

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/89014(DRS)

Docket No. 50-255

License No. DPR-20

Licensee: Consumers Power Company  
1945 West Parnall Road  
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Palisades Site, Covert, MI 49043

Inspection Conducted: May 16-18 and June 9, 1989

Inspector: *Joseph M. Ulie*  
Joseph M. Ulie

7-6-89

Date

Approved By: *Ronald N. Gardner*  
Ronald N. Gardner, Chief  
Plant Systems Section

7-6-89

Date

Inspection Summary

Inspection on May 16-18 and June 9, 1989 (Report No. 50-255/89014(DRS))

Areas Inspected: Routine, unannounced inspection to review the implementation of the licensee's fire protection program including a review of the fire protection organization; administrative controls; fire protection system surveillance test program; fire protection features for specific plant areas; Information Notices; plant modifications and quality assurance (30703, 64704 and 92701).

Results: Of the seven areas inspected, one deviation was identified (failure to seal Bus 1C in Switchgear Room 1-C to prevent an inadvertent spraying of the internal components with water and potentially causing an equipment operability problem - Paragraph 6). Three open items and one unresolved item are identified in this report. The first open item regards a surveillance procedure task of determining whether a modification had occurred since the previous surveillance. This task did not appear achievable with the guidance provided (Paragraph 4). The second open item regards an evaluation by the licensee to determine the adequacy of the sprinkler head locations in the cable spreading room (Paragraph 4). The third open item has two examples that regard a need for additional engineering detail to support the as-installed fire detection system locations for the spent fuel pool area and the cableway tunnel (Paragraph 5). The unresolved item regards design input checklists lacking accurate fire protection criteria (Paragraph 7). Overall, the implementation of the licensee's fire protection program was determined to be in accordance with NRC requirements.

## DETAILS

### 1. Persons Contacted

#### Consumers Power Company (CPCo)

- \*S. C. Cote, Property Protection Superintendent
- \*E. Dorbeck, Fire Protection Engineer
  - D. Eaton, Intern
  - J. G. Lewis, Technical Director
- \*D. J. Malone, Senior Nuclear Licensing Analyst
  - R. D. Oroz, Engineering and Maintenance Manager
- \*T. J. Palmisano, Administrative and Planning Manager
- \*R. W. Philips, Jr., Fire Protection Supervisor
- \*W. L. Roberts, Supervisory Engineer
- \*G. W. Sleeper, Senior Engineer, Plant Projects

The inspector also contacted other licensee employees during the course of the inspection.

\*Denotes those licensee personnel participating in the telecon exit meeting held on June 9, 1989.

### 2. Fire Protection Organization

The inspector interviewed two licensee personnel performing fire watch duties including a security officer conducting an hourly fire watch patrol and an individual acting as a fire watch during hot work activities. The inspector determined, after discussions with each of these individuals, that they were adequately trained. This determination was based on the fact that the fire watch individuals were able to describe the required emergency actions which they would take upon spotting a fire condition.

An unannounced fire drill was requested by the inspector and was scheduled by the licensee for May 17, 1989. However, this drill was cancelled due to an electro-hydraulic fluid leak that required the attention of shift personnel who were also assigned fire brigade duties.

### 3. Administrative Controls

While performing plant tours on May 16-18, 1989, the inspector examined licensee fire protection administrative control procedure No. 7, Revision 5, dated October 17, 1988.

The inspector's review of the procedure determined that the procedure was well written and minimized the amount of combustibles that a designated vital area may be exposed to. During plant tours on May 16-18, 1989, the inspector, accompanied by the fire protection supervisor and a senior engineer in plant projects, performed a walkthrough of designated vital

and non-vital areas including the control room, cable spreading room, Switchgear Rooms 1-C and 1-D, Diesel Generator Rooms 1-1, 1-2 and their respective day tank rooms, the intake structure, the east engineered safeguards (ESG) room (the west ESG room was inaccessible due to radiological concerns), Battery Rooms A and B, charging pump room, engineered safeguards panel room, component cooling pump room, the north and south electrical penetration rooms, compactor area-track alley, spent fuel pool area, electric equipment room and yard area. As a result, it was determined that these areas were being satisfactorily maintained. However, while touring the yard area, it was noted by the inspector that improved maintenance of the general area within the flammable hydrogen storage area was needed. This issue was considered to be of minor safety significance and prompt licensee action was initiated at the time of the inspection.

#### 4. Fire Protection System Surveillance Test Program

The inspector reviewed, in part, the licensee's fire protection system surveillance test program as required by Technical Specifications (TS). This review consisted of an examination of completed surveillance packages, a selected sampling of specific surveillance test areas and discussions with licensee staff. No witnessing of surveillance tests occurred since the licensee indicated that none were scheduled during the inspection period. The inspector's review included the following:

##### a. Fire Sprinkler Systems

The most recent 18 month surveillance check of the fire sprinkler system to determine that each sprinkler head spray pattern was not obstructed was conducted by review of the system functional test results and by visual observation during plant tours. The inspector was provided the completed surveillance test package dated May 1, 1988, documenting that this functional test was performed satisfactorily as required to meet TS Surveillance Requirement 4.17.3.1.

Step 5.1 of the applicable TS surveillance procedure (No. RO-51) specifies that a check be performed to ensure that a sprinkler head spray pattern has not been obstructed since the last surveillance due to a modification. However, since certain plant areas such as the cable spreading room ceiling area are congested by ventilation ductwork, layered cable trays, and other miscellaneous equipment, it was not readily apparent that an auxiliary operator (AO) performing this procedure on a frequency of once every 18 months could determine whether a modification had occurred since the last surveillance. An alternative would involve having the modification change process ensure, following the completion of the modification work, that the sprinkler head spray patterns have not been obstructed. This is considered an open item (255/89014-01(DRS)) pending licensee review to ensure that the task required of the AO during the surveillance procedure is achievable.

Due to the congestion of cable trays, ventilation ductwork, and other miscellaneous equipment near the ceiling level of the cable spreading room, the inspector questioned whether a review had been performed since the original safety evaluation (SE) was issued on September 1, 1978, to determine the potential for sprinkler head spray pattern obstructions in accordance with the applicable fire code. The NRC issued this fire protection SE based on a review of licensee submitted information. According to the Property Fire Protection Supervisor, an analysis had been performed since 1978 but was not available during the inspection. On June 2, 1989, the licensee provided the inspector with an analysis to support exceptions to the National Fire Protection Association (NFPA) code criteria. However, the stated NFPA exceptions to the "Standard for Installation of Sprinkler Systems" did not specifically address sprinkler head spray pattern obstructions. Consequently, following review of the licensee submitted information, the inspector suggested that the licensee perform an evaluation to determine the adequacy of the sprinkler head locations in the present cable spreading room configuration. This is considered an open item (255/89014-02(DRS)).

The inspector also noted that sprinkler systems for Charging Pump Rooms 104, 104A, and 104B, Switchgear Room 1-C, and the north cable penetration room have been added since the original fire protection review but were not listed in TSs. However, the licensee provided plant Standing Order No. 54, dated April 20, 1989, that specified these locations as supplementary TS areas which were to be regarded in the same manner as those in approved TSs. According to the licensee's staff, plans have been initiated to transfer specific fire protection sections into the FSAR by July 31, 1989. Therefore, since the above sprinkler systems are receiving the same level of surveillance and review as are TS designated area sprinkler systems, and since each of these rooms will be incorporated into the FSAR administrative procedure, no further action by the licensee was deemed necessary.

b. Fire Suppression Water System Valve Alignment

The most recent monthly surveillance check of the fire suppression water system to determine that each valve was in its correct position was performed by review of the system functional test results and by visual observations during plant tours. The inspector was given the completed surveillance test procedure (No. MO-26) which had been completed on April 19, 1989, and P&ID Drawing No. M-216, Revision 4, dated August 5, 1987. During a plant tour on May 17, 1989, the inspector, accompanied by licensee personnel, selectively sampled both inside and outside fire water valves and determined that, with the exception of one valve, each of these valves was properly positioned. One post indicator valve (No. MV-FP-178) was found in a partially closed position. This valve isolates the underground fire main to the Service Building and Project Management Building areas. According to the licensee, neither of these buildings have any vital equipment located in them. Therefore, no violation of NRC requirements had occurred. However, licensee attention to this matter was promptly initiated prior to the inspector's departure from the site.

