

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/85021(DRP)

Docket No. 50-255

License No. DPR-20

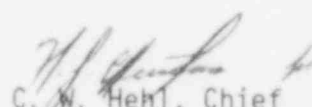
Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Palisades Site, Covert, MI

Inspection Conducted: August 13 through September 10, 1985

Inspector: E. R. Swanson

Approved By:  C. W. Hehl, Chief
Reactor Projects Section 2A

10-29-85
Date

Inspection Summary

Inspection on August 13 through September 10, 1985

(Report No. 50-255/85021(DRP))

Areas Inspected: Routine, unannounced inspection by resident inspector of operational safety; maintenance; surveillance; engineered safety features walkdown; licensee event reports; and Confirmatory Action Letter. The inspection involved a total of 97 inspector-hours onsite by one NRC inspector including 19 inspector-hours onsite during off-shifts.

Results: Of the six areas inspected two unresolved items were identified: failure to meet the environmental equipment qualification requirements for the safeguards pump room cooler fan controls; inadequate work planning and work practices resulting in an unplanned safety injection signal. Open items were identified for several outstanding corrective actions in response to recent events.

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DETAILS

1. Persons Contacted

- *J. F. Firlit, General Manager
- J. G. Lewis, Plant Technical Director
- *R. D. Orosz, Engineering and Maintenance Manager
- C. E. Axtell, Health Physics Superintendent
- *R. M. Rice, Plant Operations Manager
- C. S. Kozup, Plant Operations Superintendent
- H. M. Esch, Plant Administrative Manager
- W. M. Hodge, Property Protection Supervisor
- *R. A. Fenech, Technical Engineer
- *D. L. Fitzgibbon, Licensing Engineer
- *R. A. Vincent, Plant Safety Engineering
- *R. E. McCaleb, Quality Assurance Director

*Denotes those present at the Management Interview

Numerous other members of the plant Operations/Maintenance, Technical, and Chemistry Health Physics staffs, and several members of the contract Security forces were also contacted briefly.

2. Operational Safety

- a. The inspector observed control room activities, discussed these activities with plant operators, and reviewed various logs and other operations records throughout the inspection. Control room indicators and alarms, log sheets, turnover sheets, and equipment status boards were routinely checked against operating requirements. Pump and valve controls were verified as being proper for applicable plant conditions. On several occasions, the inspector observed shift turnover activities and shift briefing meetings.

Tours were conducted in the turbine, auxiliary, and containment buildings, and central and secondary alarm stations to observe work activities and testing in progress and to observe plant equipment condition, cleanliness, fire safety, health physics and security measures, and adherence to procedural and regulatory requirements.

The inspector made observations concerning radiological safety practices in the radiation controlled areas including: verification of proper posting; accuracy and currentness of area status sheets; verification of selected Radiation Work Permit (RWP) compliance; and implementation of proper personnel survey (frisking) and contamination control (step-off-pad) practices. Health Physics logs and dose records were routinely reviewed.

The inspector observed physical security activities at various access control points, including proper personnel identification and search and toured security barriers to verify maintenance of integrity. Access control activities for vehicles and packages were occasionally observed. Activities in the Central Alarm Station were observed.

An ongoing review of all licensee corrective action program items at the Event Report level was performed.

- b. On August 11, 1985, at 0834 hours, the unit was tripped from 98% power on loss of load. Generator field was lost during adjustment to the generator excitation. The Westinghouse control circuit did not have an operable minimum excitation limiter and the voltage adjuster did not work smoothly resulting in a loss of field trip. The motor operated auto-transformer (voltage adjuster) was replaced and administrative limits were placed on generator voltage and reactive load to reduce the possibility of another error until additional repairs can be made. All systems functioned as expected after the trip. A post-trip review was completed and revealed no other problems. The reactor had been critical since November 1984 and was expected to remain shutdown until August 20 to afford the licensee the opportunity to repair seals on one primary coolant pump and seals in nine control rod drive mechanisms.
- c. At 1003 hours on August 12, 1985, an unplanned safety injection signal (SIS) was generated during repair of a relay. Electricians were replacing a SI block relay used during testing when the partial SI occurred. The reactor was shutdown with the primary system pressure and temperature at 500 psi and 320 degrees F when the "Right Channel" SIS was generated, which caused valves to align and a low pressure safety injection (LPSI) pump and a boric acid pump to start. No water was injected due to the system pressure being greater than the discharge head of the LPSI pump (150 psi). High pressure safety injection pumps had been disabled for overpressure protection. Post-event review determined that the power to the SIS block (for low pressure) was fed through the contact block for the relay being replaced so that when the power lead was removed, the "Right Channel" blocking signal was also removed, thereby allowing the SIS actuation to occur. The defective relay was replaced later the same day without incident. Due to a recently installed modification to protect the plant from overloads on the startup transformers, the event caused several loads to be shed, including a bus which supplied onsite telephones. Security systems power and offsite telephones were verified to be operational. Power was restored in about 15 minutes and there were no long term complications from the event.

