March 2, 2001

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 - NRC INSPECTION REPORT 50-315/01-04(DRS); 50-316/01-04(DRS)

Dear Mr. Powers:

On February 15, 2001, the NRC completed the baseline heat sink performance inspection at your D.C. Cook Units 1 and 2 reactor facilities. The enclosed report presents the results of that inspection. The results were discussed on February 15, 2001, with Mr. Rencheck and other members of your D.C. Cook staff.

The inspection was an examination of activities conducted under your license as they relate to compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspector identified seven findings of very low safety significance (Green). These findings were determined to involve four violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these findings as Non-Cited Violations, 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 the 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; 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).

Sincerely,

/RA/

John M. Jacobson, Chief
Mechanical Engineering Branch
Division of Reactor Safety

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

Enclosure: Inspection Report 50-315/01-04(DRS);
50-316/01-04(DRS)

cc w/encl: A. C. Bakken III, Site Vice President
J. Pollock, Plant Manager
M. Rencheck, Vice President, Nuclear Engineering
R. Whale, Michigan Public Service Commission
Michigan Department of Environmental Quality
Emergency Management Division
MI Department of State Police
D. Lochbaum, Union of Concerned Scientists

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D. Lochbaum, Union of Concerned Scientists

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-315; 50-316
License Nos:	DPR-58; DPR-74
Report No:	50-315/01-04(DRS); 50-316/01-04(DRS)
Licensee:	American Electric Power Company
Facility:	D. C. Cook Nuclear Generating Plant
Location:	1 Cook Place Bridgman, MI 49106
Dates:	February 12 - 15, 2001
Inspector:	M. Holmberg, Reactor Engineer
Approved by:	J. Jacobson, Chief Mechanical Engineering Branch Division of Reactor Safety

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:

Reactor Safety	Radiation Safety	Safeguards
● Initiating Events	● Occupational	● Physical Protection
● Mitigating Systems	● Public	
● Barrier Integrity		
● Emergency Preparedness		

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. And 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 05000315-01-04(DRS), IR 05000316-01-04(DRS), on 02/12-15/2001, American Electric Power Company, D.C. Cook, Units 1 and 2 Heat Sink Performance Inspection.

The inspection was conducted by a Region III engineering specialist. The inspection identified seven Green findings, which were determined to involve four Non-Cited Violations of NRC requirements. The significance of findings is indicated by their color (Green, White, Yellow, Red) using IMC 609 "Significance Determination Process" (SDP).

A. Inspector Identified Findings

Cornerstone: Mitigating Systems

- Green. One Non-Cited Violation of 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action" was identified, for failure to identify nonconforming conditions associated with dented tubes in the Unit 1 east containment spray heat exchanger and blocked tubes in the Unit 2 east component cooling water heat exchanger.

  Failure to evaluate dented tubes in the containment spray heat exchanger was considered more than minor because flaw detection was challenged. If flaws were left in service, the flawed tubes could fail, causing an uncontrolled release of radioactivity and loss of heat exchanger function.

  Failure to evaluate the remaining component cooling heat exchanger capability due to blocked tubes, was considered more than minor, because blocked tubes degrade the heat exchanger's capability to remove post accident heat loads.

  The safety significance of these findings was very low because only the mitigating systems cornerstone is affected and systems remained operable (1R07.b.1).

- Green. One Non-Cited Violation of 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action" was identified, for failure to identify nonconforming conditions associated with operation in excess of the maximum design differential pressure for the Unit 2 east component cooling water heat exchanger and the Unit 1 east containment spray heat exchanger.

  Exceeding the maximum design differential pressure limit for the component cooling water heat exchanger was considered more than minor, because it could cause divider plate failure potentially rendering the heat exchanger inoperable.

  Exceeding the maximum design differential pressure limit for the containment spray heat exchanger was considered more than minor because it was indicative of heat exchanger fouling, which could degrade the heat removal capability and potentially result in internal tube support structural failures. If the internal support structures fail, they could block flow and render the heat exchanger inoperable.

  The safety significance of these findings was very low because only the mitigating systems cornerstone is affected and systems remained operable (1R07.b.2).

- Green. One Non-Cited Violation of 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action" was identified, for failure to implement actions to prevent recurrence of failed containment spray heat exchanger tubes caused by microbiologically induced corrosion, and cracking of the component cooling water heat exchanger divider plate welds.

