow plant procedural requirements was a Violation of TS 6.8.1. This Severity Level IV violation is being treated as a Non-Cited Violation (NCV), consistent with Appendix C of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as CR 00-4776 (NCV 50-316/2000001-01).

c. Conclusions

The inspectors identified that several steps of the Unit 2 emergency diesel generator load sequence surveillance test procedure had been performed out of order, contrary to Technical Specification 6.8.1. A Non-Cited Violation was identified for the failure to follow the surveillance procedure.

The inspectors assessed this event as it related to NRC Restart Action Plan 0350 Item C.4.a, "Operability of Technical Specification Systems." The inspectors noted that, although the licensee had failed to follow the test procedure in sequence, the safety significance of the event was minimal. Licensee immediate corrective actions to address this issue were prompt and reasonable. In addition, a CR was initiated to document the issue, and to track and trend corrective actions. Overall, the inspectors concluded that the Unit 2 emergency diesel generator load sequence surveillance test was adequate to demonstrate operability of associated systems.

O5 Operator Training and Qualification

O5.1 (Closed) Inspection Followup Item (IFI) 50-315/316/97305-01(DRS): Critical Safety Function Status Trees (CSFST) monitoring requirements. The concern was that the licensee's procedure Operating Head Instruction (OHI) 4023, "Emergency Operating Procedure User's Guide," Attachment 2, "STA (Shift Technical Advisor) Guideline for CSFST Usage," Revision 4, Step 3.5, indicated that if a Red or Orange condition existed, then CSFST monitoring frequency must be increased and that the time between consecutive evaluations should not exceed 10 minutes. The Westinghouse Owners Group Users Guide For Emergency Response Guidelines, dated September 1, 1983, stated, "Status Tree monitoring should be continuous if any ORANGE or RED condition is found to exist." During a licensed operator requalification program inspection (NRC Inspection Report 50-315/316/2000009 (DRS)), the inspectors reviewed the most recent revision of OHI 4023, Attachment 6, "Rules of Usage for Critical Safety Function Status Trees," Revision 6, for CSFST monitoring requirements. Attachment 6, Step 6.1 of the updated monitoring requirements, states, "IF a Red or Orange condition is encountered, THEN CSFST must be monitored continuously." The licensee updated the CSFST monitoring requirements to correspond to the emergency response user's guideline. This item is considered closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707, C.3.1.d, C.4.a)

During this inspection period, the licensee continued to test the Unit 2 emergency core cooling system (ECCS) and emergency diesel generators (D/Gs) in accordance with their integrated test plan. The ECCS and D/G testing was performed to complete post-maintenance testing, collect system performance data, and satisfy Technical Specification surveillance requirements. The inspectors observed portions of the licensee's testing listed in Section M2.1.

In addition, the inspectors also observed all or portions of the following maintenance activities and reviewed associated documentation:

- 12-EHP.SP.146, Revision 0, "Ice Condenser Ice Weight Data Analysis"
- 12-MHP.SP.C45263, Revision 5, "Ice Basket Filling–Alternate Method"
- 12-MHP 4030.010.001, Revision 3, "Ice Condenser Basket Weighting Surveillance"
- Job Order C53661, "2-DCP-4261, HELB [High Energy Line Break] Concerns in the TDAFP [Turbine Driven Auxiliary Feedwater Pump] and Hallway"

The inspectors assessed the observations and findings developed during this review as they related to the Manual Chapter 0350, Guidelines for Restart Approval, Item C.3.1.d, "Understanding of Plant Issues and Corrective Actions," and Item C.4.a, "Operability of Technical Specification Systems."

b. Observations and Findings

The current revision of the appropriate procedures were in use at the work sites, and proper work safety and radiological protection practices were noted. Work items were appropriately scheduled in the plan of the day. Noteworthy observations and findings are detailed below and in the report sections which follow.

- The inspectors reviewed ice loading and weighing activities in the Unit 2 ice condenser. The procedures referenced the appropriate TS and the inspectors concluded that the procedures provided sufficient guidance. Workers followed procedures during ice loading, weighing and other associated activities. The inspectors also noted licensee supervision performing walkdowns of the work areas and observing contractor activities. Foreign material exclusion controls were also properly implemented in the work areas. All observed material taken into the Unit 2 ice condenser was logged and equipment storage in the ice condenser was well controlled. The inspectors reviewed Condition Reports related to ice loading and weighing activities generated since January 2000, and did not identify any significant adverse trends.

- The inspectors reviewed and observed portions of the licensee's installation of Design Change Package (DCP) 2-DCP-679, Revision 0, "Modification to Containment Flood Up Overflow Wall," and 2-DCP-443, Revision 0, "Re-Route Three Floor Drains to the Containment Recirculation Sump." The DCPs were issued to increase the available water to the recirculation sump by adding holes to the crane wall and re-routing three upper containment floor drains to the recirculation sump. Modification 2-DCP-679 installed five holes in the containment flood up overflow wall in order to resolve one of the dead ended compartment issues that were identified by the NRC Architect Engineering Team in August of 1997. Modification 2-DCP-443 re-routed three floor drains from upper containment to the annulus area to inside of the crane wall.

  Confirmatory Action Letter Item 1, Recirculation Sump Inventory/Containment Dead Ended Compartments Issue, Restart Action Matrix Item R.2.2.4, URI 50-315/316/97017-05, "The As-Found Condition of the Containment Recirculation Sump Relative to Technical Specification Operability During Modes 1, 2, and 3," and R.2.3.26, EEI 50-315/316/98009-06, "Apparent Failure to Demonstrate, Using Design Basis Documentation, That There Was Adequate Containment Recirculation Sump Water Volume Following a LOCA" addressed the regulatory and safety aspects of this issue.

  The inspectors determined that the containment modifications to enhance recirculation sump water availability were performed in accordance with the design change packages and field change notices. The associated Restart Action Matrix items were closed in NRC Inspection Report 50-315/99029. Radiation shielding modifications related to DCP-679 are discussed in Section R3.1, below.

c. Conclusions

The Unit 2 ice basket loading and weighing activities were well controlled and appropriately performed. The containment modifications to enhance recirculation sump water availability were performed in accordance with the design change packages. The inspectors also concluded that appropriate reviews and approvals were obtained for field deviations from the modification requirements.

The inspectors assessed these items as they related to NRC Restart Action Plan 0350 Item C.3.1.d, "Understanding of Plant Issues and Corrective Actions," and Item C.4.a, "Operability of Technical Specification Systems." The inspectors concluded that the installation of the compartment modifications adequately addressed the recirculation sump inventory which contributed to the extended plant shutdown.

M1.2 Review of DCP-4261, “Modification of Auxiliary Feedwater Pump (AFP) Rooms Ventilation System” Installation

a. Inspection Scope (62707, C.4.b, C.4.f)

The inspectors reviewed the implementation of DCP-4261, which replaced existing ventilation fans in each of the auxiliary feedwater pump rooms with room coolers. The DCP also sealed the AFP rooms to mitigate the effects of a high energy line break. The modification had not been completed at the conclusion of this inspection period.

