UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

May 3, 2002

EA-02-058

David L. Wilson, Vice President of
Nuclear Energy
Nebraska Public Power District
P.O. Box 98
Brownville, Nebraska 68321

SUBJECT: COOPER NUCLEAR STATION - NRC INSPECTION REPORT 50-298/01-08

Dear Mr. Wilson:

On April 6, 2002, the NRC completed an inspection at your Cooper Nuclear Station. The enclosed report documents the inspection findings which were discussed with Mr. Mike Coyle, Site Vice President, and other members of your staff on April 15, 2002.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection covered selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Since September 11, 2001, Cooper Nuclear Station has assumed a heightened level of security based on a series of threat advisories issued by the NRC. Although the NRC is not aware of any specific threat against nuclear facilities, the heightened level of security was recommended for all nuclear power plants and is being maintained due to the uncertainty about the possibility of additional terrorist attacks. The steps recommended by the NRC include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with local law enforcement and military authorities, and limited access of personnel and vehicles to the site.

The NRC continues to interact with the Intelligence Community and to communicate information to Nebraska Public Power District. In addition, the NRC has monitored maintenance and other activities which could relate to the site's security posture.

Based on the results of this inspection, the NRC has identified eight findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. Because the violations were of very low safety significance, and because they were entered into your corrective action program, the NRC is treating the findings as noncited violations, in accordance with Section VI.A of the NRC's Enforcement Policy. If you contest these violations, you should provide a response with the basis for your denial within 30 days of the date of this inspection report, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Cooper Nuclear Station facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made 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/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

/RA/

Kriss M. Kennedy, Chief
Project Branch C
Division of Reactor Projects

Docket: 50-298
License: DPR-46

Enclosure:
NRC Inspection Report
50-298/01-08

cc w/enclosure:
Michael T. Coyle
Site Vice President
Nebraska Public Power District
P.O. Box 98
Brownville, Nebraska 68321

John R. McPhail, General Counsel
Nebraska Public Power District
P.O. Box 499
Columbus, Nebraska 68602-0499

D. F. Kunsemiller, Risk and
Regulatory Affairs Manager
Nebraska Public Power District
P.O. Box 98
Brownville, Nebraska 68321

Dr. William D. Leech
Manager - Nuclear
MidAmerican Energy
907 Walnut Street
P.O. Box 657
Des Moines, Iowa 50303-0657

Ron Stoddard
Lincoln Electric System
1040 O Street
P.O. Box 80869
Lincoln, Nebraska 68501-0869

Michael J. Linder, Director
Nebraska Department of Environmental
Quality
P.O. Box 98922
Lincoln, Nebraska 68509-8922

Chairman
Nemaha County Board of Commissioners
Nemaha County Courthouse
1824 N Street
Auburn, Nebraska 68305

Sue Semerena, Section Administrator
Nebraska Health and Human Services System
Division of Public Health Assurance
Consumer Services Section
301 Centennial Mall, South
P.O. Box 95007
Lincoln, Nebraska 68509-5007

Ronald A. Kucera, Deputy Director
for Public Policy
Department of Natural Resources
205 Jefferson Street
Jefferson City, Missouri 65101

Jerry Uhlmann, Director
State Emergency Management Agency
P.O. Box 116
Jefferson City, Missouri 65101

Vick L. Cooper, Chief
Radiation Control Program, RCP
Kansas Department of Health
and Environment
Bureau of Air and Radiation
1000 SW Jackson, Suite 310
Topeka, Kansas 66612-1366

Daniel K. McGhee
Bureau of Radiological Health
Iowa Department of Public Health
401 SW 7th Street, Suite D
Des Moines, Iowa 50309

William R. Mayben, President
and Chief Executive Officer
Nebraska Public Power District
1414 15th Street
Columbus, Nebraska 68601

Electronic distribution by RIV:
Regional Administrator **(EWM)**
DRP Director **(KEB)**
DRS Director **(ATH)**
Senior Resident Inspector **(MCH2)**
Branch Chief, DRP/F **(KMK)**
Senior Project Engineer, DRP/F **(JAC)**
Staff Chief, DRP/TSS **(PHH)**
RITS Coordinator **(NBH)**
Jim Isom, Pilot Plant Program **(JAI)**
RidsNrrDipmLipb
Scott Morris **(SAM1)**
CNS Site Secretary **(SLN)**
Dale Thatcher **(DFT)**
G. F. Sanborn, D:ACES **(GFS)**
K. D. Smith, RC **(KDS1)**
F. J. Congel, OE **(FJC)**
OE:EA File **(RidsOeMailCenter)**

R:_CNS\2001\CN2001-08RP-MCH.wpd

RIV:SRI:DRP/F	ACES	C:DRS/PSB	C:DRS/EMB	ACES
MCHay	HAFreeman	GMGood	CSMarschall	GFSanborn
E-KMKennedy	***/RA/***	***/RA/***	***RLNease for***	***HAFreeman for***
5/3/02	5/3/02	5/3/02	5/3/02	5/3/02

C:DRP/F				
KMKennedy				
/RA/				
5/3/02				

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	50-298
License:	DPR-46
Report:	50-298/01-08
Licensee:	Nebraska Public Power District
Facility:	Cooper Nuclear Station
Location:	P.O. Box 98 Brownville, Nebraska
Dates:	December 30, 2001, through April 6, 2002
Inspectors:	M. Hay, Acting Senior Resident Inspector J. Clark, Senior Project Engineer, Division of Reactor Projects C. Paulk, Senior Reactor Engineer, Division of Reactor Safety M. Shannon, Senior Health Physicist, Division of Reactor Safety C. Johnson, Senior Reactor Inspector, Division of Reactor Safety S. Cochrum, Project Engineer, Division of Reactor Projects Paul J. Elkmann, Emergency Preparedness Inspector
Approved by:	K. Kennedy, Chief, Project Branch F Division of Reactor Projects

SUMMARY OF FINDINGS

Cooper Nuclear Station
NRC Inspection Report 50-298/01-08

IR 05000298-01-08; 12/30/2001-04/06/2002; Nebraska Public Power District; Cooper Nuclear Station. Integrated Res/Reg Report; Equip Alignments, Operability Evals, Maint Rule Implementation, Ident & Resolution of Problems, Occupational Rad Safety.

The inspection was conducted by resident inspectors and regional specialists. During the inspection the NRC identified eight Green findings and the licensee identified seven Green findings, all of which are noncited violations. The significance of each issue is indicated by its color (Green, White, Yellow, Red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609.

A. Inspector Identified Findings

Cornerstone: Mitigating Systems

Green. The inspectors determined the licensee failed to implement effective corrective actions after identifying that changes in river temperatures adversely affected service water pump impeller clearances. The ineffective corrective actions resulted in Service Water Pump D failing on December 26, 2002. The failure to identify and correct this significant condition adverse to quality is a violation of 10 CFR Part 50, Appendix B, Criterion XVI. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Notification 10132527. This issue also had crosscutting aspects associated with problem identification and resolution.

This issue was determined to have an actual impact on safety in that the failure to properly maintain the appropriate impeller clearances resulted in pump failure. This NCV was characterized under the significance determination process as having very low safety significance. The service water system is a two-train system, with each train containing two full capacity pumps. Therefore, the loss of a single pump did not disable the design function of the service water system (Section 1R04.1).

Cornerstone: Mitigating Systems

Green. The licensee failed to adequately evaluate localized areas of erosion and corrosion of the service water system in accordance with 10 CFR Part 55a(a)(3). Specifically, the licensee used an alternative method, not approved for use as required by 10 CFR 50.55a(a)(3), to evaluate localized areas of wall thinning of the service water system piping. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Notification 10140024.

This issue was determined to have a credible impact on safety in that the failure to properly evaluate piping, in accordance with approved methods, could result in piping being below minimum code acceptable thickness. This noncited violation was characterized under the significance determination process as having very low safety significance. The licensee replaced all segments of piping that were potentially outside code requirements during the refueling outage starting in November 2001. Those segments of piping not replaced were subsequently evaluated to meet code requirements using an approved method (Section 1R04.1).

Cornerstone: Barrier Integrity

Green. The licensee failed to demonstrate that performance of the feedwater check valves was being effectively controlled through the performance of appropriate preventive maintenance in that repetitive preventive maintenance preventable failures of the valves occurred from July 1996 to February 19, 2002. Following these failures, the licensee failed to consider placing the feedwater check valves into (a)(1) status. This was determined to be a violation of 10 CFR 50.65 (a)(2). This violation is being treated as a noncited violation consistent with Section VI.A of the NRC Enforcement Policy. This issue was entered into the licensee's corrective action program as Notification 10122802.

