U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.:	50-255
License No.:	DPR-20
Report No.:	50-255/97005(DRP)
Licensee:	Consumers Power Company 212 West Michigan Avenue Jackson, MI 49201
Facility:	Palisades Nuclear Generating Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	March 1 through April 11, 1997
Inspectors:	M. Parker, Senior Resident Inspector P. Prescott, Resident Inspector
Approved by:	Bruce L. Burgess, Chief Reactor Projects Branch 6

EXECUTIVE SUMMARY

Palisades Nuclear Generating Plant
NRC Inspection Report 50-255/97005

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

Operations

- The inspectors identified that a drawing discrepancy associated with the safeguards high pressure air system was not dispositioned in a timely manner. (Section O1.2).

- The inspectors concluded that, after identification by an operator, good followup resulted in timely actions preventing further degradation of service water bay level (Section O1.3).

Maintenance

- The inspectors' review of the main steam isolation valve Code repair issue determined that the licensee failed to provide adequate oversight resulting in an improper code repair on these valves. The licensee understood the significance of the event and the need to apply resources necessary to prevent recurrence. Violations were identified for the failure to perform a proper Code repair, failure to issue an LER within thirty days, and three examples of a failure to follow procedures (Section M1.2). Corrective actions to date appeared to be thorough.

Engineering

- The inspectors determined that the licensee initially did not aggressively pursue resolution of the power cable ampacity issues. (Section E1.1).

- The inspectors expressed concerns with timeliness of corrective actions. The findings were discussed with the nuclear performance assessment department (NPAD). NPAD agreed the data indicated a performance problem. Currently, NPAD is trending these additional items to determine the significance and what future actions may be necessary (Section E1.2).

- Due to the inspectors' concern with potential high pressure air system pressure control valve degradation, the licensee developed a schedule to open and inspect the valves in question. (Section E1.3).

Plant Support

- The inspectors concluded that the licensee's placement of the criticality monitoring devices was in accordance with 10 CFR 70.24 (a)(2). However, the inspectors

were unable to determine the sensitivity of the monitors, as required by 10 CFR 70.24(a)(2), since the licensee was unable to produce any analysis to support this conclusion. This was considered an Unresolved Item (50-255/97005-04(DRP)) pending further evaluation by the licensee (Section R1.2).

REPORT DETAILS

Summary of Plant Status

The plant operated at essentially 99.6 percent power for the entire inspection report period. There was one power reduction commenced at 9:30 pm est on March 4, 1997, to repack the P-10A heater drain pump. A return to full power began at 10:39 pm (EST) on March 5, 1997. Full power was achieved at 5:59 am est on March 6, 1997. April 11, 1997, marked the 52nd day of the current power production run.

I. Operations

01 Conduct of Operations

01.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. The conduct of operations was considered by the inspectors to be good; specific events and noteworthy observations are detailed below.

01.2 High Pressure Air Drawing Discrepancies

a. Inspection Scope (71707)

The inspectors observed portions of several plant activities.

b. Observations and Findings

During a routine followup of the safeguards high pressure air system concerns with plugging of Moore pressure control regulators, the inspectors identified concerns with controlled drawings. The inspectors identified that a line had been mistakenly dropped from the high pressure controlled air drawing, M-225, sheet 2, during the revision process. The inspectors reviewed controlled drawings in the control room and noted that the drawing had been modified by a penciled in correction. Also, controlled drawings in the tagging center were observed to be addressed in a similar manner. Discussions with system engineering noted that they were not aware of the discrepancy as they were utilizing outdated laminated drawings. Further followup did not identify that any drawing change had been initiated to correct the discrepancy.

c. Conclusions

The inspectors concluded that the drawing error was very minor in nature; however, the inspectors were more concerned with the failure to properly address this issue in a timely manner. This concern was discussed at the exit.

01.3 Service Water Pump Bay Debris Intrusion

a. Inspection Scope (71707, 61726 and 62703)

The inspectors followed the licensee's actions in response to continuing fouling of the service water bay traveling screens and service water pump basket strainers.

b. Observations and Findings

As a result of a decrease in service water bay level on February 13, 1997, in which level was observed to have decreased approximately two feet due to icing and buildup of debris on the traveling screens, the inspectors have continued to closely monitor the licensee's actions to address further service water fouling conditions.

Periodically, throughout the inspection period, the inspectors have observed an increased frequency of debris intrusion into the service water bay. This condition has been observed at the service water bay traveling screens, service water pump basket strainers, and cooling tower pump seal coolers. Since initial identification, the licensee has taken additional measures to address this concern, including heightened awareness by both the operating shift and system engineering. The increased monitoring has resulted in timely identification of debris intrusion by the operating shift prior to encountering a significant buildup. The inspectors have observed operations and system engineering involvement in the troubleshooting efforts to understand the cause of debris intrusion. Initial evaluation of the debris has indicated that it is not indigenous to Lake Michigan. System engineering has noted that the debris is from runoff due to recent heavy rains, and its impact is compounded by high lake levels and westerly wind conditions. The inspectors have observed increased entry into limiting conditions for operation (LCO) due to declaring the service water pumps inoperable for service water pump basket strainer cleaning.

c. Conclusions

The inspectors concluded that the licensee has provided the appropriate resources to closely monitor service water bay debris intrusion and provided additional oversight to monitor icing conditions. The inspectors concluded that continued monitoring is warranted to ensure system performance is not impaired by further intrusion of debris past the service water basket strainers into the service water system.

