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To: R.D. GAMBLIN

From: J.P. Warner
Date: September 13, 1985

Interoffice
Communication

Subject: VALVE POSITION INDICATORS

VISTA

It is my understanding that Aberdeen has requested funds as part of their 1986 Capital Budget to improve the valve position indicators on some of their reactor and VCM charge system valves. I evaluated a similar project for the Oklahoma City PVC Plant and determined that there was not sufficient justification for the project at Oklahoma City. The following is a summary of my understanding of the issues facing the two plants:

Aberdeen

1. Aberdeen has had approximately 14 incidents where the valve position indicator showed that a valve was closed when it was at least partially opened. These incidents resulted in the uncontrolled release of material from the reactor module. These incidents were caused by either the twisting of the valve stem or by the failure of the coupling connecting the valve stem to the pneumatic actuator. In most cases, Aberdeen's records are not sufficient to identify which failure mode was responsible for the release, but it is known that both failure modes have occurred.
 2. Aberdeen has developed a valve position indicator capable of detecting the valve's true position even if the coupling fails. The new position indicator will not detect the valve's true position if the valve stem twists.
 3. Aberdeen believes that strengthening the coupling between the actuator and valve stem will result in an increase in the number of twisted valve stems. They believe that the coupling should be the "weak link" in this assembly.
 4. Aberdeen believes that a failed coupling is preferable to a twisted valve stem because a failed coupling can be detected before a release occurs if you are using the new valve stem indicators.
 5. Aberdeen has 6 actuated valves per reactor that are single block valves. Oklahoma City has two single block valves on each reactor.
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Oklahoma City

1. To the best of our knowledge, the Oklahoma City PVC Plant has not had a coupling failure on any actuated valves. In addition, we are not aware of any plug valves where the valve stem has twisted. We have found twisted valve stems on Jamesbury Ball Valves on the main dump valve on the reactor and on the water drain valve on the water stripping tanks.

Normally, we detect the twisted valve stem on the reactor main dump valve through our monthly valve leak checks and from higher than normal VCM content in the stripped slurry. The main dump valve is double blocked reducing the number of VCM releases. A significant VCM release has not occurred as a result of these twisted valve stems.

A significant VCM release from the waste water strippers did occur in December, 1979, as the result of a twisted valve stem. A copy of the near miss investigation is attached. A twisted valve stem has not been found in this service since proper winterization of the valve was completed.

2. While we have not tested the system, we believe that the system proposed by Aberdeen is a well designed system capable of detecting coupling failures.

3. We believe that we have not seen any coupling failures because we either purchase couplings that are of sufficient strength or we reinforce the coupling by installing a metal sleeve around the coupling. This has not resulted in an increase in twisted valve stems. All twisted valve stems have occurred on Jamesbury Ball Valves equipped with standard factory supplied couplings.

4. We believe that the approach to the problem that we should follow is to design a system that does not fail. We believe that our couplings meet this requirement, and we are investigating modifications that we believe will prevent the twisting of valve stems on the main reactor dump valves such as eliminating ball valves in these services and upgrading the valve stem metallurgy. We believe that there should not be a "weak link" in the actuator-coupling-valve system and that potential for failure should be eliminated or minimized---not engineered as the desirable mode of operation. We also believe that it would be extremely difficult to design a system where the coupling will always predictably be the "weak link".

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During the last two-three years considerable capital has been expended on upgrading the valve position limit switches (AFE No. 5660-Improved EPA Compliance System Reliability, AFE No. 5621-Massive VCM Release Prevention and Miscellaneous Under \$15 M funds). These new limit switches are similar to Aberdeen's proposal (also made by GO Systems) but are mounted on the actuator to allow access to the coupling and packing nuts. They have performed extremely well in our critical services and have provided reliable indications.

Based upon our experiences, we do not feel that there is justification for installing the new valve position indicators at Oklahoma City and request that this project be eliminated from our 1986 Capital Budget.

J.P. WARNER
SENIOR PROCESS ENGINEER

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A

To: D. W. Hollis

From: F. G. Jeanson
Date: August 27, 1985

Subject: LIMIT SWITCH REPLACEMENT - BUDGET DESIGN

Interoffice
Communication

VISTA

Attached is the budget design to replace the limit switches on valves in VCM and chemical wash service. These new limit switches will operate on the position of the valve stem, instead of the position of the actuator, and thus provide each valve with accurate and reliable indication in the control room.

These new type of limit switches are proposed to be installed on valves on the reactors and the VCM charge systems as part of the compliance plan capital items. This design will provide these same type of limit switches on all the other valves with existing limit switches in VCM, and chemical wash service.

A trial limit switch, that is the same model as the limit switches specified in this design, was installed in the plant in the first quarter of 1984. This limit switch has operated trouble free for approximately one and a half years.

By copy of this design to REP a budget estimate is requested. If there are any questions or comments please refer them to me.

F. G. Jeanson

F. G. Jeanson
Process Engineer

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