The inspectors assessed the observations and findings developed during this review as they related to the Manual Chapter 0350, Guidelines for Restart Approval, Item C.4.b, “Operability of Required Secondary and Support Systems,” and Item C.4.f, “Significant Hardware Issues Resolved.”

b. Observations and Findings

The licensee considered that the AFP room ventilation modifications constituted an unreviewed safety question (USQ) in accordance with 10 CFR 50.59. The licensee determined that the probability of malfunction of the new AFP pump room cooling system was higher than the failure probability associated with the original ventilation equipment. The licensee submitted a license amendment request to the NRC on February 18, 2000, requesting review of the modifications to the auxiliary feedwater pump room. The licensee’s USQ submittal was under review by the NRC.

The inspectors observed portions of the AFW pump room modifications conducted in accordance with job order (JO) C53661, “2-DCP-4261, HELB [High Energy Line Break] Concerns in the TDAFP [Turbine Driven Auxiliary Feedwater Pump] and Hallway,” and action request (AR) A194569, “2-DCP-4261 HELB Concerns TDAFP & MDAFP [Motor Driven Auxiliary Feedwater Pump] Rooms.” The inspectors concluded that maintenance workers were knowledgeable, had appropriate procedures at the worksite, and maintained foreign material exclusion and material accountability in accordance with procedural requirements. Security and fire protection requirements were met during observed work activities.

The inspectors performed a walkdown of the work area, and determined that the room cooler installation was consistent with the DCP and design drawings with the exception that one pipe hanger was not installed in accordance with design drawings. Specifically, the ESW return piping from the Unit 2 east MDAFP room cooler was in hard contact with pipe support 2-AESW-R5315, which supported the Unit 2 TDAFP east room cooler return line. This condition was contrary to the applicable design drawings. The licensee initiated CR 00-5316 to document the condition and intended to issue a field change notice to modify the pipe support and correct the condition.

c. Conclusions

Implementation of Design Change Package 4261, “Modification of Auxiliary Feedwater Pump Rooms Ventilation System,” was performed in accordance with design requirements except for one pipe support that was not installed per design. The licensee initiated a field change notice to modify the support to correct the condition.

The inspectors assessed these items as they related to NRC Restart Action Plan 0350 Item C.4.b, "Operability of Required Secondary and Support Systems," and Item C.4.f, "Significant Hardware Issues Resolved." The inspectors concluded that the licensee was implementing adequate corrective actions to resolve high energy line break concerns associated with the auxiliary feedwater system.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Case Specific Checklist Item 1, "Programmatic Breakdown in Surveillance Testing"

a. Inspection Scope (61726)

By NRC letter dated September 17, 1999, the NRC transmitted the updated Case Specific Checklist for the D.C. Cook Nuclear Plant, which identified specific issues requiring resolution prior to restart. The inspectors focused on the licensee's corrective actions for resolution of Case Specific Checklist Item 1, "Programmatic Breakdown in Surveillance Testing," which consisted of the following:

Item 1A:	Inadequate Instructions in Surveillance Tests
Item 1B:	Acceptance Criterion Lack Sufficient Margin to Analysis Limit
Item 1C:	Failure to Meet Technical Specification Requirements
Item 1D:	Preconditioning of Equipment Prior to Surveillance Testing
Item 1E:	Failure to Assess and Control the Quality of Contractors Performing Surveillance Testing

The standard applied to evaluate the acceptability for resolution of these items was that described in paragraphs C.1.1 "Root Cause Determination," C.1.2 "Corrective Action Development," and C.1.3 "Corrective Action Plan Implementation and Effectiveness," of Enclosure (2) of the NRC letter transmitting the CSC.

As documented in NRC Inspection Report 50-315/316/99033, a team inspection of the licensee's surveillance testing program concluded that: (1) no concerns were identified with the programmatic aspects of the plan, (2) the root causes reviewed appeared adequate, (3) the approach to corrective actions appeared adequate, and (4) the specific actions to address the corrective actions had been initiated. However, the team was unable to review and observe an adequate number of surveillance procedures to draw a conclusion about the overall effectiveness of the corrective actions. Consequently, the inspection team was not able to support closure of Case Specific Checklist Item 1. The purpose of this current inspection was to review associated documentation and observe a sufficient number of surveillance activities so that a conclusion can be drawn regarding the adequacy of licensee corrective actions.

b. <u>Observations and Findings</u>

The inspectors observed or reviewed several surveillance activities during this current inspection period in addition to the three surveillance activities described in NRC Inspection Report 50-315/316/99033. The activities observed or reviewed during this current inspection were:

- 02-EHP SP.114, "Component Cooling Water Pump Performance Test," Revision 0
- 02-EHP 4030.208.001, "ECCS [emergency core cooling systems] Flow Balance - Safety Injection System," Revision 2
- 02-EHP 4030.216.001, "CCW [component cooling water] Flow Balance," Revision 0
- 02-EHP 4030.219.001, "ESW [essential service water] Flow Balance," Revision 2
- 02-EHP 4030.232.217AB, "DG2AB Load Sequencing & ESF Response," Revision 0
- 02-OHP 4030.STP.027AB, "Diesel Generator Operability Test (Train B)," Revision 12
- 01-OHP 4030.STP.027CD, "Diesel Generator Operability Test (Train A), Revision 14, Attachment 2, DG1CD Fast Speed Start"
- 01-OHP 4030.STP.027CD, "Diesel Generator Operability Test (Train A), Revision 14, Attachment 7, Fuel Oil Transfer Pumps 1-QT-106-CD2 Quarterly and 1-QT-106-CD1 Monthly Checks"
- 02-OHP-4030.232.001, "Simultaneous Start of AB and CD Diesel Generators," Revision 0

A summary of the inspectors' findings are addressed below. Sections M2.2, E2.2, and E3.1 in this report discuss the testing in further detail.

- <u>Item 1A - Adequacy of instructions to ensure Technical Specification Surveillance Requirements Met</u>

  The procedures contained sufficient detail to ensure repeatability of the method used. The procedures ensured that when data is taken that the appropriate personnel (shift manager, plant manager, etc.) are informed of identified test failures. The procedures controlled the test environment to ensure that the data taken is "as-found," accurate, and consistent with TS requirements. The inspectors did identify some concerns with the instructions in the original issuance of the ESW flow balance procedure (Procedure 02 EHP 4030.219.001); however, the licensee corrected the procedure prior to its use.

- Item 1B - Sufficient Margin to Analyzed Limit

  The procedures for the observed surveillance activities contained acceptance criteria in accordance with the TS and specifically referenced other programmatic criteria as appropriate. The inspectors identified no concerns regarding measurement and instrument uncertainty in the procedures.

