U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-255
License No:	DPR-20
Report No:	50-255/99013(DRP)
Licensee:	Consumers Energy Company 212 West Michigan Avenue Jackson, MI 49201
Facility:	Palisades Nuclear Generating Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	December 17,1999, through January 31, 2000
Inspectors:	J. Lennartz, Senior Resident Inspector R. Krsek, Resident Inspector
Approved by:	Michael J. Jordan, Chief Reactor Projects Branch 3 Division of Reactor Projects

EXECUTIVE SUMMARY

Palisades Nuclear Generating Plant
NRC Inspection Report 50-255/99013(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection activities.

Operations

- The inspectors concluded that the licensee implemented thorough contingency actions to mitigate any potential problems during the transition to Year 2000 which demonstrated a positive focus on safety. Also, the licensee's Year 2000 Project Team effectively addressed potential Year 2000 issues which precluded any related problems during the transition to the new year. (Section O1.1)

- In general, the completed condition reports that were reviewed adequately addressed the overall evaluation of the issue, the apparent causes, and the corrective actions taken to preclude recurrence. (Section O7.1)

Maintenance

- Observed surveillance activities were effectively completed and documented in accordance with applicable procedures and Technical Specifications. (Section M1.1)

- Maintenance personnel job performance and documentation deficiencies were noted during a review of the circumstances surrounding the failure of the Spent Fuel Pool Cooling Pump P-51A that occurred on December 17, 1999. Also, knowledge weaknesses by operations and maintenance personnel regarding use and filling of pump oil bearing reservoir level indicator were revealed. Age and degraded material condition of the pump bearing oil reservoir and base assembly connection contributed to pump failure. The noted deficiencies did not result in any violations of regulatory requirements and were subsequently documented in the licensee's corrective action system for further evaluation. (Section M2.1)

Engineering

- System Engineering personnel actively supported surveillance testing. (Section M1.1)

- The inspectors noted, during the review of completed corrective action documentation, one minor deficiency regarding an engineering evaluation. Specifically, the evaluation lacked rigor in that there were no supporting engineering calculations or conclusions to address past operability for a safety-related component, High Pressure Safety Injection System Relief Valve RV-3264. No violations of NRC requirements were identified and this issue was subsequently documented in the licensee's corrective action system. (Section O7.1)

- Temporary Modification TM-2000-001 to inject ammonium chloride chemicals into the secondary system to mitigate the impact of elevated sodium concentrations was

completed in accordance with applicable Administrative Procedures. Appropriate safety analysis and design reviews were completed. Also, appropriate system piping drawings and procedures were revised prior to installation which demonstrated effective configuration control. (Section E1.1)

Plant Support

- Secondary system water chemistry issues regarding elevated sodium concentrations were appropriately addressed. The plant was operated within the requirements of Chemistry Operating Procedure 11 while secondary chemistry exhibited increased sodium concentrations. Also, communications amongst chemistry and operations personnel increased this inspection period and were considered timely and effective. (Section R1.1)

- The fire brigade responded in a timely manner and demonstrated competent skills during an unannounced drill for a fire in the 1-1 Emergency Diesel Generator Room. Timely and effective communications between the fire brigade members and control room personnel were noted throughout the entire exercise. (Section F4.1)

Report Details

Summary of Plant Status

Power escalation was in progress when the inspection period started. Plant power was raised and held at incrementally increased power levels to facilitate cleanup of high sodium levels in the steam generators. The high sodium levels resulted from extensive main turbine generator work completed during the refueling outage that ended on December 14, 1999. The plant reached full power on January 29, 2000, where it remained for the duration of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Preparations and Contingency Plans For Transition To Year 2000

a. Inspection Scope (71707)

The inspectors reviewed the contingency plans that were established to cope with any potential Year 2000 related problems. Also, the inspectors observed the plant response and related control room operator actions during the transition to Year 2000.

b. Observations and Findings

The inspectors noted that licensee personnel had thoroughly addressed potential Year 2000 problems. Several potential scenarios were evaluated including a plant trip with loss of offsite power for 7 days which was considered worst case. Licensee personnel concluded that the worst case scenario had a very low probability of occurring and that the most probable scenario would be no plant trip.

However, to prepare for potential problems, contingency plans were established and implemented to identify and mitigate any potential problems. The contingency actions were considered thorough and included the following:

- A full team of emergency response personnel were onsite to staff and activate the Technical Support Center, Operations Support Center, and Emergency Offsite Facility if necessary. A second team of emergency response personnel were on standby and had been directed to report to the site at 6:00 a.m. on January 1, 2000, unless notified otherwise.

