Docket File

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

February 15, 1991

Docket No. 50-255

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

Dear Mr. Slade:

SUBJECT: AMENDMENT NO. 136 TO PROVISIONAL OPERATING LICENSE NO. DPR-20: (TAC NOS. 77952 AND 77111)

The Commission has issued the enclosed Amendment No. 136 to Provisional Operating License No. DPR-20 for the Palisades Plant. This amendment consists of changes to the Technical Specifications in response to your applications dated November 2, 1990 and June 13, 1990 (as revised November 9 and December 7, 1990, and January 24, 1991).

This amendment incorporates two changes to your Technical Specifications (TSs), as follows:

Change No. 1

This change updates TS 3.17, and Tables 3.17.1, 3.17.4, 3.25.1, 4.1.1, 4.1.3, and 4.21.1 to reflect the new, Regulatory Guide 1.97 qualified, neutron monitoring system installed this outage. Additionally, TS 5.3.2.d is revised to correct the description of fixed absorber rods in use at the plant.

Change No. 2

This change broadens the operating band at which Safety Injection Tank Level must be maintained (new limits being 174 to 200 inches). Additionally, a new surveillance requirement to check the SIT alarms, and a revised Basis section is included.

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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,

Brian Holian, Project Manager
Project Directorate III-1
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 136 to License No. DPR-20
2. Safety Evaluation

cc w/enclosures:
See next page

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,

/s

Brian Holian, Project Manager
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PALISADES AMEND 77111/77952

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Palisades Plant

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

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

AMENDMENT TO PROVISIONAL OPERATING LICENSE

Amendment No. 136
License No. DPR-20

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The applications for amendment by Consumers Power Company (the licensee) dated June 13, 1990 (as revised November 9 and December 7, 1990) and November 2, 1990 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.

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:

Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 136 , 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

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: February 15, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 136

PROVISIONAL 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	INSERT
3-29	3-29
3-31	3-31
3-33	3-33
3-77	3-77
3-78	3-78
3-81	3-81
3-135	3-135
3-136	3-136
4-3	4-3
4-8	4-8
4-10	4-10
4-88	4-88
5-3	5-3

3.3 EMERGENCY CORE COOLING SYSTEM

Applicability

Applies to the operating status of the emergency core cooling system.

Objective

To assure operability of equipment required to remove decay heat from the core in either emergency or normal shutdown situations.

Specifications

Safety Injection and Shutdown Cooling Systems

3.3.1 The reactor shall not be made critical, except for low-temperature physics tests, unless all of the following conditions are met:

a. The SIRW tank contains not less than 250,000 gallons of water with a boron concentration of at least 1720 ppm but not more than 2000 ppm at a temperature not less than 40°F.

b. All four Safety Injection tanks are operable and pressurized to at least 200 psig with a tank liquid level of at least 174 inches and a maximum level of 200 inches with a boron concentration of at least 1720 ppm but not more than 2000 ppm.

c. One low-pressure Safety Injection pump is operable on each bus.

d. One high-pressure Safety Injection pump is operable on each bus.

e. Both shutdown heat exchangers and both component cooling heat exchangers are operable.

f. Piping and valves shall be operable to provide two flow paths from the SIRW tank to the primary cooling system.

g. All valves, piping and interlocks associated with the above components and required to function during accident conditions are operable.

h. The Low-Pressure Safety Injection Flow Control Valve CV-3006 shall be opened and disabled (by isolating the air supply) to prevent spurious closure.

i. The Safety Injection bottle motor-operated isolation valves shall be opened with the electric power supply to the valve motor disconnected.

j. The Safety Injection miniflow valves CV-3027 and 3056 shall be opened with HS-3027 and 3056 positions to maintain them open.

c. If Specification a. and b. cannot be met, an orderly shutdown shall be initiated and the reactor shall be in hot shutdown condition within 12 hours, and cold shutdown within the next 24 hours.

Basis

The normal procedure for starting the reactor is, first, to heat the primary coolant to near operating temperature by running the primary coolant pumps. The reactor is then made critical by withdrawing control rods and diluting boron in the primary coolant.(1) With this mode of start-up, the energy stored in the primary coolant during the approach to criticality is substantially equal to that during power operation and, therefore, all engineered safety features and auxiliary cooling systems are required to be fully operable. During low-temperature physics tests, there is a negligible amount of stored energy in the primary coolant; therefore, an accident comparable in severity to the design basis accident is not possible and the engineered safeguards'systems are not required.

