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November 16, 1983

In reply, pleas
refer to LAC-9430

DOCKET NO. 50-409

Mr. James G. Keppler, Regional Administrator
Directorate of Regulatory Operations
U. S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

SUBJECT: DAIRYLAND POWER COOPERATIVE
LA CROSSE BOILING WATER REACTOR (LACBWR)
PROVISIONAL OPERATING LICENSE NO. DPR-45
ADDITIONAL INFORMATION WITH REGARDS TO
RESPONSE TO CONFIRMATORY ACTION LETTER

REFERENCES: (1) DPC Letter, Linder to Keppler, LAC-9243, dated August 5, 1983
(2) NRC Letter, Keppler to Linder, dated July 27, 1983

Dear Mr. Keppler:

Reference 1 contained DPC's response to the Confirmatory Action letter (Reference 2) on the July 16, 1983 event at LACBWR. During a meeting at the NRC Region III office on August 8, 1983, several questions were asked about DPC's response. This letter will document the answers to the questions dealing with stress to the reactor vessel and seal inject system due to the July 16, 1983 incident. The information has been previously verbally conveyed to C. Norelius and D. Danielson, respectively, of the NRC Region III office.

Enclosed is a modified version of Table 3 of Reference 1, in which some typographical errors are corrected. The question was raised as to why the stress was considered acceptable if Equation 10 of the ASME Code was not satisfied. Note 1 to the table explains that per the ASME Code, Section NB-3653.6, a component satisfies the design requirement of the Code if it satisfies Equations [illegible], [illegible], and 11 or 9, 12, 13 and 14 of NB-3653. The stresses calculated [illegible] the August, 1974 event were within those allowed by Equations 9, 12, [illegible] of the ASME Code, Section NB-3653.

Another question was asked during the meeting on what effect the shift in the reactor vessel RT-NDT (Reference Nil-Ductility Transition Temperature) has on the vessel analysis. The answer is that there is no effect on determination of the magnitude of the stresses. The magnitude of the stress does have an

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effect on how close to the current RT-NDT the vessel is allowed to get, but as long as the vessel temperature remains above the established margin, there is no effect. During the July 16, 1983 event, the vessel temperature remained above the limits established for approach to RT-NDT.

Attached to this letter is a revised answer to NRC Question 5 of Reference 2. This revision, plus the enclosed additional information, should answer the questions on the effect the transient had on the seal inject system.

If there are additional questions, please contact us.

Yours truly,

DAIRYLAND POWER COOPERATIVE

Frank Linder

Frank Linder
General Manager

FL:LSG:ee

Enclosure

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

R. Dudley

THE FOLLOWING ADDITIONAL INFORMATION ON THE SEAL INJECT SYSTEM WAS REQUESTED BY THE NRC:

A. Seal Inject Pump Design Specifications

- ° Manufacture - Aldrich Pump Company
- ° Design Pressure - 1600 psig
- ° Discharge Flange - Class 1500 lb

B. Piping System Hydrostatic Pressure Test

The original hydrostatic test on the Seal Inject System discharge piping was done at a minimum of 2250 psig. This is in accordance with ANSI B31.1 which requires the hydro pressure to be 1.5 times the system design pressure.

C. Pump Discharge Pressure Relief Valve Setting

The two Seal Inject pump relief valves were removed and tested. The relief pressures were found to be set at 1560 psig and 1580 psig. The relief valve back pressure is approximately 20 psig. This would result in the relief valves lifting at a system pressure of 1580 psig and 1600 psig respectively. ASME Code requires that pressure relief valve blowing pressure should not exceed 110% of the design pressure.

D. Piping System Walk Down

A piping system walk down was conducted on the Seal Inject System on August 3, 1983. The piping system was inspected for pipe distortion, pipe hanger and hanger anchorage adequacy, pipe ding or rub marks, and damaged flanges. No piping system problems were observed.

NRC QUESTION:

5. Evaluate the effect of the pressure transient on the Seal Inject System.

DPC RESPONSE:

The LACBWR Seal Inject system piping on the pump discharge side was designed per ANSI B31.1 1955 Edition for a working pressure of *1500* psig at 120°F. Relief valves on the pump discharge side and piston accumulator tank nitrogen side are set at 1600 psig. A check valve in the seal inject discharge line is located upstream of the piston accumulator tank inlet to prevent backflow to the pumps when the piston accumulator tanks are supplying seal water. Bladder accumulator tanks are present on the 1A and 1B seal inject pump discharge and suction side, and also in the common discharge line after the piston accumulator tank inlet. These bladder accumulator tanks are charged with nitrogen on the bladder side and are present to reduce system pulsations.

During normal system operation, one seal inject pump supplies seal water to the 1A and 1B forced circulation pump seals and to the upper control rod drive shaft seals. A bypass valve around each pump is used to regulate seal inject flow. The standby seal inject pump will start if the pump bypass flow reaches a minimum value of 15 GPM. The piston accumulator tanks will supply seal water if the system differential pressure (forced circulation pump suction to seal inject discharge to the seals) falls below 60 psi and stop when the differential pressure reaches 200 psi. A pressure regulator limits the piston accumulator nitrogen pressure to 200 psi over the forced circulation pump suction pressure. The nitrogen is fed into the piston accumulators through a control valve with a 7/32 inch orifice. Once system differential pressure reaches 200 psi the nitrogen in the piston accumulators is vented to the off gas system. The piston accumulator tanks have sufficient capacity to supply forced circulation pump seal water for a sufficient time to allow the pumps to coast to a stop.

The seal inject pressure perturbation of July 16, 1983 started with the improper valving in of the standby forced ciculation pump seal filter. This caused the standby seal inject pump to start on low bypass flow. The piston accumulator system also cycled during this pressure perturbation.

Pressure perturbations in the seal inject system have happened in the past where the standby seal inject pump has started causing the pump discharge relief valves to lift. No damage to the seal inject system has been observed to date from these pressure perturbations.

The piping system water hammer is kept to a minimum due to the pressure relief valves, bladder accumulators, and forced circulation pump seal leak off.

TABLE 3

SUMMARY OF STRESS ANALYSIS RESULTS (August 28, 1974 Incident)

Region	Primary Stress Intensity (Equation 9 of ASME Code) (psi)	Primary Plus Secondary Stress Intensity (Equation No. 10 of ASME Code) Sn (psi)	Peak Stress Intensity (Equation 11 of ASME Code) Sp (psi)	Simplified Elastic Plastic Discontinuity Analysis			Allowable number of stress cycles (M)
				(Equation 12 of ASME Code) (psi)	(Equation 13 of ASME Code) (psi)	Alternating stress intensity $S_{alt}=1/2$ Sp or, Equation 14 of ASME Code (psi)	
Reactor Outlet Nozzle	5,269 (40,050)*	36,264 (80,100)	60,000			30,000	20,000
Reactor Inlet Nozzle	5,014 (40,050)*	72,596 (80,100)	123,305			61,653	2,000
Recirculation Piping Header Elbow	9,882 (27,150)	63,642 (54,300)	73,522	18,517 (54,300)	14,496 (54,300)	49,410	4,500
Pump Suction Piping/ Casing Transition	5,583 (25,425)	57,044 (50,850)	95,403	291 (50,850)	26,615 (50,850)	59,322	2,500

*Number in Parenthesis indicates ASME Code allowable stress values.

Note 1: According to Section NB-3653.6 of ASME Code, a component satisfies the design requirements of the Code if it satisfies equations 9, 10 and 11 or 9, 12, 13 and 14.