This issue was considered to have a credible impact on safety, in that the failure of these valves caused a higher than normal containment leakage. This noncited violation was characterized under the significance determination process as having very low safety significance. The finding was a Type A finding in accordance with the significance determination process in Table 2 of Inspection Manual Chapter 0609-H, "Containment Integrity Significance Determination Process." Type A findings are findings that affect core damage frequency. Type A findings with a delta core damage frequency less than 10^{-7}/yr associated with large early release frequency sequences in plants with Mark I containments are considered to be Green, based on low core damage frequency and large early release frequency, as documented in Table 1 of Inspection Manual Chapter 0609-H, "Containment Integrity Significance Determination Process" (Section 1R12.1).

Cornerstone: Mitigating Systems

Green. The licensee failed to identify and correct a condition adverse to quality. On October 3 and 23, 2001, the licensee identified two other areas in the service water system SW-F11 function that exceeded ASME B31.1 minimum pipe wall thickness requirements prior to being replaced. The licensee failed to implement effective corrective actions, resulting in the SW-F11 function exceeding ASME minimum pipe wall thickness. This was determined to be a violation of 10 CFR Part 50, Appendix B, Criterion XVI. This violation is being treated as a noncited violation consistent with Section VI.A of the NRC Enforcement Policy. This issue has been entered into the licensee's corrective action process as Notification 10144722.

This issue was considered to have a credible impact on safety in that the failure of the service water piping boundary would potentially cause a serious degradation of the ultimate heat sink capability. This noncited violation was characterized under the significance determination process as having very low safety significance, because the licensee had replaced all segments of piping that contained pin hole leaks and those areas where minimum pipe wall thickness exceeded the performance criteria did not exceed the design allowable stresses (Section 1R12.1).

Cornerstone: Mitigating Systems

Green. The licensee failed to maintain the safety relief valve solenoids in an environmentally qualified condition. The solenoid-operated pilot valve terminal boards and connections were not maintained consistent with the tested configuration. Specifically, conformal coating did not completely cover the electrical connections and the installation of insulated lugs deviated from the tested configuration. This was determined to be a violation of 10 CFR Part 50.49(f). This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy. This issue has been entered into the licensee’s corrective action process as Notification 10123606.

This issue was considered to have a credible impact on safety in that, if the equipment is not in a previously tested configuration, there is no assurance that the equipment will perform its design function during accident conditions. This noncited violation was characterized under the significance determination process as having very low safety significance because the safety relief valve solenoids were later tested to demonstrate they would perform their design function during accident conditions (Section 1R15.1).

Cornerstone: Mitigating Systems

Green. The licensee failed to perform an operability evaluation and/or declare equipment inoperable after identifying that the reactor equipment cooling system was not analyzed for a loss of coolant accident. This was determined to be a violation of Technical Specification 5.4.1(a). This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Notification 10147885. The inspectors also considered this noncited violation had crosscutting aspects associated with problem identification and resolution.

This issue was determined to have a credible impact on safety because the reactor equipment cooling system was not evaluated as being able to perform its cooling functions, including support for emergency core cooling systems, during accident conditions. This noncited violation was characterized under the significance determination process as having very low safety significance because the licensee subsequently performed an operability evaluation that demonstrated the system could perform all its design basis functions (Section 1R15.2).

Cornerstone: Occupational Radiation Safety

Green. The NRC determined that on November 27, 2001, three workers were not informed of the contamination levels, airborne radiological conditions, and the potential for creating an airborne area prior to the start of their task. One of these individuals received an unplanned intake of radioactive material resulting in a dose of 15 millirem. Contamination levels were as high as 480 millirad per hour (fixed) and 10 millirad per hour (loose surface). Airborne radiological conditions were 0.5 derived air concentration. The failure to inform workers of the radiological conditions in their work area is a 10 CFR 19.12 violation. This violation is being treated as a noncited violation consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Notification 10127287.

The safety significance of this finding was determined to be very low by the Occupational Radiation Safety Significance Determination Process. The failure to inform workers of the radiological conditions in their work area has a credible impact on safety, and the occurrence involved a worker's unplanned dose that could have been significantly greater if radiological conditions had been greater. However, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised (Sections 2OS2).

Cornerstone: Initiating Events

Green. The licensee failed to maintain Technical Specification Bases consistent with the USAR as required by Technical Specification 5.5.10(c). Specifically, the licensee failed to ensure that the Technical Specification Bases were maintained consistent with the Updated Final Safety Analysis Report with respect to offsite power supplying power to the 4160 volt buses. This resulted in the failure to enter Technical Specification 3.8.1.A, "One offsite circuit inoperable," that required the performance of Surveillance Requirement 3.8.1.1 within one hour on March 13, 2002. The licensee documented this issue in their corrective action process as Notification 10110178. The inspectors also determined that this noncited violation had crosscutting aspects associated with problem identification and resolution.

This issue was determined to have an actual impact on safety, in that part of the safety function of a qualified offsite power source was unavailable. However, the condition was of very low safety significance because it was identified and corrected in approximately 2 hours (less than the Technical Specification allowed outage time) and the critical busses remained energized without the need for emergency power (Section 4OA2).

B. Licensee Identified Violations

Seven violations of very low significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. These violations are listed in Section 4OA7 of this report.

Report Details

The plant was in the process of restarting from a refueling outage at the start of the inspection period. On January 8, 2002, the reactor reached 100 percent power. On January 10, 2002, reactor power was reduced to approximately 70 percent to support rod pattern adjustments. On January 11, 2002, reactor power was restored to 100 percent. On January 16, 2002, reactor power was reduced to approximately 65 percent due to reactor feed pump turbine control problems. On January 18, 2002, reactor power was restored to 100 percent. On January 19, 2002, reactor power was lowered to approximately 65 percent due to additional reactor feed pump turbine control problems. On January 21, 2002, reactor power was restored to 100 percent. On January 23, 2002, reactor power was reduced to approximately 70 percent to support rod pattern adjustments. On January 24, 2002, reactor power was restored to 100 percent. On March 23, 2002, reactor power was reduced to approximately 65 percent power to support rod pattern adjustments and reactor feed pump maintenance. On March 24, 2002, the reactor was restored to 100 percent power and was maintained throughout the rest of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness

1R04 Equipment Alignments

.1 Complete Equipment Alignment Inspection

a. Inspection Scope

The inspectors performed a complete alignment inspection of the service water system. The inspection verified that the system was installed and capable of performing its design functions as described in the Updated Final Safety Analysis Report. A review of system operating procedures, design documents, operability evaluations, engineering evaluations, and corrective action documents was conducted.

b. Findings

Failure to Implement Effective Corrective Actions

The inspectors determined the licensee failed to implement effective corrective actions after identifying that changes in river temperature adversely affected service water pump impeller clearances. The ineffective corrective actions resulted in Service Water Pump D failing on December 26, 2002. This was determined to be a violation of 10 CFR Part 50, Appendix B, Criterion XVI.

On December 26, 2002, control room operators attempted to start Service Water Pump D. The pump failed to achieve normal operating parameters (pump discharge pressure, running motor amperage). Investigation by the licensee determined that the pump shaft had sheared at a coupling due to the pump impeller contacting the bowl liner.

Since 1974 the licensee had experienced multiple failures of the service water pumps. In 1974 Service Water Pumps A and D failed to start, in 1987 Service Water Pump D failed, and in 1988 Service Water Pump A failed. For each of these failures the licensee determined that the root cause was silt accumulation in the wear rings of the pumps. The corrective action associated with this condition was to increase the frequency that the idle pumps were run to ensure that silt accumulation would not adversely affect their operation.

In February 2001, engineering personnel performed an evaluation entitled, "Evaluation of Service Water Pump Rotation Frequency." The purpose of the evaluation was to determine the effects of silt and sand accumulation on the ability of the service water pumps to perform their design function. The engineers concluded that silt and sand accumulation was not the cause of the previous pump failures. The actual cause for the pump failures was determined to be changes in river water temperature resulting in changes in the clearances between the pump impeller and bowl due to contraction and expansion of the pump components. The engineers concluded that thermal effects on the impeller clearances were well understood. They understood that the service water system engineers monitored changes in river temperature and ensured that pump clearance adjustments were made as needed to preclude the binding of the impeller and bowl liner.

Following the failure of Service Water Pump D on December 26, 2001, the inspectors questioned the system engineers as to why adjustments had not been made to preclude the binding of the pump impeller with the bowl liner. System engineers responded that they were aware that river temperatures had changed significantly since the last adjustment and had recommended that adjustments be performed. However, the engineers stated that, because of outage scheduling difficulties and the failure of personnel to recognize the importance of performing timely adjustments, the pump failed on December 26, 2001.

