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JUN 6 1980

Docket No. 50-255

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Mr. David P. Hoffman
Nuclear Licensing Administrator
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Dear Mr. Hoffman:

The Commission has issued the enclosed Amendment No. 58 to Provisional Operating License No. DPR-20 for the Palisades Plant. This amendment consists of changes to the Technical Sepcifications in response to your request dated May 14, 1980 and supplemental information submitted by letters dated June 6, 1980.

The amendment modifies the total radial peaking factor for Type H fuel during Cycle-4. Specification 3.11(g) has been changed from what you proposed with your agreement.

Copies of our related Safety Evaluation and the Notice of Issuance are also enclosed.

Sincerely,

Original signed by

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:
1. Amendment No. 58 to License No. DPR-20
2. Safety Evaluation
3. Notice

cc w/enclosures:
See next page

F.R. Notice + Amendment only.

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OFFICE	DL: ORB #5	DL: ORB #5	OELD	DL: ORB #5	DL: AD: SA	
SURNAME	HSmith:cc	TWambach	DRMA	DCrutchfield	GLainas	
DATE	6/6/80	6/6/80	6/6/80	6/6/80	6/6/80	

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*W/cy of CPCo incoming dtd. 5/14/80

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

CONSUMERS POWER COMPANY

DOCKET NO. 50-255

PALISADES PLANT

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 58
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 May 14, 1980, 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; and

   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.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 3.B of Provisional Operating License No. DPR-20 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 58, 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: June 6, 1980

ATTACHMENT TO LICENSE AMENDMENT NO. 58

PROVISIONAL OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Revise Appendix A Technical Specifications by removing the following pages and by inserting the enclosed pages. The revised pages contain the captioned amendment number and marginal lines indicating the area of change.

PAGES
3-59
3-66

satisfy the criterion. Appropriate consideration shall be given to the following factors:

(1) A flux peaking augmentation factor of 1.0,

(2) A measurement calculational uncertainty factor of 1.10,

(3) An engineering uncertainty factor (which includes fuel column shortening due to densification and thermal expansion) of 1.03, and

(4) A thermal power measurement uncertainty factor of 1.02.

b. If the quadrant to core average power tilt exceeds 15%, except for physics tests, then:

(1) The linear heat generation rate shall promptly be demonstrated to be less than that specified in Part a, or

(2) Immediate action shall be initiated to reduce reactor power to 75% or less of rated power.

c. If the power in a quadrant exceeds core average by 10% for a period of 24 hours or if the power in a quadrant exceeds core average by 20% at any time, immediate action shall be initiated to reduce reactor power below 50% until the situation is remedied.

d. If the power in a quadrant exceeds the core average by 15% and if the linear heat generation rate cannot be demonstrated promptly to be within limits, then the overpower trip set point shall be reduced to 80% and the thermal margin low-pressure trip set point (P_{Trip}) shall be increased by 400 psi.

e. If the power in a quadrant exceeds core average by 5% for a period of 30 days, immediate action shall be initiated to reduce reactor power to 75% or less of rated power.

f. The part-length control rods will be completely withdrawn from the core (except for rod exercises and physics tests).

g. The calculated value of F_r^A shall be limited to $\leq$ 1.45 (1.0 + 0.5 (1 - P)), the calculated value of F_r^{T*} shall be limited to $\leq$ 1.77 (1.0 + 0.5 (1 - P)), and the calculated value of $F_r^{\Delta H}$ shall be limited to $\leq$ 1.66 (1.0 + 0.5 (1 - P)), where P is the core thermal power in fraction of core rated thermal power (2530 MWt).

(*For the duration of Cycle-4 for H-fuel only, F_r^T for rods adjacent to the wide water gap shall be limited to 1.90 (1.0 + 0.5 (1 - P)).)

Specification (Contd)

a 10-hour period) at least each two hours thereafter or the reactor power level shall be reduced to less than 50% of rated power (65% of rated power if no dropped or misaligned rods are present). If readings indicate a local power level equal to or greater than the alarm set point, the action specified in 3.11.b shall be taken.

g. F_r^A, F_r^T and F_r^H shall be determined whenever the core power distribution is evaluated. If either F_r^A, F_r^T, or F_r^H is found to be in excess of the limit specified in Section 3.10.3(g), within one hour thermal power shall be reduced to less than:

(1) $\left(1 - \frac{2(F_r^A - 1)}{1.15}\right) \times 2530$ MWt ;

(2) $\left(1 - \frac{2(F_r^T - 1)}{1.77*}\right) \times 2530$ MWt ; or

(3) $\left(1 - \frac{2(F_r^{\Delta H} - 1)}{1.66}\right) \times 2530$ MWt

whichever is lower.

* (for reload for the duration of cycle 4 only)

Basis

A system of 45 in-core flux detector and thermocouple assemblies and a data display, alarm and record functions has been provided. A four level, five level or six level system may be used.(1)(2) The out-of-core nuclear instrumentation calibration includes:

a. Calibration (axial and azimuthal) of the split detectors at initial reactor start-up and during the power escalation program.

b. A comparison check with the in-core instrumentation in the event abnormal readings are observed on the out-of-core detectors during operation.

c. Calibration check during subsequent reactor start-ups.

d. Confirm that readings from the out-of-core split detectors are as expected.

Core power distribution verification includes:

a. Measurement at initial reactor start-up to check that power distribution is consistent with calculations.

b. Subsequent checks during operation to insure that power distribution is consistent with calculations.

c. Indication of power distribution in the event that abnormal situations occur during reactor operation.

If the data logger for the in-core readout is not in operation for more than two hours, power will be reduced to provide margin between the actual peak linear heat generation rates and the limit and the in-core readings will be manually collected at the terminal blocks in the control room utilizing a suitable signal detector. If this is not feasible with the

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 58 TO LICENSE NO. DPR-20

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION AND DISCUSSION

By letter dated May 14, 1980 (Reference 1) Consumer's Power Company (CPCo), (the licensee) requested an amendment to Appendix A of the Provisional Operating License No. DPR-20 for the Palisades Plant. This is the third in a series of related requests, pertaining to the peaking factors of the Cycle-4 H-design loading. CPCo was requested by letter from D. Ziemann (NRC) to D. Bixel dated July 11, 1979 (Reference 2), to submit information which would provide assurance that water hole peaking is appropriately considered in the calculation of flux distributions. CPCo's replies dated September 10, 1979 and February 26, 1980 (letters D. Hoffman CPCo to D. Ziemann NRC, References 3 and 4 respectively) dealt with the calculational procedure used to compute water hole peaking. CPCo by letter dated February 26, 1980 submitted information supporting the addition of the "Total Interior Rod Radial Peaking Factor $F_r^{\Delta H}$". The licensee considered it appropriate to impose a limit on the product of total radial peaking factor times the interior pin local peaking factor to assure that the assumptions in the DNB analysis remain valid in all cases. This proposed addition has been reviewed and accepted by the NRC staff (Reference 5).

The current request (Reference 1) concerns a change of the Palisades Plant Technical Specifications to increase the limit of the Total Radial Peaking Factor F_r^T for Type H fuel assembly rods adjacent to the wide water gap from 1.77 (1.0 + 0.5 (1-P)) to 1.90 (1.0 + 0.5 (1-P)) where P is the core thermal power in fraction of core rated thermal power (2530 Mwt). This increase is only for the Cycle 4 loading and will allow operation at full power for the total fuel cycle, whereas operation under the present Technical Specifications will result in plant operation derated by 12% power for part of this cycle.

2.0 EVALUATION

We reviewed the above submittals by the licensee and required additional information. We held a meeting with the licensee on June 5, 1980 and indicated the additional information needed. The licensee responded with letters dated June 6, 1980 (References 6 and 9). The following sections give a summary of our evaluation.

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2.1 CORE PHYSICS

Reference 6 provided information pertaining to the physics methods used to compute the peaking factors. This analysis included a comparison of computed peaking factors for the Palisades H-design fuel peaking factors with PDQ-4 group and XMC, a Monte Carlo code, and a comparison in a similar geometric arrangement of the XMC code, diffusion method, with experimental gamma scan results. These methods were found applicable and acceptable for this review.