  Lack of action to preclude continued microbiologically induced corrosion of the containment spray heat exchanger tubes was considered more than minor because it could result in tube failures, which would result in an uncontrolled release of radioactivity and loss of heat exchanger function.

  Lack of action to preclude recurrence of divider plate weld cracking was considered more than minor because it could lead to divider plate failure, which would render the component cooling water heat exchangers inoperable.

  The safety significance of these findings was very low because only the mitigating systems cornerstone is affected and systems remained operable (1R07.b.3).

- Green. One Non-Cited Violation of 10 CFR Part 50 Appendix B, Criterion III "Design Control" was identified, for failure to perform a review to verify the impact of tube plugging on the heat exchanger design differential pressure limit in a calculation for all safety related heat exchangers.

  Failure to assess the impact of tube plugging on the maximum design differential pressure limit is considered more than minor, because heat exchangers could be returned to service with excessive differential pressure. Excessive differential pressure could cause internal structural component failure and loss of heat exchanger function.

  The safety significance of this finding was very low because only the mitigating systems cornerstone is affected and systems remained operable (1R07.b.4).

Report Details

Summary of Plant Status: Unit 1 and 2 were at 100 percent power during this inspection period, except when Unit 1 was manually tripped and shut down on February 15, 2001, after loss of the east main feed pump due to low condenser vacuum.

1. REACTOR SAFETY

Cornerstone: Mitigating Systems

1R07 Heat Sink Performance

a. Inspection Scope

The inspector reviewed documents associated with maintenance and thermal performance evaluation of the Unit 2 east component cooling water (CCW) heat exchanger (HX), Unit 1 east containment spray system (CTS) HX, and Unit 2 east residual heat removal (RHR) HX. These HXs were chosen for review based on their relatively high risk ranking among HXs. The inspector reviewed work orders, flow testing data, and associated calculations to confirm that these HXs met their design heat removal requirements or that maintenance practices were adequate to assure design performance.

The inspector reviewed condition reports concerning heat exchanger or heat sink performance issues to verify that an appropriate threshold for identifying issues had been established. The inspector also evaluated the effectiveness of the corrective actions for identified issues, including the engineering justification for operability, if applicable. The documents that were reviewed are included at the end of the report.

b. Findings

Seven findings of very low safety significance (Green), associated with maintenance and operation of the CTS and CCW HXs were identified. These findings were determined to involve four violations of NRC requirements.

.1 Conditions Adverse To Quality Not Entered Into The Corrective Action System

.1a CTS HX Tube Denting

During a 1999, eddy current examination (ET) of the Unit 1 east CTS HX, documented in ABB Combustion Engineering report A8635-1HE18E, 48 tubes were identified with significant dents (greater than 50 volts as measured by an eddy current bobbin probe). These dented tubes represented a nonconforming condition and were not entered into the corrective action system. Consequently, the cause or significance of this denting was unknown. In some of the dented tubes, a reduced diameter ET probe was used to inspect the tube in order to travers and inspect the dented area. A reduced diameter probe, results in a larger air gap between the probe and tube wall (fill factor), which

reduces the ET probe sensitivity to flaws. Further, the dented tubes produce large voltage ET signals which can mask detection of tube flaws.

Failure to evaluate dented tubes in the containment spray heat exchanger was considered more than minor because flaw detection was challenged. If flaws were left in service, the flawed tubes could fail, causing an uncontrolled release of radioactivity and loss of heat exchanger function. This finding if left uncorrected, could result in operation with a degraded CTS system, which would adversely impact the mitigating systems cornerstone.

The licensee considered the Unit 1 east CTS HX operable because of the recent tube inspections, flow balance testing, and quarterly flushing.

.1b CCW HX Tube Blockage

During April 1996 and November of 1997, inspections of the Unit 2 east CCW heat exchanger, the licensee identified up to 10 percent of the tubes which were blocked by sand/sediment, zebra mussel shells or alga as documented in job orders R0058377 and R0036932. The licensee had established a CCW plugging limit of five percent. Therefore, operation of the HX with 10 percent of the tubes blocked represented a nonconforming condition, potentially outside analyzed limits. However, the blocked tube condition was not entered into the corrective action system and consequently no formal evaluation was completed.

Failure to evaluate the remaining HX capability due to blocked tubes, was considered more than minor, because blocked tubes degrade the HX's capability to remove post accident heat loads. This finding if left uncorrected, could result in operation with a degraded CCW system, which would adversely impact the mitigating systems cornerstone.