08 **Miscellaneous Operations Issues** (92702)

(Closed) Violation 50-255/95014-02: Failure to maintain low pressurizer pressure function of safety injection system (SIS) operable. On January 18, 1996, the reactor was being placed in cold shutdown due to faulted 2400 VAC cables that supplied the 1D bus. A work order for disabling the SIS was noted by an electrical maintenance supervisor. After a discussion with the shift supervisor (SS), a review of plant conditions, and a review of what were thought to be applicable

requirements, the SS released the work order. Primary coolant system (PCS) temperature was at approximately 364°F at the time the work order was released. This work disabled the SIS actuation on low pressurizer pressure when PCS temperature was approximately 364°F. This was a violation of Technical Specifications (TS) section 3.17.2, which required the SIS actuation signal to be operable above 300°F.

Several program and process barriers were breached requiring corrective actions for each. For the problems delineated below, the licensee's corrective action in response to the item is also provided:

- The work order block marked "TS Involvement" referenced TS 3.17. However, this section was not referred to and another section of TS was thought to be the applicable requirement.

All maintenance supervisors were counselled on assuming any prerequisite is met prior to commencing work. Also, operators, especially senior reactor operators, were trained to verify information using available references when making decisions affecting plant status or safety.

- Procedure GOP-9, Attachment 1, section 4.4 stated, "When PCS is less than 210°F (ie, cold shutdown), then initiate work order to disable SIS actuation circuits {refer to SOP-3, step 7.7.1}." These steps went unheeded in the decision making process to disable SIS.

- TS 3.16 "Engineering Safety Features System Instrumentation Settings," was referenced as the controlling requirement.

Training was given to operators on the significance of adherence to both the TS and the procedure in conjunction with disabling the SIS actuation signal.

- Electrical maintenance procedure ESS-E-24, "Disable/Enable The SIS Actuation On Low Pressurizer Pressure," section 3.3, specifies plant condition to be "cold shutdown." Procedure step 5.1 requires the assigned supervisor ensure all prerequisites are completed. The plant condition of cold shutdown was not verified.

The procedure was revised in section 3.4 to state, "As controlled by the authorizing work order." This is standard with other procedures. Section 3.3 still states "cold shutdown."

SOP-3 section 7.7 was revised to include reference to ESS-E-24. This procedure performs the actual disabling/enabling of the SIS circuitry. This item is closed.

<u>(Closed) LER 50-255/96-004:</u> Safety injection disabled with primary coolant system greater than 300°F. This event resulted in Violation 50-255/95014-02. The inspectors reviewed the adequacy of the licensee's corrective actions

pertaining to the LER in response to the violation, as noted above. This item is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62703 and 61726)

The inspectors observed all or portions of the following work activities:

Work Order No:

- 24710994: Repack of P-10A heater drain pump
- 24511071: Repack, disassemble pump, and decontaminate P-55A charging pump
- 24711073: DC circuit ground troubleshooting
- 24611820: Perform MSE-E-38 PM/EQPM of Safety Related Limitorque Type SMB Actuators on VOP-3072 (charging pump line to SI test line isol. valve)
- FIN TEAM: Replacement of failed diaphragm on CV-5501, M-59B Evaporator Concentrator level control valve
- HSF97080: Hot spots flush on tilt pit drain line
- 24710599N.2: Perform resin removal and flush line from tank T-80 equipment drain tank

Surveillance Activities

- MI-2: Reactor Protective Trip Units
- MI-005A: Containment High Pressure Test
- MI-06: Area Monitor Operational Checks
- MI-27E: Functional Check of PCS Low Temperature Overpressure Protection (LTOP) System
- MI-39: Auxiliary Feedwater Actuation System Logic Test

b. Observations and Findings

The inspectors found the work performed under these activities to be professional and thorough. All work observed was performed with the work package present and in active use. Work packages were comprehensive for the task and post maintenance testing requirements were adequate. The inspectors frequently observed supervisors and system engineers monitoring work practices. When applicable, appropriate radiation control measures were in place.

c. Conclusions

In general, the inspectors observed good procedure adherence and maintenance practices. However, detailed below is the inspectors' followup to the main steam isolation valve issue that occurred during the 1996 refueling outage. The inspectors' and licensee's review of this event identified several maintenance process and human performance issues. See the specific observations detailed below.

M1.2 Main Steam Isolation Valves (MSIVs) Repair Issues

a. Inspection Scope (62703)

In inspection report 50-255/96017, the inspectors reviewed the events that led to potentially inadequate repairs to the stuffing box plugs in both main steam isolation valve (MSIV) leakoff lines; identified as an unresolved item 50-255/96017-04. This was a followup by the inspectors to the process weaknesses found and the licensee's actions to prevent recurrence.

b. Observations and Findings

On December 20, 1996, with the plant in hot shutdown, both MSIVs (CV-0501 and CV-0510) were found leaking steam from the plugged west stuffing box leakoff points. Initially, the valve contractor and the planning organization were requested to evaluate appropriate repairs. The licensee decided a temporary leak repair was preferable; otherwise, the plant would have to return to cold shutdown to perform permanent repairs.