- Item 1C - Failure to Meet Technical Specification Requirements

  The TS requirements were appropriately reflected in the surveillance procedures. The inspectors independently confirmed the licensee’s test results and determined that the licensee initiated proper action to correct test discrepancies. The inspectors also verified that the licensee performed the tests within the required periodicity.

- Item 1D - Preconditioning of Equipment Prior to Surveillance Testing

  The inspectors identified no substantive concerns with preconditioning of equipment prior to testing. The inspectors discussed some procedure improvement opportunities with the licensee.

- Item 1E - Failure to Assess and Control the Quality of Contractors Performing Surveillance Testing

  The inspectors identified no concerns with the licensee’s control of contractors. The inspectors determined that there was sufficient management oversight to ensure that licensee procedural compliance was maintained. Performance Assurance personnel provided an appropriate level of verification.

Based on this current inspection and the inspection documented in NRC Inspection Report 50-315/316/99033, Case Specific Checklist Item 1 is closed. In addition, Item C.4e, “Adequacy of Surveillance Tests/Test Program,” of Enclosure 2 to the September 17, 1999, letter updating the Case Specific Checklist is also closed.

c. Conclusions

Case Specific Checklist Item 1, “Programmatic Breakdown in Surveillance Testing,” consisting of subitems 1A through 1E, is closed based on the inspection documented in NRC Inspection Report 50-315/316/99033 and evaluation of several extensive surveillance activities. In addition, Item C.4e, “Adequacy of Surveillance Tests/Test Program,” of Enclosure 2 to the September 17, 1999, letter updating the Case Specific Checklist is also closed.

M2.2 Emergency Core Cooling System Integrated Testing (Unit 2)

a. Inspection Scope (61726, 71707, C.4.a, C.4.b, C.4.c)

The inspectors assessed the observations and findings developed during this review as they related to the Manual Chapter 0350, Guidelines for Restart Approval, Item C.4.a, "Operability of Technical Specification Systems," Item C.4.b, "Operability of Required Secondary and Support Systems," and Item C.4.c, "Results of Pre-Startup Testing."

The inspectors observed or reviewed portions of the testing on the following Unit 2 systems: Essential Service Water (ESW), Safety Injection (SI), Component Cooling Water (CCW), and Emergency Diesel Generators (D/Gs).

b. Observations and Findings

b.1 Essential Service Water

The inspectors observed portions of the ESW system flow balance test conducted in accordance with 02-EHP 4030.219.001, "ESW Flow Balance." This test was performed to satisfy the requirements of TS 4.7.4.1.b and to demonstrate the capability of a single ESW pump to mitigate a loss of coolant accident. The inspectors concluded that the test performance was well controlled, the unit supervisor exercised good command and control, and communications among the various test watchstanders was adequate. The inspectors observed Performance Assurance department personnel and licensee senior management monitoring the test performance. Other observations are detailed below:

- The inspectors noted that the ESW flow balance procedure did not explicitly limit the screen house forebay water level during the test. Variances in water level directly affected ESW pump capability since decreasing the screen house water level required a higher net pump lift by the ESW pumps. The inspectors reviewed water levels recorded on 1-XLR-802, "Upstream Forebay (Screen House Forebay) Level," and determined that forebay level varied as much as 6 feet during performance of the flow balance. The calculations which were used to establish the test acceptance criteria included margin for a maximum screen house level decrease of 6 feet. Because the screen house forebay water level changes experienced during the test were 6 feet, the inspectors questioned if the water level used in the calculation was bounding. Specifically, the inspectors were concerned that the 6 foot water level change could be exceeded during normal plant operations, and as a result, the operability of the ESW system could be adversely affected.

- On March 18, 2000, prior to the start of the west ESW train flow balance, the inspectors performed a routine walkdown of the test equipment installation, including temporary flow transmitters and pressure gages. The inspectors identified that four temporary differential pressure detectors were installed backwards. The detectors were located on the ESW supply lines to the containment spray heat exchangers and the component cooling water heat exchangers. These detectors had been installed per Step 2.5 of 02-EHP 4030.219.001 and the installation and verification signoffs in the test procedure had been completed. The inspectors immediately notified the Unit Supervisor of the discrepancy, and the licensee initiated CR 00-4384 to document the incorrect installation. The responsible Instrumentation and Controls supervisor stated that the cause of the incorrect installation was due to personnel error. The inspectors concluded that, although the instruments were not adequately installed or verified, the error would be self-evident during later performance of the flow balance test and would not have resulted in the collection of erroneous data.

Additional observations and findings related to the performance of the ESW flow balance test are discussed in Sections E2.2 and E3.1 below.

b.2 Safety Injection

Technical Specification 4.5.2.h required the licensee to perform a flow balance test following completion of modifications to the ECCS subsystem that alter the subsystem flow characteristics and verifying system flow rates. For the SI system, the TS required a minimum of 300 gallons per minute (gpm) to both the Loop 1 and 4 Cold Legs and the Loop 2 and 3 Cold Legs. The single pump combined flow for all four loops was required to be less than 640 gpm. Engineering Head Procedure (EHP) 02-EHP 4030.208.001, “Unit 2 ECCS Flow Balance - Safety Injection System,” Revision 2, was used to perform the flow balance. If required, throttle valves installed in the injection lines could be set to ensure that the TS requirements would be satisfied. After the flow balance, the procedure directed the licensee to record the throttle valve position and seal the valves in the throttled position. The inspectors reviewed the test procedure and found that the procedure adequately addressed the TS 4.5.2.h flow requirements for the SI system.

Due to a difference in pump performance, the licensee was not able to obtain satisfactory flow from both SI pumps with a single throttle valve setting. Both pumps achieved the TS minimum flow requirement of 300 gpm to each injection line; however, after setting the throttle valves to achieve the minimum flow for the south SI pump, the north SI pump exceeded a combined injection flow of 640 gpm.

The licensee began an extensive troubleshooting effort to diagnose the problem and balance the performance between the two SI pumps. The licensee replaced the south SI pump rotating assembly. After the repair, the south SI pump performance did not significantly improve, and the licensee replaced the entire south SI pump. The new pump also did not significantly improve the south SI pump performance. At the end of this report period, the licensee had not yet determined the reason for the difference in performance between the north and south SI pumps, and the troubleshooting efforts were continuing.

b.3 Component Cooling Water

The licensee performed a flow balance of the CCW system in order to verify that the system was capable of meeting the Updated Final Safety Analysis Report (UFSAR) flow rates. On March 16, 2000, the licensee completed flow balancing of the CCW system and found that the flow rates measured during the test did not initially meet the acceptance criteria for the test. The licensee’s engineering staff wrote CR 00-4212 to document that 02-EHP 4030.216.001, CCW Flow Balance Step 4.1.12 flow acceptance criteria were not initially attained during the test.

The inspectors reviewed the test data and discussed the individual CCW flow measurements with members of the licensee’s engineering department. The licensee stated that the overall CCW flow rates as shown in the UFSAR were obtained; however, some individual components not specified in the UFSAR either had unobtainable flow rates or had flow rates which were below the acceptance criteria as stated in the CCW flow balance procedure.