- The oncoming operations crew arrived onsite 2 hours early and the offgoing operations crew was held over for 2 hours to provide additional plant operators if needed.

- The licensee's Year 2000 Project Team accessed and monitored the early warning systems that had been established by both the NRC and the industry.

- Control Room Operators received "just-in-time" training on the simulator for a loss of offsite power event. Also, Auxiliary Operators received specific training on the in-plant tasks that would be required for a loss of offsite power event.

- Control room operators conducted increased monitoring of critical systems such as the plant process computer an hour before the transition to Year 2000 and several hours after.

- Additional Instrument and Control Technicians were onsite and provided increased monitoring of equipment considered critical to plant operations.

The contingency actions that were taken demonstrated a positive focus on safety. Also, the inspectors noted that no Year 2000 related problems occurred during the transition to the new year which validated the licensee's Year 2000 Project Team's conclusion that no plant trip was the most probable event.

c. Conclusions

The inspectors concluded that the licensee implemented thorough contingency actions to mitigate any potential Year 2000 related problems which demonstrated a positive focus on safety. Also, the licensee's Year 2000 Project Team effectively addressed potential Year 2000 issues which precluded any related problems during the transition to the new year.

O7 Quality Assurance In Plant Operations

O7.1 Review of Completed Condition Report Documentation

a. Inspection Scope (71707, 62707, 37551)

The inspectors randomly selected the following condition reports to review and assess the completed corrective actions, if applicable. The following condition reports were reviewed:

- Condition Report No. 990448, "Standard Operating Procedure 15, "Service Water System," May be Inconsistent with Plant Design";

- Condition Report No. 9900538, "Potential to Exceed Service Water Final Safety Analysis Report Requirements During Stroking of Control Valves -0844 and -0845";

- Condition Report No. 9901688, "Training Requested After Outage Schedule Due Date and Without Approved Revised Procedures Available";

- Condition Report No. 9902065, "RI-6A, "Containment Pressure Channels Calibration - As Founds," Out of Tolerance Data";

- Condition Report No. 9902111, "Containment Air Cooler Ductwork Not Properly Supported";

- Condition Report No. 9902118, "As Found High Pressure Safety Injection System Relief Valve Nozzle Did Not Meet Specifications"; and,

- Condition Report No. 9902318, "Unable to Resolve Issue of YS-1400 Diesel Generator Fuel Oil Pump Suction Strainer PPAC [Predetermined Prescheduled Activity Control] Performance in Cold Shutdown or Online."

The inspection consisted of the review of applicable licensee procedures and condition report documentation as well as interviews with operations and engineering personnel.

b. Observations and Findings

The inspectors reviewed a random selection of condition reports generated for various issues to assess the completion of past operability assessments of plant equipment and the implementation of any subsequent corrective actions.

With one exception, the inspectors noted that the issues described in the condition reports were adequately addressed in the close out packages and were completed in accordance with Administrative Procedure 3.03, "Corrective Action Process." This included, initial operability determinations, overall evaluations of the issues, apparent causes, corrective actions, and past operability determinations, as applicable.

However, during the review of Condition Report No. 9902118, the inspectors noted a lack of rigor in the evaluation of the past operability of a safety system component. The condition report documented that the as found nozzle in High Pressure Safety Injection Relief Valve RV-3264 had a smaller diameter than the specifications required. This condition could have potentially affected the capacity of the relief valve to perform the intended safety function of overpressure protection of the system piping.

The condition report evaluation adequately addressed overall system operability and the correct sized nozzle was subsequently installed to correct the problem. However, the evaluation did not contain any supporting calculations or additional engineering justification to address past operablity which was initially based on engineering judgement.

