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NUCLEAR REGULATORY COMMISSION

REGION III
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February 11, 2000

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Mr. Mark L. Marchi
Site Vice President
Kewaunee Plant
Wisconsin Public Service
Corporation
Post Office Box 19002
Green Bay, WI 54307-9002

SUBJECT: KEWAUNEE INSPECTION REPORT 50-305/99013(DRP)

Dear Mr. Marchi:

On January 18, 2000, the NRC completed an inspection at your Kewaunee Nuclear Power Plant. The enclosed report presents the results of that inspection.

During the 7-week period covered by this inspection, your staff's conduct of activities at the Kewaunee facility was generally characterized by safety conscious operations. We observed that your staff identified examples of degraded equipment due to fouling from the service water system. Specific examples include the fouling of the spent fuel pool heat exchanger and a containment fan coil unit service water check valve. These degraded equipment conditions are of concern since they occurred unexpectedly and they involved components which were not being periodically monitored for performance by your staff.

Based on the results of this inspection, the NRC has determined that two violations of NRC requirements occurred. These violations are being treated as Non-Cited Violation (NCVs) consistent with Section VII.B.1.a of the NRC Enforcement Policy. These NCVs are described in the subject inspection report. If you contest the violations or severity level of the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region III, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Template NMSS/RGN-005

IE01

M. Marchi

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M. Marchi

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be placed in the NRC Public Document Room.

Sincerely,

/s/ D. Roberts for

Melvyn N. Leach, Chief,
Reactor Projects Branch 2

Docket No. 50-305
License No. DPR-43

Enclosure: Inspection Report 50-305/99013(DRP)

cc w/encl: K. Weinbauer, Manager, Kewaunee Plant
B. Burks, P.E., Director, Bureau of Field Operations
Chairman, Wisconsin Public Service Commission
State Liaison Officer

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M. Marchi

-2-

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be placed in the NRC Public Document Room.

Sincerely,

A handwritten signature in cursive script, appearing to read "Melvyn N. Leach for".

Melvyn N. Leach, Chief,
Reactor Projects Branch 2

Docket No. 50-305
License No. DPR-43

Enclosure: Inspection Report 50-305/99013(DRP)

cc w/encl: K. Weinhauer, Manager, Kewaunee Plant
B. Burks, P.E., Director, Bureau of Field Operations
Chairman, Wisconsin Public Service Commission
State Liaison Officer

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-305
License No: DPR-43

Report No: 50-305/99013(DRP)

Licensee: Wisconsin Public Service Corporation

Facility: Kewaunee Nuclear Power Plant

Location: N 490 Highway 42
Kewaunee, WI 54216

Dates: December 1, 1999, through January 18, 2000

Inspectors: J. Lara, Senior Resident Inspector
Z. Dunham, Resident Inspector

Approved By: Melvyn N. Leach, Chief
Reactor Projects Branch 2
Division of Reactor Projects

EXECUTIVE SUMMARY

Kewaunee Nuclear Power Plant NRC Inspection Report 50-305/99013(DRP)

This report includes results of the routine, unannounced inspection by resident inspectors of plant operations, maintenance, engineering, and plant support.

Operations

- The inspectors conducted direct observations of control room activities during the Year 2000 transition period. The licensee did not identify any equipment or computer related problems during or following the rollover due to Year 2000 related anomalies. The inspectors performed independent reviews of various equipment and plant parameters and did not identify any concerns. (Section O1.2)
- On December 20, 1999, the plant was outside of its design basis when both control room air conditioning units were rendered simultaneously out-of-service for about 12 seconds due to an inadequate procedure. The licensee appropriately made a 1-hour non-emergency report to the NRC Operations Center in accordance with 10 CFR 50.72(b)(ii)(B). The inspectors did not identify any concerns with the licensee's evaluation of the event. (Section O2.2)
- Overall, the licensee's facility was adequately prepared for adverse cold weather conditions. However, the inspectors identified that operators were not routinely notified when the turbine building roll-up door was open to prompt closer monitoring of plant parameters to identify any adverse cold temperature effects. (Section O2.3)
- A non-cited violation was identified against 10 CFR 50, Appendix B, Criterion XI, Test Control, for failure to perform a surveillance test procedure associated with the steam exclusion system. The procedure had not been performed since August 27, 1992. The licensee's corrective actions to address the missed surveillance were appropriate. (Section O2.4)

Maintenance

- The licensee performed work in accordance with prescribed work instructions. In addition, technicians were knowledgeable of their assigned tasks and work document requirements. No deficiencies were identified. (Section M1.1)
- During motor-operated valve testing, the pressure of isolated service water piping exceeded the piping design pressure. The overpressure condition was the result of a spring check valve that was stuck closed. The inspectors reviewed the licensee's engineering evaluation and administrative controls and did not identify any deficiencies.