Initial inspections identified that CV-0501 had a pinhole leak and CV-0510 had several pin hole leaks at the threaded connection. The licensee's temporary leak repair vendor, after an earlier initial review of the job, was brought onsite to initiate repairs on January 6, 1997. The plant was at 20 percent power. The vendor began drilling on CV-0510 first. However, drilling stopped when the vendor noted leakage through what appeared to be fractures in the plug. Work was stopped on CV-0510 and a decision was made to proceed on CV-0501. On CV-0501, the vendor began drilling into the pipe plug to prepare for threading in the leak injection fitting. However, the vendor stopped because steam began leaking almost immediately after the start of drilling, which would be indicative of an abnormal configuration of the high pressure pipe plug. The inspectors noted that the licensee did not evaluate problems with CV-0510 prior to starting work on CV-0501. Licensee management was informed of the valves' condition and decided to bring the plant to cold shutdown to make permanent repairs.

The inspectors reviewed past valve history. CV-0501 began leaking at the leakoff plug in 1992. Leakage was minimal. System engineering trended leakage until the 1993 refueling outage. Although permanent repairs were performed, a work history did not exist. A seal weld was requested but was not performed. In 1995, another leak developed at the plug. The plug was drilled and pumped with a leak

sealant. It was subsequently pumped three more times prior to the 1996 refueling outage. On CV-0510, there was no documented history of leakage of the stuffing box leakoff pipe plugs.

During the refueling outage, extensive preventive maintenance (PMs) was performed on CV-0501. As part of these activities, the stuffing box pipe plug was to be replaced to restore system integrity after a temporary leak injection hole was drilled into the plug body. Work order 24512907, step 6, required that the original plug be replaced and seal welded. The original plug was not removed. Instead, on November 16, 1996, a seal weld was placed over the leak injected plug and around the threads. To facilitate seal welding, the hex head of the plug was ground away. The weld supervisor, after discussions with the valve team supervision approved this repair even though the weld inspection checklist (WIC) sketch depicted the plug hex head in place. Failure to adhere to the weld inspection checklist was considered an example of a violation of 10 CFR 50, Appendix B, Criterion V (50-255/97005-3A).

Preventive maintenance (PM) was also performed during the outage on CV-0510. As part of the maintenance, the plug was to be seal welded. This action was taken as a precaution to prevent leakage similar to CV-0501. Upon inspection, the welder found the plug appeared to have a square versus hex head. The welder discussed the condition with the contractor valve team manager instead of the welding supervisor. Also, problems were encountered during welding, which were indicative of welding dissimilar metals. The weld used to seal CV-0510 on November 16, 1997, was not the weld specified by the weld inspection checklist. This was another missed opportunity to identify a problem. The decision to accept the condition was based on the premise that a non-destructive examination (NDE) would be performed; therefore, any problems would be identified. A lab report documenting a metal analysis of the plug indicated the plug material was 125 psig cast iron versus the specified high pressure steel rated at 3000 psig. This also explained why welding proved difficult. The failure to adhere to the procedure (weld inspection checklist) is another example of a violation of 10 CFR 50, Appendix B, Criterion V (50-255/97005-03B).

The inspectors noted several maintenance work practice deficiencies during their inspection. The licensee also identified similar concerns through a special investigative team assigned to evaluate this condition. First, in the pre-job briefs held for both MSIV PM activities, the welders were not included. Secondly, there were design issues involving the grinding away of the hex head and seal welding over the drilled hole in CV-0501. Both were accomplished without implementing the required design change controls. Third, the inspectors review and the licensee investigation identified a lack of questioning attitude on the part of welding personnel. The as- left condition of the plug seal welds was different than indicated on the WIC sketch. The welding supervisor approved the seal weld even though the WIC sketch depicted the plug head in place. Work orders existed to cover the general work activities on the valve. However, the WOs were not used at the work site during the pipe plug activities. The failure to have the work orders

at the work site is a third example of a violation of 10 CFR 50, Appendix B, Criterion V (50-255/97005-3C).

For CV-0510, the welder found the plug appeared to have a square head versus a hex head. Also, the plug was degraded as there was a fracture in the head of the plug. However, the weld supervisor was not made aware of these issues until after the seal weld was completed, Also, for CV-0510, no records were found that indicated the plug repairs or modifications were made. Finally, there was no single point of contact during the maintenance activities performed on the valve for problem resolution.

Both MSIVs are ASME Code Class 2 valves, which shall be repaired in accordance with ASME Code Section XI. Failure to perform a proper ASME Code repair was considered a Violation (50-255/97005-01).