The SIRW tank contains a minimum of 250,000 gallons of water containing 1720 ppm boron. This is sufficient boron concentration to provide a 5% shutdown margin with all control rods withdrawn and a new core at a temperature of 60°F.

Heating steam is provided to maintain the tank above 40°F to prevent freezing. The 1% boron (1720 ppm) solution will not precipitate out above 32°F. The source of steam during normal plant operation is extraction steam line in the turbine cycle.

The limits for the safety injection tank pressure and volume assure the required amount of water injection during an accident and are based on values used for the accident analyses. The minimum 174-inch level corresponds to a volume of 1040 ft^3 and the maximum 200-inch level corresponds to a volume of 1176 ft^3.

Prior to the time the reactor is brought critical, the valving of the safety injection system must be checked for correct alignment and appropriate valves locked. Since the system is used for shutdown cooling, the valving will be changed and must be properly aligned prior to start-up of the reactor.

The operable status of the various systems and components is to be demonstrated by periodic tests. A large fraction of these tests will be performed while the reactor is operating in the power range. If a component is found to be inoperable, it will be possible in most cases to effect repairs and restore the system to full operability within a relatively short time. For a single component to be inoperable does not negate the ability of the system to perform its function, but it reduces the redundancy provided in the reactor design and thereby limits the

Basis (continued)

demonstrate that the maximum fuel clad temperatures that could occur over the break size spectrum are well below the melting temperature of zirconium (3300°F).

Malfunction of the Low Pressure Safety Injection Flow control valve could defeat the Low Pressure Injection feature of the ECCS; therefore, it is disabled in the 'open' mode (by isolating the air supply) during plant operation. This action assures that it will not block flow during Safety Injection.

The inadvertent closing of any one of the Safety Injection bottle isolation valves in conjunction with a LOCA has not been analyzed. To provide assurance that this will not occur, these valves are electrically locked open by a key switch in the control room. In addition, prior to critical the valves are checked open, and then the 480 volt breakers are opened. Thus, a failure of a breaker and a switch are required for any of the valves to close.

Insuring both HPSI pumps are inoperable when the PCS temperature is <260°F or the shutdown cooling isolation valves are open eliminates PCS mass additions due to inadvertent HPSI pump starts. Both HPSI pumps starting in conjunction with a charging/letdown imbalance may cause 10CFR50 Appendix G limits to be exceeded when the PCS temperature is <260°F. When the PCS temperature is ≥ 430°F, the pressurizer safety valves ensure that the PCS pressure will not exceed 10CFR50 Appendix G.

The requirement to have both HPSI trains operable above 325°F provides added assurance that the effects of a LOCA occuring under LTOP conditions would be mitigated. If a LOCA occurs when the primary system temperature is less than or equal to 325°F, the pressure would drop to the level where low pressure safety injection can prevent core damage. Therefore, when the PCS temperature is ≥260°F and ≤325°F operation of the HPSI system would not cause the 10CFR50 Appendix G limits to be exceeded nor is HPSI system operation necessary for core cooling.

HPSI pump testing with the HPSI pump manual discharge valve closed is permitted since the closed valve eliminates the possibility of pump testing being the cause of a mass addition to the PCS.

References

(1) FSAR, Section 9.10.3;
(2) FSAR, Section 6.1,
(3) FSAR, Section 14.17
(4) Letter, H.G.Shaw (ANF) to R.J.Gerling (CPCo), "Standard Review Plan Chapter 15 Disposition of Events Review for Changes to Technical Specifications Limits for Palisades Safety Injection Tank Liquid Levels", April 11, 1990.

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^{-1}%.

References

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

Table 3.17.1
Instrumentation Operating Requirement for Reactor Protective System

No.	Functional	Minimum Operable Channels	Minimum Degree of Redundancy	Permissible Bypass Conditions
1.	Manual (Trip Buttons) (g)	1	None	None
2.	Variable High Power Level (g)	2(b,d)	1(d)	None
3.	Wide Range Channels (g)	2	1	Below 10^{-4}%(e) or Above 15% Rated Power (a) Except as Noted in (c).
4.	Thermal Margin/ Low-Pressurizer Pressure (g)	2(b,f)	1	Below 10^{-4}%(e) of Rated Power(a) and greater than cold shutdown boron concentration.
5.	High-Pressurizer Pressure (g)	2(b)	1	None
6.	Low Flow Loop (g)	2(b)	1	Below 10^{-4}%(e) of Rated Power (a) and greater than cold shutdown boron concentration.
7.	Loss of Load (h)	1	None	None
8.	Low Steam Generator Water Level (g)	2/Steam Gen (b)	1/Steam Generator	None
9.	Low Steam Generator Pressure (g)	2/Steam Gen (b)	1/Steam Generator	Below 10^{-4}%(e) of Rated Power (a) and greater than cold shutdown boron concentration.
10.	High Containment Pressure (g)	2(b)	1	None