It appears that inadequate work planning and work practices were responsible for this event. This item will be reviewed in more detail in a future inspection and will be tracked as an unresolved item (255/85021-05).

- d. While doing pre-startup checklists in the cold shutdown mode on August 20, 1985, the licensee declared all steam generator snubbers inoperable due to lack of an observable oil level in the snubber oil reservoir sight glass. The licensee investigated the cause of the oil loss and determined it to be potentially due to a number of small leaks. No evidence was found of a major leak which could be repaired. Since both reservoir systems experienced the same losses and still had about an inch of oil left in them, the licensee concluded that refilling the reservoirs would be adequate corrective action for the short operating time left until the outage. During the next outage, which will start on November 30, 1985, additional snubber inspections and testing will be conducted.
- e. During review of an incomplete surveillance test on August 22, 1985 of safety injection check valves and SI flow indicator verification, the Senior Resident Inspector identified a flow instrument which did not meet the acceptance criterion identified in the procedure. The licensee had not yet formally reviewed the test because a portion was yet to be done at the hot shutdown mode. The plant was heating up and at about 325 degrees at the time. Since Technical Specifications (TS) require that all HPSI flow indicators be operable above the cold shutdown mode, it appeared that the licensee had violated TS 3.0.4, which prohibits entering a higher mode with inoperable equipment. The licensee was apprised of the inspector's concern and stopped the heatup at 1400 hours. Subsequent licensee investigation determined that the zero null of the indicator had shifted and, although within meter tolerance, had caused flow indication to be 40 gpm low. The operator performing the test recalled that the flow indicator moved, but still indicated near zero. Based on his observation he had not considered the instrument inoperable, circled the reading and immediately brought the discrepancy to his supervisor's attention as required by plant procedures. The transmitter was adjusted and verified operable and heatup was resumed at 1730 hours. Subsequent discussions with the licensee determined that a change is being processed to remove the instruments from the Technical Specifications since the instruments are not relied upon by the operators in responding to any of the analyzed accidents. The Office of Nuclear Reactor Regulation has verbally concurred that the flow instruments are not required for accident mitigation.
- f. While in the hot shutdown mode on August 23, 1985, at about 1030 hours, the licensee determined that the Primary Coolant System (PCS) leak rate was approximately 10-15 gpm, which exceeded the TS limit of 1 gpm. Charging and letdown were isolated and leakage appeared to stop. An Unusual Event was declared in accordance with the licensee's Emergency Plan. Further investigation did not locate any leakage and at 1730 hours the licensee terminated the Unusual Event. The leakage was attributed to inventory balance problems due to pressurizer temperature changes.

- g. On August 23, 1985, at about 1800 hours, mechanical maintenance personnel performed troubleshooting on Control Rod No. 28, which included manual withdrawal to 40 inches and reinsertion. The Shift Supervisor was aware that the maintenance personnel were going to check the rod for freedom of travel, but was not aware that it was going to be moved 40 inches. 10 CFR 50.54(i) states: "Except as provided in 55.9 of this chapter, the licensee shall not permit the manipulation of the controls of any facility by anyone who is not a licensed operator or senior operator as provided in Part 55 of this chapter". After finding out how much the rod had been moved, the licensee initiated a corrective action document to ascertain whether a licensed operator should have been present when the rod was withdrawn. Although cold shutdown boron concentration was maintained during the entire evolution, it would have been appropriate to, as a minimum, have a licensed operator in direct supervision of the maintenance group and monitoring reactivity conditions while the rod was being moved. Based on the low safety significance, and corrective action underway, this event is considered a licensee identified violation of 10 CFR 50.54(i). A notice of violation will not be issued for this event, as allowed by 10 CFR 2, Appendix C. Completion of the licensee's corrective actions will be tracked as an Open Item (255/85021-01).