Appendix B, Criterion XVI, of 10 CFR Part 50, states that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall ensure that the cause of the condition is determined and corrective action is taken to preclude repetition." The failure to identify and correct the process for ensuring that the service water pumps were properly adjusted for thermal effects, resulting in a pump failure, was determined to be a violation of 10 CFR Part 50, Appendix B, Criterion XVI. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (50-298/0108-01). The licensee documented this issue in their corrective action process as Notification 10132527.

This issue was determined to have an actual impact on safety in that the failure to properly maintain the appropriate impeller clearances resulted in the pump failure. This noncited violation was characterized under the significance determination process as having very low safety significance (Green). The service water system is a two-train system, with each train containing two full-capacity pumps. Therefore, the loss of a single pump did not disable the design function of the service water system. The licensee, at a minimum, constantly maintains a service water pump running during all operating modes.

This issue also had crosscutting aspects associated with problem identification and resolution. This assessment was based on the ineffective corrective actions that were implemented after identifying that thermal changes significantly affected the service water pump impeller clearances, resulting in an additional pump failure. This crosscutting issue is an additional example of the substantive crosscutting finding described in NRC Inspection Report 50-298/01-10 pertaining to problem identification and resolution.

<u>Failure to Evaluate Service Water System Piping in Accordance With 10 CFR 50.55a(a)(3)</u>

The inspectors determined that the licensee failed to adequately evaluate localized areas of erosion and corrosion of the service water system in accordance with 10 CFR Part 55a(a)(3). Specifically, the licensee used an alternative method, that was not approved for use as required by 10 CFR 50.55a(a)(3), to evaluate localized areas of wall thinning of the service water system piping.

In August 2001, the licensee identified that an evaluation method used by the erosion/corrosion monitoring program could result in the acceptance of pipes with wall thickness less than minimum requirements specified in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Specifically, the licensee was using a method for evaluating pipe thinning entitled, “Specification for Evaluation and Acceptance of Local Areas of Material, Parts, and Components that are less than the Specified Thickness.” The erosion/corrosion program was using this method to assess the acceptability of piping following inservice inspections of piping by ultrasonic testing.

Based on this condition, the licensee performed an operability evaluation (Notification 10098565) in accordance with Generic Letter 91-18, utilizing alternate criteria for piping stress. This evaluation demonstrated that the 64 segments of service water piping, affected by the use of this alternate evaluation method, were operable through the next refueling outage scheduled to start on November 3, 2001. The inspectors reviewed documentation for the 64 segments affected and noted that predicted pipe thicknesses ranged from 27 percent to 75 percent of the nominal pipe thickness.

Following the refueling outage, in January 2002, the inspectors reviewed the licensee’s corrective actions related to the 64 segments of piping that were addressed in Notification 10098565. The inspectors noted that 17 segments of piping, out of the 64 segment total population, had been replaced. The inspectors reviewed the engineering evaluations for the 47 piping segments that were not replaced to verify that the piping met ASME Code requirements. The licensee indicated that as of November 1, 2001, all 64 segments of piping met ASME Code requirements based on the use of the alternate evaluation method entitled, “Specification for Evaluation and Acceptance of Local Areas of Material, Parts, and Components that are less than the

Specified Thickness." This alternate evaluation method had been approved for use by the licensee on September 9, 2001, in Design Calculation NEDC-01-050, "NPPD Review of Specification for Evaluation and Acceptance of Local Areas of Material, Parts, and Components that are less than the Specified Thickness." Engineering personnel concluded that this method met the requirements of the Cooper Nuclear Station Design and Licensing basis and all applicable ASME Codes. This evaluation stated "While some of the methods and assumptions are not specifically noted in the Codes, they meet the technical requirements of the Codes, employ good engineering practices and are reasonable." Subsequently, on November 1, 2001, operations closed the operability evaluation (Notification 10098565) and determined that the 64 segments of service water piping affected met all ASME Code requirements for continued operation. The inspectors requested to review the licensing documentation that approved the use of the alternative method for evaluating piping to meet ASME Code requirements as required by 10 CFR 50.55a(a)(3). The licensee indicated they had not obtained authorization for using this alternative method.

Section (a)(2) of 10 CFR 50.55a states, in part, that "Systems and components of boiling and pressurized water-cooled reactors must meet the requirements of the ASME Boiler and Pressure Vessel Code." Section (a)(3) of 10 CFR 50.55a requires that proposed alternatives to the requirements may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The failure to obtain approval from the Director of the Office of Nuclear Reactor Regulation prior to implementing the alternative method entitled, "Specification for Evaluation and Acceptance of Local Areas of Material, Parts, and Components that are less than the Specified Thickness," is a violation. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (50-298/0108-02). The licensee documented this issue in their corrective action process as Notification 10140024.

This issue was determined to have a credible impact on safety in that the failure to properly evaluate piping, in accordance with approved methods, could result in piping being below ASME Code minimum acceptable thickness. This noncited violation was characterized under the significance determination process as having very low safety significance (Green). The licensee replaced all segments of piping that were potentially outside ASME Code requirements during the refueling outage starting in November 2001. Those affected segments of piping not replaced were subsequently accepted using an approved method.

.2 Partial Equipment Alignment Inspections

a. Inspection Scope

The inspectors performed two partial equipment alignment inspections of the secondary containment ventilation system and the standby gas treatment system. The inspectors verified that the systems were installed and capable of performing their design functions as described in the Updated Final Safety Analysis Report. They reviewed system operating procedures, surveillance procedures, and design documents to assess that these systems were properly operated and maintained.

Specifically the following documentation was reviewed:

- Updated Safety Analysis Report, Volume IV, Chapter X, Section 10.2.5.2, “Secondary Containment Ventilation”
- Updated Safety Analysis Report, Volume II, Chapter V, Section 3.3.4, “Standby Gas Treatment System”
- System Operating Procedure 2.2.47A, “HVAC Reactor Building Component Checklist,” Revision 7
- System Operating Procedure 2.2.73, “Standby Gas Treatment System,” Revision 37
- System Operating Procedure 2.2.73A, “Standby Gas Treatment System Component Checklist,” Revision 6
- Surveillance Procedure 6.SC.501, “Secondary Containment Leak Test,” Revision 10
- NEDC 94-275, “Review of Calculation ATD-0453 for Determining Standby Gas Treatment Maximum Cross Air Flow,” Revision 0
- NEDC 90-113, “Reactor Building Pressure for Standby Gas Treatment Operation,” Revision 0,

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors assessed six areas during the inspection period to determine if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capabilities, and maintained passive fire protection features in good material condition.

The following areas were inspected:

- High pressure coolant injection room
- Service water pump room
- Reactor building Northwest quadrant
- Standby gas treatment room
- Control room
- Reactor building Southwest quadrant

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

.1 Quarterly Simulator Training Reviews

a. Inspection Scope

On January 30, 2002, the inspectors observed licensed operator simulator training. The simulator training evaluated the operators' ability to recognize, diagnose, and respond to a pipe break outside secondary containment, reactor vessel water level control problems, fuel failure, and offsite dose assessments. The inspectors observed and evaluated the following areas:

- Formality of communication
- Prioritizing, interpreting, and verification of alarms
- Procedure implementation
- Control board operation and manipulation of controls
- Oversight and direction provided by the shift supervisor
- The crew's and evaluator's critiques

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

.1 Periodic Evaluation

a. Inspection Scope

The inspectors reviewed licensee reports documenting the performance of the two most recent Maintenance Rule program periodic assessments. These periodic assessments are conducted to meet the requirements of 10 CFR 50.65(a)(3). The assessments covered the periods indicated in the table below:

Period Assessment	Approval Date
May 1997 through December 1998	May 24, 1999
December 1998 through December 2000	February 27, 2001

The inspectors determined if the reports contained adequate assessment of the performance of the Maintenance Rule program, as well as conformance with applicable programmatic and regulatory requirements. To accomplish this, the inspectors examined the licensee's evaluation of the following:

- The program treatment of nonrisk-significant structures, systems, and components (SSC) functions monitored against plant level performance criteria
- Program adjustments made in response to unbalanced reliability and availability of risk-significant SSCs
- The application of industry operating experience
- Performance review of Category (a)(1) systems
- Evaluation of the bases for system category status change, e.g., Category (a)(1) to (a)(2) or Category (a)(2) to (a)(1)
- Effectiveness of performance and condition monitoring at component, train, system, and plant levels

The inspectors also verified that the issuance of the two most recent assessments met regulatory timeliness requirements.