The material fouling the HX tubes was removed as part of the cleaning performed under these work orders. The licensee stated that the blockage was mostly soft materials which would have likely been removed during restoration of essential service water (ESW) system flow and thus would not have significantly degraded the HX performance to the point of effecting operability.

These findings had a credible impact on safety; however, since only the mitigating systems cornerstone is affected and systems remained operable, the findings as evaluated by the SDP are considered to be of very low safety significance (Green). 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action" requires in part, that conditions adverse to quality such as deficiencies and nonconforming conditions be promptly identified and corrected. As of February 12, 2001, the licensee failed to identify that operation of the Unit 2 east CCW HX with blocked tubes and the Unit 1 east CTS HX with dented tubes, represented nonconforming conditions, which is a violation of 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action." However, due to the very low safety significance of these findings and because the licensee subsequently entered these findings into the corrective action program (eSAT 01045013 and eSAT 01045015), this violation is a Non-Cited Violation (NCV 50-315/01-04-01, NCV 50-316/01-04-01) in accordance with Section VI.A.1 of the NRC Enforcement Policy.

.2 Conditions Adverse To Quality Not Adequately Evaluated

.2a Operation Of CCW HX With Excessive Differential Pressure

On September 17, 1999, the licensee identified a bowed divider plate in the Unit 2 east CCW HX and documented this in condition report (CR) P-99-23346. In this CR, a differential pressure of 50 pounds per square inch (psi) was recorded for this HX. This differential pressure substantially exceeded the maximum design differential pressure of 15 psi. However, the licensee failed to recognize this non-conformance with design conditions and consequently, the cause of the high differential pressure was not investigated, nor the continued integrity of the divider plate assessed.

Exceeding the maximum design differential pressure limit for the CCW HX was considered more than minor, because it could cause divider plate failure. If the divider plate failed, tube bypass would occur, potentially rendering the HX inoperable. This finding if left uncorrected, could result in operation with a degraded CCW system, which would adversely impact the mitigating systems cornerstone.

The licensee believed that the 50 psi differential pressure recorded was in error, and based on recent flow testing the HX differential pressure was 28 psi. Further, the licensee believed that much of the differential pressure recorded was due to the pressure drop across the outlet valve and not across the divider plate. Therefore, based on engineering judgement, the licensee considered the Unit 2 east CCW HX operable.

.2b Operation Of CTS HX With Excessive Differential Pressure

In 1993, differential pressure as high as 65 psi was recorded in CR 93-1761 for the Unit 1 east CTS HX. In a July 1999, Dominion Engineering Report R-40414-01-2, the cause of the 1993, high differential pressure (shell side) was attributed to biological fouling of the steel tube support/baffle plates. This differential pressure substantially exceeded the maximum design differential pressure of 14 psi; however, the licensee failed to recognize and evaluate this nonconforming condition. Further, differential pressure data had been trended by the system engineer on approximately an annual basis, with recorded pressures above design from 1990 through 1997. In this trend data, peak differential pressure reached 30 psi prior to chemical cleaning performed in 1993 and 21 psi after this cleaning. The difference in peak recorded pressure appeared to be due to the difference in time that the data was collected (approximately one month) and flushes performed as a corrective action for the 65 psi reading. However, the effect on the integrity of the HX internal support structure (flow baffle plates, tube support plates, shell divider plate) from operating with an excessive differential pressure was never evaluated.

Exceeding the maximum design differential pressure limit for the CTS HX was considered more than minor because it was indicative of HX fouling, which could degrade the heat removal capability and potentially result in internal tube support structural failures. If the internal support structures fail, they could block flow and render the HX inoperable. This finding if left uncorrected, could result in operation with a degraded CTS system, which would adversely impact the mitigating systems cornerstone.

In the most recent flow test data for this HX taken in March of 2000, a differential pressure of 14 psi (maximum design limit) was recorded. Based on a vendor letter reference in the preoperational test data for this HX, the licensee believed that the maximum design differential pressure could be raised to 22 psi. Additionally, the licensee believed the that the Unit 1 east CTS HX was operable based on recent visual inspections of the shell side which did not identify any deficiencies.

