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

CONSUMERS POWER COMPANY

DOCKET NO. 50-255

PALISADES PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 147
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 September 2, 1988, 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 hereby amended to read as follows:

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Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 147 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



fm L. B. Marsh, 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: June 22, 1992

ATTACHMENT TO LICENSE AMENDMENT NO.147

FACILITY OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the amendment number and contain marginal lines indicating the area of change.

REMOVE

3-77
3-81a
3-82
4-11b

INSERT

3-77
3-81a
3-82
4-11b

3.17 INSTRUMENTATION AND CONTROL SYSTEMS (Contd)

If the bypass is not effected, the out-of-service channel (Power Removed) assumes a tripped condition (except high rate-of-change power, variable high power and high pressurizer pressure),⁽¹⁾ which results in a one-out-of-three channel logic. If, in the 2 of 4 logic system of either the reactor protective system or the engineered safeguards system, one channel is bypassed and a second channel manually placed in a tripped condition, the resulting logic is 1 of 2. At rated power, the minimum operable variable high power level channels is 3 in order to provide adequate flux tilt detection. If only 2 channels are operable, the reactor power level is reduced to 70% rated power which protects the reactor from possibly exceeding design peaking factors due to undetected flux tilts.

The engineered safeguards system provides a 2 out of 4 logic on the signal used to actuate the equipment connected to each of the 2 emergency diesel generator units.

Two source-range channels are available any time reactivity changes are deliberately being introduced into the reactor and the neutron power is not visible on the wide-range nuclear instrumentation or above 10⁻⁴% of rated power. This ensures that redundant source-range instrumentation is available to operators to monitor effects of reactivity changes when neutron power levels are only visible on the source-range channels. In the event only one source-range channel is available and the neutron power level is sufficiently high that it is being monitored by both channels of wide-range instrumentation, a startup can be performed in accordance with footnote (d) of Table 3.17.4.

The Recirculation Actuation System (RAS) initiates on a 1 out of 2 taken twice logic scheme. Any one channel declared inoperable shall be placed in a bypass condition to ensure protection from an inadvertent RAS actuation. Since the bypassing of a channel introduces the possibility for a failure to receive an automatic RAS actuation signal, the time period in the bypassed condition is limited.

The Zero Power Mode Bypass can be used to bypass the low flow, steam generator low pressure, and TM/LP trips⁽²⁾ for all four Reactor Protective system channels to perform control rod testing or to perform low power physics testing below normal operating temperatures. The requirement to maintain cold shutdown boron concentration when in the bypass condition provides additional assurance that an accidental criticality will not occur. To allow low power physics testing at reduced temperature and pressure, the requirement for cold shutdown boron concentration is not required and the allowed power is increased to 10⁻⁴%.

Sixteen (four per core quadrant) environmentally qualified core exit thermocouples (cable and connectors) with readout from 0 to 2300°F are provided for monitoring the potential approach to inadequate core cooling. The core exit thermocouples are an integral part of the incore detector assembly and are located at the top of each incore assembly to measure primary coolant core outlet temperatures.

References

- (1) Updated FSAR, Section 7.2.7.
- (2) Updated FSAR, Section 7.2.5.2

Table 3.17.4 (Cont'd)

