

HSE information sheet

Hydrocarbon Releases (HCRs) Offshore

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Introduction

This sheet provides information regarding some observed trends in the underlying causes of HCRs, and indicates HSE's expectations of the offshore oil and gas industry in addressing these trends.

Background

In 2000/1 HSE initiated a HCR leak reduction campaign (KP1) which was conducted over a 4 year period. Findings from this campaign led to the production of guidance documents by the industry (UKOOA/IP), supported by HSE, aimed at bringing improvements to areas that were found to be significant contributors to the number of HCRs occurring offshore. These areas included piping, flanges, valves and small bore tubing systems (SBTs).

Reductions in the numbers of HCRs in these areas occurred following publication of these guides. However, during 2006/7 and 2007/8, the progress in reducing major and significant HCRs plateaued, and the planned targets for the combined total of major and significant HCRs were exceeded in both years. Based on this evidence, HSE commissioned the Health & Safety Laboratory (HSL) to analyse data on HCRs contained on the HCR System database¹. This data was reviewed with the aim of identifying underlying causes of HCRs.

Key issues and underlying causes relating to HCRs

- Evidence suggests that **piping** systems, including **flanges** and **valves** collectively continue to be a major source of HCRs, with piping being the single largest contributor. **Instruments** (i.e. SBTs) contribute the second largest single source of HCRs. **Gas Compression** is the operating system having the highest number of HCRs.
- Incorrectly fitted equipment is the most widespread operational cause followed by improper operation (i.e. human factor issues) where operational failures are reported.
- Non-compliance with procedure (i.e. human factors issue) is the most common procedural cause where procedural failures are reported.
- The HSL report shows that instrument (SBT) failures were initially found to be high in 2000/1 but these showed a noticeable decline over the next four years to 2005 following the issue of industry guidance and a raised awareness among operating companies of the importance of these systems. However there was a small rise in 2006 and 2007 in the number of all (minor, significant, major) instrument sourced releases. Further analysis by HSE of the data for larger significant gas releases over 25kg shows a more marked increase in the proportion of instrument sourced significant releases over 2006 and 2007 compared to earlier years where improvements had been recorded, with a rising trend overall for the period since 2000/1. **For the whole period since 2000/1,**

instruments (SBT) were the largest single contributor to HCRs greater than 25kg.

- Reported experience of inspection and survey on SBT systems suggests that 26% of fittings examined are found to contain faults, e.g. under-tightness, incorrect or mismatched components, leaks, incorrect or poor installation, etc., and that this failure rate has remained constant since 2001.

Prevention, mitigation and good practice guidance

Reference is made to the following industry and HSE guidance linked to prevention of HCRs, including in piping and instrumentation (SBT) systems on offshore installations:

- UKOOA/IP (Oil & Gas UK / EI) 'Guidelines for the Management, Design, Installation and Maintenance of Small Bore Tubing Systems' ISBN 978-0-85293-275-9
- Oil & Gas UK/EI 'Guidelines for the Management of the Integrity of Bolted Joints for Pressurised Systems' 2nd edition ISBN 978-0-85293-461-6.
- [HSE 'Loss of Containment Manual'](#)

What HSE expects

It is essential that every effort continues to be made by operating companies to engage with the factors that contribute to HCRs through the continued commitment to maintaining competence and performance in line with recognised best practice. It is important that working improvements achieved during campaigns such as KP1, with the assistance of guidance on good or best practice, continue as life cycle commitments and not just for the duration of a campaign.

The apparent increase in SBT failures leading to larger significant HCRs over the 2006/7 to 2007/8 period may be an indicator that more needs to be done to ensure that workforce competence training is refreshed for longer term employees or undertaken for more recent workers. Similarly, since piping/flanges/valves continue collectively to be a significant contributor to HCRs, the focus on maintaining competence and awareness of good/best practice should be maintained.

In all cases, the part played by human error through incorrect fitting of equipment, operational and procedural failures should be addressed. This issue has particular relevance where the workforce is subject to frequent change (e.g. contractors, change of operator, etc.) leading to an increased need to refresh relevant installation specific training.

Relevant legal requirements

- Management of Health & Safety at Work Regulations 1999 (MHSW)
- Provision and Use of Work Equipment Regulations 1998 (PUWER)

- Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER)

References

1 [Offshore hydrocarbon releases 2001-2008](#) RR672 HSE Books 2008

Further information

Any queries relating to this sheet should be addressed to:

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<p>This information sheet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do</p>
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