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May 6, 1981


United States Nuclear Regulatory Commission
Attention: Mr. Thomas Novak,
Assistant Director for Operating Reactors
Division of Licensing
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Pressurizer Safety Valve Discharge Line Modifications

Gentlemen:

Duquesne Light Company letter dated November 14, 1980 described administrative controls and other actions which the Company placed into effect at Beaver Valley Unit No. 1 to assure safe operation of the Unit without water filled loop seals upstream of the pressurizer power operated relief valves and the pressurizer safety valves. This letter indicated that operation without these water loop seals would be limited to a period of six months. We are now requesting an extension of that operating time to the 2nd refueling.

The present national coal strike has caused us to reexamine our plans for modifying Beaver Valley Unit 1. Operation of Beaver Valley conserves approximately 9000 tons of coal or 30,000 barrels of oil per day. Continued operation of Beaver Valley will substantially extend our fossil fuel reserves and will reduce costs which our customers will incur due to replacement of coal with more expensive oil. This will significantly help to conserve oil supplies, one of our most valuable national resources. Motivated by these concerns, we have examined the safety significance of continued operation of Beaver Valley without water loop seals on the pressurizer code safety valves.

The Company had made modifications to reestablish the water loop seals on the power operated relief valves after it was determined by analysis that the pipe supports on the discharge piping of the power operated relief valves met the appropriate design criteria. With the reestablishment of the water loop seals on the PORV's, these valves are now exposed to the same operating conditions for which they were designed. Also, on December 18, 1981, the plant was shut down when the temperature resistance bulb located in the discharge line from pressurizer safety valve RV-RC-551C exceeded 217°F, thus indicating leakage through that valve. Pressurizer

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safety valve 551C was removed and inspected and oxidation was noted on the main valve seat. No other indications of valve leakage were found. The valve seating surfaces were refinished and the valve was reassembled, retested, and reinstalled. At that time, Ashcroft, Series B-400 pressure switches set at 560 + 3 psig were installed to provide a visual indication (by means of a lighted lamp) should this pressure occur in the pilot valve cavity above the operating piston of the main valve. Pressurizing this cavity will only occur when leakage past the pilot valve exists. These pressure switches are designed to provide early warning of developing wire drawing and pilot seat leakage which could ultimately lead to a self actuation of the relief valve. The valve vendor has stated that this self actuation could not occur unless the pressure in the cavity exceeds 840 psig.

During subsequent plant operation, the safety valve relief line temperatures have remained stable and cool (approximately 150 to 160°F) and therefore the valves are presently leak tight. The indicators connected to these pressure switches and the safety valve discharge temperatures continue to be observed by operations personnel on a once per shift basis while the plant is operating to detect early signs of any change of pilot valve leak tightness. In addition, the circuitry and lamps are tested on each shift. Instructions have been issued to bring the plant to the hot shutdown condition within six hours and to the cold shutdown condition within the following 24 hours if a pressure sensing device on any of the safety valves actuates and thereby indicates significant leakage of the pilot valves at a value well below that which would cause the valve to open.

Emergency Operating Procedures which require the use of PORV's have been reviewed and revised as appropriate to incorporate the effect of operation in the event that any motor operated isolation valves associated with the PORV's are closed. These procedures have been followed and there have been no challenges to the PORV's or safety valves during Cycle 2. A plant trip from approximately 85 percent load occurred on May 2, 1981. This trip did not cause the Reactor Coolant System pressure to increase to a point sufficient to challenge the PORV's.

The plant has only been at a reactor coolant system pressure in excess of 1000 psig for approximately 83 days in the previous 180 days. The time during which the safety valves have been subjected to high pressure has been substantially less than contemplated by the original commitment to limit operation under these conditions to six months. Because of the limited time that these safety valves have been subjected to high pressure, and based upon no operating data indicating to the contrary, there appears to have been no degradation whatsoever of the leak tightness of these safety valves. Based upon all the evidence related to the safety and operability of the PORV's under these conditions, we believe that an extension of the time during which operation with code safety valve loop seals drained is permitted is fully justified. This type of design is normal for some nuclear plants and, therefore, presents no unusual operating condition.

A Safety Analysis which discusses the safety aspects of operation without water loop seals upstream of the code safety valves is attached. This Safety Analysis concludes that 1) the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report is not increased, 2) the possibility of an accident or malfunction of a different type than any evaluated previously in the safety analysis report has not been created, and 3) the margin of safety as defined in the basis for any technical specification has not been reduced.

The fuel for Cycle 2 contains sufficient energy to permit operation for an additional 220 days of full power. Therefore, we request that operation of the plant without water loop seals ahead of the code safety valves be permitted for the balance of this fuel cycle.

Very truly yours,

J. J. Carey

J. J. Carey
Vice President, Nuclear

cc: D. A. Beckman, Resident Inspector
United States Nuclear Regulatory Commission
Beaver Valley Power Station
Shippingport, PA 15077

United States Nuclear Regulatory Commission
c/o Document Management Branch
Washington, DC 20555

Attachment

Safety Evaluation

The original plant design included a provision for maintaining a water loop seal on the upstream side of the code safety valves. The purpose these water loop seals is to provide a liquid interface at the seating surfaces of the code safety valves which would minimize the leakage of steam and gas past these seating surfaces. It is desirable to establish a design objective to limit gas flow past safety valve seating surfaces to minimize the amount of hydrogen makeup to the reactor coolant system for economic reasons. Further, leakage of steam past the safety valve seating surfaces increases the cooling duty on the pressurizer relief tank (PRT). This increase in cooling duty on the PRT results in an increase in liquid waste which must be processed due to the requirement for more frequent additions of cooling water to the PRT. Increases in leakage of steam past the seating surfaces of the code safety valves also causes elevated temperatures in the discharge line from the safety valve, thus making the lifting of the safety valve somewhat more difficult to detect by observing this discharge temperature. This disadvantage is fully offset because 1) a code safety valve actuation can be readily detected by using the acoustic monitors and 2) an actuation of a code safety valve causes substantial changes in the pressure and temperature of the PRT, both of which indications are readily available to the operator in the control room.

There is no basis in the safety analysis requiring the maintenance of water loop seals upstream of the code safety valves since the concerns discussed above are related to operational convenience rather than safety concerns. Provisions have been made in the design of the station to accommodate leakage past the seating surfaces of the code safety valves. The absence of the water loop seals may increase the rate at which this leakage could occur by some unquantifiable amount. This same leakage would also occur if the water loop seals were maintained although it appears reasonable that the rate of increase of the leakage would be somewhat less. Any leakage through the seating surfaces of the code safety valves is quickly and easily detected using the temperature detector in the code safety valve discharge line.

During the course of analysis of the safety aspects of operation without water loop seals upstream of the code safety valves, the effect on pilot valve leakage was evaluated. The vendor has stated that self actuation of the code safety valve could result if leakage past the seating surfaces of the pilot valve was so severe as to cause the pressure within the cavity above the main operating piston to exceed 840 psig. To provide ample warning of increasing leakage past the seating surfaces of the pilot valve, Ashcroft, Model B-400 pressure switches rated at 3000 psig and set to actuate at 560 $\pm$ 3 psig were installed to monitor the pressure in the cavity above the main operating piston. Procedures have been implemented requiring observation of the indicators connected to these pressure switches on a shift basis. This provides ample warning of increasing leakage of the pilot valve seating surfaces from erosion or wire drawing which might give rise to increased pilot valve cavity pressure.

Operation without water loop seals upstream of the code safety valves does not involve an unreviewed safety question for the following reasons:

1. The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the Safety Analysis report is not increased. No condition is created by the operation without loop seals upstream of the code safety valves which would change the setpoint of the valves or cause the valves to fail to lift or to prevent reseating of the valves after a relief operation. The probability of pilot seat leakage is slightly but unquantifiably increased when the water loop seals are operated drained. This higher probability of inducing pilot seat leakage is totally offset by installing and monitoring on a once per shift basis the leakage into the cavity of the pilot valve. Therefore, the probability of undetected pilot valve seat leakage progressing to a point which results in an inadvertent self actuation of the valve is now substantially reduced. The pressure switch setpoint provides ample margin for action to repair the seating surfaces of the pilot valve before leakage becomes excessive. Leakage of the code safety valve will cause an elevated temperature in the code safety valve discharge pipe. The operator uses this temperature detector as a means of determining that the code safety valve is open or leaking. The acoustic monitor and PRT paramaters provide sufficient instrumentation to discriminate between a leaking and an open condition of the valve.

2. The possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report is not created. The lifting and failure to reseat of a code safety valve has been analyzed in the Safety Analysis Report. No other accident or malfunction will be created by this situation.

3. The margin of safety as defined in the basis for any technical specification is not reduced.