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Consumers Power Company
ATTN: Mr. R. B. Sewell
Nuclear Licensing Administrator
212 West Michigan Avenue
Jackson, Michigan 49201

Gentlemen:

The Commission has issued the enclosed Amendment No. 23 to Provisional Operating License No. DPR-20 for the Palisades Plant. This amendment consists of changes to the Technical Specifications in response to your request dated October 7, 1975 and as modified October 8, 1976.

This amendment requires operability and surveillance of shock suppressors required to protect the reactor coolant system and all other safety related systems and components.

Copies of the Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

Original signed by

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No.23
2. Safety Evaluation
3. Federal Register Notice

cc w/enclosures:
See next page

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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. 23
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 October 7, 1975, as modified October 8, 1976, 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 this license amendment.

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

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: January 19, 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 23

PROVISIONAL OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Revise Appendix A as follows:

Remove the following pages and replace with identically numbered revised pages:

ii
iii

Add new pages:

3-88
3-89
3-90
3-91
4-71
4-72
4-73
4-74

3.20 Shock Suppressors (Snubbers)

Applicability

Applies to the operating status of the safety related piping shock suppressors (snubbers) as listed in Table 3.20.1.

Objective

To minimize the possibility of unrestrained pipe motion as might occur during an earthquake or severe transient.

Specifications

3.20.1 During all modes of operation, except cold shutdown and refueling, all snubbers listed in Table 3.20.1 shall be operable except as noted in 'a' through 'd' below.

a. From and after the time that a snubber is determined to be inoperable, continued reactor operation is permissible only during the succeeding 72 hours unless the snubber is made operable or replaced prior to the end of the 72-hour period.

b. If the inoperable snubber cannot be made operable or replaced within the required 72 hours, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition within 36 hours.

c. If a snubber is determined to be inoperable while the reactor is in either the cold shutdown or refueling mode, the snubber shall be made operable or replaced prior to the reactor being made critical.

d. Snubbers may be added to safety-related systems without prior license amendment to Table 3.20.1 provided that a revision to Table 3.20.1 is included with the next License Amendment Request.

TABLE 3.20.1

Safety-Related Shock Suppressors (Snubbers)

Palisades ID Number	System	Location	Snubber in High Radiation Area During Shutdown*	Snubbers Especially Difficult To Remove	Snubbers Inaccessible During Normal Operation	Snubbers Accessible During Normal Operation
1	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
2	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
3	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
4	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
5	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
6	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
8	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				x
9	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
10	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
11	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
12	MSS	On Main Steam Lines - EB1 Upstream of MSIVs				X
15	MSS	EB-1-8" Upstream of CV-0781				X
16	MSS	EB-1-8" Upstream of CV-0781				X
17	MSS	EB-1-8" Upstream of CV-0780				X
18	MSS	EB-1-8" Upstream of CV-0780				X
19	MSS	EBD-6, E-50A, 36" Steam to Aux FW Turbine				X
20	MSS	EBD-6, E-50A, 36" Steam to Aux FW Turbine				X
21	CCS	Component Cooling Outside Cont				X
22	CCS	From Component Cooling Water System to Evaporators				X
23	CCS	Evaporators to Component Cooling Water Sys				X
24	CCS	Evaporators to Component Cooling Water Sys				X
25	CCS	Component Cooling Water Outside Cont - Pump Discharge				X
26	CCS	Component Cooling Water Outside Cont - Pump Discharge				X
27	CCS	Component Cooling Water Outside Cont - Pump Discharge				X
28	CCS	Component Cooling Water Outside Cont - Pump Discharge				X