The inspectors discussed this issue with engineering personnel, who concurred with the observations. Subsequently, engineering personnel initiated Condition Report No. 0000280, "Lack of Rigor in Level 3 Condition Report Evaluation for RV-3264 Undersized Nozzle," to evaluate past operability of RV-3264. Additional engineering justification for continued operability was reviewed by the inspection with no further comment.

c. Conclusions

In general, the completed condition reports that were reviewed adequately addressed the overall evaluation of the issue, the apparent causes, and the corrective actions

taken to preclude recurrence. However, the inspectors did note one minor exception regarding an engineering evaluation. Specifically, the evaluation lacked rigor in that there were no supporting calculations or additional engineering justification provided to address past operability for a safety system component, High Pressure Safety Injection System Relief Valve RV-3264. No violations of NRC requirements were identified and this issue was subsequently documented in the licensee's corrective action system.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Surveillance Test Observations

a. Inspection Scope (61726)

The inspectors interviewed operations and engineering department personnel, and reviewed the applicable sections of the Technical Specifications and the Final Safety Analysis Report. The inspectors reviewed completed documentation and observed the performance of selected portions of the following surveillance tests.

- QO-17B Inservice Test Procedure - Charging Pump P-55B
- QO-21A Inservice Test Procedure - Auxiliary Feedwater Pump P-8C
- QO-21C Inservice Test Procedure - Auxiliary Feedwater Pump P-8A

b. Observations and Findings

The inspectors noted that the correct procedures were utilized by operations personnel during the observed surveillance activities. Control Room personnel appropriately entered and exited Technical Specification Limiting Conditions of Operation. The inspectors also noted effective communications during the tests between the control room and auxiliary operators and active system engineering support. Test documentation was appropriately completed and the applicable acceptance criteria were met.

c. Conclusions

Observed surveillance activities were effectively completed and documented in accordance with applicable procedures and Technical Specifications. System Engineering personnel actively supported surveillance testing.

M1.2 Maintenance Observations

a. Inspection Scope (62707)

The inspectors interviewed operations, engineering, and maintenance department personnel and, when applicable, reviewed the Technical Specifications, the Final Safety Analysis Report, and vendor equipment manuals. The inspectors reviewed the completed work order documentation and observed the performance of selected portions of the following maintenance work orders.

- 24911792 Emergency Diesel Generator 1-2 Lube Oil High Temperature Switch
- 24010324 Calibration of Bottom Blowdown Steam Generator E-50A Flow Indication
- 24010089 Erection of Seismic Scaffold for Diesel Generator 1-1
- 24913942 Determine Cause of Spent Fuel Pool Pump P-51A Trip and Repair
- 24010032 Motor End Pump P-51A Bearing Seal Leaking Oil
- 24010303 Replace Charging Pump P-55B Block - Crack Indications Found by Non-Destructive Examination

b. Observations and Findings

The inspectors noted, during the observed maintenance activities, that maintenance technicians were knowledgeable of the tasks being performed. Work packages and procedures were observed and actively being used at the job sites. The inspectors did not identify any issues during the review of maintenance work order packages. Emergent work activities regarding Spent Fuel Pool Pump P-51A are addressed in Section M2.1 of this report.

c. Conclusions

The observed maintenance activities were completed in accordance with the approved work packages actively being used. Maintenance technicians were knowledgeable of the tasks being performed.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Spent Fuel Pool Cooling Pump P-51A Seized During Operation

a. Inspection Scope (62707, 71707)

The inspectors reviewed the circumstances surrounding the trip of the Spent Fuel Pool Cooling Pump P-51A that occurred on December 17, 1999. The inspectors discussed the issue with operations and maintenance department personnel, and reviewed the applicable work orders and vendor manuals associated with the pump repairs. The inspectors reviewed the completed work order documentation and observed the performance of selected portions of the maintenance activities.

b. Observations and Findings

On December 17, 1999, a fuel pool cooling pump low discharge pressure was received and acknowledged by nuclear control operators in the control room. Shortly thereafter, a fuel pool cooling pump trip alarm was received in the control room. The operators verified that the Spent Fuel Pool was within an acceptable level and an auxiliary operator was dispatched to the pump. The auxiliary operator noted that the pump seemed hotter than normal and that the pump would not rotate by hand. Condition Report 9903026 was generated by the Shift Supervisor to document this issue.

Initial troubleshooting of the pump by maintenance technicians revealed that the oil reservoir level indicator were easily rotated on the pump connection. Consequently, the oil reservoir level indicator could easily rotate upside down, which would empty the reservoir of oil. Subsequent inspection of the pump bearings revealed that the bearings had seized. The degraded material condition of the oil reservoir level indicator connection appeared to have contributed to the bearing failure. The licensee had not completed the root cause evaluation for this issue at the end of this inspection period.

