U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/84-14(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: July 16 through August 3, 1984

Inspector: B. L. Jorgensen

Approved By: G. C. Wright, Chief, Reactor Projects Section 2A — Date: 8/20/84

Inspection Summary

Inspection on July 16 through August 3, 1984 (Report No. 050-255/84-14(DRP))
Areas Inspected: Routine, unannounced inspection by resident inspector of operational safety; maintenance; surveillance; reactor physics; and independent inspection areas. The inspection involved a total of 123 inspector-hours onsite by one NRC inspector including 33 inspector-hours onsite during off-shifts.
Results: Of the five areas inspected, no items of noncompliance or deviations were identified in three areas. One item of noncompliance (failure to follow procedure - Paragraph 3; failure to follow Emergency Plan - Paragraph 7.e) was identified in each of the remaining two areas.

DETAILS

1. Persons Contacted

Consumers Power Company (CPCo)

*R. W. Montross, General Manager
*J. S. Rang, Operations and Maintenance Superintendent
*W. P. Mullins, Chemistry/Health Physics Superintendent
*D. W. Rogers, Technical Engineer
*R. A. Vincent, Administrator - Nuclear Activities Plant Organization
*D. G. Malone, Senior Engineer
*R. P. Margol, Quality Assurance Administrator
*C. H. Gilmor, Technical Superintendent
L. D. Seamans, Senior Engineer
D. M. Kennedy, Senior Engineer
D. L. Beach, Senior Plant Technical Analyst
D. VanDenBerg, Reactor Engineer
*C. S. Kozup, Operations Superintendent
R. J. Frigo, Shift Engineer
B. L. Schaner, Operations Supervisor
B. C. Bauer, Shift Engineer
*K. E. Osborne, Maintenance Superintendent
P. F. Bruce, Supervisory Engineer
R. D. Frederick, Plant Safety Advisor
R. O. Torp, Assistant Instrument and Control Supervisor
A. F. Brookhouse, Shift Supervisor
K. K. Davison, Shift Supervisor
J. R. Meilstrup, Shift Supervisor
E. I. Thompson, Shift Supervisor
*M. C. Sniegowski, Planning and Scheduling Administrator

*Denotes those present at the Management Interview.

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

2. General

The plant achieved initial criticality at 10:59 p.m. on July 24, 1984 following a 50-week refueling/maintenance/modification outage. The inspector observed the approach to and establishment of the initial criticality. Reactor parameters (control rod position and boron concentration) were as predicted.

During the outage, significant activities included steam generator tube inspection (including selective tube removal for laboratory analysis); plugging of approximately 280 tubes; auxiliary feedwater system modification and repair; control room HVAC modifications; 10-year reactor vessel inspection; and inspection and overhaul of the main turbine and generator. A large number of other tests and inspections, and numerous system modifications (some responsive to such issues as Appendix R, TMI, SEP and EEQ) and system repairs were also also completed.

Following completion of the reactor physics testing program (see Paragraph 6) the plant was synchronized to the grid for routine commercial power operations on July 31, 1984.

3. Operational Safety

The inspector observed control room activities, discussed these activities with plant operators, and reviewed various logs and other operations records throughout the inspection. Examples of specific operations observed include: batching concentrated boric acid to the Safety Injection Refueling Water tank to establish required level and concentration; adjusting safety injection tank and concentrated boric acid tank levels to specification; critical approach and establishment of stable zero-power critical conditions by dilution (July 24) and by use of control rods (July 26); and initial power escalation to 20% preparatory to turbine testing. A plant shutdown on July 25 in response to an "Unusual Event" involving high primary coolant system unidentified leakage (see Paragraph 7.e) was also observed.

During a control room tour on July 23, 1984 (the day before initial criticality) the inspector noted the control switch for engineered safeguards room cooler fan V-27A was in the "Pull-to-Lock" position. A discussion with the on-shift operators and the Shift Supervisor showed the operating crew had been unaware of this, and they did not know why it may have been done. The crew restored the system to operability after reviewing appropriate working orders and tagging records to assure the component was not required to be kept inoperable. This restoration to operability required resetting the associated circuit breaker and restoring automatic thermostatic controls; items which the crew identified and corrected on their own initiative. Fan V-27A is required operable (by plant procedures) for criticality.

On July 24, 1984 the inspector was in the control room for observation of initial critical approach via procedure T-95 "Initial Approach to Critical for a New Palisades Core", which was in progress. This procedure first establishes primary system boron concentration some 150-200 ppm above predicted critical boron concentration, then proceeds in phases to: withdraw all rods in 33-inch increments (making specified measurements/verifications at each increment) to the "all rods out" configuration; dilute

at 80 gpm to an estimated 30 minutes from critical; achieve critical by dilution at 40 gpm over about the last hour of the approach. By about 10:30 a.m., two of four control rod banks were partially withdrawn (in addition to the shutdown banks) when the inspector learned the primary system boron concentration had been diluted. Discussion with operators and review of associated logs established that on three occasions while T-95 was proceeding, boron-free primary makeup water had been batched to the volume control tank. As a result, primary coolant system boron concentration had been reduced from the 1410 ppm established for commencement of test T-95, to 1357 ppm. This development was immediately called to the attention of the Operations Supervisor and the Reactor Engineer, who directed a boration back to about 1410 ppm and a restart on T-95. The test procedure was modified to provide very specific prohibition to diluting boron concentration after initial conditions were established, until the control rods were in the all rods out configuration. The procedure was subsequently performed correctly as witnessed by the inspector. Procedure T-95 is an approved written procedure pursuant to Technical Specification 6.8.1. Failure to properly implement procedure T-95 is thus an example of noncompliance with this Technical Specification (255/84-14-01).

It should be specifically noted that the operating crews were well aware of the predicted critical boron concentration of about 1270 ppm, and they were also well aware that significant shutdown worth was being provided by the control rods remaining inserted. Thus, at no time was there a significant potential for development of an unanticipated criticality. Further dilution to the critical boron concentration and subsequent approach by rod withdrawal is an approved method for reactor startup, though not under procedure T-95.

Tours were conducted in the turbine and auxiliary buildings to observe various work activities and testing (discussed elsewhere in this report) and to observe plant equipment conditions, radiological controls, fire safety, security, and adherence to procedural and regulatory requirements.

Observations covering radiological safety practices in the auxiliary building included verification of proper posting; checking area status for accuracy and currency; verifying selected Radiation Work Permit (RWP) compliance; and observing personnel contamination survey (frisking) and contamination control (step-off-pad) practices. No problems were identified.

The inspector observed security activities at various access control points, including proper personnel identification and search; and toured security barriers to verify maintenance of integrity. Vehicle access control activities were also observed on occasion. When the inspector learned a work activity was planned which could affect the integrity of an access control barrier, a check with personnel responsible for security matters indicated

they had not been specifically apprised of the work plans. Compensatory measures to assure no degradation of access controls were implemented prior to the start of work and throughout the job.

One item of noncompliance, relating to improper procedure implementation as described above, was identified in inspection of this area.

4. Maintenance Observation

The inspector reviewed and/or observed selected work activities and verified appropriate procedures were in effect controlling removal from and return to service, hold points, verification testing, fire prevention/protection and cleanliness. Proper personnel qualifications for persons performing selected activities were verified.

The following were observed/reviewed:

a. Adjustment of safety injection tank "D" level indicator (Maintenance Order MO 84-ESS-0253).

b. Repair/replacement of "D" channel delta-T power module in the Reactor Power Calibration and Indication Cabinet (Maintenance Order MO 84-RPS-0008).

c. Troubleshooting source range nuclear instrument NI-001 erratic indication.

No items of noncompliance or deviations were identified.

5. Surveillance Observation

The inspector reviewed surveillance activities to ascertain compliance to scheduling requirements and to verify appropriate testing was completed to support plant initial criticality and return to commercial power operations. Selected test activities in progress or planned were reviewed to verify compliance to requirements relating to procedures, removal from and return to service, personnel qualifications, and documentation. The following test activities were inspected:

a. MO-22 "Inservice Test Procedure: High Pressure Safety Injection Pumps" - HPSI pump "A" tested on July 19, 1984.

b. RI-6 "Containment Pressure Channels Calibration" - Repeat test on July 20, 1984. During initial performance of this test on July 19, an apparent personnel error resulted in actuation of 2-of-4 logic in one channel and an estimated 600 to 700 gallons of water was sprayed into the containment building. This event will be the subject of a Licensee Event Report and will be reviewed in association with that report.

c. MO-7A1 "Emergency Diesel 1-1" - Tested July 23, 1984 with observation and review of local readings by the inspector.

d. QO-8 "ESS Check Valve Operability Test/Hot or Cold Shutdown" - The inspector reviewed test data for the July 26, 1984 test, verifying PCS loop check valves which had been leaking the previous day (requiring plant shutdown - see Paragraph 7.e) had been successfully reseated and the leakage stopped.

e. DWT-7 "Reactor Internals Noise Monitoring" - Test at 25% power on July 30, 1984.

f. MO-20 "Inservice Test Procedure - Charging Pumps" - Tested "C" charging pump for return to service August 1, 1984.

g. MI-4 "Pressurizer Low Pressure Safety Injection Initiation and High Pressure Alarm" - Tested August 2, 1984.

The inspector was advised on July 23, 1984 that test MO-7A2 on emergency diesel-generator 1-2 was found by the licensee to be four days overdue. A successful test was completed that day. The plant Technical Specifications permit seven days "inoperability" (total for both diesel-generators), which was not exceeded.

No items of noncompliance or deviations were identified.

6. Reactor Physics

During this inspection, the licensee conducted low power reactor physics testing for the refueled core, which was selectively reviewed and/or observed by the inspector.

a. Test T-143 "Zero Power Isothermal Temperature Coefficient" - The inspector reviewed the test procedure before implementation on July 27, 1984 and observed portions of the test. The inspector verified prerequisites were met, precautions were observed as specified in the procedure, plant conditions during measurements were consistent with procedure requirements, and the values obtained were within specified expectations.

b. Test T-144 "Zero Power Rod Worth Measurement" - The inspector selectively observed implementation of this test on July 27, 1984 specifically involving the boron addition measurement portion of the test. The inspector verified prerequisites were met, procedure precautions were observed during the measurements, plant conditions for the measurements were controlled within parameters specified in the procedure, and the required data were properly recorded. Subsequent discussion and review with licensee personnel established test results showed rod worths within the acceptance criteria.

c. Test T-145 "Zero Power Symmetry Check" - The test procedure was reviewed before implementation for verification of appropriate prerequisites, precautions, clear instructions, and acceptance criteria. Subsequent review and discussion with licensee personnel showed acceptance criteria had been met.

No items of noncompliance or deviations were identified.

7. Independent Inspection Activities

a. The inspector attended a meeting of the licensee's Corrective Action Review Board (CARB) on July 17, 1984. A leaking weld on the P-8C auxiliary feedwater pump recirculation line and an excessive heat buildup in containment cable tray CP-250 were among the items discussed. The heat buildup in cable tray CP-250 was detected by temperature monitoring instrumentation specifically installed for that purpose pursuant to an agreement between the licensee and NRC Region III (documented in a Confirmatory Action Letter dated July 13, 1984) after cable damage from earlier overheating was found.

b. The inspector attended a special meeting of the Plant Review Committee (PRC) - also on July 17, 1984. A specification change (SC-84-130) involving replacement of a transmitter for flow instrument FT-0404A was reviewed, as was a specification change (SC-84-128) involving redesign of the fire stop on cable tray CP-250 inside containment which was considered the primary cause of the overheating being experienced there. Both items received PRC approval and were subsequently implemented. The licensee has continued the agreed-upon temperature monitoring subsequent to installation of the modified fire stop, with data showing no recurrence of the excessive heat buildup previously experienced with the old design.

c. The inspector checked briefly on progress of an inspection of the Safety Injection Refueling Water tank foundation. This inspection by the licensee was being specifically observed by a specialist inspector from NRC Region III and will be the subject of a separate inspection report.

d. The inspector performed an ongoing review of licensee corrective action program documents at the "Event Report" level.

e. The inspector was present and followed activities in the main control room and in the Technical Support Center (TSC) following declaration of an "Unusual Event" on July 25, 1984 due to excessive (above one gallon per minute) unidentified primary coolant system leakage. The "Unusual Event" was declared at about 10:35 a.m., and subsequent licensee activities relating to reporting, compliance to applicable Technical Specifications (the plant was properly shut down pursuant

to the Limiting Condition for Operation which applied) and to problem evaluation and resolution, were considered proper and effective. The source of the leak was identified as past PCS loop check valve CK-3146 and into the quench tank and the primary coolant drain tank. This flow path was isolated and PCS leakage verified below one gallon per minute by 5:30 p.m., when the "Unusal Event" was declared terminated.

Subsequent review by the inspector showed the licensee had information well before 10:35 a.m. showing excessive PCS leakage. Leak rate measurements from 8:00 p.m. the previous night (3.45 gpm - considered unreliable due to large dilutions for the critical approach) and from 2:25 a.m. (1.577 gpm), 5:00 a.m. (1.35 gpm) and 6:00 a.m. (2.59 gpm) should have triggered earlier classification and reporting to NRC and others. Further, a similar situation developed late on July 27, 1984 when PCS leak rate at 8:00 p.m. (24-hour calculation) was 1.278 gpm. This was substantiated by a 10:15 p.m. rate measured at 1.145 gpm (2-hour). The licensee identified and isolated a leak at charging pump P-55C and verified PCS leakrate below 1.0 gpm by 3:00 a.m., July 28, but NRC was not notified until August 1, 1984 after the associated Deviation Report reached the Corrective Action Review Board and reportability requirements were recognized. Finally, at about 5:44 p.m. on July 28, use of the atmospheric dump valves to open the main steam isolation valves (as required by Palisades design) resulted in primary coolant system temperature dropping below 525°F for about three minutes with the reactor critical. This situation also constituted an "Unusual Event" by the licensee's Emergency Plan, and reporting to NRC within one hour (and specified reporting to others) was required. The "Unusual Event" was not declared until about 7:09 p.m., with reporting being completed thereafter.

Title 10, Code of Federal Regulations, Part 50.72 "Immediate Notification Requirements for Operating Nuclear Power Reactors", requires notification of the NRC Operations Center within one hour of Emergency Plan - classified conditions, which includes Unusual Events. The Palisades Plant Site Emergency Plan, Paragraph 4.1.1 "Unusual Event", specifies incidents to be classified as an Unusual Event by reference to Table 4-2. Table 4.2 identifies "Primary Coolant System leakage in excess of Technical Specifications (1.0 gpm unidentified) but less than 50 gpm (page 4-22) as an Unusual Event. Table 4.2 also specifies "Critical operation at PCS temperature less than 525°F" (page 4-24) as an Unusual Event. The circumstances described above, involving failure to make timely determinations and classifications as prescribed in emergency plans (and which resulted in late reporting) are considered an example of noncompliance with 10 CFR 50.54(q), which requires emergency plans be followed (255/84-14-02).

No other items of noncompliance or deviations were identified.

8. Management Interview

A management interview (attended as indicated in Paragraph 1) was conducted at the conclusion of the inspection on August 3, 1984. The following items were discussed:

a. The inspector described the apparent noncompliance relating to improper implementation of the procedure for initial approach to criticality (Paragraph 3).

b. The scope and findings of the inspection in the areas of maintenance, surveillance, and reactor physics was described, the inspector noting no items of noncompliance had been identified in any of these areas.

c. The apparent noncompliance involving failure to classify Emergency Plan events and initiate timely reporting (Paragraph 7.e) was discussed. The licensee stated they shared the inspector's concern regarding this matter and had, in fact, held internal discussions aimed at preventing future similar problems prior to the inspector raising the matter as an apparent noncompliance.