Analysis of the H-design fuel indicates that the maximum allowable heat generation rate limit of 15.28 kW/ft is the same as previously established in the Exxon Nuclear Company E&G designs. Likewise the radial peaking factor of 1.45 remains unchanged. The proposed increase from 1.22 to 1.31 is for the corner wide gap edge rod local peaking factor. Hence, the proposed Technical Specification 3.1.0.3(g) limit for F_r, the total radial peaking factor, is: 1.31 x 1.77/1.22 = 1.90.

The proposed modification of the Technical Specification 3.11.g which refers to lowering the reactor power in case the limit defined by 3.10.3(g) is found to be exceeded is of the form: $*1-2\left(\frac{1}{x}-1\right)P$ where x is the ratio of the peaking factor limit defined in 3.10.3(g) to the peaking factor in excess of the same limit. In the old specification, the power would be lowered within six hours to a power level of x · 2530. If we write $x = 1-\Delta x$ the new expression can be written as:

$$\left(1-2\left(\frac{1}{1-\Delta x} - 1\right)\right) \approx 1-2(1+\Delta x-1) = 1-2\Delta x$$

which is a more conservative value. In summary, the proposed Technical Specification changes have (a) been based on an acceptable calculational method, (b) do not affect the DNBR limit, and (c) the 3.11(g) results in a more conservative power level in shorter time, and they are found to be acceptable.

2.2 THERMAL-HYDRAULIC DESIGN AND TRANSIENT ANALYSES

The licensee's thermal hydraulic analysis for Cycle 4 reload using H-type fuel (8.9) with increased local peaking for the wide gap edge rods shows that the minimum departure from nucleate boiling ration (MDNBR) is not less than the design criterion of W-3 calculated value of $\geq$ 1.30 at 115% of rated power with the most limiting anticipated operational occurrence (four pump coast down). The steady state DNB calculations were performed at 2910 MWt (115% rated power). In addition, the transient analysis was performed from an initial power of 2580.6 MWt (102% of rated power). The active core flow rate used in the analysis was found to correspond to the Technical Specification limit. The analysis was performed using previously approved methods and the results meet the approved thermal-hydraulic design criteria.

A comparison of analysis results for Cycle 4 versus Cycle 3 is provided in Table 2.1. It can be seen that the results are essentially unchanged since the total peaking factor (F_Q) is unchanged by the increased local peaking value of the wide gap edge rods in the Type H fuel. The staff concludes that the thermal hydraulic design of the Cycle 4 reload using Type H fuel is acceptable.

2.3 ECCS ANALYSIS

The results of a partial ECCS reanalysis to account for Type H fuel was presented by the licensee in Reference 1. The reanalysis involved only the hot channel and hot pin calculations for the limiting break. It was not necessary to repeat the hydraulic analyses since the changes to Type H fuel would not have a substantive hydraulic effect. An axial shape sensitivity study was also performed. The change in peak clad temperature between the Type G fuel and the Type H fuel with the changed peaking factor is insignificant. We find the ECCS results and methodology acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR 51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accident previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: June 6, 1980

REFERENCES

1. Letter, D. P. Hoffman CPCo to D. L. Ziemann, NRC dated May 14, 1980 transmitting application for amendment to Provisional Operating License DPR-20.

2. Letter, D. L. Ziemann, NRC, to D. Bixel, CPCo, dated July 11, 1979.

3. Letter, D. P. Hoffman, CPCo to D. L. Ziemann, NRC, dated September 10, 1979.

4. Letter, D. P. Hoffman, CPCo, to D. L. Ziemann, NRC, dated February 26, 1980.

5. Amendment 57 to Provisional Operating License DPR-20 for the Palisades Plant dated June 6, 1980 and the supporting Safety Evaluation Report.

6. Letter, D. P. Hoffman, CPCo, to D. Crutchfield, NRC, dated June 6, 1980.

7. Exxon Nuclear Methodology for Boiling Water Reactors Volume 1, Neutronics Methods for Design and Analysis. XN-NF-80-19(8), May 1980.

8. Exxon Nuclear Company, "ECCS and Thermal-Hydraulic Analysis for the Palisades Reload H Design." XN-NF-80-18, April 1980.