The unobtainable flow rates were due to the inability of the surface mounted acoustical instruments to obtain accurate data on the 1-inch lines leading to the SI pump mechanical seal heat exchangers and oil coolers. The licensee performed additional testing and troubleshooting to verify that these components were receiving adequate flow. The flow rates which were below the acceptance criteria were evaluated by the licensee. In all but two cases, the acceptance criteria was set higher than needed to enhance instrument readability. When the flow rates were compared to the minimum flow required flow rate plus instrument uncertainty, the measured CCW flow rates were above the minimum required flow.

The two remaining cases involved the CCW flow to the hydrogen skimmer fan motor coolers and the post-accident sample cooler. A preliminary calculation for the fan motors showed that a lower flow rate to the motors was acceptable; therefore the achieved flow rate was acceptable. Similarly, the licensee evaluated the sample cooler flow and determined that a lower CCW flow to the cooler was also acceptable; therefore, the achieved flow rate was acceptable. The detailed evaluation and final approval of these two items were made Mode 4 constraints by the licensee and added to CR 00-4212 for tracking. The licensee also added a corrective action to the CR to revise the CCW flow balance procedure prior to performing the Unit 1 CCW flow balance to correct the acceptance criteria. The inspectors reviewed the licensee's proposed actions and determined that the licensee's methodology for evaluating the measured CCW flows appeared to be adequate.

b.4 Diesel Generator Load Sequence

The Unit 2 Technical Specifications required the licensee to test D/G load sequencing and ESF time response. Surveillance Procedure 02-EHP 4030.232.217A, "DG2AB Load Sequence & ESF Testing," Revision 0, was written to provide instructions for performing the testing in order to satisfy the TS requirements. The inspectors reviewed the surveillance procedure and noted that the procedure appeared to appropriately test the systems to verify that the ESF equipment responded as designed and TS requirements were being met.

The inspectors noted that the ESF equipment which was tested responded as designed. However, due to ongoing work in the plant to support restart, not all of the equipment required to be tested by the procedure was available for testing. For example, portions of the Unit 2 control room ventilation system were out-of-service for a modification. The surveillance procedure contained an allowance to defer testing unavailable equipment until prior to Unit 2 entering Mode 4.

c. Conclusions

The licensee performed testing on the essential service water, safety injection, component cooling water, and emergency diesel generator systems. The component cooling water and emergency diesel generator systems performed as designed. The licensee was investigating issues associated with the essential service water and safety injection systems at the end of this inspection period.

The inspectors assessed the observations and findings developed during this review as they related to the Manual Chapter 0350, Guidelines for Restart Approval, Item C.4.a, “Operability of Technical Specification Systems,” Item C.4.b, “Operability of Required Secondary and Support Systems,” and Item C.4.c, “Results of Pre-Startup Testing.” The inspectors concluded that the results of integrated emergency core cooling system testing demonstrated that the systems tested could perform their design functions. However, the inspectors had some unresolved questions regarding the ESW flow balance, and the licensee had not yet completed the troubleshooting on the Unit 2 south SI pump.

III. Engineering

E2 Engineering Support to Facilities and Equipment

E2.1 Condition Report Affecting Quarterly Inservice Testing (IST) Acceptance Criteria Scoped as Post-Restart

a. Inspection Scope (61726, 37751)

The inspectors reviewed data obtained during the ESW flow balance procedure described in Section M2.2.b.1. The procedure required the IST Program Manager to determine the performance level of each ESW pump. Because of uncertainty over the performance level of the Unit 2 West ESW pump, the licensee elected to perform 02-OHP 4030.STP.022W, “West Essential Service Water System Test,” in order to obtain additional pump performance data.

b. Observations and Findings

The licensee’s initial attempt to perform Surveillance Procedure 02-OHP 4030.STP.022W failed due to excessive leak by through pump discharge stainer back flush Valve 2-WRV-764. The valve leak-by resulted in a diversion of ESW pump flow which caused a lower than expected pump discharge pressure for the indicated ESW header flowrate. The strainer backwash valves had recently been upgraded by DCP-649, which also installed an automatic backup air system for the strainer backwash valves. The licensee initiated CR 00-4392 to document the failure of Valve 2-WRV-764. After the licensee switched the strainer to the opposite basket, which isolated the leaking valve, the pump performance test was completed with satisfactory results.

During a review of the test data, the inspector noted that the test procedure had not been revised to correct a non-conservative error associated with the elevation of ESW pump discharge pressure Gage 2-WPI-714. This issue was discussed in Section E1.1 of NRC Inspection Report 50-315/316/99017.

The elevation of Gage 2-WPI-714 is used in the calculation of total developed pump head, and a non-conservative gage elevation could result in a pump being declared operable with actual pump performance below the minium operability limit. The inspectors reviewed CR 00-0458, which documented the discrepancy in gage height, and noted that the CR was classified as “post-restart.” The CR was also classified as post-restart in the System Indexed Database System (SIDS) and had been approved by the system readiness review board and the system manager as a post restart item. Because the gage height discrepancy directly impacted the surveillance test acceptance criteria, the inspectors concluded that deferral of the CR to post-restart was inappropriate. After the inspectors questioned engineering department personnel about this issue, the licensee initiated CR 00-4858 to document the inappropriate deferral. The IST program manager stated that procedural revisions for the ESW quarterly surveillance test were in progress and the condition would have been addressed prior to restart, even though the CR was incorrectly classified as post-restart.

The inspectors previously evaluated use of the SIDS database and the impact of post-restart deferrals in NRC Inspection Report 50-315/316/99022. At that time, the inspectors concluded that the SIDS database was appropriately being used to track and disposition potential restart related items. Although the licensee improperly deferred CR 00-0458, due to the minimal safety significance of the error, the inspectors earlier conclusion remained valid.

c. Conclusions

The inspectors identified that the licensee inappropriately deferred a condition report until after restart of Unit 2. The condition report identified a non-conservative error associated with the elevation of an essential service water pump discharge pressure gauge that affected acceptance criteria for the quarterly in-service testing. The licensee stated that revision of the associated procedures were in progress and the condition would have been resolved prior to restart.

The inspectors previously evaluated use of the SIDS database and the impact of post-restart deferrals in NRC Inspection Report 50-315/316/99022. At that time, the inspectors concluded that the SIDS database was appropriately being used to track and disposition potential restart related items. Although the licensee improperly deferred CR 00-0458, due to the minimal safety significance of the error, the inspectors earlier conclusion remained valid.

E2.2 Acceptance Criteria for ESW Flow Balance Testing (Unit 2)

(Discussed) Unresolved Item (URI) 50-315/316/99021-02: “Review of TS requirements for ESW operability during design accident”

a. Inspection Scope (37751, 61726, c.4.c)

The inspectors reviewed 02-EHP 4030.219.001, “ESW Flow Balance,” test acceptance criteria for adequacy and conformance with design basis assumptions. The ESW flow balance acceptance criteria was developed to allow margin for differences between the tested system configuration and accident conditions, in addition to pump degradation.

