

Kenneth W Berry Director Nuclear Licensing

General Offices. 1945 West Parnall Road, Jackson, MI 49201 . (517) 788-1636

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Nuclear Regulatory Commission Document Control Desk Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT -RESPONSE TO NRC BULLETIN 88-08 - THERMAL STRESSES IN PIPING CONNECTED TO REACTOR COOLANT SYSTEMS

Nuclear Regulatory Commission Bulletin 88-08, Thermal Stresses in Piping Connected to Reactor Coolant Systems, dated June 22, 1988, and Supplements 1 and 2 to the bulletin, requires Consumers Power Company to review unisolable piping connected to the Reactor Coolant System to identify where temperature distributions could result in unacceptable stresses and to take action where such piping is identified. The bulletin also requires written confiramtion that the required actions have been completed and a description of the results of the review.

A review of systems connected to the Reactor Coolant System (Primary Coolant System - PCS) at Big Rock Point, was performed. Concerns identified by the bulletin were considered during the system evaluation. Based on industry experience, the Nuclear Regulatory Commission identified the potential for thermal fatigue in unisolable stagnant piping connected to the PCS. Specifically, undesirable stresses resulted when water, which was significantly cooler and at higher pressure than the primary system, leaked through normally closed valves into a stagnant portion of the PCS. The subsequent temperature stratification produced thermal stress cracking in the immediate area. Our actions regarding this subject, are provided herein.

For the purpose of this evaluation the area of interest was considered to be all primary system ASME Class 1 piping. Interfacing systems within this boundary were reviewed. Vents and drains as well as passive piping, such as instrument and sample lines, were considered not applicable and were excluded from the evaluation. Three systems were determined to fall within the criteria of the stated concern. These systems and their potential to initiate thermal stresses as described in the bulletin are addressed below.

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Feedwater System (FWS)

This system is an extension of the PCS. Its design and operation considers the injection of cooler, high pressure water into the primary system. The results of our evaluation has determined that temperature stratification will not occur at the system interface, therefore, the Feedwater System is not subject to the concerns stated in the bulletin.

Liquid Poison System (LPS)

This system is designed to inject a sodium pentaborate solution into the PCS. The solution is maintained at a higher pressure and cooler temperature than the PCS. Leakage into the PCS is not probable by design. System inlet and outlet are provided with positive acting squib valves which preclude inadvertent leakage. Additionally, the inlet is supplied by a check valve to prevent reverse flow, while the outlet includes a control valve capable of isolating LPS injection. The LPS piping is designed to operate at the same pressures and temperatures as the primary system. Any leakage of solution into the primary system would be readily detectable as a result of the negative reactivity effects of the sodium pentaborate as well as various alarms associated with the system. The results of our evaluation has determined that temperature stratification will not occur at the system interface, therefore, the Liquid Poison System is not subject to the concerns stated in the bulletin.

Control Rod Drive System (CRD)

Various CRD system flow paths operate at higher than reactor pressure. The two flow paths of interest are the cooling path through the CRD mechanisms to the bottom of the reactor and the return line to the PCS utilized during control rod manipulation. The cooling line is adjusted to reactor pressure plus 30 psi. It provides 0.1 gpm to 0.5 gpm of cooling water to the control rod drive to prevent temperatures from exceeding 250°F. The cooling water passes through the drive mechanisms into the bottom of the reactor vessel. The reduction of thermal stress established by this flow is an inherent design of both the system and reactor vessel. In addition, the CRD mechanism is capable of being isolated.

The return line provides a path for displaced hydraulic water during the normal manipulation of a control rod drive. Its pressure is adjusted to reactor pressure plus 200 psi. It discharges into the return line of the Reactor Cleanup System. A thermal sleeve is installed at this branch connection with the cleanup system because of previous concerns similar to those raised by the bulletin. This design consideration precludes establishing the conditions needed to induce cracking. In addition, this piping is capable of being isolated by various valves. The results of our evaluation has determined that temperature stratification will not occur at the system interface, therefore, the Control Rod Drive System is not subject to the concerns stated in the bulletin. Nuclear Regulatory Commission Big Rock Point Plant Response to NRC Bulletin 88-08 September 26, 1988

Conclusion

In conclusion, it is determined that for all systems evaluated, either thermally induced stress was a design consideration, or the conditions needed to initiate cracking as stated in NRC Bulletin 88-08 does not exist. Subsequently, and in accordance with the direction provided by the bulletin, no additional action is required.

reach for Kenneth Berry

Director, Nuclear Licensing

CC Administrator, Region III, NRC NRC Resident Inspector - Big Rock Point

CONSUMERS POWER COMPANY

Big Rock Point Plant Docket 50-155 License DPR-6

NRC Bulletin 88-08

At the request of the Commission and pursuant to the Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974, as amended, and the Commission's Rules and Regulations thereunder, Consumers Power Company submits our response to NRC Bulletin 88-08 dated June 22, 1988, entitled, "Thermal Stresses in Piping Connected to Reactor Coolant Systems." Consumers Power Company's response is dated September 26, 1988.

CONSUMERS POWER COMPANY

By David P Hoffman, Vice President Nuclear Operations

Sworn and subscribed to before me this 26th day of September, 1988.

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Elaine E Buehrer, Notary Public Jackson County, Michigan My commission expires October 31, 1989