The inspectors reviewed and verified that the licensee had established (a)(2) performance criteria, examined any SSCs that failed to meet their performance criteria, or reviewed any SSCs that have suffered repeated maintenance preventable functional failures. The inspectors selected the service water, feedwater, high pressure coolant injection, reactor core isolation cooling, and instrument air systems. The inspectors also verified that failed SSCs were considered and/or placed into (a)(1) status.

b. Findings

Feedwater Check Valves

A noncited violation of very low safety significance (Green) was identified for failing to demonstrate that the feedwater check valves were being effectively controlled through the performance of preventive maintenance. Repetitive preventive maintenance preventable failures of the valves occurred in which appropriate clearances were not implemented to ensure proper valve seat alignment.

The inspectors identified that the feedwater check valve maintenance history indicated that repetitive preventive maintenance preventable failures had occurred. The licensee informed the inspectors that these failures were documented in Root Cause Evaluation RCR 2001-1625. The licensee's root cause evaluation identified that previous maintenance activities did not ensure that appropriate clearances for proper valve seat alignment were implemented. Following these failures, the licensee failed to consider placing the valves into (a)(1) status when performance indicated that these valves were not being effectively controlled through appropriate preventive maintenance.

The valves in question were the inboard and outboard primary containment valves, RF-CV-13CV, RF-CV-14CV, RF-CV-15CV, and RF-CV-16CV. Maintenance Rule function (PC-CONT1) concerns simultaneous local leak rate test (LLRT) failure of both the inboard and outboard valves from a single containment penetration. These valves failed to the extent that the LLRT was unable to quantify leakage through the valves. The inspectors identified that during refueling outages (RFO) performed in 1998 (RFO18) and 2001 (RFO20), repeat functional failures of these valves occurred. Following these failures, the licensee failed to consider placing the valves into (a)(1) status when their performance indicated that they were not being effectively controlled through appropriate preventive maintenance until February 19, 2002.

The performance criteria for the feedwater check valves Maintenance Rule function (PC-CONT1) is two functional failures. A functional failure is defined by both reactor feed check valves (inboard and outboard) in the containment penetration failing the LLRT performed during each refueling outage. The licensee informed the inspectors that soft seats were removed and replaced with metal seats (original seats were metal prior to soft seats) to correct the problem. The licensee’s root cause evaluation (RCR 2001-1625) also identified that previous maintenance activities did not ensure that appropriate clearances, necessary for proper valve seat alignment, were implemented. The failures listed below demonstrated that the licensee did not effectively maintain the system and should have moved the system to (a)(1) status in 1996 based on repetitive preventive maintenance preventable failures.

Performance Criteria Failures (History)

Date	Type of Failures	PIR Report
1983	Two penetrations failed	NCR 2296
1985	Two penetrations failed	NCR 4906
1990	Two penetrations failed	
1991	One penetration failed	NCR 91-092
1993	Two penetrations failed	NCR 93-028
1998	One penetration failed	RCR 98-0696
2001	One penetration failed	SCR 2001-1161

The feedwater check valves were placed into (a)(1) status on February 19, 2002, based on exceeding performance criteria. Since 1983 there have been numerous check valve failures as documented above.

The inspectors identified that these valves should have also been placed into (a)(1) status in July 1996 because all four valves failed in 1993 during RFO14. Failure to move an SSC to (a)(1) status when performance indicates that the SSC is not being effectively controlled through preventive maintenance is a violation of 10 CFR 50.65 (a)(2).

10 CFR 50.65(a)(1) requires, in part, that the holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule as defined by

10 CFR 50.65 (b), against licensee-established goals, in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended functions.

10 CFR 50.65(a)(2) states, in part, that monitoring as specified in 10 CFR 50.65(a)(1) is not required where it has been demonstrated that the performance or condition of an SSC is being effectively controlled through the performance of appropriate preventive maintenance, such that the SSC remains capable of performing its intended function.

Contrary to the above, from July 1996 to February 19, 2002, the licensee failed to demonstrate that the feedwater check valves were being effectively controlled through the performance of preventive maintenance in that repetitive preventive maintenance preventable failures of the valves occurred. Following these failures, the licensee failed to consider placing the feedwater check valves into 10 CFR 50.65(a)(1) status for establishing and monitoring against performance goals. This violation is being treated as a noncited violation (50-298/0108-03) (EA-02-058) consistent with Section VI.A of the NRC Enforcement Policy. This issue has been entered into the licensee's corrective action program as Notification 10122802.

This issue was determined by the inspectors to have a credible impact on safety in that the failure of these valves caused a higher than normal containment leakage. This noncited violation was characterized under the significance determination process as having very low safety significance. The finding was a Type A finding in accordance with the significance determination process in Table 2 of Inspection Manual Chapter 0609-H, “Containment Integrity Significance Determination Process.” Type A findings are findings that affect core damage frequency. Type A findings with a delta core damage frequency less than 10^{-7}/yr associated with large early release frequency sequences in plants with Mark I containments are considered to be Green, based on low core damage frequency and large early release frequency, as documented in Table 1 of Inspection Manual Chapter 0609-H, “Containment Integrity Significance Determination Process.”

<u>Service Water System</u>

A noncited violation of very low safety significance (Green) was identified because the licensee failed to implement effective corrective actions to correct a condition adverse to quality in the service water system.

The inspectors identified that the performance of the service water system SW-F11 function was not being appropriately monitored in the Maintenance Rule program. The licensee informed the inspectors that the performance criteria for the service water system is based on conditional monitoring of the pipe wall thickness. This minimum pipe wall thickness is set at ASME B31.1 minimum pipe wall thickness based on maximum allowed wall stress. Therefore, to effectively maintain the system with preventive maintenance, the licensee must replace the pipe prior to going below minimum wall thickness. The inspectors identified numerous failures of the service water system function, in which the licensee did not effectively maintain the system based on numerous failures that were below the performance criteria.

Performance Criteria Failures (History)

Date	Type of Failures	PIR Report
07/03/93	Through-wall degradation	NCR 93-155
01/31/97	Through-wall degradation	2-09864
02/28/97	Through-wall degradation	2-12489
03/12/97	Below min wall	2-09078
01/14/98	Through-wall degradation	2-24568
04/11/98	Through-wall degradation	2-26926
04/16/98	Through-wall degradation	2-28086
10/03/01	Below min wall	10114494
10/23/01	Below min wall	10119485

The licensee failed to implement effective corrective actions, resulting in repetitive failures of the service water system SW-F11 function in that minimum pipe wall thickness was below the requirements established by ASME B31.1 requirements prior to being replaced. This was in part due to system engineers not making the appropriate Maintenance Rule determinations. The licensee had not effectively identified and corrected this condition adverse to quality. This was determined to be a violation of 10 CFR Part 50, Appendix B, Criterion XVI.

The SW-F11 function was placed into (a)(1) status on April 29, 1998, based on exceeding performance criteria and removed May 22, 2001, based on completing the corrective actions in the (a)(1) evaluation. Based on questions asked by the inspectors, the licensee identified two additional functional failures on October 3 and 23, 2001, that were below ASME B31.1 minimum requirements prior to being replaced. The inspectors were informed that the system engineer did not make the appropriate functional failure determination which resulted in not identifying the two additional failures. The licensee had not effectively identified and corrected this significant condition adverse to quality. The licensee initiated Notification 10144722 on February 28, 2002, to document these two additional failures.

10 CFR Part 50, Appendix B, Criterion XVI, states, in part, that “Measures shall be established to assure that conditions adverse to quality, such as failures, are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.”

Contrary to the above, on October 3 and 23, 2001, minimum pipe wall thickness was below ASME B31.1 requirements prior to being replaced. The failure to identify and correct two additional failures that were below ASME B31.1 minimum pipe wall thickness requirements is a violation of 10 CFR Part 50, Appendix B, Criterion XVI. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (50-298/0108-04). The licensee documented this issue in their corrective action process as Notification 10144722.

This issue was determined by the inspectors to have a credible impact on safety in that the failure of the service water piping boundary would potentially cause a serious degradation of the ultimate heat sink capability. This noncited violation was characterized under the significance determination process as having very low safety significance because those areas where minimum wall thickness was below the performance criteria did not go below the design allowable stresses; therefore, the pipe remained operable. In addition, the licensee had replaced all segments of piping that contained pin hole leaks.

.2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors evaluated the use of the corrective action system within the Maintenance Rule program for issues identified in the service water, instrument air, high pressure coolant injection, reactor core isolation cooling, and feedwater systems. This review was accomplished by the examination of a sample of the Notifications, Maintenance Rule evaluations, Maintenance Rule Expert Panel meeting minutes, and other documents listed in the attachment. The purpose of this review was to establish that the corrective action program was entered at the appropriate threshold for the purposes of:

- Implementation of the corrective action process when a performance criterion was exceeded;

- Correction of performance-related issues or conditions identified during the periodic evaluation; and

- Correction of generic issues or conditions identified during programmatic surveillances, audits, or assessments.

The inspector verified that the identification of problems and implementation of corrective action were acceptable.

b. Findings

No findings of significance were identified.

.3 Maintenance Effectiveness

a. Inspection Scope

During the inspection period, the inspectors reviewed licensee implementation of the maintenance rule program. The inspectors verified that SSCs were properly scoped and characterized, the appropriate safety significance and performance criteria were established, and the goals established and corrective actions were appropriate. The inspectors assessed the licensee's implementation of the Maintenance Rule to the requirements outlined in 10 CFR 50.65, Administrative Procedure 0.27, "Maintenance Rule Program," Revision 11, and Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2. The inspectors reviewed the following six components and/or systems that displayed performance problems:

- Service Water Pump D
- Secondary containment ventilation isolation Valve HV-AOV-265AV
- Secondary containment ventilation isolation Valve HV-AOV-267AV
- Standby gas treatment Valve SGT-AO-270AV
- Standby gas treatment solenoid operated Valve SGT-SOV-SPV543A2
- Main steam Valve MS-MOV-MO74

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed five licensee risk assessments for equipment outages as a result of planned and emergent activities. The inspectors compared the licensee's risk assessment and risk management activities to the requirements of 10 CFR 50.65(a)(4) and the recommendations of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2. The inspectors also discussed the planned and emergent work activities with planning and maintenance personnel. The inspectors reviewed the following risk evaluations:

- On January 28, 2002, Division 1 residual heat removal system was declared inoperable for scheduled maintenance activities

- On February 7, 2002, the emergency transformer was declared inoperable for replacement of 4160 volt Breaker 1GS

- From February 18-21, 2002, Service Water Pump D was inoperable during pump overhaul maintenance activities

- On March 6, 2002, the high pressure coolant injection system was declared inoperable for planned maintenance activities

- On March 13, 2002, the startup transformer (one of two qualified offsite power sources available to the site) was declared inoperable for planned maintenance on the 1AS supply breaker to the Division 1, 4160 volt, distribution system

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

.1 Safety Relief Valve (SRV) Operability Evaluation for Noncompliance with 10 CFR 50.49 Requirements

a. Inspection Scope

The inspectors visually examined electrical connections in the safety relief solenoid operated pilot valves. The inspectors assessed the installed configuration against the configuration specified in the licensee’s environmental qualification data files. Environmental qualification evaluations and test data were reviewed for the safety relief solenoid operated pilot valves following the identification of 10 CFR 50.49 nonconformances.

b. Findings

The licensee failed to maintain the SRV solenoids in an environmentally qualified condition. The inspectors determined that the solenoid operated pilot valve terminal boards and connections were not maintained consistent with the tested configuration. Specifically, conformal coating did not completely cover the electrical connections, and the installation of insulated lugs deviated from the tested configuration. This was determined to be a violation of 10 CFR Part 50.49(f).

In June 2001, the licensee identified concerns regarding the environmental qualifications of power cables going to the SRV solenoids (see NRC Inspection Report 50-298/01-07, Section 1R15, for details). Corrective actions for this condition resulted in the licensee removing the eight SRV solenoids and associated power cables during the RFO that started in November 2001. On November 13, 2001, the inspectors visually examined the condition of the SRV solenoids and power cables that had been removed from service. The inspectors noted several discrepancies involving poor workmanship practices and deviation from installation requirements associated with the solenoid terminal board connections. Specifically the following conditions were noted:

- Incomplete coverage of conformal coating on the electrical terminations as addressed by Environmental Qualification Data Package 253.
- Insulated lugs were installed where Environmental Qualification Data Package 253 addressed noninsulated lugs.
- Insulated lugs were found to have installation discrepancies with respect to the standards contained in the implementing procedural guidance.
- Conformal coating did not appear to adhere to the insulated lugs in some areas.
- Exposed bare conductors were present behind the electrical lugs (pull out).
- Foreign material was identified inside one solenoid enclosure.

- Cut or damaged cable insulation was found on three conductors.

Based on the eight SRV solenoids having discrepancies from the tested configuration, the licensee sent two solenoids and attached power cables to a testing facility to determine if the solenoids could perform their design function in a harsh environment. The test demonstrated that the SRV solenoids could perform their design function under harsh environment conditions.

Section (a) of 10 CFR 50.49 states that each licensee shall establish a program for qualifying specified electric equipment. Section (a)(1) of 10 CFR 50.49 specifies the environmental qualification requirements for safety-related equipment. Section (f) of 10 CFR 50.49 requires, in part, that each item of electric equipment important to safety must be qualified by testing an identical item of equipment under identical conditions. The inspectors determined that the licensee failed to maintain the qualification of the SRV solenoid-operated valves since the use of insulated lugs, and incomplete coverage of conformal coating on the electrical terminations deviated from the tested configuration of the equipment. The failure to maintain the SRV solenoids consistent with the tested configuration is a violation of 10 CFR 50.49(f). This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (50-298/0108-05). The licensee documented this issue in their corrective action process as Notification 10123606.

This issue was determined to have a credible impact on safety in that, if the equipment is not in a previously tested configuration, there is no assurance that the equipment will perform its design function during accident conditions. This noncited violation was characterized under the significance determination process as having very low safety significance (Green) because the SRV solenoids were later tested to demonstrate they would perform their design function during accident conditions.

.2 Failure to Perform an Operability Evaluation and/or Declare System Inoperable

a. Inspection Scope

The inspectors reviewed the licensee's actions following the discovery that the reactor equipment cooling system was not analyzed for all required design basis events. The reactor equipment cooling system is a safety-related system designed to cool the emergency core cooling systems during accident conditions.

b. Findings

The licensee failed to perform an operability evaluation after identifying that the reactor equipment cooling system was not analyzed for a loss of coolant accident. This was determined to be a violation of Technical Specification 5.4.1(a).

On March 14, 2002, the inspectors reviewed Notification10146486. This notification was initiated by a design engineer on March 11, 2002, after identifying that the reactor equipment cooling system was not analyzed for a loss of coolant accident. The system was originally analyzed for a loss of coolant accident with a concurrent loss of offsite power. However, the reactor equipment cooling system automatically isolates selected nonessential loads following a loss of offsite power that would not be isolated should power remain available. If portions of the reactor equipment cooling system did not isolate, it may not adequately perform the cooling function for the emergency core cooling systems as required during a loss of coolant accident.

The inspectors noted that the control room operators reviewed this notification on March 12, 2002, and inappropriately determined that no operability evaluation was required. Specifically, operators stated the following, “The notification asks questions which were raised during design work. If any degraded or nonconforming conditions are discovered during investigation of the potential issues discussed in the notification, then those conditions will be captured in future notifications and operability addressed at that time.”

The inspectors discussed with engineering, operations, licensing, and the Plant Manager their concern that the reactor equipment cooling system was in an unanalyzed condition and that operability of that system needed to be addressed. The licensee agreed that they had failed to adequately assess the operability of the reactor equipment cooling system after identifying the system was unanalyzed for a design basis event. Subsequently, the licensee performed an operability evaluation that demonstrated the system could perform its design function for cooling the emergency core cooling systems during a loss of coolant accident.

Technical Specification 5.4.1(a) requires that licensees establish, implement, and maintain written procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for authorities and responsibilities for safe operation. Administrative Procedure 0.5OPS, “Operations Review of Notifications/Operability Determinations/Evaluations,” Revision 9C1, implements this requirement. Section 3.1.11.3 of Procedure 0.5OPS states that an operability determination/evaluation is required upon discovery of an existing but previously unanalyzed condition. The failure to perform an operability determination/evaluation after identifying the reactor equipment cooling system was in an unanalyzed condition is a violation of Technical Specification 5.4.1(a). This violation is being treated as a noncited violation (50-298/0108-06) consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Notification 10147885.

This issue was determined to have a credible impact on safety because the potential failure of the reactor equipment cooling system to perform its cooling functions during accident conditions would adversely affect the emergency core cooling systems that it supports. This noncited violation was characterized under the significance determination process as having very low safety significance (Green) because the licensee performed an operability evaluation that demonstrated the system could perform all its design basis functions.

The inspectors also determined that this noncited violation had crosscutting aspects associated with problem identification and resolution. This crosscutting issue is an additional example of the substantive crosscutting finding related to problem identification and resolution as discussed in NRC Inspection Report 50-298/01-10, Section 4OA2.c.

.3 Periodic Review of Operability Evaluations

a. Inspection Scope

The inspectors reviewed the technical adequacy of three operability evaluations to verify that they were sufficient to justify continued operation of a system or component. The inspectors verified that, although equipment was degraded, the operability evaluation provided adequate justification that the equipment could still meet its Technical Specification, Updated Final Safety Analysis Report, and design bases requirements and that any potential risk increase contributed by the degraded equipment was thoroughly evaluated. The following evaluations were reviewed:

- Operability evaluation for Division 1 diesel generator fuel oil leak from the engine driven fuel oil pump (Notification 10145175)

- Operability evaluation for Reactor Equipment Coolant Pump B suction gauge that was overranged (Notification 10144069)

- Operability evaluation for high pressure coolant injection system turbine high vibration indications due to failed instrument (Notification 10145840)

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors performed a review of the licensee’s total population of operator workarounds. This review assessed if the functional capability of systems, or human reliability in responding to an initiating event, were adversely affected. The inspectors verified that operator workarounds were being identified at an appropriate threshold and that the cumulative effects of the workarounds would not prevent the ability of the operators to respond in a correct and timely manner to plant transients and accidents.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing

a. Inspection Scope

The inspectors verified that postmaintenance tests were adequate to verify system operability and functional capabilities. The inspectors verified that testing met design and licensing bases, Technical Specifications, the Updated Final Safety Analysis Report, the inservice test program, and licensee administrative procedures requirements. The inspectors reviewed the testing results for the following five components:

- Service water system Valve SW-MO-MO89A following maintenance (Work Order 4188990)
- 4160 volt Breaker 1GS following planned maintenance on February 7, 2002 (Work Order 4157808)
- Service Water Pump B following planned maintenance on February 21, 2002 (Work Orders 4189998 and 4195971)
- High pressure coolant injection system flow instrument Controller HPCI-FIC-1108 following replacement on March 6, 2002 (Work Order 4208522)
- Diesel generator service air Valves DGSA-V-50 and DGSA-V-53 following maintenance on March 26, 2002 (Work Order 4169427)

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors observed or reviewed the following six surveillance tests to ensure the systems were capable of performing their safety function and to assess their operational readiness. Specifically, the inspectors verified that the following surveillance tests met Technical Specifications, the Updated Final Safety Analysis Report, and licensee procedural requirements:

- Surveillance Procedure 6.SC.501, “Secondary Containment Leak Test,” Revision 10, performed on December 12, 2001
- Surveillance Procedure 6.SC.501, “Secondary Containment Leak Test,” Revision 10, performed on December 22, 2001
- Surveillance Procedure 6.EE.610, “Offsite Power AC Power Alignment,” Revision 3C1, performed on January 29, 2002

- Surveillance Procedure 6.HPCI.103, “HPCI IST and 92 Day Test Mode Surveillance Operation,” Revision 16C1, performed on March 6, 2002

- Surveillance Procedure 6.2ADS.303, “ADS Logic System Functional Test (Div 2),” Revision 6, performed on March 6, 2002

- Surveillance Procedure 6.HPCI.102, “HPCI Test Mode Surveillance Operation From ASD-HPCI Panel,” Revision 11C1, performed on March 6, 2002.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed a temporary plant modification that supplied an alternate source of gland water to the service water pumps. In December 2001, the licensee experienced a failure of the normal gland water supply system. During repair activities a temporary water supply from the water treatment system was installed. The inspectors verified that installation of the modification was consistent with design documents and that configuration control of the alternate system was properly maintained by operations personnel to support operability of the service water pumps.

b. Findings

No findings of significance were identified.

1EP1 Drill Evaluation

a. Inspection Scope

On March 19, 2002, the inspectors observed the licensee perform an emergency preparedness drill. During the drill the inspectors assessed the licensee’s performance related to classification, notification, and protective action recommendations. Following the drill, the inspectors reviewed the licensee’s critique to determine if issues were appropriately identified and documented. The following documents were reviewed in this inspection:

- Emergency Plan for Cooper Nuclear Station

- Emergency Plan Implementing Procedures for Cooper Nuclear Station

- Cooper Nuclear Station emergency preparedness drill scenario for March 19, 2002

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector performed an in-office review of Revision 28 to Emergency Plan Implementing Procedure 5.7.1, “Emergency Classification,” submitted November 1, 2001, against 10 CFR 50.54(q) to determine if the revision decreased the effectiveness of the emergency plan.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety, Public Radiation Safety

2OS2 ALARA (as Low as Reasonably Achievable) Planning and Controls

a. Inspection Scope

The inspector interviewed radiation workers and radiation protection personnel throughout the radiologically controlled area and conducted independent radiation surveys of selected work areas. The following items were reviewed and compared with regulatory requirements to assess the licensee’s program to maintain occupational exposure as low ALARA:

- ALARA program procedures
- Processes used to estimate and track exposures
- Plant collective exposure history for the past 3 years, current exposure trends, and 3-year rolling average dose information
- Six radiation work permit (RWP) packages for work activities which resulted in the highest personnel collective exposures during RFO RE 20 (RWP 2001-1084, “Drywell-Grating Modification Work”; RWP 2001-1081, “LLRT Work Activities”; RWP 2001-1028, “Rx Upper Internals Disassembly/Reassembly”; RWP 2001-1031, “Rx Lower Internals Disassembly/Reassembly”; RWP 2001-1032, “Refueling Activities”; and RWP 2001-1085, “Undervessel Activities”)
- Use of engineering controls to achieve dose reductions, including temporary shielding

- Hot spot tracking and reduction program
- Radiological work planning
- A summary of ALARA and radiological worker performance related to corrective action reports written since May 1, 2001 (12 notification reports were reviewed in detail: 10082634, 10091227, 10122159, 10124470, 10125769, 10126269, 10126965, 10127279, 10127287, 10128836, 10130469, and 10135756)
- Declared pregnant worker dose monitoring controls
- Quality Assurance Department Audit Reports 01-03 and 01-11

b. Findings

A noncited violation with very low safety significance (Green) was identified for the failure to inform workers of the radiological conditions in their work area. On November 27, 2001, three workers contacted radiation protection personnel at the radiation protection control point located on the 903-foot elevation of the turbine building and informed radiation protection personnel that they were to erect scaffolding in the "A" side of the condenser. However, the workers were never informed of the contamination levels, airborne radiological conditions, and the potential for creating an airborne area during work activities. Fixed contamination levels were as high as 480 millirad per hour, and loose surface contamination levels were as high as 10 millirad per hour. Airborne radiological conditions were 0.5 derived air concentration. One of these individuals received an unplanned intake of radioactive material, resulting in a dose of 15 millirem.

The issue was more than minor because not informing a worker of the radiological conditions in their work area has a credible impact on safety, and the occurrence involved a worker's unplanned dose that could have been significantly greater if radiological conditions had been greater. The safety significance of this finding was determined to be very low by the occupational radiation safety significance determination process because there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised.

10 CFR 19.12 states, in part, that all individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 millirem shall be kept informed of the storage, transfer, or use of radiation and radioactive material. The failure to inform workers of the radiological conditions in their work area is a 10 CFR 19.12 violation. This violation is being treated as a noncited violation consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Notification 10127287 (NCV 50-298/0108-07).

On November 29, 2001, the licensee identified a second example of a failure to inform a worker of the radiological conditions in the work area (see Section 4OA7 for details).

3. Safeguards

Cornerstone: Physical Protection

3PP1 Access Authorization

a. Inspection Scope

An assessment of the licensee's for-cause drug and alcohol testing program was performed following an accident that resulted in serious injury to a person that fell off a flatbed trailer. This inspection assessed the licensee's for-cause testing procedure and the use of this procedure to comply with the requirements contained in 10 CFR 26.24.

b. Findings

On October 2, 2001, a radiation protection worker was performing radiological surveys on new fuel that was arriving on site to support the refueling outage. During the performance of these surveys, which were performed on top of a flatbed truck trailer, the individual apparently lost track of his position and stepped off the edge of the trailer. The individual sustained serious injury that resulted in being transported to the hospital.