Subsequently, maintenance was performed to replace the oil reservoir level indicator and the connection to the pump bearings. During pump restoration for post-maintenance testing, unanticipated leakage occurred due to a pump casing drain plug which was not installed. The pump casing drain plug was within the tag-out boundary; however the plug was not identified on the tagout order or work order summary after it was removed by maintenance personnel. Consequently, the plug was not reinstalled prior to operations personnel restoring the pump. The unanticipated leakage did not result in any personnel contamination incidents, but did result in a larger contamination area near the pump. Licensee personnel documented this issue in Condition Report 9903026.

Approximately 10 days after pump P-51A was restored, a maintenance supervisor noticed oil on pump P-51A skid and a lower than normal oil reservoir level. The pump was secured and an oil level adjustment was made. Pump P-51A was then successfully run without incident. The inspectors discussed the pump P-51A issues with operations and maintenance staff which further revealed that plant personnel knowledge of normal filling and use of oil reservoirs level indicator needed to be enhanced.

In addition, maintenance personnel performed a review of past issues with this type of oil reservoir level indicator and subsequently generated Condition Report 0000031 to document the identified problems related to the normal adjustment, usage and reliability of this type of bearing oil reservoir. The inspectors reviewed and considered the immediate corrective actions that were documented in the condition reports as reasonable.

c. Conclusions

The inspectors concluded, based on reviewing the circumstances surrounding the failure of the Spent Fuel Pool Cooling Pump P-51A that occurred on December 17, 1999, that maintenance personnel demonstrated job performance and documentation deficiencies. Also, knowledge weaknesses by operations and maintenance personnel regarding use and filling of pump oil bearing reservoirs were revealed. Age and degraded material condition of the pump bearing oil reservoir level indicator and base assembly connection contributed to pump failure. The inspectors did not identify any violations of regulatory requirements regarding the noted deficiencies. Licensee personnel subsequently documented the issues in the corrective action system for further evaluation.

M7 Quality Assurance In Maintenance Activities

M7.1 Maintenance And Planning Department Self-Assessment Activities (62707)

During the inspection period, the inspectors observed portions of the maintenance and planning department Year 2000 strategic planning meeting, and reviewed maintenance self-assessments and the Department Master Action Plan. Specifically the inspectors observed the following activities:

- review of the status of previous self-assessments and department performance;
- review and development of the current Department Master Action Plan;
- update of the maintenance and construction self-assessment plan; and,
- discussion of current challenges in the maintenance and planning department.

The inspectors observed that the maintenance and planning department representatives actively participated in the meetings and were self-critical. The meetings also focused on the areas within the department which needed improvement. The subsequent development of the master action plan reflected those areas which were identified as needing improvement. The inspectors concluded that the self-assessment activities observed were self-critical and effectively highlighted areas identified as needing improvement.

III. Engineering

E1 Conduct of Engineering

E1.1 Temporary Modifications (37551, 71750)

The inspectors reviewed the completed documentation and associated safety analysis for Temporary Modification TM-2000-001. In addition, the inspectors walked down the temporary system following installation and reviewed applicable plant procedures and drawings.

The modification was developed and subsequently installed in the plant on January 12, 2000, to inject ammonium chloride chemicals into the secondary system in an effort to mitigate the impact of high sodium levels present. (This is discussed further in Section R1.1 of this report). The inspectors concluded that the Temporary Modification was completed in accordance with applicable Administrative Procedures and that appropriate safety evaluations and design reviews were completed. Also, the inspectors noted that appropriate system piping drawings and procedures were revised prior to installation which demonstrated effective configuration control.

E8 Miscellaneous Engineering Issues (92700)

E8.1 (Closed) Licensee Event Report (LER) 50-255/98-005-01: "Actuation of containment isolation caused by an inadvertent containment high radiation signal." This self-revealing event was discussed in detail in NRC Inspection Report 50-255/98002(DRP), Section E7, and was a Non-Cited Violation. Corrective actions to prevent recurrence, as documented in the LER, were considered reasonable and have been completed. No new issues were revealed by the LER. This item is closed.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Secondary System Water Chemistry Issues

a. Inspection Scope (71707, 71750)

The inspectors reviewed the applicable chemistry operating procedures and available chemistry data for secondary system chemistry. In addition, the secondary system water chemistry issues were discussed with operations and chemistry personnel.

b. Observations and Findings

An increased level of sodium has been present in the steam generator secondary side water since the 1999 Refueling Outage was completed. This issue has had a direct effect on the licensee's ability to increase reactor power during the inspection period, in that, sodium concentrations were greater than prescribed limits which restricted power

level escalation. Excessive sodium levels in the secondary system water can lead to caustic environments in steam generator tube crevices, which could result in intergranular attack and stress corrosion cracking of the steam generator tubes.

