

## Safety Alert

### Failure of pipeline emergency shut-down valve

#### Introduction:



Failed spring return pipeline emergency shut down valve

This alert is issued following the failure of a spring return pipeline emergency shut down valve (ESDV). The failure left the primary platform isolation device inoperable with the valve failed in the open position. Other ESDVs have been examined and have found to be at risk of failing in this manner. Spring return valves other than ESDVs are equally vulnerable.

#### Background:



Detailed view of spring return pipeline emergency shut down valve

Investigation is ongoing but initial indications are that the actuator spring end plate retaining tie rods failed due to corrosion leading to the spring being released from the ESDV. This made the platform primary isolation device inoperable.

The end plate and springs were released at velocity due to stored energy presenting a hazard to personnel and topside process plant.

The open end design of tie rods made them susceptible to water ingress and corrosion from trapped moisture.

#### Action required by duty holders:

**Immediate action- identify spring return valves and carry out risk assessment**

- Where identified valves are defined as Safety Critical Elements (e.g. ESDVs), or where release of the spring could present a risk of injury to personnel or damage to plant, duty holders should make these a priority for inspection / modification.
- Inspect the valves to ensure that the spring housing and retention tie rods are fit for purpose. Particular attention should be paid to open ended tie rods which may accumulate dirt and moisture. Corrosion of tie rods may not always be readily identifiable externally and may be particularly difficult to detect beneath end plates. Spring housings with internal tie rods may also be vulnerable to corrosion and should also be inspected. Springs may also suffer from corrosion and/or hydrogen embrittlement.
- Following close visual inspection, assess the integrity of the spring actuator in accordance with industry guidance and their SCE status (such as Energy Institute Guidance for Corrosion Management in Oil and Gas Production and Processing)
- If duty holders cannot inspect the identified valves within a short timescale, alternative arrangements to manage the risks should be made. These short term measures to prevent spring release might include erecting a scaffold support or installation of temporary restraints.

**Longer term duty holder actions**

- Ensure routine ESDV inspection and performance testing procedures include adequate inspection of the actuator
- Implement coating and seal maintenance programme to prevent corrosion
- Ensure the risks associated with stored energy from equipment containing compressed springs are identified and control measures put in place
- Review the suitability of the design of retaining rods and end plates on spring return valves given the potential for moisture accumulation and the difficulty in condition inspection. Consideration should be given to using a more corrosion resistant design.

**Relevant legal documents:**

Pipeline Safety Regulations (1996), Health and Safety at Work Act etc. (1974) as amended

- Pipeline ESDVs form part of the pipeline as per Regulation 3 of the Pipeline Safety Regulations (1996) (PSR). The law requires that an operator must maintain ESDVs in an efficient state, in efficient working order and good repair (PSR Regulation 19). Failure to comply with this regulation is a criminal offence.

## References:

- HSE publication L82- A Guide to the Pipeline Safety Regulations (1996).
- Energy Institute - Guidance for Corrosion Management in Oil and Gas Production and Processing.
- Energy Institute- Guidelines for the Management of Safety Critical Elements.
- Energy Institute- A framework for Monitoring the Management of Ageing Effects on Safety Critical Elements.
- Information on the incident is available on the [Stepchange website](#) 
- [Guidance on management of ageing and thorough reviews of ageing installations - HSE Offshore Information Sheet No. 4/2009 \(OIS 4/2009\)](#) 
- [HSE Research Report RR509 - Plant ageing: Management of equipment containing hazardous fluids or pressure](#)
- [Information relating to pipeline safety and integrity](#)