The inspectors also reviewed the acceptance criteria to determine consistency with TS 4.7.4.1.b.

The inspectors assessed the observations and findings developed during this review as they related to the Manual Chapter 0350, Guidelines for Restart Approval, Item C.4.c, “Results of Pre-Startup Testing.”

b. Observations and Findings

The inspectors reviewed the test acceptance criteria and identified errors in the acceptance criteria contained in the original revision of the procedure. The inspectors also identified concerns associated with the methodology and assumptions used to derive and implement the test acceptance criteria. These issues are discussed below:

b.1 Errors Identified in ESW Flow Balance Acceptance Criteria

Procedure 02-EHP 4030.219.001 was issued on March 18, 2000. The inspectors reviewed the test procedure and identified two errors associated with the test acceptance criteria. These errors involved an inconsistency in the verification of the correct positioning of ESW valves upon receipt of a safety injection signal and an error in the acceptance criteria for the emergency diesel generator minimum required flow. These errors are discussed below:

- TS 4.7.4.1.b required that automatic valves servicing safety-related equipment be tested every 18 months to verify that they actuate to their correct position on a safety injection signal. The ESW outlet valves to the CCW heat exchangers actuate to an intermediate position upon the receipt of an SI signal. These valves have two limit switches to position the valve at the correct safety injection position when the valve is moving in either the closing or opening direction. The acceptance criteria in the original procedure revision only required that the valve travel to the correct intermediate position from the “as-found” position. After the inspectors questioned the basis for testing the valve only from the “as-found” position, the licensee revised the procedure to verify valve positioning from both the fully open and closed positions. Since the ESW flow balance procedure was similar to the previous flow balance procedure (02-EHP 4030.241) the inspectors questioned if TS 4.7.4.1.b had been appropriately performed in the past. The licensee initiated CR 00-4744 to evaluate if the CCW heat exchanger ESW outlet valves were appropriately tested in the past.

- During a review of the test acceptance criteria, the inspectors identified that the licensee made an error in the specified minimum flow requirements to the emergency diesel generators. The minimum flow requirements specified in the procedure were approximately 16 gpm lower than the required values. The licensee failed to include the full instrument inaccuracy in the acceptance criteria. After the inspectors questioned the acceptance criteria, the licensee initiated CR 00-4369 and revised the procedure.

b.2 <u>ESW Flow Balance Acceptance Criteria Could Potentially Impact Current Pump Operability Limits</u>

The licensee revised the test acceptance criteria several times during performance of the flow balance testing. Each test acceptance criteria revision reduced the available margin to current pump operability limits. The inspectors questioned if the results of the ESW flow balance indicated that a more restrictive pump minimum operability limit was introduced by reducing conservatism in the acceptance criteria. Specifically, the inspectors questioned the following four issues: (1) non-conservatism in acceptance criteria development methodology, (2) inconsistent use of vendor pump curves, (3) effect of instrument uncertainty in the selection of ESW pump performance level, and (4) variations in screen house forebay level during testing. These issues are discussed below:

- The licensee's methodology for development of test acceptance criteria involved the conversion of a total head loss margin to a flow addition factor. All required component flows were then increased by this flow addition factor. The flow addition factor was calculated based on pump degradation along a quadratic hydraulic system resistance curve referenced to the design pump head of 145 feet. As system head decreases along a quadratic resistance curve, the flow addition factor should be increased to maintain a constant total head loss margin. Because both ESW trains balanced at a system head less than 145 feet, the total head loss margin associated with the actual flow balance conditions was less than originally assumed. Additionally, as described in Section E3.1 below, the licensee reduced the flow addition factor by approximately 30 percent in the final acceptance criteria. The inspectors questioned if either of these factors could have resulted in the ESW flow balance results failing to bound current ESW pump minimum operability limits.

- During the flow balance procedure, the selection of pump performance level was based on the actual vendor curve for the installed pump rather than the nominal ESW pump curve. The selected pump performance level was used to identify appropriate test acceptance criteria. The acceptance criteria flow addition factor was reduced as pump performance level decreased. Based on discussions with engineering personnel and the inspectors' review of the test acceptance criteria, the inspectors concluded that, if the installed pumps were not compared to the nominal ESW pump curve used in the system safety analysis, the current pump operability limits might not be bounded by the ESW flow balance results. The inspectors questioned the inconsistent use of pump curves since comparison of the installed pump to a stronger pump curve could result in the selection of non-conservative acceptance criteria (i.e., the pump may be identified as a weaker pump and lower required acceptance criteria could have been assigned).

- The inspectors questioned if the uncertainty associated with the quarterly IST testing results could result in the selection of non-conservative test acceptance criteria. The flow balance procedure required the IST Program Manager to select a pump performance value to the ESW pump within a one percent range. The uncertainty associated with the quantification of pump performance during the quarterly IST testing was greater than a one percent difference in pump performance level. Consequently, the failure to appropriately consider the impact of uncertainty associated with pump performance level could have led to the selection of non-conservative acceptance criteria.

- As discussed in Section M2.2.b.1 above, the forebay level changes experienced during the flow balance approximately equal to the maximum forebay level change accounted for in the acceptance criteria. The inspectors questioned if the test results imposed an additional operability limit on the ESW pump or screen house forebay level.

The licensee initiated CR 00-5045 to track the evaluation of the ESW flow balance test results, including the issues discussed above, on ESW pump operability limits. Because the operability limits for the ESW pumps impacts the resolution of URI 50-315/316/99021-02, the inspectors will continue to track the evaluation of the ESW pump operability limits under this URI.

c. Conclusions

The inspectors identified two errors in the essential service water flow balance test acceptance criteria. The first error involved the specification of a minimum essential service water flow rate to the emergency diesel generators being less than required. The second error involved the failure to test the essential service water outlet valve from the component cooling water heat exchangers in both the open and close directions. The licensee corrected these errors prior to performing the essential service water flow balance test.

The inspectors assessed the observations and findings developed during this review as they related to the Manual Chapter 0350, Guidelines for Restart Approval, Item C.4.c, “Results of Pre-Startup Testing.” The inspectors concluded that the licensee did not fully evaluate the possible impact of test results on pump operability limits. The inspectors will track the evaluation of the ESW pump operability limits under URI 50-315/316/99021-02, “Review of TS requirements for ESW operability during design accident.”

