



Consumers
Power
Company

General Offices, 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

October 18, 1974

Directorate of Licensing
US Atomic Energy Commission
Washington, DC 20545

Re: Docket 50-255
License DPR-20
Palisades Plant
AO-22-74

Gentlemen:

Attached is Abnormal Occurrence Report AO-22-74 which covers our finding that the low-flow trip set points for two Primary Coolant Pumps (PCP) and three PCP configurations were in error. Since the plant has not operated with these pump configurations, no safety limits were violated. As the attached report shows, a temporary and conservative set point for three PCP operation has been established should the plant desire to use the three PCP combination.

Yours very truly,

Ralph B. Sewell (Signed)

DAB/map

Ralph B. Sewell
Nuclear Licensing Administrator

CC: JGKeppler, USAEC

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PALISADES PLANT
Abnormal Occurrence Report AO-22-74

1. Report No: AO-22-74, Docket 50-255
- 2a. Report Date: October 18, 1974
- 2b. Occurrence Date: October 10, 1974
3. Facility: Palisades Plant, Covert, Michigan
4. Identification of Occurrence: The low-flow trip set points for two- and three-pump (Primary Coolant Pump) operation were found to be below Technical Specifications limits.
5. Conditions Prior to Occurrence: The plant was operating in the four-pump configuration at approximately 30% power.
6. Description of Occurrence: A possible violation was detected on October 3, 1974, when a vendor procedure (P-CE-3962) was reviewed and it was found that the present set points appeared to be less conservative than those recommended in P-CE-3962. This information was verbally reviewed with a member of the Directorate of Regulatory Operations Region III staff on October 4, 1974. At that time, it was mutually concluded that pending the outcome of a further detailed review by the Plant Review Committee (PRC) the event would be appropriately classified. Immediate review was not required because of the combination of the small potential error, measured flow being greater than was used in the Safety Analysis and the authorized low power level.

Separate analyses, of available information, were made both at the plant and in the General Office, after which a Plant Review Committee meeting was held at the plant on October 10, 1974 with five members of the General Office staff present. It was determined at this meeting that the set points for two- and three-pump operation were below Technical Specifications limits.

7. Apparent Cause: The cause of the problem is that in calculating trip set points for all pump configurations the flow-to-dP relationship was assumed to be a square root function based on four-pump flow. It has since been determined that the square root function applies only when the trip set point is based on a percent of original flow for the specific pump configuration in use. An example helps clarify this position. Assume, for the example, that three-pump flow (F_3) equals 73.8% of four-pump flow (F_4). The Technical Specifications have a minimum trip set point of 71% of four-pump flow. The original calculations showed that 90% of three-pump flow was more conservative than the calculated minimum set point; therefore, this value was used as the set point:

$$dP_{3 \text{ trip}} = (0.9)^2 dP_3 = 0.81 dP_3$$

However, assuming measured three-pump flow equals 73.8% of measured four-pump flow, the previously calculated set point is shown to be in error:

$$F_3 = 0.738 F_4$$

$$F_{\text{trip}} = 0.71 F_4 = \frac{0.71}{0.738} F_3$$

$$dP_{3 \text{ trip}} = \left[\frac{0.71}{0.738} \right]^2 dP_3 = 0.926 dP_3$$

A similar analysis shows that the two-pump trip set point was also below Technical Specifications limits.

8. Analysis of Occurrence: Since the plant has not operated in the two- or three-pump configuration at power, no safety limits were violated. Also, because all information used to determine the Technical Specifications limits is not immediately available, the determination as to possible safety problems had the plant operated in these modes has not been analyzed.
9. Corrective Action: Several steps of corrective action were recommended by the Plant Review Committee:
 - a. Initiate administrative controls to limit reactor operation in the two-pump mode to the hot standby condition until the proper flow trip set points are established.
 - b. Set the high power trip set point for three-pump operation at 25% power. This is based on the fact that normal two-pump operation allows 25% reactor power, and the three-pump flow trip set point presently established is well above the 46% Technical Specifications limit for two-pump flow. Given that flow exceeds the minimum allowable for 25%, the power level of 25% is conservative.
 - c. We are engaged in discussions with Combustion Engineering to establish justification for new low-flow trip set points. When this data becomes available, a Technical Specifications change will be initiated to alleviate the present situation.
10. Failure Data: Not applicable.