Palisades ID Number	System	Location	Snubber in High Radiation Area During Shutdown*	Snubbers Especially Difficult To Remove	Snubbers Inaccessible During Normal Operation	Snubbers Accessible During Normal Operation
29	CVC	Primary Coolant Pump Leakoff to Volume Control Tank - 602' Pipeway	X			X
30	CVC	Letdown to Volume Control Tank - 602' Pipeway	X			X
31	ESS	GC-8 Shutdown Cooling Lower Pressure Safety Injection Pump Suction				X
32	ESS	HC-3 Engineering Safeguards Pump Suction				X
33	ESS	GC-8 Shutdown Cooling LPSI Pump Suction				X
34	ESS	HC-3 Engineering Safeguards Pump Suction				X
35	ESS	GC-1 LPSI Pump Discharge				X
36	ESS	GC-1 LPSI Pump Discharge				X
37	ESS	GC-1 LPSI Pump Discharge				X
38	ESS	GC-1 LPSI Pump Discharge				X
39	ESS	GC-8 Shutdown Cooling LPSI Pump Suction				X
40	ESS	GC-8 Shutdown Cooling LPSI Pump Suction				X
41	ESS	GC-8 Shutdown Cooling LPSI Pump Suction				X
42	ESS	GC-1 LPSI Pump Discharge				X
43	ESS	HC-3 Engineering Safeguards Pump Suction				X
44	ESS	GC-1 LPSI Pump Discharge (After CV-3025 SDHX to LPSI Valves)				X
45	ESS	HC-3 Engineering Safeguards Pump Suction				X
46	MSS	Steam Generator A, Restraint 1-SS-1	X	X	X	
47	MSS	Steam Generator A, Restraint 1-SS-2	X	X	X	
48	MSS	Steam Generator A, Restraint 1-SS-3	X	X	X	
49	MSS	Steam Generator A, Restraint 1-SS-4	X	X	X	
50	MSS	Steam Generator A, Restraint 1-SS-5	X	X	X	
51	MSS	Steam Generator A, Restraint 1-SS-6	X	X	X	
52	MSS	Steam Generator A, Restraint 1-SS-7	X	X	X	
53	MSS	Steam Generator A, Restraint 1-SS-8	X	X	X	
54	MSS	Steam Generator B, Restraint 2-SS-1	X	X	X	
55	MSS	Steam Generator B, Restraint 2-SS-2	X	X	X	
56	MSS	Steam Generator B, Restraint 2-SS-3	X	X	X	
57	MSS	Steam Generator B, Restraint 2-SS-4	X	X	X	
58	MSS	Steam Generator B, Restraint 2-SS-5	X	X	X	

Palisades ID Number	System	Location	Snubber in High Radiation Area During Shutdown*	Snubbers Especially Difficult To Remove	Snubbers Inaccessible During Normal Operation	Snubbers Accessible During Normal Operation
59	MSS	Steam Generator B, Restraint 2-SS-6	X	X	X	
60	MSS	Steam Generator B, Restraint 2-SS-7	X	X	X	
61	MSS	Steam Generator B, Restraint 2-SS-8	X	X	X	
62	SIS	On Low-Pressure Safety Injection Line Inside Cont Before Motor-Operated Valves			X	
63	SIS	Low-Pressure Safety Injection to T-82C			X	
64	SIS	Low-Pressure Safety Injection to T-82C			X	
65	MSS	On EBD-7 Steam to Aux Feed Pump				X

*Modifications to this Table due to changes in high radiation areas should be submitted to the NRC as part of the next license amendment.

4.16 Inservice Inspection Program for Shock Suppressors (Snubbers)

Applicability

Applies to periodic surveillance of safety-related hydraulic snubbers as listed in Table 3.20.1.

Objective

To specify the frequency and type of surveillance to be applied to the hydraulic snubbers.

Specifications

4.16.1 All snubbers listed in Table 3.20.1 shall be visually inspected. This inspection shall include but not necessarily be limited to, inspection of the hydraulic fluid reservoir, fluid connections, and linkage connections to the piping and anchor to verify snubber operability in accordance with the following schedule:

Number of Snubbers Found Inoperable During Inspection or During Inspection Interval	Next Required Inspection Interval
0	18 Months ± 25%
1	12 Months ± 25%
2	6 Months ± 25%
3, 4	124 Days ± 25%
5, 6, 7	62 Days ± 25%
≥8	31 Days ± 25%

The required inspection interval shall not be lengthened more than one step at a time.

Snubbers may be categorized in two groups, 'accessible' or 'inaccessible' based on their accessibility for inspection during reactor operation. These two groups may be inspected independently according to the above schedule.

4.16.2 Hydraulic snubbers whose seal material is other than ethylene propylene and which have not been demonstrated to be compatible with the operating environment shall be visually inspected for operability every 31 days.

4.16.3 The initial inspection, if not already completed, shall be performed within 6 months from the date of issuance of these specifications. For the purpose of entering the schedule in Specification 4.16.1, it shall be assumed that the facility had been on a 6-month inspection interval.

4.16.4 Once each refueling cycle a representative sample of at least 10% of the hydraulic snubbers listed in Table 3.20.1 shall be functionally tested for operability including verification of proper piston movement, lockup and bleed. For each snubber found inoperable, an additional sample of 10% of the hydraulic snubbers shall be tested until no more failures are found or all units have been tested. Snubbers of rated capacity greater than 50,000 pounds, those in high radiation areas during shutdown or those especially difficult to remove, need not be functionally tested provided operability was previously verified.

