

August 31, 1993

Mr. Gerald B. Slade
Plant General Manager
Palisades Plant
Consumers Power Company
27780 Blue Star Memorial Highway
Covert, Michigan 49043

Dear Mr. Slade:

SUBJECT: PALISADES PLANT - AMENDMENT NO. 157 TO FACILITY OPERATING LICENSE
NO. DPR-20 (TAC NO. M86245)

The Commission has issued the enclosed Amendment No. 157 to Facility Operating License No. DPR-20 for the Palisades Plant. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated March 29, 1993, and supplemented April 29, 1993.

The amendment changes the surveillance interval in Table 4.2.2, Item 2, "Partial Movement of All Control Rods (Minimum of 6 In)" from once "Every Two Weeks" to once "Every 92 Days." The amendment also deletes the footnote to Table 4.2.2, which provides for reduced testing of CRD-20 and CRD-31 during the remainder of Cycle 10 and corrects the FSAR references in that table to reflect the arrangement of the Palisades Updated FSAR.

A copy of our Safety Evaluation is also enclosed. The notice of issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY

Anthony H. Hsia, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 157 DPR-20
- 2. Safety Evaluation

cc w/enclosures:
See next page

OFFICE	LA:PD31	PM:PD31	OGC	(A)D:PD31	SRXB
NAME	CJamerson	AHsia	M. Wang	WDean	RJones
DATE	6/19/93	6/17/93	8/17/93	8/31/93	8/15/93

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DFOI

Mr. Gerald B. Slade
Consumers Power Company

Palisades Plant

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CONSUMERS POWER COMPANY

DOCKET NO. 50-255

PALISADES PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 157
License No. DPR-20

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Consumers Power Company (the licensee) dated March 29, 1993, and supplemented April 29, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public; and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to the license amendment and Paragraph 2.C.(2) of Facility Operating License No. DPR-20 is hereby amended to read as follows:

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Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 157 , and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



William M. Dean, Acting Director
Project Directorate III-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 31, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 157

FACILITY OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Revise Appendix A Technical Specifications by removing the page identified below and inserting the attached page. The revised page is identified by amendment number and contains vertical lines indicating the areas of change.

REMOVE

4-15

INSERT

4-15

Table 4.2.2

Minimum Frequencies for Equipment Tests

	<u>Test</u>	<u>Frequency</u>	<u>FSAR Section Reference</u>	
1.	Control Rods	Drop Times of All Full-Length Rods	Each Refueling Shutdown	7.6.1.3
2.	Control Rods	Partial Movement of All Rods (Minimum of 6 In)	Every 92 Days	7.6.1.3
3.	Pressurizer Safety Valves	Set Point	One Each Refueling Shutdown	4.3.7
4.	Main Steam Safety Valves	Set Point	Five Each Refueling Shutdown	4.3.4
5.	Refueling System Interlocks	Functioning	Prior to Refueling Operations	9.11.4
6.	Service Water System Valve Actuation (SIS-CHP)	Functioning	Each Refueling Operation	9.1.2
7.	Primary System Leakage	Evaluate	Daily	4.7.1
8.	Diesel Fuel Supply	Fuel Inventory	Daily	8.4.1



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 157 TO FACILITY OPERATING LICENSE NO. DPR-20

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

By letter dated March 29, 1993, the Consumers Power Company (the licensee) requested an amendment to the Technical Specifications (TS) appended to Facility Operating License No. DPR-20 for the Palisades Plant. The proposed amendment would change the surveillance interval for Table 4.2.2, Item 2, "Partial Movement of All Rods (Minimum of 6 In)" from once "Every Two Weeks" to once "Every 92 Days." It would also delete the footnote to Table 4.2.2, which provides for reduced testing of CRD-20 and CRD-31 during the remainder of Cycle 10. Finally, it would correct the FSAR references in that table to reflect the arrangement of the Palisades Updated FSAR. The licensee submitted additional information to supplement the application by a letter dated April 29, 1993. This letter provided clarifying information and did not change the initial proposed no significant hazards consideration.

2.0 EVALUATION

The Palisades Control Rod Drive Mechanism (CRDM) is of the Rack and Pinion type. These CRDMs have a drive package containing a drive motor, position indication equipment, and a releasing clutch, which is outside the Primary Coolant System (PCS) boundary; and a drive shaft, right angle gear set, pinion gear, and rack, within the PCS boundary. The drive package is connected to the drive shaft through a mechanical seal, which forms the PCS pressure boundary.

The CRDM drive motor is connected to the drive shaft through a reduction gear. A spring engaged, electrically released brake, is provided to prevent the control rod from drifting when the motor is not energized. The motor is a fractional horsepower, single phase, two speed motor, though only a single speed (46 inches per minute) is connected. The DC brake is energized through separate contacts on the motor contactor.

When the CRDMs are driven outward, the motor and brake are energized, and the motor drives through the gearbox, turning the clutch upper half. If the clutch is energized (engaged) the clutch lower half is also turned. A cam and roller assembly, concentrically located within the electric clutch, transmits torque in only one direction, and allows the motor to drive the rod inward even when the electric clutch is disengaged.

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The lower half of the clutch is connected to the vertical drive shaft, which turns the horizontal pinion gear through a right angle bevel gear set. The pinion gear drives the rack up and down. The rack assembly is connected to the control rod.

