

Incident description: Gas leak 2013

During work on a tie-in to the platform, an isolation plan was prepared. As part of the isolation plan was the following barrier: a double actuated ball valve connected to a pressure indicator and a bleed (leading out of the module).

The ball valve contains a ball which rotates 90 degrees to close/open. The actuator does not have a rotating stem, but moves up and down. It is made with a spline in a way that forces the ball to rotate while the stem moves up / down. The ball valve is so designed that it needs a supply pressure to keep the ball in the seat and in a closed position. If the actuator loses power supply, the ball could become detached from the seat if the system pressure is equal to the pressure on the back side. When the system pressure then increases after a pressure equalisation, the process stream may be able to rotate the ball to open position. A sketch of the valve is shown in the figure below. A system pressure higher than the pressure on the back side of the ball will help to keep the valve closed.

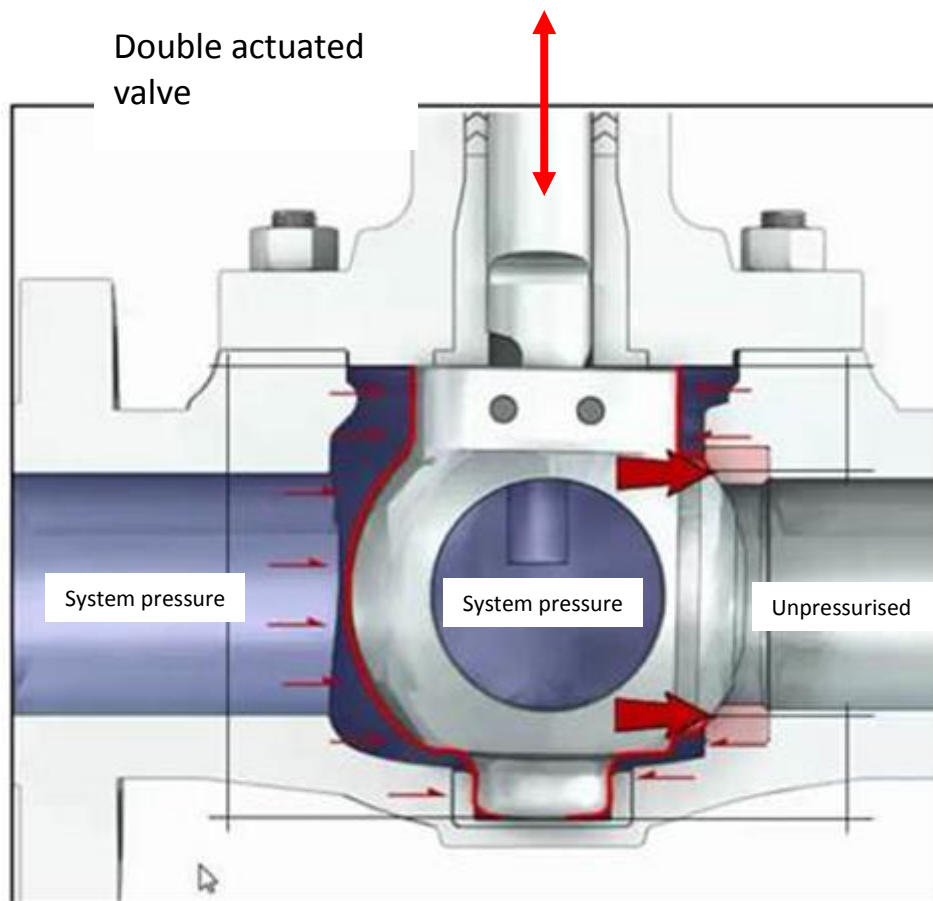


Figure: Sketch of ball valve.

In order to secure the ball valve in a closed position, the air supply for opening of the valve was closed. No other safeguarding of the valve position was implemented. The isolation was then verified. In connection with another incident on the platform the emergency shutdown was activated, while the isolation plan was still set. The process segment containing the ball valve

remained depressurised after startup of the platform. Four days later the segment with the ball valve was pressurised.

Lack of air supply to the actuator meant that the ball valve did not have closing pressure and was thus gradually opened by the process pressure. The bleed to secure area was thus unintentionally pressurised. This resulted in a leak for about 3 minutes, with a leak rate of 0,73 kg/s.

