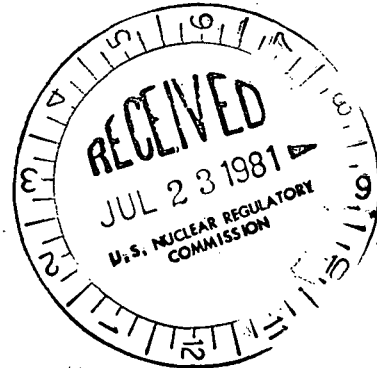


July 16, 1981

Docket No. 50-255
LS05-81-07-050

Mr. David P. Hoffman
Nuclear Licensing Administrator
Consumers Power Company
1945 W Parnall Road
Jackson, Michigan 49201



Dear Mr. Hoffman:

SUBJECT: SEP TOPIC V-5, REACTOR COOLANT PRESSURE BOUNDARY LEAKAGE
DETECTION - PALISADES

Enclosed is a copy of our revised draft evaluation of SEP Topic V-5 for Palisades. This assessment compares your facility, as described in Docket No. 50-255, with the criteria currently used by the regulatory staff for licensing new facilities. This revised draft evaluation factors in the information contained in the March 10, 1981 letter from the NRC to you regarding this subject for both Big Rock Point and Palisades, and information contained in SEP Topic V-10.A and available 10 CFR 50, Appendix I submittals for Palisades. Please inform us within 30 days whether or not your as-built facility differs from the licensing basis assumed in our assessment.

This evaluation will be a basic input to the integrated safety assessment for your facility unless you identify changes needed to reflect the as-built conditions at your facility. This assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this subject are modified before the integrated assessment is completed.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing

Enclosure:
SEP Topic V-5

cc w/enclosure:
See next page

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OFFICE	SEPB:DL	SEPB:DL	SEPB:DL	ORB#5:DL:PM	ORB#5:DL:C	AD,SA:DL
SURNAME	Kherring:dk	RHermann	WRussett	Twambach	DCrutchfield	Glainas
DATE	7/7/81	7/8/81	7/9/81	7/10/81	7/15/81	7/15/81

PALISADES

SYSTEMATIC EVALUATION PROGRAM TOPIC V-5

REACTOR COOLANT PRESSURE BOUNDARY (RCPB) LEAKAGE DETECTION

I. Introduction

The safety objective of Topic V-5 is to determine the reliability and sensitivity of the leak detection systems which monitor the reactor coolant pressure boundary to identify primary system leaks at early stage before failures occur.

II. Review Criteria

The acceptance criteria for the detection of leakage from the reactor coolant pressure boundary is stated in the General Design Criteria of Appendix A, 10 CFR Part 50. Criterion 30, "Quality of Reactor Coolant Pressure Boundary," requires that means shall be provided for detecting and, to the extent practical, identifying the location of the sources of leakage in the reactor coolant pressure boundary.

III. Review Guidelines

The acceptance criteria are described in the Nuclear Regulatory Commission Standard Review Plan Section 5.2.5, "Reactor Coolant Pressure Boundary Leakage Detection." The areas of the Safety Analysis Report and Technical Specifications are reviewed to establish that information submitted by the licensee is in compliance with Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems."

IV. Evaluation

Safety Topic V-5 was evaluated in this review for compliance of the information submitted by the licensee with Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems." The information in the Safety Analysis Report, Technical Specifications, the March 10, 1981 letter from the NRC to Consumers Power Co. regarding SEP Topic V-5 for Big Rock Point and Palisades, the April 21, 1979 letter from the NRC to Consumers Power Co. regarding SEP Topic V-10.A, and the available 10 CFR 50, Appendix I review information for Palisades was reviewed. Regulatory Guide 1.45 requires that at least three separate detection systems be installed in a nuclear power plant to detect an unidentified leakage from the reactor coolant pressure boundary to the primary containment of one gallon per minute within one hour. Leakage from identified sources must be isolated so that the flow rates may be monitored separately from unidentified leakage. The detection systems should be capable of performing their functions following certain seismic events and capable of being checked in the control room. Of the three separate leak detection

methods required, two of the methods should be (1) sump level and flow monitoring and (2) airborne particulate radioactivity monitoring. The third method may be either monitoring of condensate flow rate from air coolers or monitoring of airborne gaseous radioactivity. Other detection methods, such as humidity, temperature and pressure, should be considered to be alarms of indirect indication of leakage to the containment. In addition, provisions should be made to monitor systems interfacing with the reactor coolant pressure boundary for signs of intersystem leakage through methods such as radioactivity and water level or flow monitors. Plant incorporated systems and their corresponding features are tabulated in Enclosure 1. Detailed guidance for the leakage detection system is contained in Regulatory Guide 1.45.

Based upon our review of the referenced documents and the summaries presented in Enclosure 1, we have determined:

- 1) The systems employed for the detection of leakage from the reactor coolant pressure boundary to the containment do not meet the requirements of Regulatory Guide 1.45. Specifically, the airborne particulate radioactivity monitor required by the Guide is not present. The sensitivity of the sump level monitor is far from that indicated in Regulatory Guide 1.45. In addition, the sensitivity of the gaseous radiation is adequate at 1% failed fuel, but it is not clear that this is the case at lower amounts of failed fuel. There is insufficient information to determine the extent to which other Guide requirements are met.
- 2) Provisions are made to monitor reactor coolant in-leakage to those systems listed in Table 2 of Enclosure 1. However, from the review of the referenced information it is not clear that this table includes all systems which interface with the reactor coolant pressure boundary. In addition, information concerning the leak detection methods, similar to that given for the detection systems in Table 1 of Enclosure 1, is incomplete for those in Table 2.
- 3) Palisades FSAR Amendment 15 (Question 4.3) indicates that CVCS Makeup Flowrate is included as a Plant Incorporated System for leak detection, however, information regarding this method is not given such that Table 3 of Enclosure 1 is incomplete.
- 4) The Palisades Technical Specifications do not impose requirements concerning the operability of the leakage detection systems to monitor leakage to the primary containment, as required by Regulatory Guide 1.45.

V. Conclusions

- 1) The leakage detection systems incorporated for measurement of leakage from the reactor coolant pressure boundary to the containment are not in conformance with Regulatory Guide 1.45 criteria. The necessity for any modifications will be determined during the integrated safety assessment.
- 2) A section should be added to the Palisades Technical Specifications concerning operability of the reactor coolant pressure boundary to the containment leakage detection systems. Standard Technical Specification 3/4.4.6 and the corresponding surveillance requirements should be used as guidance for the development of this section for the leakage detection systems relied upon as a result of the integrated safety assessment.
- 3) Information concerning the leakage detection systems for the detection of inter-system reactor coolant pressure boundary leakage and the CVCS Makeup Flowrate is incomplete. Therefore, we cannot determine the extent to which Regulatory Guide 1.45 is met. The necessity for any modifications in this area will be considered during the integrated safety assessment.

REACTOR COOLANT PRESSURE BOUNDARY LEAKAGE DETECTION SYSTEMS
Regulatory Guide 1.45 Requirements

Table 1:

Plant: Palisades

<u>RCPB to Containment</u> System	Incorporated	Leak Rate Sensitivity	Time Req'd to Achieve Sensitivity	Earthquake For Which Function Is Assured	Control Room Indication For Alarms & Indicators	Documentation Reference	Testable During Normal Operation
1) Sump Level Monitoring (Inventory)	Yes	*25 gpm	1 hr.		Yes	FSAR Amend. 15, Question 4.3	
2) Sump Pump Actuations Monitoring (Time Meters)							
3) Airborne Particulate Radioactivity Monitoring							
4) Airborne Gaseous Radioactivity Monitoring	Yes	** .03 gpm	** 45 min.			FSAR Amend. 15, Question 4.3	
5) Condensated Flow Rate from Air Coolers							
6) Containment Atmosphere Pressure Monitoring							
7) Containment Atmosphere Humidity Monitoring	Yes	*2.5 gpm	1 hr.			FSAR Amend. 15, Question 4.3	
8) Containment Atmosphere Temperature Monitoring							
9) Accoustic Emissions							
10) Moisture Sensitive Tape							
11) Reactor Vessel Flange Pressure and Drain Tank Level Detectors	Yes				Yes	FSAR Amend. 15, Question 4.3	
12) Safety Valve and PORV Seat Leakage via Temperature Monitors	Yes					FSAR Amend. 15, Question 4.3	

* Based upon dividing the total leakage stated in the referenced documentation by 60 min. to derive the constant rate necessary during a 1 hr. period.

** Minimum sensitivity and time based upon an assumption of 1% failed fuel.

REACTOR COOLANT PRESSURE BOUNDARY LEAKAGE DETECTION SYSTEMS
Regulatory Guide 1.45 Requirements

Table 2:

Plant: Palisades

<u>Intersystem Leakage</u> Systems Which Interface w/ RCPB	Methods to Measure RCPB In-Leakage	Leak Rate Sensitivity	Time Req'd to Achieve Sensitivity	Earthquake For Which Function Is Assured	Control Room Indication For Alarms & Indicators	Documentation Reference	Testable During Normal Operati
1) Secondary System	Air Ejector Rad. Monitor	< 5 gpm			Yes	FSAR Amend. 5, Question 4.3	
2) Secondary System	Blowdown Rad. Monitor	< 5 gpm			Yes	FSAR Amend. 5, Question 4.3	
3) Component Cooling Water System	Rad. Monitor				Yes	8/6/70 AEC SEP Sect. 3.10, and 4/21/79 NRC Ltr.	
4) Component Cooling Water System	Surge Tank Level					to CPCo re: SEP Topic V-10.A 4/21/79 NRC Ltr. to CPCo re: SEP	
5) Control Rod Drive Mechanisms	Seal Leak-off Line Thermocouple				Yes	Topic V-10.A FSAR Amend. 5, Question 4.3	
6)							
7)							
8)							
9)							
10)							
11)							
12)							

REACTOR COOLANT PRESSURE BOUNDARY LEAKAGE DETECTION SYSTEMS
Regulatory Guide 1.45 Requirements

Table 3:

Plant: Palisades

RCS Inventory Balance

Leak Rate Sensitivity	<1 gpm						
Corresponding Time Required to Achieve Sensitivity							

*Normal Inventory Check

Instrumentation Required with Corresponding Location:

Earthquake For Which Instrumentation Hardware Functioning Is Assured:

Testable During Normal Operation:

Documentation Reference: FSAR Amend. 15, Question 4.3