The licensee later cooled down to repair a control rod drive mechanism which would not drive. The drive package was replaced and tested. The failure was attributed to binding and galling of the ratchet pawl and collet assembly. Failures like this have been experienced before in 1975 and 1979 and attributed to fuel handling tool design. Combustion Engineering personnel were onsite assisting in evaluation and troubleshooting. The cause was initially determined to be due to the rod latch testing method used. Their evaluation also concluded that the binding could not cause a rod to stick out of the core. Additional corrective actions are still being evaluated.

- h. During plant heatup on August 26, 1985, at 1129 hours, the power operated relief valves (PORV) spuriously cycled open following a primary coolant pump start. System pressure was about 280 psi and the low temperature overpressure (LTOP) setpoint was thought to be set at 375 psi. System pressure recorders saw an increase to 330 psi. After instrument troubleshooting it was determined that the LTOP setpoint was at 365 psi. No other cause for the spurious cycling could be found and a restart of the same pump at slightly lower pressure did not lift the PORV. An Unusual Event was declared from 1135 to 1530 hours during the troubleshooting and evaluation. The licensee had not planned to take corrective actions to prevent further occurrences until requested by the NRC inspector. These actions will be tracked as an Open Item (255/85021-02)

- i. During hot rod testing on August 27, 1985, at 0625 hours, a reactor trip occurred due to noise on a startup range nuclear instrumentation (NI) channel. A high startup rate was generated. Control rods were just off the bottom of the core except for the rod being tested. Shutdown boron concentration was being maintained. NI noise has been a recurring problem and has generally been attributed to connector and cable problems. Problems with these instruments further delayed the reactor startup. Additional details are contained in Licensee Event Report (LER) 85-013. Corrective actions will be addressed during the future review of the LER.
- j. At 1654 hours on August 28, 1985, the reactor was taken critical ending the unscheduled outage which began August 12, 1985. The main generator was connected to the grid at 2355 hours, but was taken off line due to an electro-hydraulic (E-H) leak on the turbine control valves. After repair of the E-H leak the generator was again connected to the grid at 1321 hours on August 29, 1985. On August 30, 1985 at 0009 the repaired E-H fitting again broke and the turbine was again taken off line. After repairs the generator was again connected to the grid at 0517 on the same day. Power escalation continued until 1138 hours when the reactor tripped from 48% power.
- k. The trip on August 30, 1985, was caused by actuation of a relay which tripped the turbine which gave a loss of load trip signal to the reactor. All systems functioned normally on the trip. The relay which caused the trip was the "Generator Distance Back Up Relay" which was incorrectly cut out for maintenance. Poor labeling of the relay cutout switch was the apparent cause. The licensee plans to improve labeling of the relays and also resolve the communication problems which allowed the repaired relay to be left out of service during startup and operation.
- l. Following the trip, restart was delayed until 1901 hours due to "noise" problems on the nuclear instruments. The generator was on the grid at 0300 hours on August 31, 1985, but was taken off line at 0955 due to electro-hydraulic fluid leak on the #1 governor valve. The reactor remained critical. At 1619 hours on August 31 the generator was again synchronized to the grid. While at 57% power another E-H leak on the No. 1 governor valve required taking the turbine off line again at 0044 on September 1, 1985. Vibration had caused a leak in the same place as the previous day. At 1015 hours the generator was on line again, but was taken off line at 1327 hours, again due to a leak on the No. 1 governor valve. At 0616 hours on September 2, 1985, the generator was again on line, this time with the No. 1 governor valve "failed closed" to prevent vibration. The plant operated at 68% power with the No. 1 and No. 4 governor valves closed to prevent vibration until 1030 hours on September 8, 1985, when the turbine was taken off line for repair of the E-H control system. Further online troubleshooting was done on the turbine control valves, but the plant was still limited in power by the No. 1

governor valve closure at the end of the report period. On September 15, 1985 the licensee removed the turbine from service and made final repairs to the governor control circuit and E-H system, which solved the vibration problems.