No	Functional Unit	Minimum Operable Channels	Minimum Degree of Redundancy	Permissible Bypass Conditions
8.	Pressurizer Wide Range Water Level Indication	2 ^(m, n, o)	None	Not required in Cold or Refueling Shutdown
9.	Pressurizer Code Safety Relief Valves Position Indication (Acoustic Monitor or Temperature Indication)	1 per Valve	None	Not Required below 325°F
10.	Power Operated Relief Valves (Acoustic Monitor or Temperature Indication)	1 per Valve	None	Not required when PORV isolation valve is closed and its indication system is operable
11.	PORV Isolation Valves Position Indication	1 per Valve	None	Not required when reactor is depressurized and vented through a vent ≥ 1.3 sq.in.
12.	Subcooling Margin Monitor	1	None	Not required below 325°F
13.	Auxiliary Feed Flow Rate Indication	1 per flow ^(h) Control Valve	None	Not required below 325°F
14.	Auxiliary Feedwater Actuation System Sensor Channels	2 per steam generator ^(e)	1	Not required below 325°F
15.	Auxiliary Feedwater Actuation System Actuation Channels	2 ^(f)	1	Not required below 325°F
16.	Excore Detector Deviation Alarms	1 ^(g)	None	Not Required Below 25% of Rated Power
17.	Axial Shape Index Alarm	2 ⁽ⁱ⁾	1	Not Required Below 25% of Rated Power
18.	Reactor Vessel Water Level	2 ^(j,k,l,m)	None	Not Required Below 325°F
19.	Core Exit Thermocouples	4/core Quadrant ^(p, q, r)	None	Not required below 300°F

3-81a

Amendment No. 67, 68, 96, 113, 118, 129, 147,

Table 3.17.4 (Cont'd)

3. Restore the system to OPERABLE status at the next scheduled refueling.
- (m) The provisions of Specification 3.0.4 are not applicable.
 - (n) With one OPERABLE Pressurizer Wide Range Water Level Channel in lieu of the requirement of 3.17.2, restore the inoperable channel to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.
 - (o) With no OPERABLE Pressurizer Wide Range Water Level Channels in lieu of the requirements of 3.17.2, either restore at least one of the inoperable channels to OPERABLE status within 48 hours, or be in at least HOT SHUTDOWN within the next 12 hours.
 - (p) The environmentally qualified core exit thermocouples are used in determining the minimum channels operable requirement.
 - (q) With only three OPERABLE Core Exit Thermocouples per core quadrant, in lieu of the requirement of 3.17.2, either restore the inoperable channel to OPERABLE status within 7 days if repairs are feasible without shutting down or prepare and submit a Special Report to the Commission within 30 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.
 - (r) With the number of OPERABLE Core Exit Thermocouples less than three per core quadrant, in lieu of the requirements of 3.17.2, either restore three core exit thermocouples per core quadrant to OPERABLE status within 48 hours, or be in HOT SHUTDOWN or below within the next 12 hours and the reactor shall be placed in a condition where the affected equipment is not required, within 48 hours.
- 3.18 (Deleted)

TABLE 4.1.3

Minimum Frequencies for Checks, Calibrations & Testing of Miscellaneous Instrumentation and Controls (Contd)

<u>Channel Description</u>	<u>Surveillance Function</u>	<u>Frequency</u>	<u>Surveillance Method</u>
21 Core Exit Thermocouples ⁽⁶⁾	a. Check b. Calibrate	M (6)	a. Comparison of Channels b. Known voltage substituted for thermocouple

(6) Only applicable to the environmentally qualified core exit thermocouples. These thermocouples will be calibrated on a refueling cycle frequency.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. DPR-20

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

By letter dated September 2, 1988, Consumers Power Company (the licensee) requested amendment to the Technical Specifications (TS) appended to Facility Operating License No. DPR-20 for the Palisades Plant. The proposed amendment would revise the Technical Specifications to incorporate operability and surveillance requirements for core exit thermocouples (CETs).

Palisades original core exit thermocouple (CET) TS change was submitted on November 21, 1985. The licensee superseded this submittal by letter dated November 25, 1987, revising the CET calibration frequency from once per 18 months (as proposed), to once per refueling cycle. This proposed change required two CETs per core quadrant to be operable. The guidance TS, provided in Generic Letter (GL) 83-37, requires four operable safety grade CETs per quadrant.

Following NRC questions and comments, Palisades resubmitted their CET TS change on September 2, 1988. After further discussion, additional information was provided by Palisades on March 17, 1992. The proposed change requires four operable CETs per quadrant; however, it allows continued operation with less than the four CETs per quadrant operable.