Also, to demonstrate that the fire water and auxiliary feedwater (AFW) system crosstie valves were being maintained, the licensee provided the inspector with the completed surveillance test package (No. QO-21) which was completed on March 9, 1989. No discrepancies were noted during this review. During a plant tour, the inspector also verified that the crosstie valve was in the proper position.

c. Fire Hose Station

The most recent monthly surveillance check of the fire hose stations to assure that this fire equipment is available and ready for use was performed by review of the test results and by visual observations during plant tours. The inspector was given the completed surveillance test procedure (No. MO-26) which was completed on April 19, 1989. During plant tours on May 16 and 17, 1989, the inspector, accompanied by licensee personnel, selectively sampled vital area hose stations and determined each of these stations to be in satisfactory condition.

d. Fire Detection System

The most recent semi-annual functional test of the fire detection system outside containment was provided for inspector review. The completed surveillance test package, No. SI-7, Revision 7, dated June 8, 1987, was completed on April 26, 1989. The package indicated that this functional test was performed satisfactorily in accordance with TS 4.17.1.2.

5. Verification of Fire Protection Features for Specific Plant Areas

The inspector selectively examined fire protection modifications described in the NRC's Fire Protection Safety Evaluation (SE) of the Palisades facility dated September 1, 1978, to determine whether the licensee was maintaining the required fire protection features. During plant tours conducted on May 16-18, 1989, the inspector observed the status of fire protection features in the following areas:

a. Control Room

The control room contains safety-related control cabinets and consoles including all the systems required for normal plant shutdown.

The inspector confirmed that ionization type smoke detectors were installed in the control room walk-in cabinets located within the primary control panel. The inspector also confirmed that a three-hour fire door was installed in the stairwell opening between the control room and Switchgear Room 1-D.

b. Cable Spreading Room

This area contains 480 V transformers, switchgear, cables for power, instrumentation and control for vital and non-vital systems, and other equipment related to safety-related AC and DC power supplies.

The inspector confirmed that ionization type smoke detectors were installed in the cable spreading room. Also, as required, it was confirmed that a ladder dedicated for manual firefighting capability was positioned in this room. Additional comments regarding fire protection features located in the cable spreading room are discussed in Paragraph 4 of the report.

c. Switchgear Rooms

There are two redundant 2.4 kV switchgear rooms (1C and 1D). Each room contains the switchgear for one of the redundant divisions of safe shutdown equipment and its associated cables. A tunnel which contains cabling of one safety division leads from Switchgear Room 1-D to the associated penetration area.

The inspector confirmed that the following fire protection features were installed in Switchgear Rooms 1-C and 1-D: (1) ionization type smoke detectors; (2) sprinkler system in each room; (3) a fire rated door between the penetration opening separating Switchgear Room 1-D and the cable spreading room; and (4) sealed wall cable penetrations.

However, in the cableway tunnel that leads from Switchgear Room 1-D to the north penetration room, no detector is installed in the south end of the cableway tunnel where changes in the ceiling height occur. No analysis was available for review during the inspection which addressed the acceptability of this design. On June 2, 1989, the licensee provided the inspector with an analysis to support exceptions to the NFPA code criteria. In accordance with Generic Letter 86-10, dated April 24, 1986, the licensee had conducted an evaluation encompassing the location and spacing of the installed fire detection system. However, the inspector requested the licensee to provide the detailed information which was used to support the licensee's conclusion that the fire detection system meets the full intent of NFPA 72E for this area. This is considered an open item (255/89014-03(DRS)) pending receipt and review of this information.

An additional concern was raised by the inspector regarding the potential for water to enter Bus 1C in Switchgear Room 1-C at floor level due to the switchgear being floor mounted, the absence of floor drains, and no special instructions being included in the fire pre-plans or elsewhere.

On June 2, 1989, the licensee provided the inspector with both a specific analysis to support no floor drains or the need for curbing in Switchgear Room 1-C and general analyses addressing the issue of inadvertent fire suppression system actuation affecting a plant safety system. The specific evaluation postulates a total loss of all equipment in the room and still having the ability to safely shutdown through the use of the alternate shutdown procedures. During the telecon exit of June 9, 1989, the inspector indicated that further consideration by the licensee was prudent to limit the extent of postulated water damage so as to avert the loss of any vital equipment.

d. Diesel Generator Rooms

The diesel generators are each housed in separate rooms, separated from each other by 3-hour fire-rated walls. The safety-related equipment in each room is the diesel generator and electrical equipment associated with the same division of safety equipment as the generator.

The inspector confirmed that the doors between the diesel generator rooms and the vestibule are fire-rated three hour doors. It was also verified that a curb was installed at each of these doors to prevent oil from seeping under the door.

e. Intake Structure

Safety-related equipment in this area includes three service water pumps. Also in this area are the three fire pumps, two diesel driven and one electric motor driven, and the diesel fuel oil transfer pumps.

The inspector confirmed that, as required, the fire pump diesel fuel oil day tanks have been relocated to another enclosed room with a diked enclosure.

f. Battery Rooms

The two redundant safety-related batteries are each housed in individual enclosures.

The inspector confirmed that each battery room has an installed ionization type smoke detector.

g. Charging Pump Room

The charging pump room contains the three charging pumps. The adjacent hallway contains power and control cabling for the charging pumps, and cabling for the engineered safeguards panel.

The inspector confirmed that the charging pump room has installed ionization type smoke detectors. Also, a curb has been provided between pump A and the other pumps to prevent the spread of an oil fire.

h. Safeguards Area

This area has two fire zones, each of which contains the containment spray, low pressure safety injection, and high pressure safety injection pumps of each division.

The inspector confirmed that ionization type smoke detectors have been installed in the east safeguards area. The west safeguards area was not inspected due to radiological concerns.

i. Component Cooling Pump Area

Safety-related equipment in this area includes the three component cooling pumps and heat exchangers.

The inspector confirmed that ionization type smoke detectors have been installed on the 590' elevation of this area where the three component cooling pumps and heat exchangers are located.

j. Refueling and Spent Fuel Pool Area

Safety-related equipment in this area include the new and spent fuel pools, fuel storage racks, and fuel handling equipment.

The inspector confirmed that smoke detectors have been installed in this location over the tool crib area. However, the inspector questioned the ability of these detectors to sense a fire initiated due to ordinary combustible fire hazards. The bases for the inspector's concern were the spatial separation between the sensing device and the fire hazard and the potential for stratification of the products of combustion. On June 2, 1989, the licensee provided the inspector with additional information. One section of this information included an analysis to support exceptions to the NFPA code criteria. In accordance with Generic Letter 86-10, dated April 24, 1986, the licensee had conducted an evaluation encompassing the location and spacing of the installed fire detection system. However, the inspector requested the licensee to provide the detailed information which was used to support the licensee's conclusion that the fire detection system meets the full intent of NFPA 72E for this area. This is considered another example of open item (255/89014-03(DRS)) pending receipt and review of this information.

k. Cable and Penetration Rooms

There are two cable penetration areas into containment totally separated from each other by distance and a number of fire barriers. Each area contains cables for safety-related equipment redundant to the other area.

The inspector confirmed that smoke detectors and sprinkler systems have been installed in the north and south penetration areas.

6. Information Notices

The inspector examined the licensee's responses to the following Information Notices (IENs): (1) IEN No. 85-84, "Systems Interaction Event Resulting In Reactor System Safety Relief Valve Opening Following a Fire Protection Deluge System Malfunction," response dated January 6, 1986; (2) IEN No. 87-14, "Actuation Of Fire Suppression Causing Inoperability Of Safety-Related Ventilation Equipment," response dated May 29, 1987; (3) IEN No. 88-04, "Inadequate Qualification and Documentation Of Fire Barrier Penetration Seals," response dated April 20,



1988; (4) IEN No. 88-56, "Silicone Foam Penetration Seals," response extension requested October 25, 1988; and (5) IEN No. 88-64, "Reporting Fires In Nuclear Process Systems At Nuclear Power Plants," response dated October 26, 1988.

A review of the first IEN found the response to be acceptable. However, the second IEN response, although related in part to the first IEN, did not address the broader generic problem involving operator errors and single and common-cause failures that initiate fire suppression systems and cause the inoperability of safety-related systems. An unsealed penetration opening into electrical equipment in an area protected by a fire suppression system could be of concern if water ingress could potentially affect equipment operability. During the course of an inspector walkdown of plant safety related areas on May 17, 1989, the inspector, accompanied by licensee personnel, observed an unsealed opening in the top of a cable entry point in the Bus 1C cabinet above breaker 152-108 (Switchyard Auxiliary Power). According to Paragraphs D.3, E.3, and F.5 of the Fire Hazards Analysis, dated March 31, 1977, all switchgear top cable penetrations are sealed with flammastic to prevent water ingress from the room fire suppression system. Therefore, this is considered a deviation (255/89014-04(DRS)) from an NRC commitment as described in the Notice of Deviation. On June 2, 1989, the licensee provided the inspector with nuclear work order request No. 141334 which initiated work to seal the top of Bus 1C to remove the potential for water ingress. Based on the unsealed opening being found in the top of Bus 1C, further review by the licensee of other equipment that may be exposed to the inadvertent spraying of the internal components with water that could result in an equipment operability problem appeared appropriate (reference e.g. IEN's 83-41, 87-14 and 88-60). The third and fourth IENs are related to penetration fire seals. The licensee's technical review of each was still ongoing. This area will need to be reviewed further during a future inspection. The last IEN review found the licensee evaluation to be consistent and meeting NRC guidelines.

#### 7. Plant Modifications

The inspector reviewed Administrative Procedure No. 9.03 entitled, "Facility Change-Minor," Revision 6, dated November 1988. Section 8, "Fire Protection Requirements" of Attachment 4 of the design input checklist, lists intended applicable design criteria for various design disciplines. This document specifically references thirteen of the sections of 10 CFR Part 50, Appendix R, Section III. Nine of these sections do not specifically apply to the Palisades site and other criteria which does apply was not listed. Based on the errors/omissions identified in this procedure, the inspector questioned the adequacy of the licensee's design review which verified that the appropriate regulatory requirements and licensee commitments were incorporated in the licensee's modification design reviews. This is considered an unresolved item (255/89014-05(DRS)).

8. Quality Assurance

The inspector requested the licensee to provide the last audits performed to satisfy TS Sections 6.5.2.8.g, h, and i. The licensee provided Audit Report No. QT-86-21, dated October 8, 1986; No. QT-87-21, dated September 29, 1987; and No. QT-88-22, dated October 14, 1988. A review, in part, of each audit report indicated that the licensee performed the scheduled audits as required and verified a selected sample of fire protection program aspects of the in-place program. The inspector concluded that the licensee was satisfying the fire protection TS requirements.

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 4 and 5.

10. Unresolved Item

An unresolved item is a matter about which more information is required to ascertain whether it is an acceptable item, a deviation, or a violation. An unresolved item disclosed during the inspection is discussed in Paragraph 7.

11. Deviations

A licensee's failure to satisfy a written commitment or to conform to the provisions of applicable codes, standards, guides, or accepted industry practices when the commitment, code, standard, guide, or practice involved has not been made a legally binding requirement by the Commission, but is expected to be implemented. A deviation from a written licensee commitment is discussed in Paragraph 6.

12. Exit Interview

The inspector held a telecon exit interview with licensee representative (denoted in Paragraph 1) at the conclusion of the inspection on June 9, 1989, and summarized the scope and findings of the inspection. The inspector also discussed the likely informational content of the inspection report with regard to documents reviewed by the inspector during the inspection. The licensee did not identify any of the documents as proprietary. On June 13, 1989, licensee technical representatives contacted the inspector to provide additional technical details for issues that remained open at the time of the June 9, 1989 exit interview. The inspector acknowledged the licensee's planned resolution of these issues and requested the licensee to document the evaluation criteria and results.