- m. A 3-hour PCS leak rate test completed at 2345 hours on September 7, 1985, indicated 1.14 gpm leakage, in excess of TS limits. An Unusual Event was declared. The leak rate had been trending up prior to this time yet licensee inspections found no indication of actual leakage from the PCS. After isolating the letdown and charging lines, a 2-hour leak rate was calculated to be 0.59 gpm at 0221 hours on September 8, 1985. The Unusual Event was terminated at this time. After cycling the divert valve (which sends PCS letdown flow to either the volume control tank or radiation waste tanks) and placing letdown flow back in service, the leak rate was calculated to be 0.61 gpm. The licensee is reasonably confident that the divert valve, CV-2056, was responsible for the erroneously high PCS leak rate results.
- n. On September 9, 1985, at 1300 hours, the licensee declared a four-hour reportable event when they discovered that an Environmental Equipment Qualification (EEQ) modification was not done by March 31, 1985. The Engineered Safeguards Room Cooler Temperature switches were not replaced as planned according to their November 30, 1984 letter to the Office of Nuclear Reactor Regulation. The licensee started the cooler fans manually and caution-tagged the remote hand switches to assure their operability. Installation was in progress when the error was discovered and is expected to be complete by September 30, 1985.

Pursuant to 10 CFR 50.49 the licensee was required to install qualified equipment by March 31, 1985. Extensions could be granted until November 30, 1985, provided justification for continued operation (JCO) was provided for each piece of equipment not able to be qualified by that time. In their June 15, 1984 letter, the licensee provided a JCO for the thermostats, which was subsequently identified as unnecessary in their November 30, 1984 letter. This letter to the NRC provided clarification of their original JCO and added that the subject JCO "... is not applicable since the thermostats identified by this JCO will be installed by March 31, 1985." In addition, licensee correspondence on this issue (October 5 and November 30, 1984, et. al.) was confusing to the NRC as to exactly which components required NRC-approved JCOs. The licensee subsequently submitted a clarification letter dated January 15, 1985 to the NRC, and NRR later approved the requested JCOs. The overall lack of accuracy and completeness of the licensee's correspondence required considerable additional effort on the part of the NRC in resolving this issue before approval of the requested JCOs could be granted.

Qualified thermostats were onsite, but, due to problems encountered in installation, they failed to be installed by the committed date of March 31, 1985. In addition, the NRC inspector found, during this inspection, that the engineer supervising the installation was unaware of the March 31, 1985 deadline date. Based on this fact and the high visibility of EEQ matters (both in general and specifically due to the substantial attention devoted to the licensee's correspondence), the inspector concluded that the licensee's in-place controls to track the thermostat installation were inadequate. The failure to install the modification as committed is a potential violation of 10 CFR 50.49, but is being further reviewed by the NRC for additional reasons and will be tracked as an Unresolved Item (255/85021-03).

- o. On Tuesday, September 10, 1985, at 2000 hours, the results of a 24-hour Primary Coolant System (PCS) leak rate calculation showed unidentified leakage of 1.619 gpm. Technical Specifications limit unidentified leakage to 1.0 gpm and the licensee declared an Unusual Event. The high leak rate was suspected to be due to a large water addition made in following a Xenon Transient. A two-hour leak rate test completed at 2300 hours showed PCS unidentified leakage to be 1.06 gpm. Letdown flow was then isolated and another leak rate test was started. Some PCS sample valve leakage was identified. The leak rate at 0240 hours on September 11, 1985, showed 0.18 gpm unidentified leakage. The licensee then terminated the Unusual Event. The exact source of leakage in the Chemical and Volume Control System (CVCS) has not been positively identified although the divert (3-way) valve was again suspected of being the prime contributor to the leak rate calculational errors. With CVCS in service, a leak rate was calculated to be 0.617 gpm at 0505 hours. The licensee is continuing their investigation.

One unresolved and two open items were identified which require further review.

3. Maintenance

The inspector reviewed and/or observed the following selected work activities and verified appropriate procedures were in effect controlling equipment removal from and return to service, hold points, verification testing, fire prevention/protection, and cleanliness.

- Troubleshooting and repair of SV-3069 electrical controls (24503535)
- Calibration of redundant condensate storage tank level instruments (24503091)
- Lube oil cooler repair on Diesel Generator 1-2 (24503066)
- Installation of recorder for T-102 level LIA-0437A (24503598)

- Installation of strong backs on personnel airlock (24503529)
- Repair of indication and controls for CV-0826

No violations or deviations were identified.

4. Surveillance

The inspector reviewed surveillance activities to ascertain compliance with scheduling requirements and to verify compliance with requirements relating to procedures, removal from and return to service, personnel qualifications, and documentation. The following test activities were inspected:

- Q0-1 Safety Injection System Testing

The operability testing for a failed test relay was performed following relay replacement. The relay failed again and required adjustment. Further testing will be conducted to validate the repairs.