Additionally, the inspectors noted that the licensee adequately evaluated other similar spring check valves for potential common mode failure mechanisms. (Section M2.1)

- The service water flow to the spent fuel pool heat exchanger degraded unexpectedly. The licensee adequately evaluated the operability of the spent fuel pool heat exchanger, which was not included in the licensee's program for monitoring the performance of service water-cooled components. The reduced service water flow resulted from zebra mussel shell intrusion and other fouling located in the shell side of the heat exchanger. Additionally, the licensee questioned and evaluated the possibility of zebra mussel intrusion in other service water system heat exchangers. The licensee's long-term corrective action plans to replace the spent fuel pool heat exchanger tube bundle were appropriate. (Section M2.2)

Engineering

- Engineering support to plant operations and maintenance organizations was observed during the course of plant work activities. Observations were made in the areas of Kewaunee Assessment Processes, plant surveillance testing, and various design and degraded equipment issues. Two specific degraded equipment issues included a stuck check valve and reduced service water flow to the spent fuel pool heat exchanger. No deficiencies were identified. (Section E1.1)

Plant Support

- The licensee appropriately made a 1-hour non-emergency notification to the NRC Operations Center in accordance with 10 CFR 50.72(b)(v) following a 59 percent loss of the emergency siren system to the population within the emergency planning zone. The inspectors reviewed the licensee's response to the event and did not identify any concerns. (Section P2.1)
- The licensee failed to ensure that unauthorized personnel remained outside of a posted radiography area while radiography was in progress. The inspectors reviewed the licensee's immediate corrective actions and did not identify any deficiencies. A Non-Cited Violation was identified. (Section R1.2)

Report Details

Summary of Plant Status

The unit operated at power levels up to approximately 97 percent during the 7-week inspection reporting period. On December 18, 1999, operators briefly reduced power to perform turbine stop valve and control valve testing.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors conducted frequent reviews of ongoing plant operations. These reviews included observations of control room evolutions, shift turnovers, and log keeping. The inspectors also reviewed the Updated Safety Analysis Report (USAR) Section 12, "Conduct of Operations," the facility's Technical Specifications (TSs), and operability evaluations.

The inspectors observed shift turnover meetings and discussions regarding the status of plant equipment, planned testing, and maintenance. Operators exhibited good working knowledge of plant equipment and instruments. On December 18, 1999, operators briefly reduced reactor power to 70 percent to perform turbine stop and control valve testing. The turbine stop and control valve testing was completed satisfactorily. Specific events and observations are detailed in the sections below.

O1.2 Year 2000 (Y2K) Readiness of Systems at Nuclear Power Plants - General Comments (71707)

The inspectors reviewed the licensee's preparations for the Y2K rollover into the new year. The inspectors verified that the Y2K contingency plans were available for use. Direct observation of control room activities were conducted from 11:00 p.m. on December 31, 1999, through 1:00 a.m. on January 1, 2000. Licensee personnel performed reviews of plant parameters and equipment prior to and after the rollover to identify potential Y2K anomalies. The licensee did not identify any equipment or computer related problems during or following the rollover related to Y2K. The inspectors performed independent reviews of various equipment and plant parameters and did not identify any concerns.

O2 Operational Status of Facilities and Equipment

O2.1 Plant Equipment and System Walkdowns - General Comments (71707)

In addition to routine plant inspections, the inspectors examined the material condition and system configuration of selected portions of the residual heat removal system and the emergency diesel generator fuel oil system. No deficiencies were identified during

the evaluations. Additionally, the inspectors accompanied operations personnel during a monthly routine inspection of the containment building. The inspectors did not identify any deficiencies.

O2.2 Both Control Room Air Conditioning (CRAC) Units Simultaneously Out of Service

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the licensee's identification that during a routine bi-weekly rotation of the CRAC units, both units were inadvertently placed out of service at the same time. This condition was outside the plant's design basis. The following documents were reviewed:

- Operating Procedure N-ACC-25, "Control Room Air Conditioning System," Revision R
- KAP 99-300037, Both CRAC Units Out of Service During Bi-weekly Equipment Rotation
- USAR, Section 9.6.4, "Control Room Air Conditioning System"
- Technical Specification 3.12, "Control Room Post-Accident Recirculation System"

b. Observations and Findings

On December 20, 1999, the licensee performed Procedure N-ACC-25 to conduct the bi-weekly rotation of the CRAC units from the operating 'A' CRAC unit, to the standby 'B' CRAC unit. A licensed operator, who was in the process of reactivating his license, was performing the procedure while in direct oversight from a licensed reactor operator. The procedure directed the operator to place the standby unit's control switch to "On" and then to place the operating unit's control switch to "Off" to allow the standby unit to start and to stop the previously operating unit. The operator performed the equipment rotation in accordance with Procedure N-ACC-25. However, the 'B' CRAC unit did not energize as was expected, and the 'A' CRAC unit restarted 12 seconds later, after its control switch was placed in "Auto." The licensee's review revealed that the control circuitry for the CRAC units contained a timer which required that the control switch for the operating CRAC unit be positioned to "Off", prior to the timer timing out, following placement of the standby CRAC unit's control switch to "On." The licensee determined that the required switch manipulations took longer than usual due to the slow and methodical nature by which the operator performed the procedure and, as a result, the switch manipulations exceeded the timing circuitry requirements. This resulted in a run inhibit interlock on the 'B' CRAC unit with the 'A' CRAC unit control switch in the "Off" position at the same time. This rendered both CRAC units simultaneously out-of-service, which was outside the plant's design basis. The licensee made a 1-hour non-emergency report to the NRC Operations Center in accordance with 10 CFR 50.72(b)(ii)(B) for being outside the design basis of the plant. Both CRAC units were subsequently returned to operable status and the licensee documented the event in KAP 99-300037.

The inspectors determined that this event had minor safety significance due to the fact that both trains of CRAC units were only out of service for 12 seconds.

The licensee identified several factors that contributed to this event. One factor was the lack of adequate procedural guidance to ensure that the switch manipulations were performed within the time limits of the timing circuit. In addition, the timing circuit was not specifically included in the training lesson plans for the control room post-accident recirculation system. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" required, in part, that activities affecting quality be prescribed by documented instructions or procedures appropriate to the circumstances. The lack of procedural guidance regarding the timing circuit was considered a violation of this requirement. However, this failure constitutes a violation of minor significance and is not subject to formal enforcement action. Subsequent to the inspection period, the licensee documented this event in Licensee Event Report (LER) 50-305/1999-006-00.

c. Conclusions

On December 20, 1999, the plant was outside of its design basis when both CRAC units were rendered simultaneously out-of-service for about 12 seconds due to an inadequate procedure. The licensee appropriately made a 1-hour non-emergency report to the NRC Operations Center in accordance with 10 CFR 50.72(b)(ii)(B). The inspectors did not identify any concerns with the licensee's evaluation of the event.

O2.3 Cold Weather Preparations

a. Inspection Scope (71714)

The inspectors performed plant walkdowns and interviewed personnel to evaluate the licensee's precautions for coping with cold weather conditions. The following documents were reviewed:

- USAR, Section 9.6.3, "Auxiliary Building Ventilation Systems"
- KAP 3731, Control Room Alarm Received Due to Cold Weather Conditions
- Preventative Maintenance Procedure (PMP) 08-07, "Fire Protection System Hydrant Discharge Host Test and Hose Station and Floor Drain Inspection," Revision O

b. Observations and Findings

Overall, the inspectors determined that the plant was well protected from the potential adverse effects of cold weather. As discussed in USAR Section 9.6.3, the facility was designed for a minimum temperature of 60 degrees Fahrenheit (°F) inside the Auxiliary Building with an outside temperature of -20°F. All safety-related equipment was located inside heated buildings and heat tracing was only necessary for boron precipitation prevention.

The inspectors reviewed operator logs and noted that, on one occasion when the turbine roll-up door was opened for a tanker unload, control room operators received an alarm for low generator seal oil temperature. The equipment operator determined that the alarm was due to the open door which allowed cold air to enter the turbine building. The alarm cleared a few hours after the door was closed. The inspectors interviewed

operations personnel and determined that when the doors were opened for truck deliveries, the control room was not routinely notified. The inspectors observed that prior notification would provide operators the opportunity to closely monitor plant equipment and parameters for cold temperature effects. The licensee initiated KAP 3731 to document the issue and the inspectors' observations. The inspectors identified that control room operators had been notified during subsequent operation of the turbine building roll-up door.

The inspectors also toured the outside of the plant and did not identify any safety-related equipment or piping likely to be adversely affected by cold weather. The inspectors also verified that existing maintenance procedures provided for verifying that water in outside fire hydrants were drained following testing activities.

Conclusions

Overall, the licensee's facility was adequately prepared for adverse cold weather conditions. However, the inspectors identified that operators were not routinely notified when the turbine building roll-up door was open to prompt closer monitoring of plant parameters to identify any adverse cold temperature effects.

O2.4 Steam Exclusion Operating Procedure Not Performed Within Periodicity

a. Inspection Scope (71707)

The inspectors reviewed the licensee's failure to perform a steam exclusion control circuitry surveillance within its prescribed periodicity. The following documents were reviewed:

- Operating Procedure RT-ASV-14, "Steam Exclusion Pushbutton/Relay Test," Revision B
- Kewaunee Assessment Process (KAP) 2436, RT-ASV-14 Not Performed Since August 27, 1992
- USAR, Section 10A.2.3, "Design Criteria to Mitigate Consequences of Postulated Pipe Breaks"
- Generic Letter (GL) 96-01, "Testing of Safety-Related Logic Circuits"

The purpose of the steam exclusion system is to provide suitable environmental conditions for required equipment during a high energy line break. Additionally, the system provides a habitable environment for personnel in areas which may require access should a high energy line break occur.

b. Observations and Findings

On December 9, 1999, the licensee identified that Operating Procedure RT-ASV-14 had not been performed since August 27, 1992, when it was first developed after installation of the steam exclusion system. The required periodicity of the procedure, as stated in USAR Section 10A.2.3, was each operating cycle - not to exceed 18 months. The purpose of the procedure was to test the capability of the control room steam exclusion initiate pushbuttons and the steam exclusion slave relays to activate the steam

exclusion system. The procedure also initiated closure of steam exclusion boundary dampers and started associated engineered safeguard features equipment. The procedure had not been incorporated into the licensee's planning and scheduling process after its initial performance in August 1992, which resulted in the missed surveillance.

The licensee documented the missed surveillance in KAP 2436. The inspectors reviewed the licensee's evaluation of KAP 2436 and did not identify any deficiencies. The licensee subsequently performed Procedure RT-ASV-14 with satisfactory results. Additionally, the licensee incorporated Procedure RT-ASV-14 into its planning and scheduling program to ensure future timely performance of the procedure.

This issue was identified through the licensee's program for reviewing the USAR for accuracy and completeness. 10 CFR 50, Appendix B, Criterion XI, Test Control requires, in part, that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures. The inspectors determined that the failure to properly test the safety-related steam exclusion system was a violation of this requirement. However, this Severity Level IV violation is being treated as a Non-Cited Violation consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-305/99013-02(DRP)). This violation was entered into the licensee's corrective action program as KAP 2436.

c. Conclusions

A non-cited violation was identified against 10 CFR 50, Appendix B, Criterion XI, Test Control, for failure to perform a surveillance test procedure associated with the steam exclusion system. The procedure had not been performed since August 27, 1992. The licensee's corrective actions to address the missed surveillance were appropriate.

07 Quality Assurance in Operations

07.1 Kewaunee Quality Programs Audit Report for Third Quarter 1999 (40500)

The inspectors reviewed selected portions of the licensee's Quality Programs Audit Report for the Third Quarter, 1999. Topics reviewed included the Operations Assessment, Maintenance Assessment, and Material and Procurement Control. The inspectors noted that the licensee's self-assessment highlighted deficiencies and included appropriate conclusions. The inspectors identified no concerns with the licensee's audit report.

08 Miscellaneous Operations Issues (92700)

08.1 (Closed) LER 305/97008-00: Target Rock Solenoid Valve Test Failure Under Differential Pressure Conditions.

This report was a voluntary submittal to the NRC to document the potential for inadequate testing of Target Rock solenoid valves. The inspectors reviewed the

technical issues and proposed corrective actions as submitted in the LER and did not identify any deficiencies or concerns. The corrective actions included removal and overhaul of the affected valves. Additionally, a revision was made to the test procedures that affect the Target Rock solenoid valves to ensure that the valves open with both an applied differential pressure and with no differential pressure across the valve. The inspectors noted through a review of subsequent test data that following the implementation of the licensee's corrective actions, there had not been a recurrence of these valves failing to open. This issue is closed.

O8.2 (Closed) LER 305/98013-00: Technical Specifications for Reactor Coolant System Venting System Violated Due to Personnel Error.