(a) Bypass automatically removed.
(b) One of the inoperable channels must be in the tripped condition.
(c) Two channels required if TM/LP, low steam generator or low-flow channels are bypassed.
(d) If only two channels are operable, load shall be reduced to 70% or less of rated power.
(e) For low power physics testing, 10^{-4}% may be increased to 10^{-1}% and cold shutdown boron concentration is not required.
(f) Axial Offset operability requirements are given in Specification 3.11.2.
(g) Required operable if any clutch power supply is energized.
(h) Automatically bypassed below 15% power.

Table 3.17.4

Instrumentation Operating Requirements for Other Safety Feature Functions

No.	Functional Unit	Minimum Operable Channels	Minimum Degree of Redundancy	Permissible Bypass Conditions
1	SIRWT Low-Level Switches	4	NA(b)	One channel may be inoperable for a period of 7 days. (b)
2	ΔT-Power Comparator	3(c)	1	None
3	(Deleted)			
4	Air Cooler Service Water Flow Instruments	1	None	None
5	Primary and Secondary Rod Insertion and Out-of-Sequence Monitors	1	None	N/A
6	Fuel Pool Building Crane Interlocks	1	None	As Requested Under Administrative Controls.(a)
7	Source-Range Channels	2	1(d)	Not required Above 10^{-4}% of Rated Power.

(a) Crane shall not be used to move material past the fuel storage pool unless the interlocks are available.

(b) If a channel is declared inoperable, it shall be placed in a bypass condition. Minimum degree of redundancy is not applicable to the SIRWT low-level switches.

(c) If only two channels are operable, load shall be reduced to 70% or less of rated power.

(d) Minimum operable channels shall be one (1) and minimum degree of redundancy is zero (0) if shutdown neutron power levels indicated on the wide range channels are greater than three times the lowest decade in which neutron visibility can be confirmed. Neutron visibility will be confirmed through observation of reactivity changes on neutron power level (including a 1/M plot during reactor start-up) and comparing the observed changes to the changes noted on previous similar start-ups. Instrumentation operability will also be verified by comparison among the three operable channels to ensure their individual responses are in agreement.

Table 3.25.1

ALTERNATE SHUTDOWN MINIMUM EQUIPMENT

No	Instrumentation	Minimum Equipment	Readout Location
1	Pressurizer Pressure (PI-0110)	1	C150
2	Pressurizer Level (LI-0102E)	1	C150
3	Reactor Coolant Hot Leg Temperature (TI-0112HAA) (TI-0122HAA)	1/Loop	C150A
4	Reactor Coolant Cold Leg Temperature (TI-0112CAA) (TI-0122CAA)	1/Loop	C150A
5	Steam Generator Pressure (PI-0751E) (PI-0752E)	1/S.G.	C150A
6	Steam Generator Level (LI-0757C) (LI-0758C)	1/S.G.	C150
7	Source Range Neutron Monitor (NI-1/3C)	1	C150A
8	Auxiliary Feedwater Suction Pressure (PS-0741D)	1	C150
9	SIRW Tank Level (LT-0332B)	1	C150A
10	Auxiliary Feedwater Flow Rate (FI-0727B) (FI-0749B)	1/S.G.	C150

Table 3.25.1
(Continued)

ALTERNATE SHUTDOWN MINIMUM EQUIPMENT

No	Transfer Switches	Minimum Equipment	Switch Location	Function
11	HS-0102A	1	C150	Control Room Alarm.
12	HS-0102B	1	C150	S/G Level Indications. Pressurizer Level Indications. Aux. FW Flow Indication. Aux. Fw Flow Control.
13	HS-0522C		C150	Opens Aux. Fw Pump Steam Valve CV-0522B.
14	HS-0102C	1	C150A	Control Room Alarm. S/G Pressure Indications. Hot/Cold Leg Temperature Indications. Neutron Monitor System Power.