These findings had a credible impact on safety; however, since only the mitigating systems cornerstone is affected and systems remained operable, the findings as evaluated by the SDP are considered to be of very low safety significance (Green). 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action" requires in part, that conditions adverse to quality such as deficiencies and nonconforming conditions be promptly identified and corrected. As of February 12, 2001, the licensee failed to identify that operation in excess of design differential pressure for the Unit 1 east CTS HX and the Unit 2 east CCW HX, represented nonconforming conditions, which is a violation of 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action." However, due to the very low safety significance of these findings and because the licensee subsequently entered these findings into the corrective action program (eSAT 01045050 and eSAT 01045048), this violation is a Non-Cited Violation (NCV 50-315/01-04-02, NCV 50-316/01-04-02) in accordance with Section VI.A.1 of the NRC Enforcement Policy.

.3 Lack Of Action To Prevent Recurrence Of Significant Conditions Adverse To Quality

.3a Preventative Action For CTS Tube Degradation/Failure Not Implemented

The licensee investigated the cause of the tube leaks and defects identified during a 1999, ET examination of the Unit 1 and Unit 2 CTS HXs. The evaluation and conclusions for the cause of these defects was documented in Dominion Engineering Report R-40414-01-2 issued in July of 1999. This report concluded that tube failures were predominately caused by microbiologically induced corrosion (MIC) of tubes from the ESW system on the shell side of the HXs. The Dominion Engineering report recommended several measures to arrest the MIC and ensure tube integrity. If action was not taken to eradicate the MIC, this report concluded that tube failures could occur rapidly (within a matter of months). To address this issue, action 3 of CR P-98-07066, required placing the CTS HXs in wet lay up with an appropriate biocide to arrest the MIC induced tube degradation. This action was not taken. The response to action 3 stated that the system would be placed in service with continuous chlorination, and that this process would prevent MIC from developing or adhering to the ESW side of the CTS HX. However, this action was also not implemented. The ESW flow to these HXs occurs for only 15 minutes on a quarterly basis and chlorination of the ESW system does not occur during the winter months. Thus, corrective action was not taken which would preclude continued tube degradation by MIC.

Lack of action to preclude continued MIC of the CTS HX tubes was considered more than minor because it could result in tube failures, which would result in an uncontrolled release of radioactivity and loss of HX function. This finding if left uncorrected, could result in operation with a degraded CTS system, which would adversely impact the mitigating systems cornerstone.

The licensee considered the potentially degraded CTS HXs operable based on recent inspections, flow balance testing and quarterly flushing.

.3b Preventative Action Not Taken For Cause Of CCW Divider Plate Cracking

In 1999, the licensee identified cracking of the divider sheet attachment weld of both Unit 2 CCW HXs as well as the Unit1 east CCW HX. In CR P-99-23878, the licensee documented cracking in the Unit 1 east CCW HX divider plate weld, and the cause was identified as lack of preventative maintenance. For similar cracking identified in the Unit 2 east CCW HX (CR 99-23681) the cause was listed as inadequate design thickness of the divider plate and for cracking in the Unit 2 west CCW HX (CR P-99-25835) no cause was identified. In 1989, (CR 1-05-89-1030) the Unit 1 west CCW HX divider plate was found to be cracked along almost the entire length of the attachment weld and the cause was identified as "normal fatigue." In each case, the cracks were repaired, but no actions were assigned to investigate and prevent repetition of the divider plate cracking.

Lack of action to preclude recurrence of divider plate weld cracking was considered more than minor because it could lead to divider plate failure, which would render the CCW HXs inoperable. This finding if left uncorrected, could result in operation with a degraded CCW system, which would adversely impact the mitigating systems cornerstone.

Because the divider plate cracking identified in each instance had been repaired, and based on recent HX inspections in the divider plate area, the licensee considered the CCW HXs operable.

These findings had a credible impact on safety; however, since only the mitigating systems cornerstone is affected and systems remained operable, the findings as evaluated by the SDP are considered to be of very low safety significance (Green). 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action" requires in part, that for significant conditions adverse to quality, the cause is determined and corrective action taken to preclude repetition. As of February 12, 2001, the licensee had failed to implement actions to prevent recurrence of failed CTS HX tubes caused by MIC, and cracking of the CCW HX divider plate welds (significant conditions adverse to quality), which is a violation of 10 CFR Part 50 Appendix B, Criterion XVI "Corrective Action." However, due to the very low safety significance of these findings and because the licensee subsequently entered these findings into the corrective action program (eSAT 01045052 and eSAT 01046029), this violation is a Non-Cited Violation (NCV 50-315/01-04-03, NCV 50-316/01-04-03) in accordance with Section VI.A.1 of the NRC Enforcement Policy.