The details of this issue and an associated Non-Cited Violation were documented in Inspection Report 50-305/98017, Section O1.3. No new issues were revealed by the LER.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance and Surveillance Test Observations (61726, 62707)

The inspectors observed and reviewed all or portions of the following surveillance test and maintenance activities:

- Surveillance Procedure (SP) 38-101B, "Station Battery BRB-101 Monthly and/or Quarterly Test," Revision E
- SP 42-312B, "Diesel Generator B Availability Test," Revision H
- SP 48-003G, "Nuclear Power Range Channel 3 (Blue) N-43 Monthly Test," Revision K
- SP 38-182A, "(EDC) QA-1 Station Battery BRA-101 1A Cell to Cell Resistance Check," Revision C
- SP 47-316D, "Channel 4 (Yellow) Instrument Channel Test," Revision F
- SP 54-063, "Turbine Trip Mechanism Tests," Revision Z
- SP 47-281, "AMSAC [Anticipated Transient Without Scram Mitigation System Actuation Circuitry] Quarterly Functional Test," Revision I
- SP 02-138, "Service Water Pump and Valve Test - IST," Revision AQ
- PMP 05B-03, "Auxiliary Feedwater System (AFW) QA-1 Motor Operated Valve Maintenance," Revision K
- PMP 35-09, "Chemical Volume Control (CVC) QA-1 Charging Pump Pulsation Dampener Maintenance," Revision M
- Work Request (WR) 217875, Inspect/Replace Bonnet and/or Diaphragm on LD-21
- WR 217697, Boroscopic Exam of Spent Fuel Pool Heat Exchanger

The inspectors also reviewed the surveillance procedure and the appropriate USAR sections. The licensee performed work in accordance with the prescribed work instructions. In addition, the technicians were knowledgeable of their assigned tasks and work document requirements. No deficiencies were identified by the inspectors.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Stuck Check Valve Prevents Pressure Relief of Service Water (SW) Piping

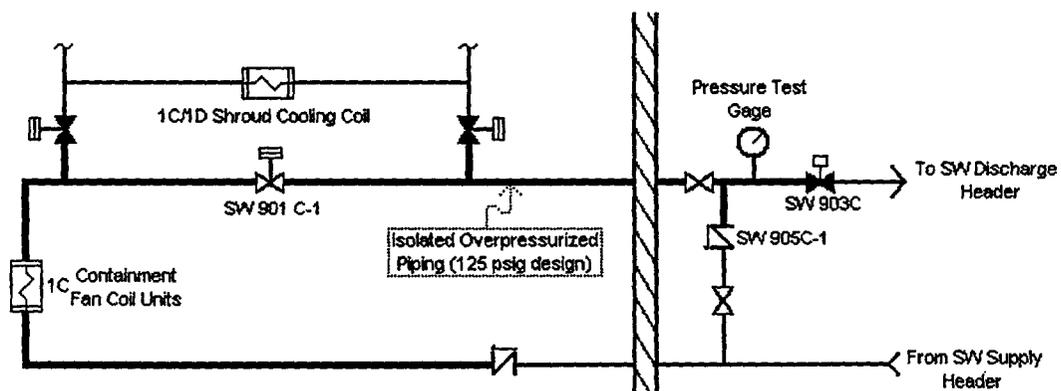
a. Inspection Scope (61726, 37551)

The inspectors reviewed the licensee's response to a stuck closed check valve which was relied upon to provide over-pressure protection for Containment Fan Coil Unit (FCU) SW piping. The following documents were reviewed:

- Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions."
- KAP 3723, Unexpected High Pressure Observed During Diagnostic Testing of Valve SW-903C
- KAP 3733, Overpressure Protection of SW Piping With Respect to GL 96-06
- Special Operating Procedure SW-02-12, "SW-903C/MV-32058 MOV Diagnostic Test," Revision Original
- WR 217684, Evaluation and Repair of Valve SW-905C
- USAR, Section 6.3, "Containment Air Cooling System"

b. Observations and Findings

During the performance of motor-operated valve testing on Valve SW-903C, test personnel noted that while Valve SW-903C was closed, the pressure of the isolated portion of the SW piping of Containment FCU 'C' indicated about 150 pounds per square inch gage (psig). The design pressure of that section of piping was 125 psig. The licensee suspected that the cause of the pressure increase was thermal expansion of isolated fluid in the associated SW piping. However, a spring check valve, Valve SW-905C-1, was designed to relieve any pressure increase to prevent exceeding pressure design limits as shown in the simplified diagram below. Valve SW-905C-1 had been originally installed to address GL 96-06 concerns.