No	Control Circuits	Minimum Equipment	Controls From	Function
15	Auxiliary FW Flow Control (HIC-0727C)	1	C150	Controls B S/G Aux. FW Flow Control Valve (CV-0727).
16	Auxiliary FW Flow Control (HIC-0749C)	1	C150	Controls A S/G Aux. FW Flow Control Valve (CV-0749).

TABLE 4.1.1

Minimum Frequencies for Checks, Calibrations and Testing of Reactor Protective System(S)

Channel Description	Surveillance Function	Frequency	Surveillance Method
1. Power Range Safety Channels	a. Check (7)	S	a. Comparison of four-power channel readings.
	b. Check(3)	D	b. Channel adjustment to agree with heat balance calculation. Repeat whenever flux-ΔT power comparators alarms.
	c. Test	M(2)	c. Internal test signal.
	d. Calibrate(6)	R	d. Channel alignment through measurement/adjustment of internal test points.
2. Wide-Range Neutron Monitors	a. Check	S	a. Comparison of channel indications.
	b. Test	P	b. Internal test signal.
	c. Calibrate	R	c. Channel alignment through measurement/adjustment of internal test points.
3. Reactor Coolant Flow	a. Check	S	a. Comparison of four separate total flow indications.
	b. Calibrate	R	b. Known differential pressure applied to sensors.
	c. Test	M(2)	c. Bistable trip tester.(1)(4)
4. Thermal Margin/Low Pressurizer Pressure	a. Check: (8) (1) Temperature Input (2) Pressure Input	S	a. Check: (1) Comparison of four separate calculated trip pressure set point indications. (2) Comparison of four pressurizer pressure indications. Same as 5(a) below.
	b. Calibrate (1) Temperature Input (2) Pressure Input	R	b. Calibrate: (1) Known resistance substituted for RTD coincident with known pressure and power input. (2) Part of 5(b) below.
	c. Test	M(2)	c. Bistable trip tester.(1)
5. High-Pressurizer Pressure	a. Check (8)	S	a. Comparison of four separate pressure indications.
	b. Calibrate	R	b. Known pressure applied to sensors.
	c. Test	M(2)	c. Bistable trip tester.(1)

TABLE 4.1.2

Minimum Frequencies for Checks, Calibrations and Testing of Engineered Safety Feature Instrumentation Controls (Contd)

Channel Description	Surveillance Function	Frequency	Surveillance Method
13. Safety Injection Tank Level and Pressure Instruments	a. Check	S	a. Verify that level and pressure indication is between independent high high/low alarms for level and pressure.
	b. Calibrate	R	b. Known pressure and differential pressure applied to pressure and level sensors.
	c. Check	R	c. Functional Check on high and low level alarms.
14. Boric Acid Tank Level Switches	a. Test	R	a. Pump tank below low-level alarm point to verify switch operation.
15. Boric Acid Heat Tracing System	a. Check	D	a. Observe temperature recorders for proper readings.
16. Main Steam Isolation Valve Circuits	a. Check	S	a. Compare four independent pressure indications.
	b. Test(3)	R	b. Signal to meter relay adjusted with test device to verify MSIV circuit logic.
17. SIRW Tank Temperature Indication and Alarms	a. Check b. Calibrate	M R	a. Compare independent temperature readouts. b. Known resistance applied to indicating loop.
18. Low-Pressure Safety Injection Flow Control Valve CV-3006	a. Check	P	a. Observe valve is open with air supply isolated.
19. Safety Injection Bottle Isolation Valves	a. Check	P	a. Ensure each valve open by observing valve position indication and valve itself. Then lock open breakers and control power key switches.
20. Safety Injection Miniflow Valves Cv-3027, 3056	a. Check	P	a. Verify valves open and HS-3027 and 3056 positioned to maintain them open.

NOTES:

(1)Calibration of the sensors is performed during calibration of Item 5(b), Table 4.1.1.
(2)All monthly tests will be done on only one channel at a time to prevent protection system actuation.
(3)Calibration of the sensors is performed during calibration of Item 7(b), Table 4.1.1.
(4)Required when PCS is >1500 psia.