Following the incident, the inspectors questioned the licensee as to whether the injured individual had been administered a for-cause drug and alcohol test. The licensee indicated that they had not tested the individual based on the fact that they had observed his performance up to the point of the fall and observed no unusual behavior and that the individual did not exhibit any alcohol odor. The licensee stated that the individual's supervisor made this determination; however, there was no documentation available for the inspector's review. Following the licensee's review of this issue, they acknowledged that their fitness for duty procedure and their implementation of the procedure were not adequate to ensure that the requirements of 10 CFR 26.24 were consistently met. The licensee subsequently revised the procedure.

This issue is unresolved pending further NRC review of the licensee's implementation of their fitness for duty procedure following the accident on October 2, 2001, and the adequacy of the procedure (URI 50-298/0108-08).

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

.1 Reactor Safety Performance Indicators

a. Inspection Scope

The inspectors reviewed logs, notifications, and plant records to verify the accuracy of reported data for the following three indicators:

- Reactor coolant system activity
- High pressure injection system unavailability
- Unplanned power changes

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed selected notifications placed into the licensee's corrective action process to verify that equipment, human performance, and program issues are being identified at an appropriate threshold and the associated immediate and long-term corrective actions taken or planned were commensurate with the significance of the issues.

b. Findings

The licensee failed to prevent recurrence of previously identified noncited Violation 50-298/0106-01. Specifically, the licensee failed to ensure that the Technical Specification Bases were maintained consistent with the Updated Final Safety Analysis Report with respect to offsite power supplying power to the 4160 volt buses. This resulted in the failure to enter Technical Specification Limiting Condition for Operation (LCO) 3.8.1.A, "One offsite circuit inoperable." This issue was determined to have crosscutting aspects associated with problem identification and resolution.

NRC Inspection Report 50-298/01-06 described a noncited violation of Technical Specification 5.5.10(c) for the failure to ensure that the bases were maintained consistent with the Updated Final Safety Analysis Report. The bases described an operable offsite circuit consisting of each offsite circuit supplying power to one critical bus. However, the Updated Final Safety Analysis Report described the ability of each offsite circuit to supply and to auto-transfer to both critical busses. NRC Inspection Report 50-298/01-06 documented that on multiple occasions the licensee had placed the plant in a configuration where one offsite circuit was only capable of supplying power to one critical bus, without auto-transfer capability. During these occasions, the licensee inappropriately determined that operability of the offsite power sources was not affected and, therefore, did not enter any Technical Specification Limiting Condition of Operation.

In response to the original violation, the licensee's immediate corrective action consisted of placing into effect Standing Order 2001-07 on September 14, 2001. This standing order defined an offsite circuit such that each transformer (station startup service transformer and emergency station service transformer) is capable of its design auto transfer to supply both divisions of the 4160 volt essential buses. This standing order was to remain in effect until the licensee established a Technical Specification Bases consistent with the Updated Safety Analysis Report.

On March 1, 2002, Standing Order 2001-07 was inappropriately closed by operations personnel before all the corrective actions had been implemented. On March 13, 2002, operations personnel racked out Breaker 1AS for planned maintenance. Breaker 1AS is the startup transformer supply breaker to the Division 1 4160 volt buses. Due to Standing Order 2001-07 being closed, operations inappropriately determined that the startup transformer was operable. This resulted in the failure to enter Technical Specification 3.8.1(A), "One offsite circuit inoperable," that required the performance of Surveillance Requirement 3.8.1.1 within one hour. Surveillance Requirement 3.8.1.1 verifies that correct breaker alignment and indicated power availability for each offsite circuit is maintained.

Technical Specification 5.5.10(c) states "The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the Updated Final Safety Analysis Report." The failure of the Bases Control Program to contain provisions to ensure that the Technical Specification Bases are maintained consistent with the Updated Final Safety Analysis Report is a violation of Technical Specification 5.5.10(c). This violation is being treated as a noncited violation (50-298/0108-09) consistent with Section VI.A of the NRC Enforcement Policy. The licensee documented this issue in their corrective action process as Notification 10110178.

This issue was determined to have an actual impact on safety in that some of the safety functions of a qualified offsite power source were affected. This noncited violation was characterized under the significance determination process as having very low safety significance (Green). The condition was identified and corrected in approximately 2 hours (less than the Technical Specification allowed outage time) and the critical busses remained energized without the need for emergency power.

This issue also had crosscutting aspects associated with problem identification and resolution. This assessment was based on the ineffective immediate corrective actions that were implemented prior to long term corrective actions being put in place. These ineffective immediate corrective actions resulted in a recurrence of a previously identified noncited violation. This crosscutting issue is an additional example to the substantive crosscutting finding described in NRC Inspection Report 50-298/01-10 pertaining to problem identification and resolution.

4OA3 Event Followup

.1 <u>(Closed) Licensee Event Report (LER) 05000298/2000-012</u>

On December 18, 2000, a personnel error was made during a surveillance test, resulting in load shedding of the Division I 4160 volt critical bus. An NRC inspection performed in response to this event determined that a violation of Technical Specification 5.4.1(a) resulted. NRC Inspection Report 50-298/2000-014, Section 1R22, documented the details associated with this finding.

.2 (Closed) LER 05000298/2000-008 and 05000298/2000-008-01

On April 1, 2000, the licensee discovered that environmentally qualified equipment located in the drywell was not qualified for the worst-case postulated environmental conditions. An NRC special inspection performed in response to this condition determined that multiple violations of NRC requirements resulted. NRC Inspection Report 50-298/2000-007 documented the details associated with this issue.

4OA6 Meetings

.1 Exit Meeting Summary

The emergency preparedness inspector presented the inspection results to Mr. G. Casto, Emergency Preparedness Manager, and other members of licensee management during a telephonic exit interview conducted on January 4, 2002.

The health physics inspector presented the inspection results to Mr. D. Wilson, Site Vice President, and other members of licensee management at the conclusion of the inspection on February 28, 2002.

The inspectors presented the maintenance rule inspection results to Mr. D. Wilson, Site Vice President, and other members of licensee management at the conclusion of the inspection on February 28, 2002. On March 28, 2002, a telephone call was made to Mr. Rick Wachowiak, Supervisor, Risk Management, and Mr. Coy Blair, Licensing engineer to discuss changes in the final characterization of the maintenance rule finding results.

On April 15, 2002, the results of the resident inspector inspections were discussed with Mr. Mike Coyle, Site Vice President, and other staff personnel.

During all meetings, licensee management acknowledged the inspection findings presented. Additionally, the inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violations

The following findings of very low safety significance (Green) were identified by the licensee, are violations of NRC requirements, and meet the criteria of Section VI.A of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a noncited violation.

If you deny any of the noncited violations, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Cooper Nuclear Station.

NCV Tracking Number	Requirement Licensee Failed to Meet
50-298/0108-10	Technical Specification 5.4.1(a) requires that the licensee establish, implement, and maintain written procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for Equipment Controls. On January 28, 2002, the licensee identified that, during performance of troubleshooting activities on the reactor building ventilation system, personnel inappropriately lifted an electrical lead, resulting in a loss of secondary containment pressure control. This resulted in an unplanned entry into LCO 3.6.4.1(A) for the loss of secondary containment. This is being treated as a noncited violation. The licensee entered this issue into their corrective action process as Notification 10122626. The safety significance of this violation was determined to be very low. The lifted wire was replaced and secondary containment pressure control was re-established after approximately 10 minutes. The standby gas treatment system was also available for secondary containment pressure control if needed.
50-298/0108-11	Technical Specification 5.4.1(a) requires that the licensee establish, implement, and maintain written procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A recommends procedures for surveillance tests. On February 11, 2002, personnel failed to follow Surveillance Procedure 6.CRD.201, "North and South Shutdown Volume Vent and Drain Valve Cycling," resulting in both shutdown vent and drain lines failing to close. This condition resulted in an unplanned entry into LCO 3.1.8(B), "One or more shutdown volume vent or drain valves inoperable." This is being treated as a noncited violation. The licensee entered this issue into their corrective action process as Notification 10141525. The safety significance of this violation was determined to be very low. The function of these valves is to provide primary containment isolation during a scram. This condition was present for approximately 10 minutes (less than the Technical Specification allowed outage time) before being identified and corrected.
50-298/0108-12	License Condition 2.C(3) of the Cooper Nuclear Station Facility Operating License requires that the licensee fully implement and maintain in effect all provisions of the Commission-approved physical security plan. The licensee's physical security plan states that prior to entering the protected area, all personnel will be searched in accordance with 10 CFR 73.55(d).