E3 Engineering Procedures and Documentation

E3.1 Undocumented Assumptions Used In Design Information Transmittal (DIT)

a. Inspection Scope (37751)

The acceptance criteria for the ESW Flow Balance Procedure (02-EHP 4030.219.001) was developed using the Design Information Transmittal (DIT) process of 12-EHP 5040 DES.001, “Design Control.” The DIT process provided a mechanism to transmit design information across design interface organizations, in this case the design engineering and test engineering organizations. The inspectors reviewed the content of DIT B-00944-02, “ESW Flow Balance Test Acceptance Criteria Summary for 02-EHP 4030.219.001,” for consistency with design control requirements and procedures.

b. Observations and Findings

Following a review of DIT-B-00944-02 and discussions with engineering department staff, the inspectors concluded that the DIT, which provided the acceptance criteria used in Revision 2, change 2 of the ESW flow balance procedure, did not adequately document key assumptions. For example, the DIT did not document the basis for the following assumptions: (1) an assumed four percent degradation in pump head due to degraded voltage and frequency conditions that could exist during loss of offsite power conditions, (2) a change in the reference pump head value used to determine acceptance criteria from 155 feet to 145 feet, and (3) the basis for a “slope correction” that reduced the test acceptance criteria flow addition factor by approximately 30 percent.

The engineering personnel responsible for the development of the DIT informed the inspectors that engineering judgement was used to develop the DIT methodology and inputs. Although 12-EHP 5040 DES.001 Section 4.6.4 allowed the use of engineering judgement, Engineering Head Instruction (EHI)-5045, “Design Control,” Revision 0, required that additional requirements be met when engineering judgement was used. Specifically, Section 4.3.3 of EHI-5045 required the documentation of assumptions used to form an engineering judgement. Furthermore, Section 4.3.5 of EHI-5045 required that the content of this documentation shall be such that a “knowledgeable individual can understand the engineering judgement and its basis without recourse to the originator.” The inspectors concluded that DIT-B-00944-02 failed to meet the requirements of EHI-5045 in that the basis for several key assumptions were not documented.

10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” required, in part, that activities affecting quality shall be prescribed by documented instructions and shall be accomplished in accordance with these procedures. Contrary to these requirements and EHI-5045 Section 4.3, DIT-B-00944-02 used engineering judgement but failed to provide adequate documentation of assumptions and their basis. This Severity Level IV violation is being treated as a Non-Cited Violation (NCV), consistent with Appendix C of the NRC Enforcement Policy. This violation is in the licensee’s corrective action program as CR 00-5091 (NCV 50-315/316/2000001-02).

c. Conclusions

The inspectors identified that the licensee failed to provide adequate design control over the development of acceptance criteria for the essential service water flow balance test. The design information transmittal used to provide acceptance criteria failed to provide adequate documentation of assumptions and their bases. This condition was contrary to requirements contained in licensee design control procedures which resulted in a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings.”

E8 Miscellaneous Engineering Issues

E8.1 Inspectors Review of Restart Action Matrix Items

a. Inspection Scope (92700)

In a letter dated July 30, 1998, the NRC informed the licensee that an oversight panel had been established in accordance with NRC Manual Chapter (MC) 0350, and a checklist was enclosed which specified activities which the NRC considered necessary to be addressed prior to restart. In accordance with MC 0350, an inspection plan was developed to evaluate the effectiveness of the licensee's actions to correct the items listed on the Case Specific Checklist.

In addition to the Case Specific Checklist, on November 22, 1999, the NRC MC 0350 oversight panel developed a Restart Action Matrix (RAM) to track the completion of NRC and licensee activities which were determined necessary for plant restart. The NRC MC 0350 oversight panel assessed the RAM items on the basis of importance, either from a high priority or low priority standpoint, and established criteria for inspection of the RAM items based on these priorities. For priority items, the panel criteria required that: (1) the licensee had written a condition report to track the issue addressed by the RAM item, and (2) the licensee appropriately tracked the item as required for restart.

b. Observations and Findings

The inspectors reviewed the following low-risk items and concluded that the licensee's actions met the requirements of the MC 0350 oversight panel restart criteria; therefore, the following items are discussed.

- (Closed) RAM Item R.2.1.8, URI 50-315/316/98007-16: Review of additional information on the appropriateness of the use of duct tape inside containment.

  The licensee wrote CR 98-0930 to document the issue. The licensee performed a 10 CFR 50.59 safety evaluation and concluded that the use of duct tape as an aid to reinstall the bulkhead seals was acceptable. Maintenance Head Procedure 4030.STP.039, "Upper and Lower Containment Compartments Seal Material Inspection," was revised to allow the use of duct tape as a construction aid. This RAM item is closed.

- (Closed) RAM Item R.2.1.18, LER 50-315/98051-00: Reactor trip signal from manual safety injection not verified as required by Technical Specification surveillance.

  The licensee wrote CR 98-6496 to document the issue. The licensee planned to submit a supplement to the LER 50-315/98051-00 to include the results of an evaluation of the significance and cause of the missed Technical Specification surveillance.

Licensee Event Report 50-315/98051-00 will remain open pending the inspectors' review of the LER supplement. Restart Action Matrix Item 2.1.18 is closed.

- (Closed) RAM Item R.2.1.21, LER 50-315/99003-00: Control room pressurization system performance surveillance test does not test system in normal operating condition.

  The licensee established administrative controls to maintain the control room pressure boundary door between the Unit 1 and Unit 2 control rooms as closed. The licensee planned to submit a supplement to the LER 50-315/99003-00 to include the results of a control room habitability analysis. The analysis was scheduled to be complete after restart because the administrative controls maintained the control room pressure boundary door in its most conservative configuration.

  Licensee Event Report 50-315/99003-00 will remain open pending the inspectors' review of the LER supplement. Restart Action Matrix Item 2.1.21 is closed.

- (Closed) RAM Item R.2.1.22, LER 50-316/99002-00: Requirements of Technical Specification 4.0.5 not met due to improperly performed test.

  The licensee wrote CR 99-7440 to document the error. The licensee planned to issue a new procedure to correct the testing methodology deficiencies. The licensee's schedule for issuing the procedure is acceptable. Restart Action Matrix Item 2.1.22 is closed.

- (Closed) RAM Item R.2.3.38, URI 50-315/316/98009-23: Performing changes to safety-related procedures without apparent proper review and/or approval, contrary to the provisions of TS 6.5.3.1 and 10 CFR 50.59 requirements.

  The licensee wrote CR 97-3758 to document generic problems with the implementation of 10 CFR 50.59 program. This RAM item was related to RAM Item R.2.4.7, "Adequacy of operations procedure safety evaluations," which was closed in NRC Inspection Report 50-315/316/99029. Restart Action Matrix Item 2.3.38 is closed.

c. Conclusions

Based on verification that the issues were entered in the corrective action system, that the issues were properly characterized and classified, that appropriate corrective actions had been specified, and that the corrective actions were scheduled and tracked, the issues listed above are closed.

E8.2 <u>(Closed) RAM Item R.2.1.20, LER 50-315/98060-00</u>: Reactor trip response time testing does not comply with Technical Specification requirement.

On December 31, 1998, licensee personnel identified that the reactor trip system response time testing (RTSRT) procedure did not comply with the TS. Technical Specifications defined RTSRT as the time interval from when the monitored parameter exceeds its trip setpoint until loss of stationary gripper voltage. The licensee wrote CR 98-7855 to document the use of a constant rather than measured value to account for the stationary gripper coil voltage decay time portion of the reactor trip system time response testing.

