DMB

April 19, 1985

LTR: BYRON 85-0589

Mr. James G. Keppler
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 61057

SUBJECT: Byron Station - Unit One
Supplementary Report on the Main Steam Isolation Valve Airline Check Valve Investigation

REFERENCES: 1) Notification of Potentially Defective Airline Check Valves pursuant to 10CFR21 from R.E. Querio to J. G. Keppler dated 3/21/85.
2) Licensee Event Report 85-027-00, Docket No. 50-454 from R. E. Querio to J. G. Keppler dated 3/29/85.

This letter is provided as a supplementary report documenting the results of our investigation of the Main Steam Isolation Valve (MSIV) airline check valve failure documented in our referenced 10CFR21 Notification and Licensee Event Report (LER). This report is being transmitted to you pursuant to the requirements of 10CFR21.21(b)(2).

The results of our investigation into the failure mode of the originally supplied MSIV airline check valves indicate that they rely upon a sudden decrease in air pressure, which will allow the poppet to seat forcefully against the valve seat, to achieve a proper seal between the elastomer seal ring on the valve poppet and the seat in the valve body.

During examination of the originally supplied check valves, it was observed that the valve poppet could be easily displaced from its normal seating position by application of a light load. If the applied load was released quickly, the poppet would recenter in the valve seat and the valve would seal. However, if the load was released slowly, the poppet tended to seat off-center and the valve did not seal.

During examination of the original valve internals it was noted that the valve poppet guide stem exhibited a moderately loose fit with respect to the poppet. Under conditions which would exist during a slow closure it was observed that, when the looseness between the poppet and the guide stem was coupled with the minor load exerted by the valves' seating spring, sufficient force did not always exist to center the poppet seal in the valve seat and form a leak tight seal.

The CPI check valve design differs from that of the originally supplied valves in that the poppet in the originally supplied valves are guided on a stem. The originally supplied valve's poppet demonstrates a tendency to cock itself on the stem in a position which is off center with respect to the valve seat when it is in the fully extended position (seating position). The result of this tendency of the poppet to cock on the guide stem and a relatively weak seating pressure (5 psi) is that the valve does not always form a leak tight seal, especially when pressure is decreased slowly.

Alternately, the CPI valve design guides the poppet within the valve body as a piston in a cylinder and uses a higher seating force (10 psi) than the originally supplied valves. This design eliminates the tendency of the valve poppet to cock and attempt to seat itself off center.

The design of the valves also differs in that, the originally supplied check valve utilizes an Elastomer seal ring installed on the face of the valve poppet as the seal material. The CPI check valve utilizes a tapered Elastomer seal which is installed in the valve body. Also, the seat on the poppet face is spherical on the CPI valve. The tapered seal and the spherical seating surface on the face of the poppet of the CPI valve guide the poppet into the proper seating alignment to aid in ensuring a leak tight seal.

Finally, the CPI check valves demonstrate a higher quality of machining and smaller dimensional fabrication tolerances than the originally supplied check valves.

As a result of Anchor Darling's recommendations and this investigation, Byron Station has decided to replace the originally supplied check valves with Parker CPI Model No. 8F-C8L-10-SS, stainless steel check valves. These valves were cycled 4470 times during vendor testing at 250 psig differential pressure with no loss of sealing capability.

As an interim measure, Byron Station has replaced the originally supplied check valves with CPI Model No. 8F-C8L-10-B, brass check valves. Bench testing was conducted on-site for each of the brass body CPI valves received. Each valve was subjected to a 110 psig differential pressure. Pressure was then bled down at a rate of 1 psi per minute for 15 minutes. With the exception of the one failure noted below, none of the valves experienced any leakage.

The CPI Model No. 8F-C8L-10-SS, stainless steel check valves, which are identical to the brass CPI check valves in all aspects except for the valve body material, will be installed when they are available. Installation of the CPI stainless steel check valves is expected to be completed by July 1, 1985.

One failure was documented with a CPI brass check valve during pre-installation testing. This failure has been traced to the presence of brass shavings inside the valve body which may have been left from the fabrication of the valves or from the installation of the valve threaded connections on the test rig. The failed valve was cleaned and retested with acceptable results. Several other CPI brass check valves have been examined to determine if brass shavings were present. Based upon these examinations it was determined that the brass shavings were unique to the one failed valve. The failed valve has not been installed in the plant.

The MSIV operators will be tested on a bi-weekly basis. At the time that the stainless steel valves are installed, a program will be proposed based upon testing, which should allow us to lengthen the testing period interval. This revises our previous testing schedule which required testing of the MSIV operators every 30 days. Also a memo has been issued to all Licensed Operators stating that until an acceptable confidence level is obtained for the MSIV operators, the MSIV's are to be closed following a loss of offsite power event.

for R. E. Querio
Station Superintendent
Byron Nuclear Power Station

REQ/RJP/lh

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