Chemistry Operating Procedure 11, "Secondary System Chemistry," was based on industry standards for controlling secondary system chemistry and prescribed the associated requirements. In addition, the licensee has utilized chemistry consultants, specializing in these types of issues, to assist in the cleanup of the sodium. The inspectors verified that the plant was operated within the operating limits of Chemistry Operating Procedure 11 through plant operation observations and reviews of chemistry data.

The licensee's plan for sodium removal, in conjunction with Chemistry Operating Procedure 11, resulted in incremental reactor power increases, with a subsequent hold for chemistry sampling. Reactor power was then increased only if the sodium levels were less than the Action Level 1 limit of 5 parts per billion sodium, per Chemistry Operating Procedure 11.

The licensee concluded that the source of sodium was most likely a result of the extensive work on the secondary side systems during the refueling outage. These systems included both low pressure turbines and the moisture separator reheaters. The licensee suspected that materials used to clean these systems prior to installation were a likely source of the sodium contamination.

Also, due to the duration that elevated sodium concentrations were present, the licensee suspected that chemical "hideout" was occurring in the steam generators. This phenomenon resulted from steam voids forming at the steam generator tube walls, which results in the entrapment of sodium in steam generator tube crevices.

Licensee personnel developed and subsequently installed a temporary modification to inject ammonium chloride chemicals into the secondary system in an effort to mitigate the impact of high sodium levels. (This is discussed further in Section E1.1 of this report). The chlorides injected into the secondary system would offset the elevated sodium concentrations and resultant adverse effects. In addition, licensee personnel were developing additional plans to address the potential "hideout" of sodium in the steam generators when the inspection period ended.

The inspectors noted during the inspection report period that activities which affected or potentially impacted the secondary system water chemistry issue were appropriately addressed. The inspectors noted the requirements of Chemistry Operating Procedure 11 were met and that increased and timely communications amongst chemistry and operations personnel were evident during this inspection period.

c. Conclusions

Secondary system water chemistry issues regarding elevated sodium concentrations were appropriately addressed. The plant was operated within the requirements of Chemistry Operating Procedure 11 while secondary chemistry exhibited increased

sodium concentrations. Also, communications amongst chemistry and operations personnel increased this inspection period and were considered timely and effective.

F4 Fire Protection Staff Training and Qualification

F4.1 Unannounced Fire Drill

a. Inspection Scope (71750)

The licensee conducted an unannounced fire drill during the inspection report period. The inspectors observed the fire drill and post-drill critique. Also, the inspectors reviewed the appropriate plant procedures.

b. Observations and Findings

The unannounced drill was a simulated fire in the 1-1 Emergency Diesel Generator Room. The inspectors noted that all five fire brigade members and security personnel reported to the scene within the required time. All brigade members wore the appropriate personal protective equipment and demonstrated competent fire fighting skills.

During the drill, the brigade leader demonstrated good judgement, exemplified by the additional section of fire hose that was attached for the attack team's initial entry. In addition, the initial attack team leader demonstrated good judgement by ventilating the room after the fire was out, using the diesel generator room ventilation system in conjunction with an infrequently utilized outside door. Communications between the attack team leaders, the fire brigade leader, and control room personnel were timely and effective.

The inspectors noted pro-active discussion, during the post-drill critique, amongst the brigade members regarding the drill and any improvements which could have been made. This demonstrated a positive self-critical attitude.

c. Conclusions

The fire brigade responded in a timely manner and demonstrated competent skills during an unannounced drill for a fire in the 1-1 Emergency Diesel Generator Room. Timely and effective communications between the fire brigade members and control room personnel were noted throughout the entire exercise.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on January 31, 2000. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined

during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

G. R. Boss, Operations Manager
D. E. Cooper, General Manager, Plant Operations
N. L. Haskell, Director, Licensing
K. M. Haas, Director, Engineering
R. P. Margol, Chemistry Supervisor
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R. L. Massa, Shift Operations Supervisor
T. J. Palmisano, Site Vice President

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D. Hood, Project Manager, NRR

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
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

None

Closed

50-255/98-005-01	LER	Actuation of containment isolation caused by an inadvertent containment high radiation signal

Discussed

None