Consumers Power Company

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February 11, 1972

Dr. Peter A. Morris, Director
Division of Reactor Licensing
United States Atomic Energy
Commission
Washington, DC 20545

Re: Docket No 50-255
License No DPR-20

Dear Dr. Morris:

This letter is written to apprise you of two events that occurred recently at the Palisades Plant. These events were the failure of a safety injection system containment sump isolation valve to open during quarterly surveillance testing and the deliberate misalignment of a control rod drive mechanism (CRDM) during plant operation so that an azimuthal zennon transient test could be conducted.

On February 1, 1972, during exercising of safety injection system valves as required by Article 4.6.4-a of the technical specifications, CV-3029 (one of two containment sump isolation valves) failed to respond to an open signal. This valve is a double acting piston, air-operated, 24-inch gate valve.

At the time the incident occurred, the reactor was operating at a power level of approximately 440 MW_t. Generator output was 105 MWe (gross). The three-month interval safety injection system testing was in progress to meet technical specification requirements. The results of these tests were all acceptable with the exception of CV-3029.

Normal air pressure to operate this valve is supplied at 90 - 100 psig. This air pressure supply was increased to 130 psig and the valve opened. As it started to open, the gate appeared to "pop" loose from the valve seat and then stroke normally to the full open position. The valve was stroked several times at both the elevated air pressure and the normal operating pressure. The valve was considered operable following this testing. However, it was decided to increase the testing frequency to assure that the valve would continue to operate while further investigating the cause of the erratic operation of CV-3029.

Originally, this valve (and its redundant valve CV-3030) was installed with a double acting air operator, storage tank, air pressure booster and individual pressure regulators to the opening and closing sides of the valve operator. The purpose of the booster and air storage tank was to provide a sufficient capacity of stored air to cycle the valve one time after a complete loss of instrument air. Several other valves in each engineered safeguards room were provided with air boosters and storage tanks to provide the ability to operate these valves one cycle following a complete loss of air pressure. Because of the difficulties experienced in achieving reliable operation due to problems with the boosters during the initial testing of these valves, changes were made which eliminated the use of the air boosters and individual storage tanks. A new high-pressure air system was installed in each engineered safeguards room (refer to Section VII of the Semiannual Report of Operations No 1). These new systems provided accumulators to cycle each valve connected to the system at least once following a loss of the air compressor. The modifications were designed and installed by the Bechtel Corporation and reviewed by Consumers Power Company personnel.

During the investigation into the difficulty experienced in opening CV-3029 February 1, 1972, the valve manufacturer was contacted regarding valve timing and operating pressure requirements under the design conditions of operation. The valve manufacturer informed us that the valve installed in the vertical upright position should be closed with an air pressure that is slightly less than the pressure provided to open the valve. In addition, the valve stroke on closing should be uniform and total travel time should not be less than one minute. The minimum operating requirements change with valve orientation because of the consideration of the weights of the moving portions of the valve. CV-3030 is mounted upside down while CV-3029 is mounted about 45 degrees below a horizontal position. The assumption of a valve installed in the upright position is the limiting condition with regard to differences in opening and closing air pressure required for proper operation of the valve under design conditions.

When the new air systems were installed and the air boosters removed, the pressure provided to the opening and closing sides of CV-3029 and CV-3030 were the same. This was adequate for CV-3030 and marginal for CV-3029. No instructions from the manufacturer existed when the modifications were made; consequently, the personnel reviewing the modifications did not appreciate the relationships of opening and closing supply pressure for these two large valves.

In light of the above discussion, the cause of this incident has been designated as inadequate review of modifications made to established plant design. Our general office review procedures have been strengthened during the past year in accordance with 10 CFR 50, Appendix B. These procedures are being reevaluated in light of this occurrence for possible areas of improvement.

Plans are being made to revise the operating scheme of these two valves such that a greater air pressure is available to open the valve than is provided for closing the valve. This will provide adequate margin in operating pressure to insure the valves will operate under the design conditions even if they were in the most limiting orientation, ie, upright. Until this modification is completed, the valve will be closed by manually controlling the closing pressures such that they are less than the opening pressure.

Two completely redundant containment sump isolation valves are provided. Therefore, the failure of one valve does not impair the ability of the safety injection system to perform its design function in the recirculation mode of operation. In addition, the technical specifications provide appropriate rules governing plant operation with inoperable components present in the safety injection system. A single component being inoperable does not negate the ability of the safety injection system to perform its function, but it does reduce the redundancy provided by design. The time limits for operation with an inoperable component provide assurance that the reactor will not be operated for an extended time period with an inoperable component.

The possibility of recurrence of this type of failure will be reduced by providing a greater air pressure to open the valve than to close it. Until this modification is completed, the same effect will be provided by manual control of the closing pressures.

In the unlikely event this valve were again to stick in the closed position, it could be opened by manually increasing the air pressure supplied to the opening side of the valve operator. The valve operator is designed to withstand 400 psi. The air systems installed in the engineered safeguards rooms provide 325 psi air.

On February 2, 1972, control rod drive mechanism (CRDM) No 33 was misaligned from the remainder of regulating Group 3 so that an azimuthal zennon transient test could be conducted.

The effects of this deliverate misalignment of CRDM No 33 were analyzed in accordance with Article 3.10.4-c of the technical specifications prior to starting the test. Hot channel factors were shown to be within design limits under the test conditions. In addition, the test was discussed with Division of Compliance personnel prior to starting the test. It was concluded from these discussions that the operation with a deliberately misaligned CRDM should be reported in accordance with Section S-5 of the Special Technical Specifications.

The test procedure required CRDM No 33 to be fully inserted for five hours and then withdrawn to its normal position at the upper electrical limit with the remainder of reactor regulating Group 3. During the positioning of CRDM No 33, boron concentration was adjusted to maintain essentially constant power level. While the CRDM was

misaligned and after it was withdrawn, data were to be gathered by monitoring neutron instrumentation. These data were to be analyzed for azimuthal zennon transient effects.

Unfortunately, the reactor tripped due to a feed-water transient before the test could be completed. Therefore, it will be necessary to conduct another test at a later date when the plant has been returned to operation.

Yours very truly,

Ralph B. Sewell (Signed)

RBS/dmb

Ralph B. Sewell
Nuclear Licensing Administrator