Causes

Direct cause:

Securing of actuator for ball valve was not correctly/adequately performed.

Root causes:

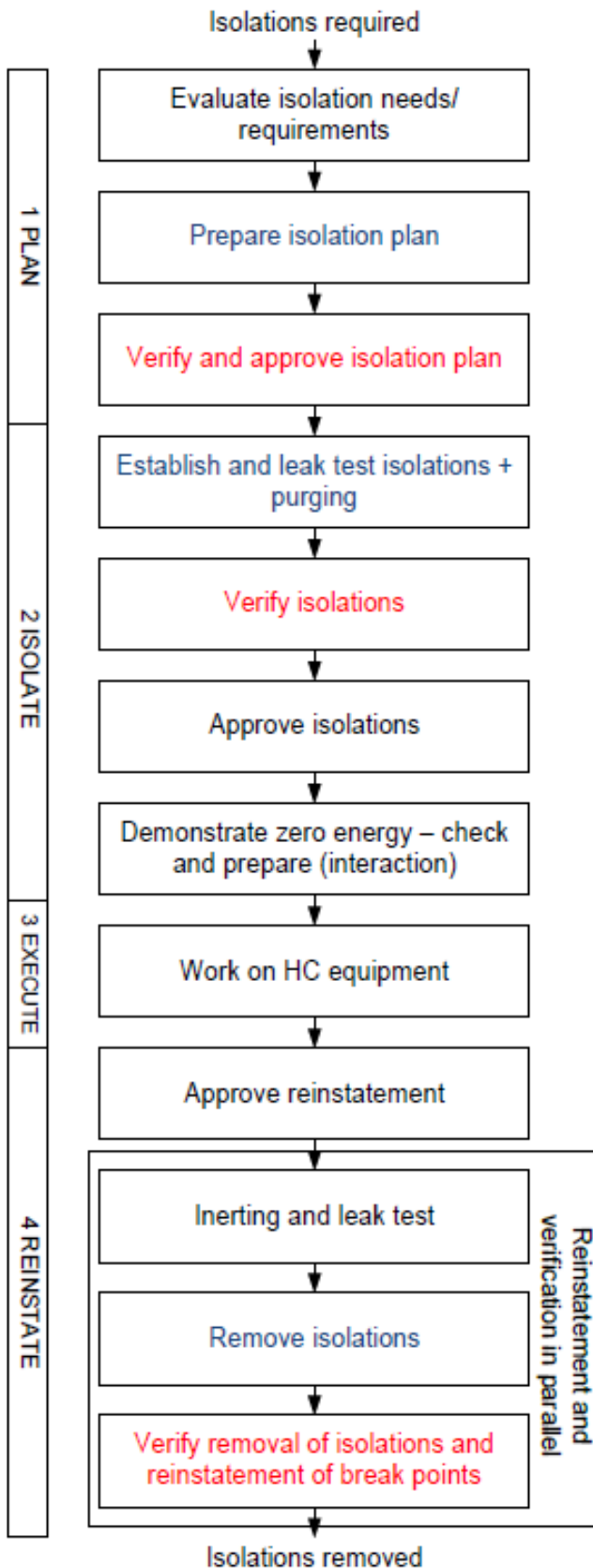
- Procedure for securing barrier valves was too general (in order to cover several valve types).
- Verification of isolation was performed by personnel without the proper expertise on actuated valves.

Learning points and recommendations:

- Ensure that procedures describe how different valve types need to be secured in order to function as a barrier.
- Implement mechanical lock for valves that require external active power supply in order to function as a barrier.
- Ensure that personnel performing verification tasks has proper competence.

Blue and red text indicate roles which are to function as independent barriers.

Status for steps in best practice document



Description:

- 1 Was executed, functioning as intended
- 2 Was executed, but failed
- 3 Was not executed
- Uncertain whether executed

Status during the incident:

- 1
- 2 Executed (but the plan did not describe the necessary conditions for securing the valve position)
- Uncertain
- 2 Executed (but the ball valve was not adequately secured)
- 2 Executed (but personnel did not have proper competence)



Gas leak 0,73 kg/s, 3 minutes