10 CFR 73.55(d)(1) requires, in part, that the search function for detection of firearms, explosives, and incendiary devices must be accomplished through the use of both firearms and explosive detection equipment capable of detecting those devices. On February 27 and March 5, 2002, the search function for detection of firearms failed, resulting in a test weapon being successfully passed through the licensee's access control point into the protected area. The licensee initiated prompt corrective actions. This is being treated as a noncited violation. The licensee entered these issues into their corrective action process as Notifications 10145888 and 10144779.

This noncited violation was characterized under the significance determination process as having very low safety significance because there have not been greater than two similar findings in the past four quarters.

50-298/0108-13

Technical Specification 5.4.1.(a) requires procedures for the ALARA Program. Procedure 3.14, "Temporary Shielding," Revision 10, is used, in part, to implement this requirement. Section 3.5.3 of this procedure stated to "Install shielding in accordance with the Temporary Shielding Request (TSR)." TSR 01-107 authorized shielding to be installed on "B" RHR piping. On December 1, 2001, the licensee identified that temporary shielding was installed on main steam piping rather than the "B" RHR piping. The estimated additional exposure for installing and removing the shielding from the main steam pipe was approximately 20 millirem. This violation is being treated as a noncited violation and is in the licensee's corrective action program, reference Notification 10127279.

The safety significance of this violation was determined to be very low by the occupational radiation safety significance determination process because there was no overexposure or substantial potential for an overexposure and the ability to assess dose was not compromised.

50-298/0108-14

10 CFR 20.1501(a) states, in part, that each licensee shall make or cause to be made surveys that are reasonable to evaluate the magnitude and extent of radiation levels and the potential radiological hazards. On November 18, 2001, the licensee identified that radiation protection personnel failed to survey a high radiation area in the "A" side of the condenser prior to two workers entering the condenser. Radiation levels were as high as 450 millirem per hour. This violation is being identified as a noncited violation and is in the licensee's corrective action program, reference Notification 10124470.

The safety significance of this violation was determined to be very low by the occupational radiation safety significance determination process because there was no overexposure or substantial potential for an overexposure and the ability to assess dose was not compromised.

50-298/0108-15

Technical Specification 5.4.1.(a) requires procedures for the radiation work permit system. Procedure 9.RADOP.1, “Radiation Protection at Cooper Nuclear Station,” Revision 2, is used, in part, to implement this requirement. Section 3.7.4 of this procedure states that each individual is responsible for abiding by all the instructions on the RWP. Worker instructions associated with RWP 2001-1082, Revision 0, states, in part, “Contact RP prior to each entry.” On November 27, 2001, the licensee identified that a worker performed work on “B” steam jet air ejector without contacting radiation protection personnel. This worker received an unplanned intake of radioactive material that resulted in a dose of 18 millirem. This violation is being treated as a noncited violation and is in the licensee’s corrective action program, reference Notification 10126269.

The safety significance of this violation was determined to be very low by the occupational radiation safety significance determination process because there was no overexposure or substantial potential for an overexposure and the ability to assess dose was not compromised.

50-298/0108-07

10 CFR 19.12 states, in part, that all individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 millirem shall be kept informed of the storage, transfer, or use of radiation and radioactive material. On November 29, 2001, the licensee identified that an individual assigned as a firewatch was moved from a nonradiation area to a radiation area in the reactor building without being informed of the radiological conditions in the work area. Radiation levels were as high as 6 millirem per hour. This violation is being treated as a noncited violation and is in the licensee’s corrective action program, reference Notification 10126965.

The safety significance of this violation was determined to be very low by the occupational radiation safety significance determination process because there was no overexposure or substantial potential for an overexposure and the ability to assess dose was not compromised.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Blair, Licensing Engineer
G. Casto, Emergency Preparedness Manager
T. Chard, Manager, Radiation Protection and Chemistry
J. Christensen, Manager, Training
M. Coyle, Site Vice President
J. Dixon, Supervisor, Radiation Protection
F. Diya, Manager, Plant Engineering
J. Edom, Maintenance Rule Coordinator
R. Fisher, Licensing Engineer
J. Flaherty, Regulatory Compliance
P. Fleming, Manager, Licensing
R. Gardner, Operations Manager
M. Gillan, Assistant to Plant Manager
V. Hoefler, Engineering Specialist
B. Houston, Senior Manager, Quality Assurance
J. Hutton, Plant Manager
K. Jones, Manager, Design Engineering
D. Kimball, Assistant Manager, Radiation Protection
D. Kunsemiller, Manager, Risk and Regulatory Affairs
J. Lechner, Project Manager, Plant Engineering
W. Macecevic, Work Control Manager
D. Meyers, Senior Manager, Site Support
J. Ranalli, Senior Manager of Engineering
D. Robinson, Acting Manager, Quality Assurance Operations
J. Salisbury, Manager, Engineering Support
D. VanDerKamp, Engineer, Licensing
R. Wachowiak, Supervisor, Risk Management
L. Wetherell, Executive Assistant to Vice President
N. Wetherell, Manager, Maintenance
D. Wilson, Vice President-Nuclear

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-298/0108-08	URI	Failure to perform a for-cause drug and alcohol test (3PP1)

Closed

05000298/2000-012	LER	Human error results in automatic load shed of critical bus (Section 4OA3.1)

05000298/2000-008	LER	Nonconservative drywell temperature profile (Section 4OA3.2)
05000298/2000-008-01	LER	Nonconservative drywell temperature profile (Section 4OA3.2)

<u>Opened and Closed During this Inspection</u>

50-298/0108-01	NCV	Failure to implement effective corrective actions (Section 1R04.1)
50-298/0108-02	NCV	Failure to evaluate piping in accordance with 10 CFR 50.55a(a)(3) (Section 1R04.1)
50-298/0108-03	NCV	Failure to monitor performance of Maintenance Rule components (Section 1R12.1)
50-298/0108-04	NCV	Failure to identify and correct a condition adverse to quality (Section 1R12.1)
50-298/0108-05	NCV	Noncompliance of safety relief valves with 10 CFR 50.49 requirements (Section 1R15.1)
50-298/0108-06	NCV	Failure to perform an operability evaluation and/or declare equipment inoperable (Section 1R15.2)
50-298/0108-07	NCV	Two examples of the failure to inform workers of the radiological conditions in their work area (Sections 2OS2 and 4OA7)
50-298/0108-09	NCV	Failure to maintain Technical Specification Bases consistent with the USAR (Section 4OA2)
50-298/0108-10	NCV	Failure to follow equipment control procedure (Section 4OA7)
50-298/0108-11	NCV	Failure to follow surveillance test procedure (Section 4OA7)
50-298/0108-12	NCV	Failure to fully implement the physical security plan (Section 4OA7)
50-298/0108-13	NCV	Failure to follow temporary shielding procedure requirements (Section 4OA7)
50-298/0108-14	NCV	Failure to conduct a radiation survey (Section 4OA7)
50-298/0108-15	NCV	Failure to follow radiation work permit requirements (Section 4OA7)

LIST OF ACRONYMS USED

ALARA	as low as is reasonably achievable
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
LCO	limiting conditions for operations
LER	licensee event report
LLRT	local leak rate test
NCV	noncited violation
RFO	refueling outage
RWP	radiation work permit
SRV	safety relief valve
SSC	structures, systems, and components
TSR	temporary shielding request
URI	unresolved item

PARTIAL LIST OF DOCUMENTS REVIEWED

Procedure	Title	Revision
0.27	Maintenance Rule Program	13
0.27.1	Periodic Structural Inspections of Structures	2
0.27.2	Maintenance Rule (a)(1) Evaluation And Goal Setting	3
0.27.3	Maintenance Rule Program Periodic Assessment	5
0.31	Equipment Status Control	
0.49	Schedule Risk Assessment	9
0.5.CLSS	Classification of Problem Identification Reports	6
0.5.NAIT	Corrective Action Implementation And Nuclear Action Item Tracking	7
0.5.RCR	Preparation Of Resolve Condition Reports	4
0.5SCR	Preparation Of Significant Condition Reports	4
3.10	Examination And Evaluation Of Pipe Wall Thinning	9

<u>Miscellaneous Documents</u>

Self-Assessment of Maintenance Rule Implementation at Cooper Nuclear Station, by Philip H. Johnson, dated March 15-19, 1999

RCR 2001-1625, Root Cause, 4215072, Reactor Feed Check Valves

RCR 2001-1064, Root Cause, 4205589, T2 Transformer

Expert Panel Meeting Notes

Drawings

Flow Diagram 2004, Sheet 3, Revision N42
Flow Diagram 2043, Revision N47
Flow Diagram 2044, Revision N65

Problem Identification Report

PIR 1-02456
PIR 2-14905
PIR 4-00952
PIR 4-12207

Notification

10095417
10101826
10119485
10137216
10137788