The inspectors followed the licensee's root cause investigation and subsequent corrective actions. Both leaking plugs were permanently repaired by installing 3,000 psi forged steel, one inch pipe plugs with high temperature sealant through design change FES 97-003. The issue was discussed with the various work groups. The event was reviewed, weaknesses identified and corrective actions discussed. Maintenance management developed action items, which were incorporated into the department master action plan.

c. Reportability

On March 6, 1997, during a management review board (MRB) meeting for condition report (C-PAL) 97-007 the licensee questioned reportability for the unauthorized repairs conducted to the stuffing box plugs on the MSIV's. Based upon this discussion, the licensee determined that a 30 day licensee event report (LER) was required to be submitted to the NRC based upon 10 CFR 50.73. The inspectors questioned the licensee's basis for start of the 30 day report, as it appeared that the licensee had ample information on February 19, 1997, because the results of the evaluation of the material composition for the stuffing box plug for MSIV CV-0510 were obtained, which was forwarded from the laboratory to the plant site. The laboratory results confirmed that the installed stuffing box plug was cast iron material and; therefore, a 125 psig plug was installed versus the required 3000 psig high pressure steel plug. In addition, on/or about January 10, 1997, adequate information was available to determine that an unauthorized code repair had been conducted to MSIV CV-0501, in that an unauthorized seal weld was performed on the stuffing box plug on the MSIV. This condition was not identified until the plant was started up on January 6, 1997. The failure to report a condition outside the design basis of the plant within 30 days is considered a violation of 10 CFR 50.73 (50-255/97005-02).

d. Conclusions

The inspectors concluded the licensee failed to maintain adequate control over the MSIV stuffing box valve pipe plug repairs, as evidenced by the procedural violation

with three examples. CV-0501 and CV-0510 should have been repaired in accordance with ASME Section XI and this was considered a violation. Also, the licensee failed to make a timely report to the NRC, a third violation.

However, the inspectors reviewed the licensee's extensive corrective actions to date, which demonstrated an understanding of the potential significance of the event. The inspectors' evaluation of the safety significance determined that had the pipe plugs actually failed, the safety significance would have been minimal. The leakage would have represented an additional potential radiological release, coincident with a steam generator tube rupture. However, the leakage would be small compared to the large secondary coolant mass released to atmosphere through the atmospheric dump valves. Sufficient margin existed in the radiological dose calculations to account for this minor leakage. The inspectors, through observations of subsequent maintenance work did not identify additional examples of inadequate procedural adherence or improper oversight of contractor and licensee maintenance personnel.

M8 Miscellaneous Maintenance Issues (92902)

(Closed) LER 50-255/95-001: Malfunction of left channel design basis accident (DBA) sequencer resulted in inadvertent actuation of left channel safeguards equipment. The left channel sequencer, MC-34L, spuriously activated on March 2, 1995. All safeguards equipment responded as required. The licensee formed a team to determine root cause. The team determined that a failure of the microprocessor module of the electronic DBA sequencer caused the event. The sequencer is a programmable logic controller (PLC) that consists of a main microprocessor and various input/output (I/O) modules for each piece of equipment actuated by the sequencer. The microprocessor was replaced and operability of the sequencer verified. The microprocessor was sent to the vendor for testing. The vendor could not simulate the problem, but agreed with the licensee's conclusion that the problem was most likely a faulty component that caused an intermittent memory or processor error. The inspectors reviewed the historical performance of the DBA sequencer. A similar event occurred in 1989, to the right channel sequencer. However, similarity was limited to the loss of active lights on the I/O cards and the inability to recreate the failure. In 1995, a polarity sensitive capacitor was incorrectly installed during manufacture in the processor unit of MC-34L, which caused its power supply to fail. During repair/diagnosis of the failure by the vendor, it was determined that a capacitor had been installed backwards and was the cause of the MC-34L failure. The inspectors concluded that this did not appear to be a generic reliability or maintenance issue. This item is closed.

(Closed) Violation 50-255/95002-01: Failure to perform the required independent verification. A field technician caused a false reactor trip indication while landing electrical leads to install a personal computer (PC) to record main generator output data, per temporary modification (TM) 94-017. The TM provided the steps for installing the PC, but the field technician failed to follow these steps.

The inspectors had the following observations concerning the installation of the TM. For each observation, the corrective action is outlined:

- Contrary to TM Procedure 94-017, there was no independent verification performed for each step of the TM.

Administrative procedure 9.31 was revised so that the independent verification shall occur concurrent with the TM installation.

- The proper method of independent verification was not understood by the field technician.

The event was reviewed with all technicians. Also, written expectations for work at Palisades was issued to all technicians.

- The quality of the documentation of work performed was poor. Also, the instructions in the TM were not clear.

The event was reviewed with planners and a memo sent to each planner stating that relevant information from a temporary modification will be incorporated into the work order. This event was also reviewed with all maintenance supervisors sharing lessons learned from this event. The electrical and instrumentation and control (I & C) supervisors were issued management expectations for work that involves Consumers employees that are not permanently assigned to the Palisades plant. A memo was issued to all engineering personnel to review this event. This item is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 Power Cable Ampacity Review

a. Inspection Scope (37551)

The inspectors reviewed engineering's progress on the issue of determining if plant power cables are within Final Safety Analysis Report (FSAR) requirements for cable ampacity and temperature limits. If a cable was identified outside of these limits, then the inspectors reviewed the associated operability determination for adequacy.

b. Observations and Findings

In inspection report 50-255/96017, the inspectors reviewed the licensee's development of a degraded equipment list in response to Generic Letter (GL) 91-18, "Resolution Of Degraded And Nonconforming Condition." This action was taken to ensure that an appropriate overview of equipment/system operability had been conducted prior to startup from the 1996 refueling outage. GL 91-18 provides guidance on resolution of degraded and nonconforming conditions affecting safety-

related systems structures and components (SSCs). The inspectors reviewed the list for thoroughness and potential conflicts with GL 91-18 guidance or noncompliance with 10 CFR 50 Appendix B "Corrective Action." Specifically, the inspectors looked for timely and adequate repair or engineering safety analyses of the issues identified.

One of the issues that came out of the degraded equipment list was the acceptability of the licensee's methodology for calculating cable ampacity. Since 1988, the licensee has been in the process of reviewing cables within the plant to evaluate the impact of accelerated aging due to heat degradation of the insulation caused while energized. The licensee had determined that 2700 of 2900 power cables in 424 cable trays were routed in trays with greater than 30 percent fill. The licensee concluded that while certain analyzed cables exceeded Code ampacity limits, the cable thermal limits were not exceeded and therefore, the FSAR design basis was met. Section 8.5.2 of the FSAR states, in part, "Cables installed in ventilated trays, conduit or underground ducts are thermally sized in accordance with National Electrical Code (NEC) or the Insulated Power Cable Engineer Association/Insulated Cable Engineer Association (IPCEA/ICEA) ampacity values. Ampacities are adjusted based on actual field conditions when possible. These adjustments may include, but not be limited to, conductor operating temperature, ambient temperature, cable diameter, tray depth of fill, conduit percent fill, and firestops."

Prior to startup from the 1996 refueling outage on December 25, 1996, the licensee justified operability of 41 cables based upon a bounding Harshe-Black analysis. Presently, the Harshe-Black methodology used to justify operability for these cables has not been approved for use by the NRC. The Code assumes that all cables are continuously energized and carrying rated current. The Harshe-Black methodology considers only those cables that are energized for a design basis accident (DBA). Harshe-Black also differs from the Code in that the code calculated ampacity limit ensures the cable thermal limit will not be exceeded, while the Harshe-Black method allows the ampacity limits to be exceeded because field testing of ampacity (at Palisades) demonstrated that a cable could be above the 100 percent ampacity limit and the cable thermal limit will not be exceeded.

On March 31, 1997, the licensee determined that a number of cables might exceed the ampacity of the non-refined Harshe-Black methodology; meaning direct readings of environmental and operating conditions will be required for calculations. During this comprehensive review, the inspectors were notified by the licensee that 17 cables have been calculated to exceed the Harshe-Black methodology. The licensee discussed with the inspectors the methods that would be used to determine operability of the 17 cables. The licensee intends to provide direct temperature and current measurements and perform a visual inspection to justify continued operability of the affected cables. The licensee provided an informal completion date of the end of 1997 for this review. The inspectors expressed a concern to the licensee that this target date may not allow sufficient time to incorporate cable

replacement, if determined necessary, by start of the May 1998 refueling outage. The licensee has since reevaluated the time required to analyze the cables and committed to complete evaluations of the remaining cables within a few months.

c. Conclusions

The inspectors determined the licensee's actions were adequate. The licensee did not initially appear to be aggressively pursuing resolution of this issue. The NRC intends to review the licensee's final engineering analysis to determine whether the cables are within FSAR requirements, degraded but operable, or require replacement. The licensee has also agreed to incorporate any necessary cable replacements within the scope of the 1998 refueling outage.

E1.2 Timely Resolution Of Issues

a. Inspection Scope (37551)

In inspection report 50-255/97002, the inspectors reviewed the events surrounding a February 1997, P-66A high pressure safety injection (HPSI) pump breaker trip. The trip occurred while attempting to charge a safety injection tank (SIT). As part of that review, the inspectors also looked at a similar event that occurred in July 1996. Specifically, the inspectors reviewed the licensee's timeliness of corrective actions to address the events.

b. Observations and Findings

The scenario for the two events was similar. While refilling a SIT following a sampling collection, the HPSI pump tripped. Inspection of the HPSI pump breaker revealed that the "Y" phase time overcurrent (TOC) relay had actuated, which tripped the pump. Also, in October 1996, an auxiliary operator during rounds, found the "Y" phase TOC relay target had dropped in. In each case, a different root cause was determined to have initiated the breaker trip or TOC relay flag to drop in. The inspectors observed the licensee's actions for each event. Immediate actions by the licensee were appropriate.

However, when the inspectors reviewed the assigned corrective actions of the condition report (CR) from the July event, only two of the four corrective actions had been completed. The procurement of spare relays had been extended from the original November 1996, to March 1997 completion date. The action to revise procedure SOP-3, "Safety Injection and Shutdown Cooling System," to permit the use of the other HPSI pump P-66B, to fill the SITs at full primary coolant system pressure, if justified by engineering analysis, was due to be completed in November 1996. This was also given an extension to April 1997. Subsequently, the licensee had re-evaluated the issues. Spare parts have been procured and the procedure revision completed.