2.0 EVALUATION

Subcooling margin monitors, core exit thermocouples, and a reactor coolant inventory tracking system comprised "Instrumentation for Detection of Inadequate Core Cooling," Item II.F.2 of NUREG-0737. Generic Letter 83-37 provided guidance in incorporating these system requirements into the TS.

The text of GL 83-37 states "four CETs in each quadrant are required to be operable" and a "minimum of two CETs in each quadrant shall be operable at all times." The sample TS supplied with GL 83-37 provided a shutdown action requirement with less than four CETs operable per core quadrant. With less than four, but greater than two CETs operable in a quadrant, the sample TS allowed seven days to repair prior to initiating a plant shutdown. With less than two CETs operable, 48 hours were allowed to repair.

The licensee has been reluctant to accept the sample TS provided in GL 83-37 for two primary reasons: (1) CPC only upgraded (to safety related) the minimum number of CETs (16; four per core quadrant), and (2) the Palisades Plant does not have TS similar to that provided for in the GL. The Palisades Plant has "custom" TS. These nonstandard TS do not easily facilitate incorporation of the GL 83-37 guidance TS. Their instrumentation TS only maintain a column for "Minimum Operable Channels." The TS Tables do not include a "Required No. of Channels" column, as shown in the GL 83-37 sample TS. However, the operability requirements of the guidance TS can be applied to the Palisades CETs.

The proposed Palisades CET TS application does require four CETs operable per core quadrant, consistent with GL 83-37 guidance. However, the TS change request allows continued plant operation with less than four operable CETs per core quadrant, only entering a "shutdown action statement" should "the number of operable CETs be less than two per core quadrant." Palisades claimed that this request was justified because the NRC staff had approved a similar Technical Specification for the Fort Calhoun Station.

The NRC staff had several discussions with Palisades staff regarding acceptable action statements for CET operability concerns. The Fort Calhoun Station has qualified additional CETs, (above the minimum TS requirement of 16), which provides added assurance of adequate instrumentation to assess the reactor core post-accident. Palisades maintains only the minimum number of safety-grade CETs. The licensee is reluctant to upgrade additional CETs, due to the high cost for a minimal gain in redundant instrumentation (\$50 - 70K per thermocouple).

The NRC staff reviewed the operating history of the Palisades CETs. Palisades has operated three cycles with qualified CETs. Only two CET failures have occurred, one in the first cycle of operation with the new, qualified CETs; and one in the third. Root cause investigation revealed that the first failure was due to a faulty connection, which could have been repaired during operation. The second failure occurred during the last operating cycle, and appears to be a failure of the detector instrument loop, which can only be repaired during a shutdown or refueling outage.

The NRC staff discussed the shortcomings in the licensee's proposed action statements with Palisades plant personnel during a visit to the site on September 27, 1991. The NRC staff showed the licensee that operation with proposed action statement (n), of TS 3.17.4, (September 2, 1988 submittal), would allow plant operation with only two thermocouples operable, even if the control room indications for these two thermocouples were powered from the same source. In the event of a loss of this single power supply, all control room indication for the CETs in that quadrant would be lost. The NRC staff considers this potential condition unacceptable.

As a result of this discussion, the licensee proposed to change the wording of action statements (n) and (o), as submitted by letter dated September 2, 1988, to require entry into a "shutdown Action Statement" with less than three CETs

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The proposed Palisades CET TS application does require four CETs operable per core quadrant, consistent with GL 83-37 guidance. However, the TS change request allows continued plant operation with less than four operable CETs per core quadrant, only entering a "shutdown action statement" should "the number of operable CETs be less than two per core quadrant." Palisades claimed that this request was justified because the NRC staff had approved a similar Technical Specification for the Fort Calhoun Station.

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The NRC staff reviewed the operating history of the Palisades CETs. Palisades has operated three cycles with qualified CETs. Only two CET failures have occurred, one in the first cycle of operation with the new, qualified CETs; and one in the third. Root cause investigation revealed that the first failure was due to a faulty connection, which could have been repaired during operation. The second failure occurred during the last operating cycle, and appears to be a failure of the detector instrument loop, which can only be repaired during a shutdown or refueling outage.

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As a result of this discussion, the licensee proposed to change the wording of action statements (n) and (o), as submitted by letter dated September 2, 1988, to require entry into a "shutdown Action Statement" with less than three CETs

OPERABLE (vice two, as stated in the original proposed wording). Action statement (m), emphasizes that the environmentally qualified core exit thermocouples are to be used in determining the minimum channels operable requirement. This statement is acceptable as is. The revised action statements, which have been re-lettered to accommodate current TS format, are as follows:

- (p) The environmentally qualified core exit thermocouples are used in determining the minimum channels operable requirement.
- (q) With only three OPERABLE Core Exit Thermocouples per core quadrant, in lieu of the requirement of 3.17.2, either restore the inoperable channel to OPERABLE status within 7 days if repairs are feasible without shutting down or prepare and submit a Special Report to the Commission within 30 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.
- (r) With the number of OPERABLE Core Exit Thermocouples less than three per core quadrant, in lieu of the requirements of 3.17.2, either restore three core exit thermocouples per core quadrant to OPERABLE status within 48 hours, or be in HOT SHUTDOWN or below within the next 12 hours and the reactor shall be placed in a condition where the affected equipment is not required, within 48 hours.

The NRC staff considers the above revised Action Statements acceptable. The Action Statements ensure that the NRC is aware of problems with CET operability, and require plant shutdown should the licensee be unable to restore a minimum three CETs per core quadrant to operable status. As a result of a phone conversation with the licensee on June 18, 1992, and letter from the licensee dated June 22, 1992, further clarifying restrictions were added to footnote (r) stating that, if three core exit thermocouples per core quadrant cannot be restored to OPERABLE status within 48 hours, the reactor is to be in HOT SHUTDOWN or below within the next 12 hours and be placed in a condition where the affected equipment is not required (i.e., below 300°F), within 48 hours. Additionally, this revised Action Statement ensures that loss of one power supply for CET indication will not result in any core quadrant with no qualified CETs operable.

Proposed footnote (l), exempting the provisions of Specification 3.0.4 should one CET be inoperable, is not necessary. Specification 3.0.4 was changed by Amendment 130, dated March 23, 1990 (subsequent to the CET license amendment application dated September 2, 1988). Amendment No. 130 allows plant start-up when Action requirements would allow continued operation of the facility for an unlimited period of time.

Discussion with the licensee has also resulted in an additional, minor modification to the TS wording as submitted by letter dated September 2, 1988. The permissible bypass condition for the CETs had been requested to state "Not

required below 325°F." This temperature limit was based on the plant condition when not on shutdown cooling. The licensee has recently changed the requirement for entry to shutdown cooling to be 300°F, vice 325°F (license amendment request dated September 16, 1991). Per additional information provided March 17, 1992, the licensee now requests that the permissible CET bypass condition state "Not required below 300°F." This basis is consistent with that required by GL 83-37 and is considered acceptable by the NRC staff.

The proposed addition of CETs to Table 4.1.3 is also considered acceptable. Footnote (6) is only applicable to the environmentally qualified CETs, which will be calibrated on a refueling cycle frequency instead of 18 months as stated in the Standard TS provided in GL 83-37. The NRC staff considers the refueling cycle frequency acceptable because a radiation dose of about 800 millirem would result from performing the calibration separately.

Also, the addition of a new paragraph to TS 3.17 Basis, and the revision to the listed references, are considered acceptable as they properly reflect the addition of CET operability requirements to TS.

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 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 and a change in a surveillance requirement. 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding (54 FR 49128 and 57 FR 20509). Accordingly, this 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 this 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: B. Holian
T. Huang

Date: June 22, 1992