9. Letter, D. P. Hoffman, CPCo, to D. Crutchfield, NRC, dated June 6, 1980.

Table 2.1

DNB Analysis

Comparison of Cycle 4 and Cycle 3

	Cycle 3	Cycle 4
Nominal Core Power (MWt)	2530	2530
Design Overpower (MWt)	2910	2910
Total Vessel Flow Rate (10^6 lb m/hr)	120.2	120.2
Active Core Flow Rate (10^6 lb m/hr)	113.0	113.0
Core Inlet Temperature (°F)	542.5	542.5
Core Pressure (psia)	2010	2010
Core Pressure Drop (psi)	13.2 ± 0.5	13.2 ± 0.5
Fuel Bundles in Core	204	204
Core Average Linear Heating Rate (KW/ft) at 2530 MWt	5.37	5.37
Fraction of Heat Generated in Fuel	0.975	0.975
Total Peaking Factor (F_Q)	2.76	2.76
MDNBR (at design overpower)	1.309	1.305
Hot Bundle Flow Factor	0.98	0.97
MDNBR (worst anticipated transient*)	1.43	1.45

*four pump coastdown

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-255

CONSUMERS POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO PROVISIONAL OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 58 to Provisional Operating License No. DPR-20, issued to Consumers Power Company (the licensee), which revised the Technical Specifications for operation of the Palisades Plant (the facility) located in Covert Township, Van Buren County, Michigan. The amendment is effective as of its date of issuance.

The amendment modifies the total radial peaking factor for Type H fuel during Cycle-4.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this action was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

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For further details with respect to this action, see (1) the the application for amendment dated May 14, 1980, as supplemented by letters dated June 6, 1980, (2) Amendment No. 58 to License No. DPR-20, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room 1717 H Street, N. W., Washington, D. C. 20555, and at the Kalamazoo Public Library, 315 South Rose Street, Kalamazoo, Michigan 49006. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C., 20555, Attention: Director, Division of Licensing

Dated at Bethesda, Maryland, this 6th day of June, 1980.

FOR THE NUCLEAR REGULATORY COMMISSION

Gus C. Lainas, Assistant Director
for Safety Assessment
Division of Licensing

William O. Miller, Chief
License Fee Management Branch, ADM

Hazel Final

Date: 4/1/80
Amended Form Date:

FACILITY AMENDMENT CLASSIFICATION - DOCKET NO(S). 50-255

Licensee: Consumers Power Co

Plant Name and Unit(s): Palisades

License No(s): DPR-20 Mail Control No: *8003110532

Request Dated: 2/26/80 Fee Remitted: Yes ✓ No ____

Assigned TAC No: 12962

Licensee's Fee Classification: Class I ____, II ____, III ✓, IV ____, V ____, VI ____, None ____

Subject: Radial Peaking Factor $4,000 Limit

Amendment No. 58 Date of Issuance 6/6/80

[X] 1. This request has been reviewed by DOR/DPM in accordance with Section 170.22 of Part 170 and is properly categorized.

[ ] 2. This request is incorrectly classified and should be properly categorized as Class ____. Justification for classification or reclassification: ____

[ ] 3. Additional information is required to properly categorize the request:

[ ] 4. This request is a Class ____ type of action and is exempt from fees because it:

(a) ____ was filed by a nonprofit educational institution,

(b) ____ was filed by a Government agency and is not for a power reactor,

(c) ____ is for a Class ____ (can only be a I, II, or III) amendment which results from a written Commission request dated ____ for the application and the amendment is to simplify or clarify license or technical specifications, has only minor safety significance, and is being issued for the convenience of the Commission, or

(d) ____ other (state reason therefor): ____

HS 3/28/80

R Silver

D. L. Ziemann
Division of Operating Reactors/Project Management

[X] THE INITIAL FEE DETERMINATION HAS BEEN REASSESSED AND IS HEREBY AFFIRMED JVW.

[ ] The above request has been reviewed and is exempt from fees.

Twambach
Date 6/4/80
Date

William O. Miller, Chief
License Fee Management Branch

LFMB 6/78

*also processed under # 8003060257