Basis

Snubbers are designed to prevent unrestrained pipe motion under dynamic loads (as might occur during an earthquake or severe transient) but still allow normal thermal motion during startup and shutdown. The consequence of an inoperable snubber is an increase in the probability of structural damage to piping as a result of a seismic or other event initiating dynamic loads. It is, therefore, required that all snubbers required to protect the primary coolant system or any other safety system or component be operable during reactor operation.

Because the snubber protection is required only during low probability events, a period of 72 hours is allowed for repairs or replacements. In case a shutdown is required, the allowance of 36 hours to reach a cold shutdown condition will permit an orderly shutdown consistent with standard operating procedures. Since plant start-up should not commence with knowingly defective safety-related equipment, Specification 3.20.1.c prohibits start-up with inoperable snubbers.

All safety-related hydraulic snubbers are visually inspected for overall integrity and operability. The inspection will

include the fluid reservoir, fluid connections, and any linkage connections to associated piping and anchors.

The inspection frequency is based upon maintaining a constant level of snubber protection. Thus, the required inspection interval varies inversely with the observed snubber failures. The number of inoperable snubbers found during a required inspection determines the time interval for the next required inspection. Inspections performed before that interval has elapsed may be used as a new reference point to determine the next inspection. However, the results of such early inspections performed before the original required time interval has elapsed (nominal time less 25%) may not be used to lengthen the required inspection interval. Any inspection whose results require a shorter inspection interval will override the previous schedule.

Experience at operating facilities has shown that the required surveillance program should assure an acceptable level of snubber performance provided that the seal materials are compatible with the operating environment.

Snubbers containing seal material which has not been demonstrated by operating experience, lab tests or analysis to be compatible with the operating environment should be inspected more frequently (every month) until material compatibility is confirmed or an appropriate changeout is completed.

Examination of defective snubbers at reactor facilities and material tests performed at several laboratories (Reference 1) have shown that millable gum polyurethane deteriorates rapidly under the temperature and moisture conditions present in many snubber locations. Although molded polyurethane exhibits greater resistance to these conditions, it also may be unsuitable for application in the higher temperature environments.

Data are not currently available to define precisely an upper temperature limit for the molded polyurethane. Lab tests and in-plant experience indicate that seal materials are available, primarily ethylene propylene compounds, which should give satisfactory performance under the most severe conditions expected in reactor installations.

To increase further the assurance of snubber reliability, functional tests should be performed once each refueling cycle. Where practical, these tests will include stroking of the snubbers to verify proper piston movement, lockup and bleed. Ten percent represents an adequate sample for such tests. Observed failures on these samples should require testing of additional units. Snubbers in high radiation areas or those especially difficult to remove need not be selected for functional tests provided operability was previously verified.

Snubbers of rated capacity greater than 50,000 pounds are exempt from the functional testing requirements because of the impracticability of testing such large units.

The snubbers associated with the steam generators are made by a different manufacturer and they have not experienced significant problems. Since these snubbers are connected into a complex system, certain tests are not considered practical. Because of the size of the steam generator snubbers and their complex system, these snubbers have been classified as especially difficult to remove. Verification of piston motion is considered adequate to demonstrate operability on a refueling cycle frequency.(1)

All applicable snubbers located inside the containment are classified as inaccessible during normal operation.

(1) Report H. R. Erickson, Bergen Paterson to K. R. Goller, NRC, October 7, 1974, Subject: 'Hydraulic Shock Sway Arresters.'

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 23 TO PROVISIONAL OPERATING LICENSE NO. DPR-20

CONSUMERS POWER COMPANY

PALISADES PLANT

DOCKET NO. 50-255

INTRODUCTION

During the summer of 1973, inspections at two reactor facilities revealed a high incidence of inoperable hydraulic shock suppressors (snubbers) manufactured by Bergen Paterson Pipesupport Corporation. As a result of those findings, the Office of Inspection and Enforcement required each operating reactor licensee to immediately inspect all Bergen Paterson snubbers utilized on safety systems and to reinspect them 45 to 90 days after the initial inspection. Snubbers supplied by other manufacturers were to be inspected on a lower priority basis.

Since a long term solution to eliminate recurring failures was not immediately available, the Division of Reactor Licensing sent a letter dated October 1, 1973, to operating facilities (including Palisades) utilizing Bergen Paterson snubbers specifying continuing surveillance requirements and requesting a submittal within one year of proposed Technical Specifications for a snubber surveillance program. By letter dated October 7, 1975, and as revised October 8, 1976, Consumers Power Company proposed Technical Specifications for hydraulic snubbers at the Palisades Plant. During our review of the proposed change, we found that certain modifications were necessary. These modifications were discussed with Consumers Power Company and have been incorporated into the proposed Technical Specifications.

