Flow Control Division
Anchor/Darling Valves
BW/IP Valves
Edward Valves
Valtek Control Products
Worcester Valves

November 24, 2009

US Nuclear Regulatory Commission
Document Control Desk
11545 Rockville Pike
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Subject: USNRC 10CFR Part 21 Notification (Log No. 2009-24-00 / Event No. / Accession No. ML093140090) **Revised Notification**

Ref: Flowserve Size ¾ Figure 848Y Disk/Disk Nut Separation
LaSalle Station
Exelon PowerLabs, LLC Project Number: LAS-62808
Flowserve Complaint Report 4914
Flowserve Evaluation Report No. 10 CFR 21-50

Gentlemen,

This is to notify the US Nuclear Regulatory Commission, in accordance with the provisions of 10CFR-Part 21 of a deviation identified by Flowserve Corporation.

Upon further investigation, Flowserve has become aware that additional Figure Numbers 849, 828 and 829 may also be affected by the deviation reported herein, as they share the OLD Stem/Disk Assembly Design.

Background

On September 8, 2009, Flowserve Corporation was notified by Exelon – LaSalle Nuclear Power Station of a failure which occurred and was initially communicated via Flowserve Complaint Report # 4914.

The Referenced Complaint Report describes an anomaly with a Size ¾ Figure 848Y bolted bonnet valve at the LaSalle Nuclear Power Station.

The subject valve was in service at the time of disassembly. The disassembly revealed that the disk nut, which captures the valve stem in the valve main disk, had separated from the main disk.

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The valve in question is a manually operated, non active valve. The safety function of this valve is to retain system pressure. This safety function was not affected by separation of the stem nut from the valve disk.

However, other Figure 848, 849, 828 and 829 valves may have different safety related functions that could be affected by this type of failure. See Discussion and Conclusion below.

Discussion

Figure 1 provides an illustration of the stem/disk assembly. The **"Old Design"** is typical of the valve that is the subject of this discussion. The valve stem has a collar on the very end. After the stem is inserted into the disk, the disk nut is threaded into the disk to retain the stem. A lock weld is then created to prevent the disk nut from unthreading out of the disk.

In about 1990, the design was changed to that shown as the **"New Design"** in Figure 1. The disk nut was eliminated, and the disk retained on the end of the valve stem using a piece of wire inserted into a groove located half in the valve stem and half in the disk.

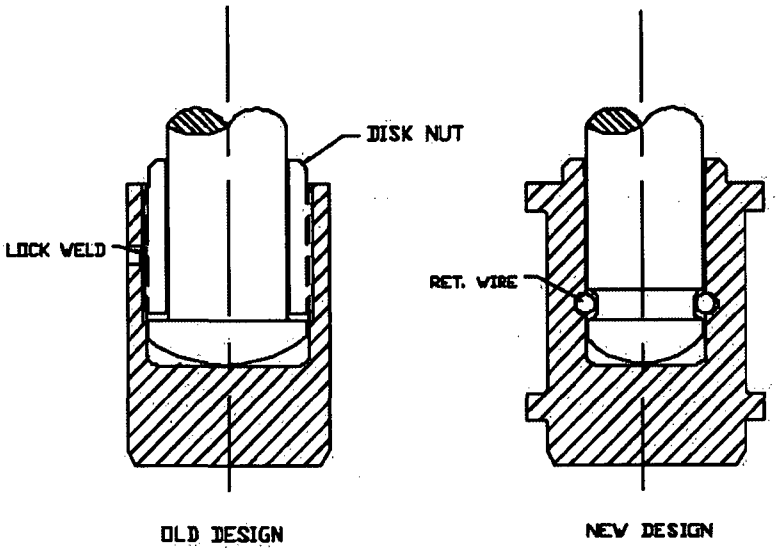

Figure 848 / 849 / 828 / 829 **Figure A848 / A849 / A828 / A829**

Figure 1 Stem/Disk Assemblies for Old Design and New Design.

For the case of the **"Old Design"** valve at LaSalle, once the disk nut has unthreaded out of the disk, the stem and the disk are no longer connected. The valve will then operate as a stop-check valve. The valve will open in response to normal forward flow, and close in response to normal reverse flow.

Because the disk nut is a solid piece assembled around the valve stem, the disk nut cannot fall off of the valve stem and become a loose part in the piping system.

After unthreading from the disk, the disk nut will sit on top of the disk. The valve will be able to open only partially, because the disk nut will interfere with the ability of the valve to open fully. The amount that the valve can open will depend on the size of the valve. For the Size ¾ valve at LaSalle, the disk would be able to open less than 1/8 of an inch. The amount that other valve sizes would be able to open is different, but all would be reduced.

In operation, the valve would function as a stop-check valve rather than a stop valve. If the handwheel is used to close the valve, the valve will remain closed. If the handwheel is used to retract the valve stem, differential pressure in the normal forward flow direction will open the valve and allow flow through the valve.

The valve handwheel will operate as though there is no problem, even though the disk is no longer connected to the valve stem.

The valve drawing does not provide a flow direction arrow, although a flow direction arrow is provided on the side of the valve body forging. If the installation was performed using the drawing as a guide, there is no guarantee that the valves were not installed backwards.

Figure 848, 849, 828 and 829 manually operated valves are not typically used as active safety-related devices.

Based on the above, different safety scenarios for the valve are described below:

Scenario	Impact on Safety-Related function
Valve has no safety-related function.	None
Safety-related function is to retain pressure	Safety-related function is not affected.
Safety-related function is to remain closed.	
Safety-related function is to close against reverse flow.	
Safety-related function is to pass a minimum amount of flow in the normal forward flow direction.	Safety-related function may be affected.
Safety-related function is to pass a minimum amount of flow in the normal reverse flow direction.	

Conclusion

Based on the above, the Nuclear Industry needs to be notified concerning the potential defect, and encouraged to inspect the operation of their valves, especially if they have a safety-related function in the plant that may be adversely affected.

The valves affected are Size 2 and smaller Edward Figure 848,849, 828 and 829 valves manufactured by Rockwell International at the Sulphur Springs, Texas, and the Raleigh, North Carolina, manufacturing facilities prior to 1991. These valves may be tagged "Rockwell", "Rockwell Edward" or "Edward". The valves affected have the **"Old Design"** stem/disk assembly shown in Figure 1.

Valves with Figure Number **A**848 / **A**849 / **A**828 / **A**829 incorporate the **"New Design"** stem/disk connection and are not affected.

The total number of valves affected and their installed locations are not known.

Respectfully submitted,

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