The CRDM rack is guided by a support tube. The rack has a larger diameter section, called a buffer piston, at its upper end. The guide tube has a restricted diameter toward its lower end. In this restricted diameter region there is a close fit between the buffer piston and the guide tube. When the buffer piston enters this restricted diameter region, water trapped below it acts as a brake to slow the fall of the rod.

Just below the lower clutch jaw, a small gear set drives the primary position indication shaft. The primary position indication provides a digital rod position readout by use of a synchro transmitter, and six cam operated limit switches which are used for motor control and position indication lights. A secondary position indication system, using magnetic reed switches, is actuated by a magnet located in the connector nut at the top of the rack assembly.

When a reactor trip signal interrupts power to the CRDM clutch, the clutch jaws spring apart, and the control rod falls by gravity into the core. With the clutch disengaged, the CRDM parts below the clutch rotate separately from the gear motor and brake above the clutch. All CRDM parts below the clutch (lower clutch shaft, primary position shaft, mechanical seal, drive shaft, bevel gears, pinion gear, magnet for secondary position indication, and rack) move whenever the rod moves.

The two safety functions of the CRDM are:

First, a reactor trip signal de-energizes the clutch and allows the control rod to drop by gravity into the core; this is the only CRDM safety function assumed in the analyses.

Second, when a reactor trip signal is generated, a "rod rundown" signal energizes all full length CRDM motors to drive their rods in case they could not fall freely into the core. The rod rundown signal is terminated when that rod nears full insertion. The clutch is designed to allow the motor to apply a torque to the drive shaft, in the "IN" direction, even when the clutch is released. Functioning of the rod rundown feature is not assumed in the analyses.

Operating history has shown a trend that exercising a CRDM, as required by TS Table 4.2.2, Item 2, often causes seal leakage to increase. Leaking seals can result in shortened seal life and increased CRDM seal leak rate, which can lead to forced shutdown due to excessive PCS leakage. Due to this increase in leakage, a previous amendment (Amendment No. 155), dated January 29, 1993, has changed the surveillance interval in Table 4.2.2, Item 2, for testing two

CRDMs, CRD-20 and CRD-31, from once "Every Two Weeks" to once in March 1993, until the end of Cycle 10. The proposed amendment changes the frequency for all control rod exercising in Table 4.2.2, Item 2, from the current frequency of once "Every Two Weeks" to once "Every 92 Days."

The licensee has provided an analysis to demonstrate that CRDM exercising is not sufficient to ensure mechanical freedom over the full insertion distance. The analysis also demonstrates that the rod exercising test has never detected any of the occurrences where mechanical binding of mechanical components has prevented or excessively slowed full control rod insertion.

In operating experience with CRDMs, there have been 12 reported instances involving a total of 29 control rods which could not be fully inserted by gravity within the required time. Of these 12, 10 were discovered during startup testing and 2 on reactor trips. In neither case was the problem detectable by rod exercising since the rods did not stick fully out of the core.

CRDM seal faces are finely lapped, are constantly pressed together, are without relative motion (except when the rod is moved), and are in a warm acidic environment. Such conditions make them most susceptible to bonding. However, operating experience suggests that seal face bonding does not occur. This is supported by the following experiences:

- 1) The part length rods are fully withdrawn prior to reactor startup, are not exercised, and typically remain motionless throughout the operating cycle. These rods have shown no sign of seal face bonding either during operation or during disassembly for maintenance.
- 2) On several occasions, the plant has operated for extended periods with one full length rod declared inoperable due to drive package or seal problems. Inoperable rods are typically not exercised. No rod has failed to trip or shown other signs of seal bonding.
- 3) Disassembled CRDM seals typically show bright polished contact surfaces except in those areas eroded by continued severe leakage. There have been no signs of bonded or sticky seal faces due to corrosion or material migration.

Without a change to the TS, biweekly testing of the CRDMs must continue. Experience has shown that this biweekly testing of the CRDMs has resulted in accelerated seal degradation. The wear of the CRDM seals, magnetic brakes and other related mechanisms has led to plant shutdowns and cooldowns in order to perform repairs. These cooldowns lead to unfavorable plant transients and additional wear on plant equipment. The required maintenance also increases radiation exposure. With reduced surveillance testing, the expected rate of seal degradation, and its consequences, will be reduced.

The NRC staff has reviewed the licensee's analysis and concluded that the proposed change is acceptable. The proposed longer testing period will reduce personnel radiation exposure and the wear of the CRDM seals, magnetic breakers, and other selected mechanisms without diminishing the capability of detecting mechanical binding of the CRDM. The granting of this amendment is consistent with both NUREG-1366 (item 4.2.1), and NUREG-1432, Standard Technical Specifications - Combustion Engineering Plants (SR 3.1.5.5), which suggest a quarterly and 92-day interval for CRDM exercising, respectively.

Based on the above, the staff has determined that this amendment should be granted.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Michigan State Official was notified of the proposed issuance of the amendment. The Michigan State Official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (58 FR 28054). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Mohammed A. Shuaibi

Date: August 31, 1993

DATED: August 31, 1993

AMENDMENT NO. 157 TO FACILITY OPERATING LICENSE NO. DPR-20-PALISADES

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