TABLE 4.1.3

Minimum Frequencies for Checks, Calibrations and Testing of Miscellaneous Instrumentation and Controls (Cont'd)

Channel Description	Surveillance Function	Frequency	Surveillance Method
1. Source Range Neutron Monitors	a. Check	S	a. Comparison of both channel count rate indications when in service.
	b. Test	P	b. Internal Test Signals.
	c. Calibrate	R	c. Channel alignment through measurement/adjustment of internal test points.
2. Primary Rod Position Indication System	a. Check	S	a. Comparison of output data with secondary RPIS.
	b. Check	M	b. Check of power dependent insertion limits monitoring system.
	c. Calibrate	R	c. Physically measured rod drive position used to verify system accuracy. Check rod position interlocks.
3. Secondary Rod Position Indication System	a. Check	S	a. Comparison of output data with primary RPIS.
	b. Check	M	b. Same as 2(b) above.
	c. Calibrate	R	c. Same as 2(c) above, including out-of-sequence alarm function.
4. Area Monitors Note:Process Monitor Surveillance Requirements are located in Tables 4.24-1 and 4.24-2	a. Check	D	a. Normal readings observed and internal test signals used to verify instrument operation.
	b. Calibrate	R	b. Exposure to known external radiation source.
	c. Test	M	c. Detector exposed to remote operated radiation check source or integral electronic check source.
5. Emergency Plan Radiation Instruments	a. Calibrate	A	a. Exposure to known radiation source.
	b. Test	M	b. Battery check.
6. Environmental Monitors	a. Check	M	a. Operational check.
	b. Calibrate	A	b. Verify airflow indicator.
7. Pressurizer Level Instruments	a. Check	S	a. Comparison of two wide and two narrow range independent level readings.
	b. Calibrate	R	b. Known differential pressure applied to sensor.
	c. Test	M	c. Signal to meter relay adjusted with test device.

Table 4.21.1 (Cont'd)

ALTERNATE SHUTDOWN MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Channel Description	Surveillance Function	Frequency	Surveillance Method
7. Source Range Neutron Monitor (NI-1/3C)	a. Test	Prior to Startup(4)	a. Internal test signal (performed under Table 4.1.3)
8. Auxiliary Feedwater Low Suction Pressure Switch (PS-0741D)	a. Calibrate	Refueling cycle	a. Apply known pressure to pressure sensor.
9. SIRW Tank Level Indication (LI-0332B)	a. Check (1) b. Calibrate	Quarterly Refueling cycle	a. Compare independent level readings. b. Apply known differential pressure to level sensor.
10. Auxiliary Feedwater Flow Rate (2) Indication (FI-0727B) (FI-0749B)	a. Calibrate	Refueling cycle	a. Apply known differential pressure to sensor(s).
11. Auxiliary Feedwater Flow Control (3) Valves (CV-0727 & CV-0749)	a. Check	Refueling cycle	a. Verify Control.
12. Auxiliary Feedwater Pump Inlet Steam Valve (CV-0522B)	a. Check	Refueling cycle	a. Verify Control.

NOTES:
(1) Quarterly checks are not required when the plant is less than 325°F.
(2) Satisfies Table 4.1.3-15 Requirement.
(3) See Specification 4.9b.
(4) Prior to each startup, if not done previous week.

(Next page is 4-90)

5.3.2 Reactor Core and Control

a. The reactor core shall approximate a right circular cylinder with an equivalent diameter of about 136 inches and an active height of about 132 inches.

b. The reactor core shall consist of approximately 43,000 Zircaloy-4 clad fuel rods containing slightly enriched uranium in the form of sintered UO_2 pellets. The fuel rods shall be grouped into 204 assemblies. A core plug or plugs may be used to replace one or more fuel assemblies subject to the analysis of the resulting power distribution.

c. The fully loaded core shall contain approximately 211,000 pounds UO_2 and approximately 56,000 pounds of Zircaloy-4. Poison may be placed in the fuel bundles for long term reactivity control.

d. The core excess reactivity shall be controlled by a combination of boric acid chemical shim, cruciform control rods, and mechanically fixed absorber rods where required. Forty-five control rods shall be distributed throughout the core as shown in Figure 3-5 of the FSAR. Four of these control rods may consist of part-length absorbers.

5.3.3 Emergency Core Cooling System

An emergency core cooling system shall be installed consisting of various subsystems each with internal redundancy. These subsystems shall include four safety injection tanks, two high-pressure and two low-pressure safety injection pumps, a safety injection and refueling water storage tank, and interconnecting piping as shown in Section 6 of the FSAR.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 136 TO PROVISIONAL OPERATING LICENSE NO. DPR-20

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

CHANGE NO. 1

By letter dated November 2, 1990, Consumers Power Company (the licensee) requested amendment to the Technical Specifications (TSs) appended to Provisional Operating License No. DPR-20 for the Palisades Plant. The proposed amendment would allow use of the Regulatory Guide 1.97 qualified neutron monitoring system which is being installed during the 1990 refueling outage. Additionally, a change was proposed to the Design Features section to more accurately describe the fixed absorber rods.