.4 Inadequate Design Review For Tube Plugging In Safety Related HXs

In August of 2000, the licensee completed calculation MD-12-MSC-068N revision 1, which established acceptable design tube plugging limits for all safety related HXs. This calculation established plugging limits based on acceptable thermal performance criteria for the CCW, CTS, RHR HXs and others. However, this calculation lacked an evaluation of the impact on the design differential pressure caused by plugging tubes. For example, this calculation allowed five percent of the CCW HXs tubes to be plugged, without regard

to the potential for exceeding the maximum design tube side differential pressure limit of 15 psi.

Failure to assess the impact of tube plugging on the maximum design differential pressure limit is considered more than minor, because HXs could be returned to service with excessive differential pressure. Excessive differential pressure could cause internal structural component failure and loss of HX function. This finding if left uncorrected, could result in operation with degraded safety related systems, which would adversely impact the mitigating systems cornerstone.

The licensee considered the heat exchangers operable, because the HXs were not currently plugged at the maximum values allowed by this calculation.

This finding had a credible impact on safety; however, since only the mitigating systems cornerstone is affected and systems remained operable, the finding as evaluated by the SDP is considered to be of very low safety significance (Green). 10 CFR Part 50 Appendix B, Criterion III "Design Control" requires in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by calculational methods. Failure to perform a review to verify the impact of tube plugging on the HX maximum design differential pressure limit in calculation MD-12-MSC-068N, is a violation of 10 CFR Part 50 Appendix B, Criterion III "Design Control." However, due to the very low safety significance of the finding and because the licensee subsequently entered this finding into the corrective action program (eSAT 01045053), this violation is a Non-Cited Violation (NCV 50-315/01-04-04, NCV 50-316/01-04-04) in accordance with Section VI.A.1 of the NRC Enforcement Policy.

4. OTHER ACTIVITIES

4OA5 Management Meetings

Exit Meeting Summary

The inspector presented the inspection results to Mr. Rencheck, Vice President Engineering, and other members of licensee management at the exit meeting held on February 15, 2001. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Bakken, Site Vice President
M. Rencheck Vice President Engineering
R. Ebright, Plant Engineering
S. Greenlee, Design Engineering
T. Noonan, Director, Performance Assurance
G. Arent, Mechanical Design Manager
K. Muller, Mechanical Design Supervisor
W. McCrory, Engineering
E. Anderson, Engineering
N. Jackiw, Regulatory Affairs
J. Nadeau, Corrective Actions Supervisor

NRC

B. Bartlett, Senior Resident Inspector
K. Coyne, Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened & Closed

NCV 50-315/01-04-01 NCV 50-316/01-04-01	Failure to identify nonconforming conditions associated with operation of the Unit 1 east CTS HX with dented tubes and operation of the Unit 2 east CCW HX with blocked tubes is a violation of 10 CFR Part 50 Appendix B, Criterion XVI.
NCV 50-315/01-04-02 NCV 50-316/01-04-02	Failure to identify nonconforming conditions associated with operation in excess of the maximum design differential pressure for the Unit 2 east CCW HX and the Unit 1 east CTS HX is a violation of 10 CFR Part 50 Appendix B, Criterion XVI.
NCV 50-315/01-04-03 NCV 50-316/01-04-03	Failure to implement actions to prevent recurrence of failed CTS HX tubes caused by microbiologically induced corrosion and the CCW HX divider plate weld cracking is a violation of 10 CFR Part 50 Appendix B, Criterion XVI.

NCV 50-315/01-04-04 NCV 50-316/01-04-04	Failure to perform a review to verify the impact of tube plugging on the HX design differential pressure limit in a calculation for all safety related HXs is a violation of 10 CFR Part 50 Appendix B, Criterion III.

Discussed

None

LIST OF DOCUMENTS REVIEWED

Calculations

MD-12-MSC-068N, Revision 1	"Tube Plugging Allowance for Safety Related Heat Exchangers"
ENSM 990305AF, Revision 0	"Determine CCW Heat Exchanger UA Value During Recirculation Operation"
MD-12-CTS-007-N, Revision 1	"CTS Heat Exchanger UA Determination for Containment Integrity Analysis"
ENSM990414, Revision 0	"Determine RHR UA Value During Recirculation Operation"

Drawings

QH-12970, Revision B, "Combined Shell, Channel & Tube Sheets"
QH-31603-1-T, Revision B, "Bundle Detail"
8504-243500, Revision D, "Comb. Shell & Channel Details"
12-AEP-Y69G22615A-0, Revision 1, "Containment Spray Heat Exchanger Tube Layout"
BEV-15586, Revision B, "Residual Heat Exchanger Shell & Channel Details"