The licensee had been using a constant value of 0.12 seconds to account for the stationary gripper voltage decay time. This value was determined by the measured difference in rod drop time initiated by pulling a single gripper coil fuse as compared to the rod drop time initiated by opening a reactor trip breaker. Since individual rod drop testing was done by pulling a single fuse, the licensee added 0.12 seconds to the measure time to account for the more realistic case of rod insertion initiated by the opening of the reactor trip breaker. Section 3.2.3.1.4 of the UFSAR stated that, as part of the basic operational requirements for a full length control rod drive mechanism, free fall of [the] drive assembly shall begin less than 150 milliseconds (0.15 seconds) after power interruption no matter what holding or stepping action is being executed with any load and coolant temperature of 100°F to 550°F.

The inspectors reviewed CR 98-7855 which stated that, “In 1990, after a series of memos attempting to clarify whether the decay of stationary gripper coil voltage needed to be included in the RTSRT, a decision was made to use 0.12 seconds to account for the time in RTSRT testing. However, the validity of the 0.12 second allowance was not fully verified and the reasoning was not fully documented. It appears that a 0.15 second allowance, already in place in the UFSAR, should have been used.” Based on the UFSAR description of the control rod drive mechanism operational requirements, the inspectors concluded that the use of 0.12 seconds to account for stationary gripper voltage decay time was not bounding and therefore, its use as a constant value to account for stationary gripper voltage decay time did not demonstrate that the RTSRT was within its TS limit.

Technical Specification 4.3.1.1.3 required, in part, that the reactor trip system response time of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Technical Specification Section 1.22 defined reactor trip system response time as the time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until loss of stationary gripper coil voltage. Instrument Head Procedure (IHP) 02-IHP 4030.STP.100, “Reactor Protection & Engineered Safeguards System Time Response,” Revision 1, was intended to provide instructions for satisfying TS Requirement 4.3.1.1.3. The surveillance procedure required the technician to add 0.12 seconds to the measure time before comparing the measured RTSRT to the acceptance criteria. Contrary to the above, the surveillance procedure contained a non-conservative figure to account for the stationary gripper voltage decay time; therefore, the TS requirement to demonstrate that the RTSRT was within its limit for each trip function was not met. The licensee reviewed the RTSRT test data and added 0.15 seconds in place of 0.12 seconds to each of the RTSRT test results to account for the stationary gripper voltage decay time. The licensee showed that the RTSRT would have met the reactor trip response time Technical Specification. Consequently, the inspectors determined that the failure to use an appropriate constant value for the stationary gripper voltage decay time constituted a violation of minor significance and is not subject to formal enforcement action.

The licensee planned to submit a supplement to the LER 50-315/98060-00 to include the results of an evaluation of the significance and root cause of the event. Licensee Event Report 50-316/98060-00 will remain open pending the inspectors' review of the LER supplement. Restart Action Matrix Item 2.1.20 is closed.

E8.3 (Closed) Inspector Follow-up Item 50-315/316/96009-01: Provide guidance on the scope and content of the quarterly, refueling cycle assessment for the maintenance rule implementation.

Station Procedure PMI-5035, Revision 2, "Maintenance Rule Program" (Section 6.7.2) and EHI 5035, Revision 4, "Maintenance Rule Program Administration" (Section 4.9) were revised to include guidance on performing the quarterly, refueling cycle assessment. The first of these assessments was completed on January 31, 1998, covering the 1996-1997 refueling cycle and the fourth quarter of 1997. The inspectors reviewed this report to verify that it was consistent with the procedural guidance. Additionally, a subsequent NRC inspection of the licensee's maintenance rule implementation was documented in NRC Inspection Report 50-315/316/97016 (DRS). This inspection concluded that the program was being acceptably implemented. Based on the licensee's actions, this item is considered closed.

IV. Plant Support

R1 Radiation Protection and Chemistry Controls (71750)

During normal resident inspection activities, routine observations were conducted in the area of radiation protection and chemistry controls using Inspection Procedure 71750. No uncontrolled releases of radioactive material were identified.

R3 Radiological Procedures and Chemistry Procedures and Documentation

R3.1 Weak Procedural Requirements for ALARA Reviews of Design Change Packages

a. Inspection Scope (71750)

The inspectors reviewed the radiation shielding analysis performed to support DCP-679, "Modification to Containment Flood Up Overflow Wall." The DCP required the installation of additional radiation shielding located on the annulus side of the flood up wall in order to reduce dose rates inside the annulus during power operation. The annulus region is periodically accessed by personnel during plant operation.

b. Observations and Findings

The inspectors reviewed the shielding analysis contained in Attachment 15 to DCP-679. The shielding analysis used a simple geometric attenuation equation to determine the increase in dose rates associated with the holes in the flood up wall. The analysis did not specifically address the potential effect of neutrons on doses in the annulus region. The inspectors questioned the basis of the assumptions used in the shielding analysis, including neglecting the effects of neutrons on total dose and the simplified treatment of gamma radiation streaming. After discussions with radiation protection personnel, the inspectors concluded that the shield design was reasonable. The licensee stated that, based on surveys performed during previous power operation, neutrons would not significantly contribute to the total dose in the annulus region.

Plant Managers Procedure 5043.MOD.009, “Design Change and Temporary Modification Package Reference Guide,” Revision 1 required the completion of an ALARA checklist for design change packages. The completed checklist for DCP-679 stated that the design required the addition of shielding materials and therefore required a detailed ALARA review. The radiation protection (RP) department reviewer included comments on the ALARA checklist indicating that the shielding design conformance with UFSAR Section 11.2, “Plant Radiation Shielding,” shall be addressed prior to implementation. The inspectors were informed by RP supervision that there was no formal documentation of a detailed ALARA review and that design change procedures did not provide guidance on the documentation of an ALARA review. The inspectors questioned how the comments documented on the ALARA checklist were incorporated into the review and approval of the DCP. The inspectors were informed that no formal method existed to ensure that comments were incorporated into the final approval of the DCP.

During discussions with RP supervision, the inspectors were informed that the shield design conformance with UFSAR Section 11.2 would be determined during post startup radiation surveys. Specifically, potential impacts on the annulus region plant zone classification, as defined in UFSAR Table 11.2-1, will be identified during these surveys. The licensee initiated CR 00-4571 to document that there was no formal guidance for the conduct of detailed ALARA design change reviews nor a formal mechanism to ensure proper disposition of comments documented in the ALARA checklist. Condition Report 00-4571 also documented other weaknesses in the ALARA interface with the design change process, including a lack of formal training offered to design engineers on good ALARA techniques and a lack of radiation protection representation on the design review board.

c. Conclusions

The inspectors identified weaknesses in the design interface between the engineering and radiation protection departments. Specifically, there was no formal guidance for the conduct of an ALARA review of a design change package.

