# Case Study

risk management and assessment for business

# *Reducing Offshore Hydrocarbon Releases*

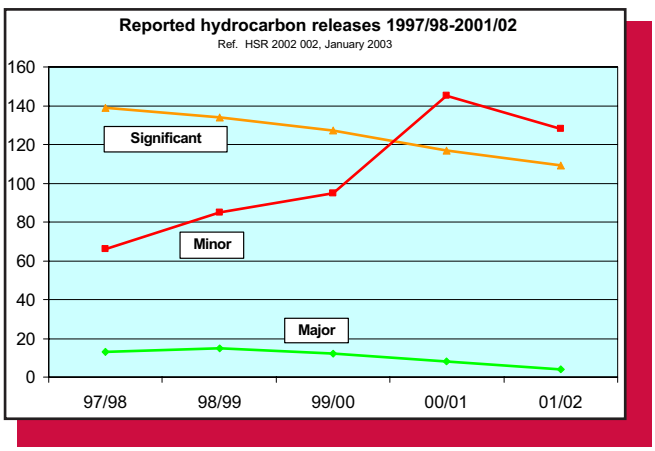
## The Challenge

Working with its strategic partner, Mitsui Babcock Technology Limited, Risktec Solutions Limited has been addressing the ongoing initiative by the Health and Safety Executive's (HSE) Offshore Safety Directorate to reduce the numbers of uncontrolled hydrocarbon leaks from offshore production platforms on the UK Continental Shelf.

Hydrocarbon leaks are potential initiating events for fires and explosions and not only pose a major offshore accident hazard, but can affect the environment and significantly disrupt production as well.

The main contributors to releases are Small Bore Connections (SBC) and associated piping. Typically there are several thousand SBCs on an offshore production platform and the challenge is to adopt a cost-effective approach to identify root causes and remedies to reduce the likelihood of leaks.

The HSE has a target to reduce the occurrence of leaks to 50% of the 1999/2000 numbers by 2004. In the first two years of the campaign, the data to 2001/2002 shows a continued downward trend in the occurrence of "major" and "significant" leaks, which is encouraging.




While it is still unclear whether the surge of "minor" releases witnessed two years ago was, as is suspected, because of improved reporting, what is beyond doubt is that sustained effort from the industry will be required if the overall target is to be met. In addition to this ongoing effort, the HSE is now targeting the poorest performing installations to establish what progress is being made.

## Our Solution

Risktec and Mitsui have developed a three phase, risk-based approach to help resolve this problem. The approach has already been applied to eleven installations - ten offshore platforms and one onshore plant - but is applicable to any North Sea fixed production platform.

### Phase I - Data Collection

This phase is undertaken by Mitsui Babcock Technology and focuses on identifying all the SBCs, which is not a trivial task in light of their large number. Data are recorded in a specially developed SBC database, including plant information from drawings, process information from manuals and condition information from previous survey reports. Records are validated by conducting a comprehensive offshore visual survey based on defined criteria.

The output from this exercise is a full set of validated physical data for all SBCs on the platform.

### Phase 2 - Risk Ranking

A range of data from the Phase I database, such as unique SBC number, its location and its condition, is then passed to Risktec who apply a bespoke risk model to conduct a risk ranking exercise. This model, named SBC Risk Ranking Model (SRRM), takes account of a broad range of mechanisms that contribute to premature failure, including vibration, fatigue, corrosion, erosion and mechanical fitness for purpose, to provide an estimate of release frequency.

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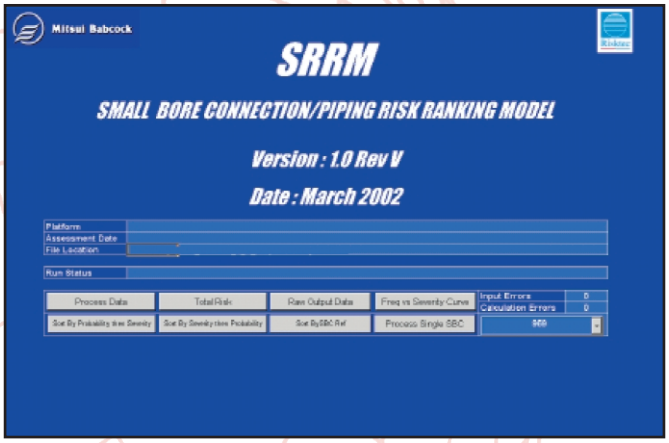


In addition, the consequences of failure are considered by taking account of such factors as pressure and temperature, proximity to sensitive equipment, and manning levels. Critically, the escalation potential associated with any release is assessed to provide a numerical severity ranking.

The model uses a risk scoring system to generate a risk score for each SBC in terms of impact on people, assets and the environment. The scoring system provides a workable level of resolution between a simple risk matrix approach (moderate effort, poor level of resolution) and a full blown Quantitative Risk Assessment (QRA) approach (intensive effort, high level of resolution).

The output is a list of SBCs, prioritised in order of risk, together with a detailed report of recommended actions, including a scope of work for inspection and modification to high risk locations.

### Phase 3 - Vibration/Fatigue Surveys and/or NDT

Once the recommended actions are agreed, this phase would be undertaken by Mitsui or other specialist organisations. Implementation includes conducting vibration/fatigue surveys and/or NDT as required, updating the databases and delivering a report with recommended remedial actions. These actions would be taken forward by the Operator with the intention of reducing the potential for leaks.

## Our Company

Risktec Solutions is an independent and specialist risk management consulting firm. We assist clients in major hazard industries and commercial sectors to manage safety and business risk.

Based in Warrington, Aberdeen and Teesside in the UK, Risktec is part of Nutec Group, a leading provider of safety and emergency response training to industries worldwide.

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## The Benefits

This approach is believed to be unique in that it combines the practical engineering expertise of Mitsui with the specialist risk expertise of Risktec, to provide a single integrated solution. The technique differs from many other solutions, which often rely very much on engineering judgment alone, or are executed solely by risk analysts and lack focus when it comes to engineering detail and interpretation.

What is more, the risk-based approach allows the Operator to target resources on those areas which present the greatest risk. The output is a package of tangible improvement options, such as additional or improved maintenance, inspection and testing, and the adoption of best practice for basic but problematic areas such as the making of bolted pipe joints.

The phased approach enables the Operator to take a step by step view of the value of the assessment, without committing to significant expenditure from the outset, while risk ranking allows work to be appropriately prioritised.

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