Simplified Diagram

The licensee initiated KAP 3723 and WR 217684 to document this condition and to investigate the cause of the failure of Valve SW-905C-1 to relieve pressure as designed. Additionally, the licensee performed an engineering evaluation which concluded that the increased pipe stresses due to the overpressurization were negligible compared to the allowable stresses for the piping material in use. The inspectors reviewed the licensee's operability determination documented in KAP 3723. The inspectors noted that KAP 3723 contained administrative controls for the operation of Valve SW-903C to ensure that GL 96-06 concerns were satisfied. The inspectors did not identify any deficiencies with KAP 3723.

Additional troubleshooting determined that Valve SW-905C-1 was fouled and stuck closed. The valve was then cleaned and reassembled. The licensee subsequently retested Valve SW-905C-1 with satisfactory results. The inspectors noted that the licensee questioned the operability of Valves SW-905A-1, SW-905B-1 and SW-905D-1, which are the spring check valves associated with the other containment FCUs. The licensee subsequently performed testing of the other spring check valves and determined that they were functioning as designed. Additionally, the licensee planned to disassemble and inspect the remaining check valves to ensure proper operation.

c. Conclusions

During motor-operated valve testing, test personnel observed that the pressure of isolated service water piping exceeded the design pressure. The overpressure condition was the result of a spring check valve that was stuck closed. The inspectors reviewed the licensee's engineering evaluation and administrative controls and did not identify any deficiencies. Additionally, the inspectors noted that the licensee adequately evaluated other similar spring check valves for potential common mode failure mechanisms.

M2.2 Reduced SW Flow to the Spent Fuel Pool (SFP) Heat Exchanger (HX)

a. Inspection Scope (62707, 37551)

On December 3, 1999, the licensee measured SW flow to various plant equipment and components. These measurements were conducted to support a design change to the system and a vendor analysis of new ultrasonic flow meters that had recently been purchased. One of the flow rates measured was SW flow to the SFP HX, which was 492 gallons per minute (gpm). On November 3, the licensee had measured flow at 829 gpm. The licensee noted that the 829 gpm was reduced from what was typically measured; however, at that time the licensee attributed the reduced flow to inconsistent flow measurements by new ultrasonic flow meters (See Inspection Report 50-305/99012).

The inspectors reviewed the licensee's response to reduced SW flow to the SFP HX. The following documents were reviewed:

- KAP 3736, Reduced SW Flow to the SFP HX
- USAR, Section 9.3, "Auxiliary Coolant System"
- WR 217697, Boroscopic Exam of SFP HX

- GL 89-13, "Service Water System Problems Affecting Safety-Related Equipment"

b. Observations and Findings

The licensee initiated KAP 3736 to document the reduced flow and the associated operability determination. The licensee's immediate corrective actions included a boroscopic examination of the shell side of the SFP HX. During that inspection, the licensee observed what appeared to be live zebra mussels, shell fragments, and other fouling such as scale buildup on the exterior of the U-tubes of the SFP HX. However, due to the limited access points for the boroscopic examination, only a small fraction of the shell side of the SFP HX was able to be examined. The licensee suspected that the reduction in SW flow to the SFP HX was due to excessive scale buildup in conjunction with the tight tolerances between the HX U-tubes. Other corrective actions included a full flow SW flush of the SFP HX in an attempt to dislodge any zebra mussel shells and other debris. The licensee observed that SW flow through the SFP HX did not improve following the flush. The licensee also conducted a boroscopic examination of the SW side of the 'B' Component Cooling HX to determine the extent of any potential zebra mussel intrusion. That boroscopic examination did not reveal any zebra mussels or other fouling within the 'B' Component Cooling HX. The licensee's proposed long-term corrective actions include replacement of the SFP HX tube bundle prior to the next refueling outage currently scheduled for April 2000.

The licensee determined that the SFP HX was operable based on the available SW flow to remove sufficient heat load and maintain the SFP temperature at less than 70°F. The evaluation was based on the current spent fuel storage in the SFP. However, in order to cool the SFP under full core off-load conditions, additional hold time may be required prior to the movement of fuel from the core to the SFP. As stated in USAR Chapter 9.3, Auxiliary Coolant System, the design of the facility included alternate cooling capability in the event of system malfunctions or failures. In the event of loss of forced flow with full core offload, analysis indicated sufficient margin exists to prevent bulk boiling. Additionally, level and temperature instruments are available to detect a loss of cooling condition. The inspectors reviewed operations Procedure A-SFP-21, "Abnormal Spent Fuel Pool Cooling and Cleanup System Operation," which provided instructions for cross-connecting the residual heat removal HX 1A to the SFP system to allow for emergency cooling of the SFP.