Corrective Action Reports

1-05-89-1030, Unit 1 West CCW HX Divider Plate Weld Cracks
P-98-07066, Hydro Testing of Unit 1 West CTS HX Failed Due to Leakage
P-98-01536, DTS Hxs Not Analyzed for Vibration Impact of Empty Tubes
P-99-25835, Unit 2 West CCW HX Divider Plate Weld Cracks
P-99-23346, Unit 1 East CCW HX Divider Plate Bowed
P-99-23681, Unit 2 East CCW HX Divider Plate Weld Cracks
P-99-23878, Unit 1 East CCW HX Divider Plate Weld Cracks
P-99-09241, CTS Hx Tubes Show Linear Cracks Along the Centerline of the Tube Weld
P-99-07521, Foreign Object Observed in U1 CTS Tube Bundle
P-99-020164, Cracks > 98 Percent in Tube Welds of All Four CTS HXs
P-99-06878, CR 95-95-0510 Concerns Not Addressed
P-99-23207, Failed Applied Protective Coatings
P-99-07171, Cracking at Unit 2 East CCW HX Pedestal
P-99-09741, No Corrosion Protection for CCW Side of RHR HX

Heat Exchanger Data Sheets, Vendor Manuals and Design Specifications

AEP Specification - DCCHP109QCN, Revision 1, "Nuclear Auxiliary Heat Exchangers"
Specification - DCCHP109QCN, Revision 1, "Heat Exchanger Data Sheet - Containment Spray"
Specification - DCCHP109QCN, Revision 1, "Heat Exchanger Data Sheet - Component Cooling"
ML-Worthington Limited "Exchanger Specification Sheet"
Yuba Heat Transfer Division "Exchanger Specification Sheet"
VTD-West-0792, Revision 2 "Westinghouse Instruction Manual for Auxiliary Heat Exchangers"
AEP standard MDS-607, Revision 1 "Heat Exchanger Tube Plugging"
Westinghouse Electric Exchanger Specification Sheet AN-RG-541 "Residual Heat Exchanger"
Engineers & Fabricators Inc. "Exchanger Specification Sheet"

Procedure

01-EHP 4030.119.241	"ESW Flow Balance" data sheets 1 "East ESW Train Flow and Pressure Data" dated March 20, 2000 and November 1, 2000.

Job Orders

R0080406, R0067087, R83998, R83988, R58377

LIST OF INFORMATION REQUESTED

For heat exchangers (HXs) [Unit 2 east component cooling water HX, Unit 1 east containment spray heat exchanger, Unit 2 east RHR HX] the following information is needed in the resident inspectors office before February 12, 2001, to support the biennial "Heat Exchanger Performance" inspection procedure 71111.07:

1. Copy of the two most recently completed tests confirming thermal performance of each HX. Include documentation and procedures that identify the types, accuracy, and location of any special instrumentation used for these tests. (e.g., high accuracy ultrasonic flow instruments or temperature instruments). Include calibration records for the instruments used during these tests.

2. Copy of the evaluations of data for the two most recent completed tests confirming the thermal performance of each HX.

3. Copy of the calculation which establishes the limiting (maximum) design basis heat load which is required to be removed by each of these HXs.

4. Copy of the calculation which correlates surveillance testing results from these HXs with design basis heat removal capability (e.g., basis for surveillance test acceptance criteria).

5. The clean and inspection maintenance schedule for each HX.

6. For the last two clean and inspection activities completed on each HX, provide a copy of the document describing the inspection results.

7. Provide a copy of the document which identifies the current number of tubes in service for each heat exchanger and the supporting calculation which establishes the maximum number of tubes which can be plugged in each HX.

8. Provide a copy of the document establishing the repair criteria (plugging limit) for degraded tubes which are identified in each HX.

9. Copy of the design specification and heat exchanger data sheets for each HX.

10. Copy of the vendor/component drawing for each HX.

11. Provide a list of issues with a short description documented in your corrective action system associated with these HXs in the past three years.

12. Provide a list of calculations with a short description which currently apply to each HX.

13. Provide HX performance trending data tracked for each HX.

If the information requested above will not be available, please contact Mel Holmberg as soon as possible at (630) 829-9748 or E-mail - msh@NRC.gov.