Because of this example and other known instances of lack of a timely response to issues, the inspectors reviewed the CR tracking system to verify how prevalent this

problem may be. The nuclear performance assessment department (NPAD) trended the total number of CRs granted due date extensions and open CR corrective action subdocuments for management review. NPAD also independently trended average CR cycle time. The inspectors discussed with NPAD a concern that there may be CRs that were given multiple extensions and CRs not meeting the original scheduled completion period. Also, that system engineering may have the most significant problem with extensions. From the discussion, NPAD performed a review of the CR data base. For February 1997, out of the total 138 CRs granted extensions, 92 had one extension, 29 CRs had two extensions, and 10 CRs had 3 extensions. There was one CR with 8 extensions. In February, only 57.7 percent of the CRs met the forecasted completion date. System engineering was granted the most due date extensions (56) in the month of February.

c. Conclusions

The inspectors discussed the findings with NPAD and NPAD agreed the data indicated a performance concern. Currently, NPAD is trending these additional items to determine the significance and what future actions may be necessary.

E1.3 Safeguards High Pressure Air System Reliability

a. Inspection Scope (37551)

The inspectors reviewed the root cause analysis documenting the failure of a pressure control valve (PCV) and an air regulator for the high pressure safety injection (HPSI) control valve. The inspector's review identified what could be potentially viewed as a generic failure mechanism, the plugging of air regulator controllers by rust accumulating on the debris screens. The inspectors reviewed past work history on the PCVs and discussed the safeguards high pressure air system performance with system engineering.

b. Observations and Findings

On March 19, 1997, CV-3018, the HPSI discharge control valve cross-tie to train two, was stroked. The valve was stroked closed and could not be stroked open. The corresponding air regulator PCV was found to be plugged by rust that originated from the west engineering safeguards room high pressure air system piping, which is carbon steel. The inspectors discussed with system engineering if this had potential generic implications. From the discussions several longstanding system deficiencies were noted. The present pressure control valves which were installed in 1988, due to obsolescence of the previous valve, have a small orifice with a screen that goes to a pilot chamber. That screen was found clogged with rust, which disabled the PCV. The inspectors noted that the piping for the system is carbon steel.

The inspectors reviewed the work history of PCVs and noted that the present PCVs were installed in 1988, due to observed degradation of the original PCVs. However, a review of the work history did not identify a reliability problem with the

valves. The inspectors, in discussions with system engineering, found that the license's preventive maintenance program, known as Periodic Predetermined Activities Control (PPAC), were stopped in 1991, due to concerns with taking the valve out of service. System engineering had recently reinstituted the PPACs. However, none of the PPACs have been performed to date. The inspectors reviewed the safeguards high pressure air system drawings and noted that not all PCVs were configured the same. Some PCVs had the air filters upstream of the valve, as would be expected. However, the majority of the filters were located downstream of the PCVs and system engineering was aware of the discrepancy. However, the inspectors were concerned that this was a longstanding issue which had not been resolved. Engineering followup on the issue was found to be minimal. The inspectors noted nearly all valves have a backup system of either instrument air or nitrogen. Further, system engineering noted that the pressure control valve required a 10 psi differential pressure downstream before the PCV opens. The inspectors identified that this could potentially mean the only time the PCV would be operated is during the once a refueling outage high pressure air system performance test. In normal system configuration the only air going through the PCV is a nominal flow of bleed off air. The inspectors reviewed the refueling outage performance test, T-205, "High Pressure Air System Performance Verification." In the 1996 refueling outage the test was not performed. In the 1995 refueling outage, minimal testing was performed. The inspectors noted there was questionable data from the test. The Final Safety Analysis Report (FSAR) stated that there will be enough air to stroke required valves after 40 minutes. The PCVs have a constant bleedoff port, yet the pressure did not decay after an hour. Also, after stroking some valves, there was no system pressure loss noted. The inspectors reviewed the FSAR and Technical Specifications for any testing frequency requirements. None were found. The HP air system does not have a design basis document (DBD). A DBD is under consideration for the near future.

In addition, the inspectors reviewed the licensee's probabilistic risk analysis (PRA) which identified that the high pressure air compressors, C-6A and C-6B, were fed from the opposite train of power than the components they serve. This has led to some PRA results that would not be expected if the compressor power feeds were consistent with the served component power feeds. This becomes important in scenarios where one train of power/components is failed and recirculation is achieved more than one hour after accident initiation. Since it was demonstrated that there is only enough air in the receiver tanks to last 40 minutes, the containment sump valve would not open unless the compressors were available. This type of scenario is most likely during fire events, especially in the west safeguards room.

c. Conclusions

The inspectors identified to the licensee the problems noted. System engineering has since scheduled PM activities to inspect and clean selected PCVs; specifically, those that have filters downstream of the PCVs. These have been determined most susceptible to plugging. System engineering was reviewing the feasibility of modifications to improve system reportability.

E8 Miscellaneous Engineering Issues (92700 and 92903)

(Closed) LER 50-255/95013: Circuit fuse coordination deficiency which affected Appendix R safe shutdown equipment. Through the licensee's Appendix R Enhancement Program, it was discovered that fuses in the potential transformer (PT) circuit for the emergency diesel generator 1-1 were not properly coordinated. This could result in the PT primary side fuse blowing when Appendix R fire-related faults appeared on a PT secondary side circuit. Blowing of the primary side fuse should occur first to prevent fire-induced circuit faults from affecting diesel generator operability. When the condition was discovered, compensatory measures (hourly fire tours of the cable spreading room) were already in place. The lack of fuse coordination in the diesel generator PT circuit appeared to be an original design deficiency.

The inspectors reviewed the Functional Equivalent Substitution (FES) that documented the licensee's review to install properly sized fuses. The circuit was monitored for maximum inrush current and maximum steady state load. With this information, a proper fuse size was determined to coordinate with the upstream fuse and still have acceptable margin for the expected load and available short circuit current. The inspectors reviewed work order no. 2461160, that installed the fuses. This item is closed.

IV. Plant Support

R1 Radiological Protection

R1.1 Maintenance Outages and Daily Radiological Work Practices

a. Inspection Scope (71750 and 83750)

The inspectors observed radiological worker activities during various maintenance activities detailed in this inspection report, and also monitored radiological practices during daily plant tours.

b. Observations and Findings

The inspectors observation of jobs in progress during the maintenance activities detailed above revealed that radiation technicians were visible at the job sites. The technicians took appropriate actions and surveys in accordance with good ALARA practices.

c. Conclusions

The inspectors concluded that radiological practices observed during the maintenance activities and plant daily walkdowns were adequate. The inspectors had no concerns. Specific observations are detailed below.

R1.2 Criticality Accident Monitoring

a. Inspection Scope (71750 and 83750)

The inspectors reviewed the licensees conformance with the requirements of 10 CFR 70.24, "Criticality Accident Requirements."

b. Observations and Findings

In reviewing the licensees compliance to 10 CFR 70.24, the inspectors identified that the licensee had provided two criticality monitors in the spent fuel pool/new fuel storage area. 10 CFR 70.24(a)(2) requires a monitoring system that is capable of detecting a criticality which generates radiation levels of 300 rems per hour one foot from the source of the radiation. It also required that monitoring devices in the system have a preset alarm point of not less than 5 millirems per hour nor more than 20 millirems per hour. The device shall be no further than 120 feet from the special nuclear material. The licensee has two radiation monitors located in the spent fuel pool/new fuel storage areas that are within 120 feet of the spent fuel pool/new fuel storage areas. The area radiation monitors, RIA-2313 and RIA-5709, Spent Fuel Pool Area Radiation Monitors, are set to alarm locally along with illuminating an annunciator in the control room at a preset value of 15 millirems per hour. The inspectors observed monthly surveillance testing which confirmed that the alarm setpoints were properly established. In reviewing the instrument sensitivity, the inspectors were unable to locate any analysis to support the instruments ability to detect a criticality which generates radiation levels of 300 rems per hour at one foot. The licensee's review was unable to locate any established documentation. The licensee had taken action, in response to the inspectors concerns, to prohibit further receipt of new fuel in the new fuel vault until adequate supporting instrument sensitivity analysis can be provided. However, the licensee has provided a supporting analysis that concludes that the reactivity will be less than 0.95 under worst case for the new fuel storage array.

In reviewing the licensee's procedures, the inspectors identified that the licensee utilizes Alarm Response Procedure (ARP)- 8, "Safeguard Safety Injection and Isolation Scheme EK-13 (EC-13)," upon initiation of a criticality alarm. After confirmation of a valid alarm, Off Normal Procedure (ONP)-11.2, "Fuel Handling Accident," is implemented to ensure that the appropriate steps are taken including evacuation of personnel from the affected area. The licensee has identified that evacuation drills have been conducted for simulated fuel handling accidents during annual exercises and provided training on site specific alarms including area radiation monitor alarms as part of the annual General Employee Training. This training includes recognition of the specific alarm along with the required response to the alarm. Although the licensee has not conducted any evacuation drills for the specific area radiation monitor alarms, this action appears to meet the intent of 10 CFR 70.24(a)(3).

c. Conclusion

The inspectors concluded that the licensee's placement of the criticality monitoring devices were in accordance with 10 CFR 70.24 (a)(2). However, the inspectors were unable to determine the sensitivity of the monitors, as required by 10 CFR 70.24(a)(2), as the licensee was unable to produce any analysis to support this conclusion. This was considered an Unresolved Item (50-255/97005-04(DRP)) pending further evaluation by the licensee.

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 April 16, 1997. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. A. Fenech, Senior Vice President,
Nuclear, Fossil, and Hydro Operations
T. J. Palmisano, Site Vice President - Palisades
G. B. Szczotka, Manager, Nuclear Performance Assessment Department
D. W. Rogers, General Manager, Plant Operations
D. P. Fadel, Director of Engineering
S. Y. Wawro, Director, Maintenance and Planning
J. L. Hanson, Director, Strategic Business Issues
R. J. Gerling, Design Engineering Manager
A. L. Williams, Acting Manager, System Engineering
T. C. Bordine, Manager, Licensing
J. P. Pomeranski, Manager, Maintenance
D. G. Malone, Shift Operations Supervisor
M. P. Banks, Manager, Chemical & Radiation Services
K. M. Haas, Manager, Training

NRC

M. E. Parker, Senior Resident Inspector, Palisades
P. F. Prescott, Resident Inspector, Palisades

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62703:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 83750:	Occupational Radiation Exposure
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92903:	Followup - Engineering

ITEMS OPENED

50-255/97005-01	VIO	Unauthorized Code repair performed on MSIVs
50-255/97005-02	VIO	Failure to submit a LER within 30 days as required by 10 CFR 50.73
50-255/97005-03	VIO	Failure to perform MSIV repairs in accordance with 10 CFR 50 Appendix B requirements
50-255/97005-04	URI	Unable to determine sensitivity of criticality monitors per 10 CFR 70.24

ITEMS CLOSED

50-255/96-017-04	URI	Inadequate repairs to stuffing box plugs in MSIVs
50-255/95014-02	VIO	Failure to maintain low pressurizer pressure function of safety injection system operable
50-255/96-004	LER	Safety injection disabled with PCS greater than 300°F
50-255/95-001	LER	Malfunction of left channel DBA sequencer resulted in inadvertent actuation of left channel safeguards equipment
50-255/95002-01	VIO	Failure to perform the required independent verification
50-255/95-013	LER	Circuit fuse coordination deficiency which affected Appendix R safe shutdown equipment

LIST OF ACRONYMS USED

AP	Administrative Procedure
ALARA	As Low As Reasonably Achievable
ARP	Alarm Response Procedure
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
CR	Condition Report
CRS	Control Room Supervisor
CV	Control Valve
DBA	Design Basis Accident
DBD	Design Basis Document
DRP	Division of Reactor Projects
EDG	Emergency Diesel Generator
FES	Functional Equipment Substitution
FSAR	Final Safety Analysis Report
GL	Generic Letter
HPSI	High Pressure Safety Injection
ICEA	Insulated Cable Engineer Association
IFI	Inspection Followup Item
IPCEA	Insulated Power Cable Engineer Association
IR	Inspection Report
LCO	Limiting Conditions for Operation
LER	Licensee Event Report
LTOP	Low Temperature Overpressure
MRB	Management Review Board
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NOV	Notice of Violation
NPAD	Nuclear Performance Assessment Department
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
ONP	Off Normal Procedure
OOS	Out of Service
PCS	Primary Coolant System
PCV	Pressure Control Valve
PLC	Programmable Logic Controller
PDR	Public Document Room
PM	Preventive Maintenance
PPAC	Periodic & Predetermined Activity Control
PRA	Probabilistic Risk Assessment
PT	Potential Transformer
RFO	Refueling Outage
RIA	Radiation Indication Alarm
SI	Safety Injection
SIS	Safety Injection System
SIT	Safety Injection Tank

SRO	Senior Reactor Operator
SS	Shift Supervisor
SSC	Systems, Structures and Components
SV	Solenoid Valve
SOP	System Operating Procedure
TM	Temporary Modification
TOC	Time Overcurrent
TS	Technical Specification
VAC	Volts Alternating Current
WIC	Weld Inspection Checklist
WO	Work Order

September 18, 1998

Mr. Thomas J. Palmisano
Site Vice President and General Manager
Palisades Nuclear Generating Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES INSPECTION REPORT 50-255/98015(DRP)

Dear Mr. Palmisano:

On August 21, 1998, the NRC completed an inspection conducted at your Palisades Nuclear Generating Plant. The enclosed report presents the results of that inspection.

The inspection covered a 7-week period. Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with personnel, and observation of activities in progress. The purpose of the inspection effort was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements.

The operating crew demonstrated positive command and control while implementing the emergency operating procedures in response to an inadvertent main feedwater pump trip and resultant reactor trip. Your staff's root cause analysis for the main feedwater pump trip was comprehensive and thorough.

No violations or deviations of NRC requirements were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and the enclosure will be placed in the NRC Public Document Room.

Sincerely,

Original signed by

Geoffrey E. Grant, Director
Division of Reactor Projects

Docket No.: 50-255
License No.: DPR-20

Enclosure: Inspection Report 50-255/98015(DRP)

IE01

See Attached Distribution:

See Previous Concurrences

DOCUMENT NAME: C:\WORK\PAL98015.DRP

To receive a copy of this document, indicate in the box "C" = Copy w/o attach/encl "E" = Copy w/attach encl "N" = No copy

OFFICE	RIII		RIII		RIII		RIII	
NAME	Schweibinz/co		Burgess		Shear		Grant	
DATE	09/ /98		09/ /98		09/ /98		09/ /98	

OFFICIAL RECORD COPY

cc w/encl: R. Fenech, Senior Vice President, Nuclear Fossil and Hydro Operations
N. Haskell, Director, Licensing
R. Whale, Michigan, Public Service Commission
Michigan Department of Environmental Quality
Department of Attorney General (MI)
Emergency Management Division, MI Department of State Police

cc w/encl: R. Fenech, Senior Vice President, Nuclear Fossil and Hydro Operations
N. Haskell, Director, Licensing
R. Whale, Michigan, Public Service Commission
Michigan Department of Environmental Quality
Department of Attorney General (MI)
Emergency Management Division, MI Department of State Police

Distribution:
CAC (E-Mail)
Project Mgr., NRR w/encl
J. Caldwell, RIII w/encl
C. Pederson, RIII w/encl
B. Clayton, RIII w/encl
SRI Palisades w/encl
DRP w/encl
TSS w/encl
DRS (2) w/encl
RIII PRR w/encl
PUBLIC IE-01 w/encl
Docket File w/encl
GREENS
IEO (E-Mail)
DOCDESK (E-Mail)