The inspectors also noted that the licensee had not performed performance monitoring of the SFP HX since it had not been included within the scope of GL 89-13. Based on additional questions from the inspectors, the licensee indicated that a review would be performed to determine whether the HX should have been included within the scope. The licensee documented the inspectors' concerns for further evaluation.

c. Conclusions

The service water flow to the SFP HX degraded unexpectedly. The licensee adequately evaluated the operability of the SFP HX, which was not included in the licensee's program for monitoring the performance of SW-cooled components. The reduced SW flow resulted from zebra mussel shell intrusion and other fouling located in the shell side

of the HX. Additionally, the licensee questioned and evaluated the possibility of zebra mussel intrusion in other SW system HXs. The licensee's long-term corrective action plans to replace the SFP HX tube bundle were appropriate.

M8 Miscellaneous Maintenance Issues (92700)

M8.1 (Closed) LER 305/98017-00: Safety Injection Valve Leakage Could Have Caused Plant Analytical Limits to be Exceeded.

The details of this event were documented in Inspection Report 50-305/98018, Section M2.2. No new issues were revealed by the LER.

M8.2 (Closed) Unresolved Item (URI) 305/99010-02: Effect of Back-pressure on the Determination of Internal Containment Spray (ICS) Relief Valve Setpoint.

This item pertained to whether the failure to include back-pressure in the setpoint determination of Valves ICS-20A/B was in violation of the in-service testing plan. This was of concern since the relief valve setpoint was 225 psig and the ICS pump suction piping design pressure was also 225 psig. The licensee's in-service test plan required consideration of constant superimposed back-pressure in relief pressure setting for non-balanced pressure relief valves when the back-pressure exceeded 1 percent of the set pressure. The licensee determined that the superimposed back-pressure had not been accounted for in the determination of the relief setpoint of Valves ICS-20A/B.

Further reviews during this inspection period determined that the nominal back-pressure exerted on Valves ICS-20A/B was 1.5-2.0 psig as set by a pressure regulator in the waste gas vent header. This back-pressure was determined to be less than the minimum back-pressure required for consideration in the relief setpoint determination. This item is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 General Comments (37551)

Engineering support to plant operations and maintenance organizations was observed during the course of plant work activities. Observations were made in the areas of KAPs, plant surveillance testing, and various design and degraded equipment issues. Two specific degraded equipment issues included a stuck check valve (Section M2.1) and reduced SW flow to the SFP HX (Section M2.2). No deficiencies were identified.

IV. Plant Support

P2 Status of Emergency Preparedness Facilities, Equipment, and Resources

P2.1 Loss of Emergency Siren System (71750)

On January 5, 2000, at 11:50 a.m., a failure of the Emergency Siren System occurred. The failure was discovered during a routine monthly test of the system. The failure was attributed to a malfunction with the primary radio base station at the Kewaunee County Emergency Operations Facility in Algoma, Wisconsin. This failure resulted in a 59 percent loss of coverage to the population within the emergency planning zone. A follow-up test using a secondary radio transmitter was successful. The licensee made a 1-hour non-emergency notification to the NRC Operations Center in accordance with 10 CFR 50.72(b)(v). The licensee documented the event in KAP 00-000011. The inspectors reviewed the licensee's response to the event and did not identify any concerns. The primary radio base station was subsequently repaired early that same afternoon and satisfactorily tested.

R1 Radiological Protection and Chemistry Controls

R1.1 General Comments (71750)

The inspectors performed frequent walkdowns of safety-related equipment located within the radiologically controlled area. The inspectors noted that radiation areas and high radiation areas were posted and controlled in accordance with NRC requirements. Contaminated areas were kept to a minimum allowing operator access to equipment without the need for protective clothing. During this inspection period the licensee conducted radiography on selected SW piping in support of various GL concerns. The inspectors reviewed Health Physics (HP) Procedure HP 5.10, "Control of Radiography," interviewed HP Technicians, and conducted independent radiation surveys at the radiography boundaries. No deficiencies were identified with the exception of a radiography boundary violation discussed in Section R1.2 below.

R1.2 Unauthorized Personnel Located Within a Posted Radiography Area

a. Inspection Scope (71750)

The inspectors reviewed the licensee's response and evaluation to an unauthorized entry into a posted radiography area. The following documents were reviewed:

- KAP 99-300050, Violation of Radiography Barrier
- HP 5.10, "Control of Radiography," Revision C
- Radiation Work Permit (RWP) 99-15, RWP for Radiography Activities
- Technical Specification 6.11, Radiation Protection Program

b. Observations and Findings

On December 22, 1999, a mechanical maintenance technician entered a posted radiography area while radiography was in progress. The technician mistakenly believed that the radiography was not in progress and that he had permission to cross the posted boundary. The maintenance technician was discovered to be in the posted radiography area by an HP technician at a boundary other than the one the maintenance technician originally crossed. The maintenance technician was then instructed to exit the posted radiography area. The boundary crossing was due to a mis-communication between the maintenance technician and another technician who had checked with HP personnel on the status of the radiography in progress. The licensee subsequently performed a radiation survey of the areas where the maintenance technician had been while the radiography was in progress. The radiation survey indicated that the highest dose rate measured was 3.0 millirem per hour while all other areas were measured at 0.1 millirem per hour or less. The licensee determined that the technician's total exposure during the event was less than 1 millirem.

The inspectors determined that corrective actions in response to this event were appropriate. These actions included direction for management to discuss with personnel the importance for industrial safety during radiography and the need to adhere to all posted radiation boundaries.

Technical Specification 6.11 requires, in part, that procedures for personnel radiation protection shall be approved, maintained and adhered to for all operations involving personnel radiation exposure. Procedure HP 5.10, Section 6.10, required, in part, that all unauthorized personnel are clear from a posted radiography area prior to beginning radiography and that they remain outside the area during the radiography. The failure to ensure that unauthorized personnel remained outside of a posted radiography area as required by Procedure HP 5.10 was a violation of Technical Specification 6.11. However, this Severity Level IV violation is being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy (NCV 50-305/99013-01(DRP)). This violation was entered into the licensee's corrective action program as KAP 99-300050.

c. Conclusions

The licensee failed to ensure that unauthorized personnel remained outside of a posted radiography area while radiography was in progress. The inspectors reviewed the licensee's immediate corrective actions and did not identify any deficiencies. An NCV was identified.

V. Management Meetings

X1 Exit Meeting Summary

On January 18, 2000, the inspectors presented the inspection results to the plant manager and members of his staff. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Wisconsin Public Service Corporation

D. Braun, Assistant Plant Manager - Operations
D. Cole, Manager, Engineering and Technical Support
K. Evers, Manager, Nuclear Support Services
J. Hannon, Superintendent, Plant Instrument and Control
G. Harrington, Plant Licensing Supervisor
M. Marchi, Vice President - Nuclear
J. Mortonson, Assistant Plant Manager - Maintenance
M. Reinhart, Superintendent, Radiation Protection
B. Koehler, Superintendent, Plant Quality Programs
J. Stoeger, Superintendent, Operations
T. Webb, Nuclear Licensing Director
K. Weinbauer, Manager, Kewaunee Plant

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 40500: Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726: Surveillance Observations
IP 62707: Maintenance Observation
IP 71707: Plant Operations
IP 71714: Cold Weather Preparations
IP 71750: Plant Support Activities
IP 92700: Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-305/99013-01 NCV Personnel Violation of Radiography Boundary
50-305/99013-02 NCV Failure to Perform 18-Month Test of Steam Exclusion System

Closed

50-305/97008-00 LER Target Rock Solenoid Valve Test Failure Under Differential Pressure Conditions
50-305/98013-00 LER Technical Specifications for Reactor Coolant System Venting System Violated Due to Personnel Error
50-305/98017-00 LER Safety Injection Valve Leakage Could Have Caused Plant Analytical Limits to be Exceeded
50-305/99010-02 URI Effect of Back-pressure in the Determination of ICS Relief Valve Setpoint
50-305/99013-01 NCV Personnel Violation of Radiography Boundary

Discussed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CRAC	Control Room Air Conditioning
°F	Degrees Fahrenheit
DRP	Division of Reactor Projects, Region III
FCU	Fan Coil Unit
GL	Generic Letter
gpm	gallons per minute
HP	Health Physics
HX	Heat Exchanger
ICS	Internal Containment Spray
IP	Inspection Procedure
I&C	Instrument and Control
KAP	Kewaunee Assessment Process
LER	Licensee Event Report
NCV	Non-Cited Violation
PDR	Public Document Room
PMP	Preventative Maintenance Procedure
psig	pounds per square inch gage
RCS	Reactor Coolant System
SFP	Spent Fuel Pool
SP	Surveillance Procedure
SW	Service Water
TS	Technical Specification
URI	Unresolved Item
USAR	Updated Safety Analysis Report
WR	Work Request
Y2K	Year 2000