CHANGE NO. 2

By letter dated June 13, 1990, and subsequently revised by letters dated November 9 and December 7, 1990, and January 24, 1991, the licensee requested an amendment to revise TS 3.3.1.b., "Emergency Core Cooling System." The proposed amendment would reduce the required minimum boron solution level in the Safety Injection Tanks (SIT) from 186 to 174 inches. Additionally, the maximum allowed tank level would be expanded from 198 to 200 inches. This change effectively broadens the operating band at which SIT level must be maintained from 12 to 26 inches.

Two related TS changes were also submitted. First, a new surveillance requirement to check the SIT high and low level alarms was proposed to be included in TS table 4.1.2. Secondly, the Bases section for TS 3.3.1 has been updated and two TS references have been added.

2.0 DISCUSSION

CHANGE NO. 1

In 1988, the licensee performed a modification which upgraded the sensitivity of the fission chambers used to detect neutron flux. During the most recent refueling outage, the licensee has completed its upgrade of the neutron monitoring system by certifying the system is qualified to the criteria of Regulatory Guide 1.97. The changes in the neutron monitoring system performed this outage involved using the existing fission chambers, installing new cables from the fission chambers through two new electric penetrations to preamplifiers (which were relocated to outside containment), and installing new cables from the preamplifiers to the power sources in the control room. Additionally, the neutron monitoring channel which supplies the alternate shutdown panel was modified. The alternate shutdown panel had previously received neutron monitoring indication from a dedicated, spare fission chamber. The new system supplies the panel through an optical isolator associated with the left channel (NI-1/3) of the RG 1.97 qualified instrumentation.

Eight channels of instrumentation are provided to monitor the neutron flux. The nuclear instrumentation system consists of two start-up channels, two wide-range logarithmic channels and four power range safety channels. The start-up and wide-range channels share high sensitivity fission chambers while the power ranges channels are completely independent (each power range channels has a separate detector and power supply).

The rate-of-change of power is normally monitored at start-up by two source range monitors which sum inputs from two fission chambers and cover a range of approximately five decades (control room indication uses a scale from 1 to 3x10e5 cps). The two other channels are wide-range units which take signals from fission chambers and cover a range greater than ten decades, overlapping the start-up channels by approximately three decades (control room indication uses a scale from 1x10e-8 to 200% power).

The proposed Technical Specification changes, associated with the above modifications are as follows:

<u>Changes</u>

A. In the third paragraph from the end of the Basis for Section 3.17, delete reference to the "start-up" range and replace it with "source" range. Delete reference to the "log" range and replace it with reference to the "wide" range.

B. In Table 3.17.1, change Item No. 3 from "Log Range" to "Wide-Range".

C. In Table 3.17.4, Item 7, change "Start-up" to "Source Range" and in footnote (d) to Table 3.17.4, change "log range" to "wide range".

D. In Table 3.25.1, Item No. 7, change "Start-up" to "Source" and "(N-001A)" to "(N-1/3C)".

E. In Table 3.25.1, Item 14, add "Neutron Monitor System Power" under the Function Column.

F. In Table 4.1.1, Item 2, under the Channel Description Column, delete the word "Logarithmic". In Surveillance Functional Column, add "C. Calibrate". In the Frequency Column, add "R" on the

"C. Calibrate" line. In the Surveillance Method Column on the "a" line, delete "both wide-range readings" and insert "Channel indications". Also in the Surveillance Method column, add "C. Channel alignment through measurement/adjustment of internal test points".

G. In Table 4.1.3, Item No. 1 in the Channel Description Column change "Start-up" to "Source"; in the Surveillance Functions Column add "c. Calibrate"; in the Frequency Column, add "R" on the "c. Calibrate" line; and, in the Surveillance Method Column, add "C. Channel alignment through measurement/adjustment of internal test points.

H. In Table 4.21.1, item No. 7, under the Channel Description column, change "Start-up" to "Source" and "(NI-001A)" to "(NI-1/3C)". In the surveillance Method Column, after "a. Internal Test Signal" add, "(Performed under Table 4.1.3, Item 1.b)".

I. In Section 5.3.2d, change the description of the mechanically fixed rods from "...mechanically fixed boron rods..." to"...mechanically fixed absorbers rods...".

CHANGE NO. 2

The four safety injection tanks are part of the safety injection system and are used to flood the core with borated water following a depressurization of the primary coolant system. Three of the four tanks will provide sufficient coolant to recover the core following a Loss of Coolant Accident. The tanks are connected to the Primary Coolant System cold legs through normally open isolation valves. Two check valves prevent primary coolant from entering the tanks. Current TS maintain the tanks pressurized to at least 200 psig, with a tank liquid level of at least 186 inches and a maximum level of 198 inches, and a boron concentration from 1720 to 2000 ppm. Injection will occur whenever the primary system pressure falls below the combined pressure of the static water head plus the tank gas pressure.

The licensee proposed the following changes to the TS;

Changes

A. Change Specification 3.3.1.b to read as follows:
"All four Safety Injection Tanks are operable and pressurized to at least 200 psig with a tank liquid level of at least 174 inches and maximum level of 200 inches with a boron concentration of at least 1720 ppm but not more than 2000 ppm."

B. Change the fourth paragraph of Section 3.3 Basis as follows:
"The limits for the Safety Injection Tank pressure and volume assure the required amount of water injection during an accident and are based on values used for the accident analyses (3, 4). The minimum 174-inch level corresponds to a volume of 1040 ft^3 and the maximum 200-inch level corresponds to a volume of 1176 ft^3."

C. Add the following to References:

"(3) FSAR, Section 14.17
(4) Letter, H. G. Shaw (ANF) to R. J. Gerling (CPCo), "Standard Review Plan Chapter 15, Disposition of Events Review for Changes to Technical Specification Limits on Palisades Safety Injection Tank Liquid Levels", April 11, 1990.

D. Add Surveillance Function "C." To Item 13 on Table 4.1.2 to require performance, at least once per 18 months, of a functional check on the SIT high and low level alarms.

These changes are considered necessary to reduce the risk of TS violations made possible by periodic surveillance and correction of boron concentration. When sampling the SITs to verify boron concentration, it is necessary to drain the tanks sufficiently to obtain an accurate sample. During this evolution, TS Section 3.3.2.a is in effect and limits the non-operability of one tank to one hour. Because a significant amount of water must be drained from the tank to obtain a representative sample, the possibility exists that proper level may not be restored within the one hour period. This procedure places demands on the Operations staff which would be minimized if the operating band of the tanks were broadened.

3.0 EVALUATION

CHANGE No. 1

The changes to the neutron monitoring system enhance the reliability of the accuracy of the neutron monitoring function under accident conditions. The previous system has basically been upgraded to the more stringent requirements of Regulatory Guide 1.97. The upgraded equipment performs the same function as the previously installed equipment, and maintains the same degree of redundancy.

For consistency with Standard Technical Specifications, the licensee has proposed to change the name of the most sensitive neutron monitoring range from "Start-up Range" to "Source-Range". Similarly, the name of the "Logarithmic Range" has been proposed to be renamed "Wide-Range". These designations are more consistent with standard industry phraseology, and more clearly describe the respective neutron monitoring ranges. Changes A,B,C,D,F,G and H reflect the new terminology.

Changes D and H also correct the designation of the source range neutron monitor which provides indication for alternate shutdown capability (N-001A is changed to NI-1/3C). The source of the signal to the alternate shutdown panel source range monitor has been modified. The previous signal (N-001A) originated from an older, dedicated fission chamber. The new signal (NI-1/3C) is supplied through an optical isolator associated with the left channel of the new, RG 1.97 qualified instrumentation. The newer system provides for more accurate indication and improved reliability.

Change E provides additional information to the TS, to clearly delineate the neutron monitoring system power source. Changes F, G, and H either add additional surveillances to the TS, or clarify existing surveillances.

Change I is necessary to correct the TS description of the core's mechanically fixed rods. Fixed boron rods are no longer in use at Palisades. A conversion from boron to Gadolinia rods was completed in core reloads H, I and J. Also, with recent fuel cycles converting to reduced leakage designs, additional neutron absorbent rods are being utilized (e.g., stainless steel, Hafnium). Because a variety of materials may be used, the term "fixed absorber rods" is considered appropriate to accommodate different core reload designs.

In summary, the proposed TS changes more clearly describe the function and operation of the neutron monitoring system. Additionally, the changed description of the type of neutron absorbing rod in use at the Palisades Plant corrects an error in the Design Features TS section, which was overlooked at the time of the Core reload H submittal. These changes reflect the use of material or equipment which will perform the same functions as existing equipment, and are considered acceptable.

CHANGE NO. 2

Discussions were held with the licensee's Operations staff to assess the operational restrictions imposed by the current SIT level band. Operational data for the period from 11/88 to 9/90 indicates that the SITs were sampled 187 times. SIT sampling is required monthly by the TS. The increased sampling frequency (approximately 100 samples above the TS minimum) was required due to known inleakage into the SITs from the primary coolant system. This inleakage slowly lowered SIT boron concentration; therefore, additional monitoring of tank concentration was required in order to ensure the minimum TS levels for SIT boron concentration were maintained.

The SITs do not have tank recirculation capability; therefore, a relatively large amount of tank water is required by procedure to be purged through the sample lines in order to obtain a representative sample (on the order of 1700 gallons per sample). This water volume necessitates that the TS Limiting Condition for Operation be entered each time a tank is sampled.

Although the most appropriate deterrent in preventing unnecessary SIT sampling is ensuring the leak-tightness of the SIT boundary valves, widening the operational water level band will assist in maintaining the tanks within their prescribed limits.

The licensee contracted with their fuel vendor to evaluate the effect of a slightly reduced or increased total liquid volume in the SITs (174 and 202 inches, respectively, for minimum and maximum allowed SIT levels). The result of the fuel vendor's Standard Review Plan Chapter 15 disposition of events was that the large break loss of coolant transient is the only event which completely drains the SITs (thereby it is the only event which could be affected by the changes in SIT level limits).

Data supplied by the licensee indicates that flow from the intact loop SITs, SIT lines, and cold legs keeps the downcomer full for about 30 seconds after the peak cladding temperature (PCT) for the transient is reached. Reduction of the minimum SIT level to 174 inches causes the SITs to empty, in the worst case, approximately four seconds earlier than would have occurred with the previous tank limits. Downcomer level does not fall prior to the time the PCT is reached. Additionally, increasing the maximum SIT level to 202 inches has no impact on the large break LOCA analysis because the SIT flow time would be conservatively extended beyond the time in the limiting analysis. These conclusions apply to all break sizes contained in the February 1990 Palisades Large Break LOCA Analysis of record.

The following factors were also considered:

- The change in the upper SIT limit involves a relatively small increase in the maximum amount of water stored in the SITs (two inches of level); therefore, the probability of overfilling, containment flooding, and malfunctions due to seismic events are not significantly increased.

- The LOCA containment analysis, which conservatively does not take credit for SIT injection, shows that peak containment pressure stays below the design pressure.

- A comparison of the SIT operating band volumes in use at several Combustion Engineering plants indicates similar volumes. Also, the Combustion Engineering Standard TS provides for an operating band of roughly the same volume as that proposed by Palisades (126 and 136 cubic feet, respectively).

- The effect of the reduced minimum SIT inventory on the available suction source for Safety Injection during long term recirculation from the containment sump has been considered. The reduction (1885 gal) in required minimum inventory is a very small fraction of the total available inventory (approx. 380,000 gal) considering the vast inventory contribution from the four SITs and the Safety Injection Refueling Water Tank; and, therefore, will have a negligible effect on the operation of the safety injection pumps or the containment temperature and pressure response.

- The boron concentration in the tanks will be unchanged and the slight reduction in total inventory will not have a significant effect on the sump boron concentration during the recirculation phase of the accident. Additionally, this change will not significantly effect the time before hot leg injection is required to prevent precipitation of boron.

In summary, the proposed changes to the Technical Specification limits on Palisades SIT levels have been evaluated to ensure that adequate water is available for make-up to the primary coolant system. The analysis shows that when the contents of the SITs are at the proposed lower level, and a large break LOCA occurs, the SITs do not empty until after the peak cladding temperature is reached and until after high and low pressure safety injection are actuated. The addition of a surveillance requirement to perform a functional check on the SIT high and low level alarms institutes additional TS controls on ensuring that SIT level will be adequately measured and maintained. Additionally, the basis section has been updated and the TS Reference section appropriately expanded. Therefore, these proposed TS changes are considered acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in 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. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. The staff therefore concludes that the proposed changes are acceptable.

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