- R0-21 Control Rod Drive Interlock Test

The inspector noted that the operator pulling the shutdown banks did not have his startup nuclear instrument range recorder selected. The Shift Supervisor also noticed the operator's error and corrected the situation.

- CL-35 Startup Checklists for Nuclear Instruments
- CL-36 Startup Checklists for Turbine Trip
- RM-58 Visual Inspection of Steam Generator Snubbers
- Q0-8 ESS Block Valve and HPSI Flow Instrument Operability Test

The inspector identified two concerns to the licensee. First, the HPSI flow instrument (FI-0312A) was reading zero when the acceptance criteria was approximately 40 gpm. This was resolved as being within the accuracy of the instrument at low flow conditions. The second was related to the adequacy of the procedure in demonstrating flow instrument operability. The licensee's corrective action system will resolve this latter concern.

No violations or deviations were identified.

5. Engineered Safety Features Walkdown

The inspector performed a walkdown of the Safety Injection Accumulators and verified: That each accessible valve in the flowpath was in its required position and operable; that power was aligned for components

that activate on an initiation signal; that essential instrumentation was operable; and that no conditions existed which would adversely affect system operation.

No violations or deviations were identified.

6. Licensee Event Reports

Through direct observations, discussions with licensee personnel, and review of records, the following reportable events were examined to determine that reportability requirements were met, immediate corrective action was accomplished as appropriate, and corrective action to prevent recurrence had been accomplished per Technical Specification.

(Closed) LER 255/85-008: On July 22, 1985, the licensee identified that modification work had inadvertently created an unisolable path between the control room and the environment. Appropriate actions were taken to commence a plant shutdown until a temporary seal could be put in place. The licensee identified that the drawing used to plan the work did not have adequate details to identify the control room integrity boundary. Review and revision of the drawings will be tracked as an Open Item (255/85021-04).

(Closed) LER 255/85-009: A High Pressure Safety Injection (HPSI) flow transmitter was found inoperable on July 27 and August 1, 1985, and was required to be operable by the Technical Specifications. During operability testing of the transmitter on July 28, 1985, a SIS flow path valve was found to be inoperable. Concurrently, a low Safety Injection Tank (SIT) level prompted the initiation of a plant shutdown. The flow transmitter was replaced and the valve control problem was corrected.

The low SIT level was due to fill and drain valve leakage which will be repaired during the November 30, 1985 refueling outage.

(Closed) LER 255/85-010: On August 11, 1985, a reactor trip occurred due to loss of load. This event and corrective actions are addressed in Paragraph 2.b. This event is closed.

(Closed) LER 255/85-011: On August 12, 1985, an inadvertent Safety Injection System (SIS) actuation occurred during a maintenance evolution. The event was a result of inadequate work planning which resulted in lifting of an electrical lead which removed the right channel SIS actuation block signal. The plant was in the hot shutdown mode and there were no consequences to the actuation. This event is closed.

No violations or deviations were identified.

7. Confirmatory Action Letter - RIII-85-09

A written requalification examination was administered to five senior reactor operators and three reactor operators on July 3, 1985. Three of the four sections of each examination were prepared by the NRC. The theory section of each examination was prepared by the licensee. After grading it was determined that all three reactor operators and one senior reactor operator failed to achieve the minimum standards of 80% overall and 70% in each section specified in the licensee's requalification program. After notification by the NRC on July 16, 1985 (the date of the Confirmatory Action Letter) the licensee removed the reactor operators and the senior reactor operator from licensed duties.

The NRC reviewed and accepted an accelerated requalification program for the three reactor operators and the senior reactor operator. A re-examination was reviewed and accepted by the NRC and administered to the operators on August 29, 1985. On September 6, 1985, review of the re-examination grading by the NRC corroborated the licensee's assessment that all operators passed the re-examination. The licensee was informed of this later the same day, and the operators were returned to licensed duties. All actions required by the licensee are considered completed.

No violations or deviations were identified.

8. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations or deviations. Two unresolved items were disclosed during the inspection as discussed in Paragraph 2.c and 2.n.

9. Open Items

Open Items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 2.g, 2.h, and 6.

10. Management Interview

A management interview (attended as indicated in Paragraph 1) was conducted on September 10, 1985 following the inspection. The scope and findings of the inspection were discussed.

The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary.