



Consumers
Power
Company

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 US NRC
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Director, Nuclear Reactor Regulation
 Att Mr Dennis M Crutchfield, Chief
 Operating Reactors Branch No 5
 US Nuclear Regulatory Commission
 Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 -
 PALISADES PLANT - RESPONSE TO STATION ELECTRIC
 DISTRIBUTION SYSTEM VOLTAGE

Consumers Power Company was requested by NRC letter dated June 19, 1980, to provide additional information on adequacy of station electric distribution system voltages for our Palisades Plant. This information was supplied to you by letter dated August 22, 1980.

In that response we stated that Item 5, compliance with General Design Criteria (GDC)-17, would be addressed under our SEP evaluation. We have recently been informed, by the NRC, that the GDC-17 evaluation is no longer an SEP topic and that a response to Item 5 of your June 19, 1980 letter needs to be addressed. Our response is as follows:

Item 5

As per Reference e (NRC letter (Ziemann) to CP Co (Bixel) dated November 16, 1979), the generic issue in Reference b (NRC letter on adequacy of station electric distribution system voltages August 8, 1979) is part of SEP topic VIII-1-A. CP Co should, therefore, review the station power system for possible violation of GDC-17 as requested in Reference b.

Response to Item 5

10CFR50, Appendix A, "General Design Criteria For Nuclear Power Plants," establishes what is generally considered the minimum requirements for the principal design criteria for water-cooled nuclear plants. Although Appendix A establishes the minimum requirements, it also recognizes that "different criteria will be needed to take into account unusual sites and environmental conditions." Appendix A also states that there may be plants "for which fulfillment of some of the General Design Criteria may not be

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necessary or appropriate. For plants such as these, departures from the General Design Criteria must be identified and justified." The following identifies and justifies departures from General Design Criteria (GDC) 17 for the Palisades Plant.

GDC-17 requires the plant to have an "Electric Power System" which permits the functioning of safety systems to "provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded...and (2) the core is cooled and containment integrity and other vital functions are maintained...."

In order to accomplish the above safety functions, the criteria further requires separate and redundant on-site electric power supplies, including batteries and on-site distribution systems. The criteria also requires two physically independent power sources feeding power to only two distribution systems. It also permits two of these sources to originate from one principal source, a common switchyard.

The Palisades Plant on-site electric power sources include batteries, two diesel generators, and the on-site electric distribution system. These sources have sufficient independence, redundancy and testability to perform the above two safety functions assuming the single failure of one of the on-site diesel generators. The Palisades Plant is, therefore, in full compliance with the on-site requirements of the criteria.

Off-site power from the transmission network, with the unit off line, is supplied by one circuit from the switchyard to the plant. This circuit is located on a set of double circuit towers along with the generator line to the switchyard (delay access line). This delayed access line can be made available by disconnecting the generator links (approximately 4-6 hours) and backfeeding through the main transformer and station power transformer to the on-site distribution system. Due to the time required to disconnect the links, no credit is taken for the delay access line.

GDC-17 established a very conservative requirement that only one power source remains available from the four that are required to be installed. This requires the failure of three out of four sources which exceeds the generally accepted single failure criteria. Consumers Power Company considers this criteria to be excessive based on the following:

The Palisades Plant FSAR Section 14.8.1 refers to an outage rate of 0.035 outages/mile/year on double circuit towers, as reported by two other utilities. Our own data, compiled between 1969 and 1978, demonstrates an outage rate of 0.0058 outages/tower mile/year. The probability of losing the off-site source is only 0.0029/year for 0.5 mile of tower line.

The probability of both diesel generators failing to start is 10^{-3} according to the WASH-1400, Appendix III, "Failure Data," October 1975.

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Therefore, the probability of losing all three power sources at the same time is 2.9×10^{-6} .

Based upon the above consideration, loss of off-site power combined with failure to start the diesel generators contribute far less than 5% to the probability of core melt. Based on the above discussion, the addition of another transmission line would not reduce the likelihood of the loss of off-site power enough to justify its installation.

The above statistics conservatively neglect the safety feature at the Palisades Plant which allows heat to be removed from the primary system without benefit of any power. Loss of off-site power combined with inability to start either diesel generator does not result in core damage. Adequate core cooling will still occur with natural circulation in the primary coolant system and feedwater provided to the steam generators from the turbine driven auxiliary feedwater pump. The mode of cooling is controlled by the "loss of control power" portion of Emergency Operating Procedure EOP 10 and can continue during the time required to restore one or all of the power sources.

In summary, the Palisades Plant was initially licensed with only three power sources. We feel that there is a high probability that (1) specified acceptable fuel design limits and design conditions are not exceeded and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. These safety functions are accomplished through the low probability of losing all three power sources combined with loss of control power procedures.

Consumers Power Company feels that the departure from General Design Criteria 17 at the Palisades Plant is adequately justified and, therefore, has no plans to modify the plant electric power system.



David P Hoffman
Nuclear Licensing Administrator

CC Director, Region III, USNRC
NRC Resident Inspector-Palisades