S1 Conduct of Security and Safeguards Activities (71750)

During normal resident inspection activities, routine observations were conducted in the area of security and safeguards activities using Inspection Procedure 71750. No discrepancies were noted.

F1 Control of Fire Protection Activities (71750)

During normal resident inspection activities, routine observations were conducted in the area of fire protection activities using Inspection Procedure 71750. No discrepancies were noted.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of the licensee management at the conclusion of the inspection on March 31, 2000. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

X2 Summary of MC 0350 Restart Action Matrix Items

The inspectors reviewed selected items from the NRC Inspection Manual Chapter 0350 Case Specific Checklist (CSC) and the Restart Action Matrix (RAM). The following list indicates NRC CSC and RAM Items which are discussed in the report:

- Case Specific Checklist Item 1, “Programmatic Breakdown in Surveillance Testing,” which consisted of the following:

  Item 1A: Inadequate Instructions in Surveillance Tests
  Item 1B: Acceptance Criterion Lack Sufficient Margin to Analysis Limit
  Item 1C: Failure to Meet Technical Specification Requirements
  Item 1D: Preconditioning of Equipment Prior to Surveillance Testing
  Item 1E: Failure to Assess and Control the Quality of Contractors Performing Surveillance Testing

- RAM Item R.2.1.8, URI 50-315/316/98007-16, “Review of additional information on the appropriateness of the use of duct tape inside containment,” is discussed in Section E8.1. This item is closed.

- RAM Item R.2.1.18, LER 50-315/98051-00, “Reactor trip signal from manual safety injection not verified as required by technical specification surveillance,” is discussed in Section E8.1. This item is closed.

- RAM Item R.2.1.20, LER 50-315/98060-00, "Reactor trip response time testing does not comply with Technical Specification requirement," is discussed in Section E8.1. This item is closed.

- RAM Item R.2.1.21, LER 50-315/99003-00, "Control room pressurization system performance surveillance test does not test system in normal operating condition," is discussed in Section E8.1. This item is closed.

- RAM Item R.2.1.22, LER 50-316/99002-00, "Requirements of Technical Specification 4.0.5 not met due to improperly performed test, " is discussed in Section E8.1. This item is closed.

- RAM Item R.2.3.38, URI 50-315/316/98009-23, "Performing changes to safety-related procedures without apparent proper review and/or approval, contrary to the provisions of TS 6.5.3.1 and 10 CFR 50.59 requirements, "is discussed in Section E8.1. This item is closed.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

#A. Bakken, Site Vice President
#J. Cassidy, Radiation Protection
#R. Crane, Regulatory Affairs Supervisor
#S. Dort, Regulatory Affairs
#M. Finissi, Director, Plant Engineering
#R. Gaston, Compliance Manager
#S. Greenlee, Director, Design Engineering
#R. Godley, Director, Regulatory Affairs
#D. Hafer, Assistant Director, Design Engineering
#G. Harland, Work Control
#I. Jackiw, Regulatory Affairs
#R. Kalinowski, Engineering Programs Manager
#W. Kropp, Director, Performance Assurance
#A. Magnafici, Restart Group Engineer
#J. Molden, Director, Maintenance
#T. Mountain, Regulatory Affairs
#J. Pollack, Plant Manager
#M. Rencheck, Vice President, Nuclear Engineering
#B. Smalldridge, Assistant Operations Manager
#T. Taylor, Regulatory Affairs

# Denotes those present at the March 31, 2000, exit meeting.

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 62707: Maintenance Observation
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 92700: Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities

NRC MANUAL CHAPTER 0350 ITEMS DISCUSSED

- Item 1, “Programmatic Breakdown in Surveillance Testing”
- Item C.3.1.d, “Understanding of Plant Issues and Corrective Actions”
- Item C.4.a, “Operability of Technical Specification Systems“
- Item C.4.b, “Operability or Required Secondary and Support Systems”
- Item C.4.c, “Results of Pre-Startup Testing”
- Item C.4.f, “Significant Hardware Issues Resolved.”

ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened</u>

50-316/2000001-01	NCV	Failure to follow procedure during Unit 2 diesel generator load sequence testing
50-315/2000001-02 50-316/2000001-02	NCV	Undocumented engineering assumptions used in design information transmittal

<u>Closed</u>

50-315/96009-01 50-316/96009-01	IFI	The licensee was to provide guidance on the scope and content of the quarterly, refueling cycle assessment for the maintenance rule implementation.
50-315/97305-01 50-316/97305-01	IFI	Critical Safety Function Status Trees monitoring requirements
50-315/98007-16 50-316/98007-16	URI	Review of additional information on the appropriateness of the use of duct tape inside containment

50-315/98009-23 50-316/98009-23	URI	Performing changes to safety-related procedures without apparent proper review and/or approval, contrary to the provisions of TS 6.5.3.1 and 10 CFR 50.59 requirements
50-316/99002-00	LER	Requirements of TS 4.0.5 not met due to improperly performed test
50-316/2000001-01	NCV	Failure to follow procedure during Unit 2 diesel generator load sequence testing
50-315/2000001-02 50-316/2000001-02	NCV	Undocumented engineering assumptions used in design information transmittal

Discussed

50-315/98051-00	LER	Reactor trip signal from manual safety injection not verified as required by technical specification surveillance
50-315/98060-00	LER	Reactor trip response time testing does not comply with Technical Specification requirement
50-315/99003-00	LER	Control room pressurization system performance surveillance test does not test system in normal operating condition
50-315/99021-02 50-316/99021-02	URI	Review of TS requirements for ESW operability during design accident

LIST OF ACRONYMS

AFP	Auxiliary Feedwater Pump
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
AR	Action Request
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CR	Condition Report
D/G	Diesel Generator
DCP	Design Change Package
DIT	Design Information Transmittal
DHSO	Department Head Standing Order
DRP	Division of Reactor Projects
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Feature
ESRR	Expanded System Readiness Review
ESW	Essential Service Water
HELB	High Energy Line Break
IHP	Instrument Head Procedure
IMP	Instrument Maintenance Procedure
IST	In-Service Test
JO	Job Order
MC	Manual Chapter
MCCB	Molded Case Circuit Breaker
MDAFP	Motor Driven Auxiliary Feedwater Pump
MHP	Maintenance Head Procedure
MOV	Motor Operated Valve
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OHI	Operations Head Instruction
OHP	Operations Head Procedure
OSO	Operations Standing Order
PA	Performance Assurance
PMI	Plant Manager’s Instruction
PMP	Plant Manager’s Procedure
PMSO	Plant Manager’s Standing Order
PMT	Post Maintenance Testing
PDR	Public Document Room
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RTSRT	Reactor Trip System Response Time Testing
SRO	Senior Reactor Operator
STP	Surveillance Test Procedure
SWO	Stop Work Order
TDAFP	Turbine Driven Auxiliary Feedwater Pump
TS	Technical Specification
VIO	Violation