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PERRY NUCLEAR POWER PLANT

Al Kaplan

VICE PRESIDENT
NUCLEAR GROUP

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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440, 50-441
NRC Bulletin 88-08
Thermal Stresses in Piping
Connected to Reactor Coolant Systems

Gentlemen:

The subject bulletin is concerned with unisolable piping connected to the reactor coolant system (RCS) which may be subject to damage from thermal fatigue. As noted in the Bulletin, thermal fatigue of unisolable piping connected to the RCS can occur when the connected piping is isolated by a leaking block valve, the pressure upstream from the block valve is higher than RCS pressure, and the temperature upstream of the block valve is significantly cooler then RCS temperature.

For the reasons given in the attachment, piping connected to the Perry RCS is not subject to fatigue from these factors, and remains in compliance with General Design Criterion 14 of 10CFR50 Appendix A.

If you have further questions, please feel free to call.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

AK/sc

cc: T. Colburn
K. Connaughton
USNRC Region III

IE16
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Perry RCS Connected Piping Systems

The following systems were evaluated and found not to be susceptible to thermal fatigue due to contributing factors identified in NRC Bulletin 88-08. In the PWR incident described in the bulletin, significantly cooler water leaked by a single isolation valve and exposed unisolable hot piping to temperature cycling. Differences in configuration and operating conditions preclude this occurrence at Perry. Specific to Perry, the following systems, which may involve a stagnant interface between the reactor coolant system (RCS) and connected systems at colder temperatures, have been evaluated.

Residual Heat Removal (RHR) Including Low Pressure Coolant Injection

The design pressure upstream of the isolation and check valves is 500 psig; normal operating RCS pressure downstream is 1035 psig. No water can leak through the isolation valve into the reactor coolant piping (regardless of valve tightness), unless the reactor is depressurized below approximately 330 psig with an RHR pump running while the system is isolated from the reactor. This operating mode is too limited in duration to represent a fatigue limit concern. In the standby mode this system is maintained at the pressure necessary to keep the injection line filled up to the RCS isolation valves (less than 100 psig) which is well below reactor operating pressure (1035 psig). Therefore, no leakage flow is possible into the reactor coolant piping when in the standby mode.

Low Pressure Core Spray

The design pressure upstream of the isolation and check valve is 600 psig and the normal operating RCS pressure downstream is 1035 psig. No water can leak through the isolation valve into the reactor coolant piping (regardless of valve tightness) unless the reactor is depressurized below approximately 330 psig with the LPCS pump running while the system is isolated from the reactor. This operating mode is too limited in duration to represent a fatigue limit concern. It should also be noted that the vast majority of time spent depressurized is spent in the Cold Shutdown operational condition without a significant temperature differential existing.

High Pressure Core Spray (HPCS)

The design pressure of this system is sufficient to inject water into the reactor coolant piping. However, in the standby mode this system is maintained at the pressure necessary to keep the injection line filled up to the RCS isolation valve (less than 100 psig) which is well below reactor operating pressure (1035 psig). Therefore, no leakage flow is possible into the reactor coolant piping when in the standby mode. The system is subjected to a quarterly flow test; this operating mode is also too limited in duration to represent a fatigue limit concern.

Reactor Core Isolation Cooling

This system is maintained at a pressure lower than the reactor coolant piping except for quarterly flow test and core cooling modes of operation. Flow testing is performed at pressures that could cause some RCS inleakage, but test duration (about 1/2 hour) does not represent a significant accumulation of fatigue cycles.

Reactor Water Cleanup and Feedwater

These systems are normally operating, and are analyzed and designed for thermal gradients created as the result of their operation.

Standby Liquid Control

No leakage is expected past the explosive-actuated (squib) injection valves between this system and the RCS.

Michael D. Lyster who, being duly sworn, deposed and said that (1) he is General Manager, Perry Plant Operations Department of The Cleveland Electric Illuminating Company, (2) he is duly authorized to execute and file this report on behalf of The Cleveland Electric Illuminating Company and as duly authorized agent for Duquesne Light Company, Ohio Edison Company, Pennsylvania Power Company and the Toledo Edison Company, and (3) the statements set forth therein are true and correct to the best of his knowledge, information and belief.

Michael D. Lyster

Michael D. Lyster

Sworn to and subscribed before me, this 27th day of September, 1988.

Jane E. Mott

JANE E. MUTT
Notary Public, State of Ohio
My Commission Expires February 20, 1990
(Recorded in Lake County)