EVALUATION

Snubbers are designed to prevent unrestrained pipe motion under dynamic loads as might occur during an earthquake or severe transient while allowing normal thermal movement during startup and shutdown.

The consequence of an inoperable snubber is an increase in the probability of structural damage to piping resulting from a seismic or other postulated event which initiates dynamic loads. It is, therefore, necessary that snubbers installed to protect safety system piping be operable during reactor operation and be inspected at appropriate intervals to assure their operability.

Examination of defective snubbers at reactor facilities has shown that the high incidence of failures observed in the summer of 1973 was caused by severe degradation of seal materials and subsequent leakage of the hydraulic fluid. The basic seal materials used in Bergen Paterson snubbers were two types of polyurethane; a millable gum polyester type containing plasticizers and an unadulterated molded type. Material tests performed at several laboratories (Reference 1) established that the millable gum polyurethane deteriorated rapidly under the temperature and moisture conditions present in many snubber locations. Although the molded polyurethane exhibited greater resistance to these conditions, it also may be unsuitable for application in the higher temperature environments. Data are not currently available to precisely define an upper temperature limit for the molded polyurethane. The investigation indicated that seal materials are available, primarily ethylene propylene compounds, which should give satisfactory performance under the most severe conditions expected in reactor installations.

An extensive seal replacement program has been carried out at many reactor facilities. Experience with ethylene propylene seals has been very good with no serious degradation reported thus far. Although the seal replacement program has significantly reduced the incidence of snubber failures, some failures continue to occur. These failures have generally been attributed to faulty snubber assembly and installation, loose fittings and connections and excessive pipe vibrations. The failures have been observed in both PWRs and BWRs and have not been limited to units manufactured by Bergen Paterson. Because of the continued incidence of snubber failures, we have concluded that snubber operability and surveillance requirements should be incorporated into the Technical Specifications. We have further concluded that these requirements should be applied to all safety related snubbers, regardless of manufacturer, in all light water cooled reactor facilities.

(1) Report H. R. Erickson, Bergen Paterson to K. R. Goller, NRC, October 7, 1974, Subject: Hydraulic Shock Sway Arrestors

The proposed Technical Specifications and Bases were developed to provide additional assurance of satisfactory snubbers performance and reliability. The specifications require that snubbers be operable during reactor operation and prior to startup. Because snubber protection is required only during relatively low probability events, a period of 72 hours is allowed for repair or replacement of defective units before the reactor must be shut down.

An inspection program is specified to provide additional assurance that the snubbers remain operable. The inspection frequency is based upon maintaining a constant level of snubber protection. Thus the required inspection interval varies inversely with the observed snubber failures. The longest inspection interval allowed in the Technical Specifications after a record of no snubber failures has been established is nominally 18 months. Experience at operating facilities has shown that the required surveillance program should provide an acceptable level of snubber performance provided that the seal materials are compatible with the operating environment. Snubbers containing seal material which has not been demonstrated to be compatible with the operating environment are required to be inspected every 31 days until the compatibility is established or an appropriate seal change is completed.

To further increase the level of snubber reliability, the proposed Technical Specifications require functional tests and internal inspections of snubbers at least once each refueling cycle. The tests will verify proper piston movement, lock up and bleed, and the internal inspections will monitor for wear, breakdown and deterioration that cannot be observed by the external inspections.

We have concluded that the proposed Technical Specifications, as modified, increase the probability of successful snubber performance, increase reactor safety and are therefore acceptable.

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 appraisal need not be prepared in connection with the issuance of this amendment.

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 accidents 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: January 19, 1977

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. 23 to Provisional Operating License No. DPR-20 issued to Consumers Power Company which revised Technical Specifications for operation of the Palisades Plant, located in Covert Township, Van Buren County, Michigan. The amendment is effective as of the date of issuance.

The operation of shock suppressors is required to protect the reactor coolant system and all other safety related systems and components and was assumed in the Staff Safety Evaluation Report. Operating history of these plants have indicated that shock suppressors were not always operable. Accordingly, this amendment requires the operability and surveillance of safety related shock suppressors.

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 amendment 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 the issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated October 7, 1975, as modified October 8, 1976, (2) Amendment No. 23 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 Operating Reactors.

Dated at Bethesda, Maryland, this 19th day of January 1977.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors