Asset Integrity

An industry progress report

April 2009

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1 Executive summary

This report describes industry progress in response to the issues identified in the HSE's Key Programme 3 Asset Integrity Programme Report.

There has been substantial asset integrity investment over the last 4 years - over £1 billion per year has been spent. This has resulted in significant improvements in physical integrity; and considerable progress in effective asset integrity management, awareness and performance. The continuing need for effective asset integrity management throughout the remaining life of the oil and gas industry is recognised.

Our report is drawn from

- advice received from operating companies, supported by independent verifiers, of the current asset integrity status of installations inspected as part of the KP3 project; and,
- additional confirmatory cross checks undertaken by a specialist asset integrity consultant on a representative sample of operating companies.

Our analysis of operator responses to the current asset integrity status request shows that management system compliance has increased from 60% to 80% (with only 1% "red light" findings); while physical state of plant compliance has improved from 40% to over 70% (with 4% "red light" findings remaining). Remaining red light issues are being actively managed to resolution by summer 2009. Asset integrity management systems now show that

- Management knowledge, understanding, awareness, oversight and engagement on asset integrity and process safety has been improved and enhanced from Board level down. This includes the concept of barriers in major hazard risk control and the need for robust arrangements, including technically competent oversight, for safety-critical system management.
- Board level leadership has been engaged through an industry-developed interactive Asset Integrity Workshop for managing directors and their direct reports – a workshop already recognised as worldwide best practice. During 2008, 25 such workshops were held, attended by over 400 senior managers.
- Sophisticated performance monitoring arrangements are in place using consistent and measurable indicators of performance for safety-critical systems. Business leaders are now better informed and equipped to act on the information received

and hence to prioritise future action. As work on safety-critical plant and equipment is being completed, the priority for addressing fabric maintenance is rising, with most companies identifying that they will be involved in significant fabric maintenance and corrosion management programmes throughout 2009. Safety-critical maintenance backlogs have been reduced and deferral arrangements are better controlled.

- Sharing and learning is more widespread leading to a reduction in variation between assets. The quality and visibility of maintenance records is improving thus enhancing knowledge and understanding. Closer working relationships are developing between verifiers and companies, though some work remains to maximise the value of this relationship. The industry has also developed and published of a range of comprehensive asset integrity guides, run numerous workshops and seminars and developed a sharing website, which is now widely used.
- Engagement of the whole workforce concerning asset integrity has increased at all levels – from CEO and the senior management team, through asset and installation management, through the engineering and technical authorities, and through the offshore workers generally. Companies have undertaken asset integrity, process safety and corrosion related roll out presentations, seminars, briefings etc to staff and contract workers.
- The important strategic role for Engineering and Technical Authorities in decision making, particularly in relation to continuing operations with degraded safety-critical plant and equipment integrity and in the maintenance deferral process, has been reinforced and re-embedded.
- Many of the lessons that have been learned and applied in the UK are already being applied elsewhere in the world through seminars, workshops and publications, as worldwide best practice. Over 1000 copies of the lessons from Piper Alpha DVD, produced by Oil & Gas UK in 2008, have been distributed worldwide
- The Asset Integrity Steering Group continues to work closely with HSE to secure lasting improvement in the management of asset integrity. The industry made a public commitment in March 2009 to continued asset integrity investment throughout the current economic downturn.

2 Background

This report has been produced in response to a request from HSE for an industry contribution to the report commissioned by James Purnell Secretary of State for Work and Pensions, on the progress made by the offshore industry in response to the issues identified in the KP3 report published in October 2007. In addition the report provides an opportunity to share ideas more widely across the offshore industry.

To compile the data presented here, each operating company was requested to check the current asset integrity status for installations visited as part of the HSE KP3 inspection programme against the traffic lights given for their installations on the HSE matrix. Companies were asked to focus attention on those matters that gave rise to 'red' and 'amber' issues on their installations and to sample a selection of 'green' findings, to confirm their current status.

Companies were requested to ask their independent verification body to comment on the current status of each KP3 element based on the verifier's current records. In addition Oil & Gas UK employed a specialist asset integrity consultant to undertake additional cross checks on a representative sample of several operating companies.

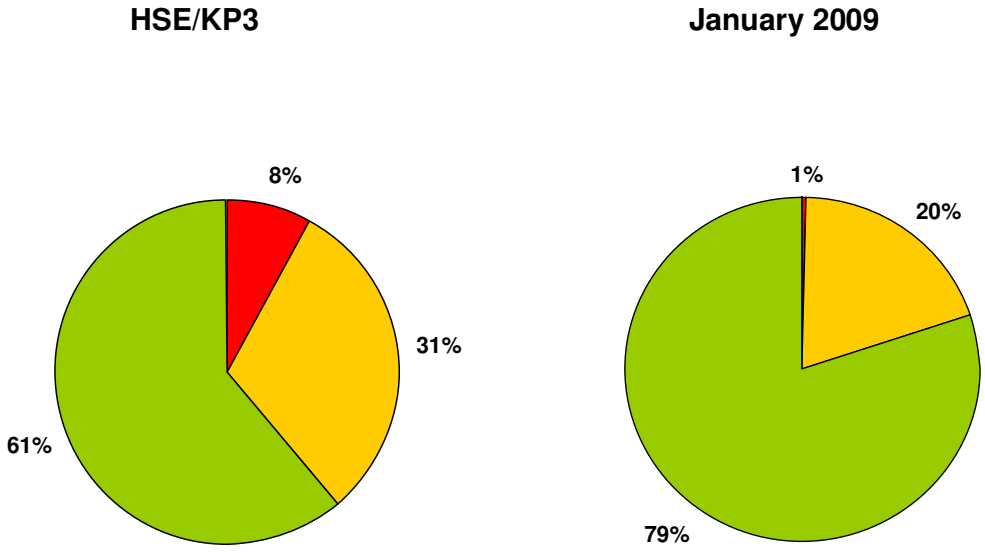
3 Asset Integrity/Process Safety Management Systems

The KP3 programme, together with other events such as Texas City and the longer term view of the potential to extend the sustainable productive life of the North Sea, acted as a catalyst for driving the asset integrity management agenda to a higher level and has resulted in a better coordinated approach. Cooperative and constructive working with HSE throughout the development and implementation of the KP3 programme resulted in significant improvements in physical integrity, together with considerable progress in effective asset integrity management, awareness and performance. Cross-industry acceptance of the need to raise the profile of effective asset integrity led to close scrutiny of existing maintenance management systems that had in some cases developed piecemeal, or where differences existed primarily as a result of mergers and acquisitions. The result was recognition of a need for change as these systems were a barrier to effective and sustainable asset integrity management.

Operating companies have reviewed, and where necessary made changes to, their maintenance management systems to provide much greater clarity for those involved in

ensuring that safety-critical plant and equipment (the barriers) is fit-for-purpose and will work on demand. This has involved training at all levels within the organisation (staff and contractors) from Board level down; and the consequent requirement to keep the management team better informed through meaningful indicators of performance and progress. Most operators have taken on additional staff, or reallocated existing resources with the specific role of targeting and improving the delivery of asset integrity management. The importance and added value arising from the involvement of key staff (Technical Authorities) in decision-making concerning degraded safety-critical elements (SCE), or the deferral process has been well recognised and accepted. And also the need for performance standards to be tested and confirmed for SCE as part of the maintenance routine, and the importance of keeping and maintaining work order history records.

3. Management System Traffic Lights



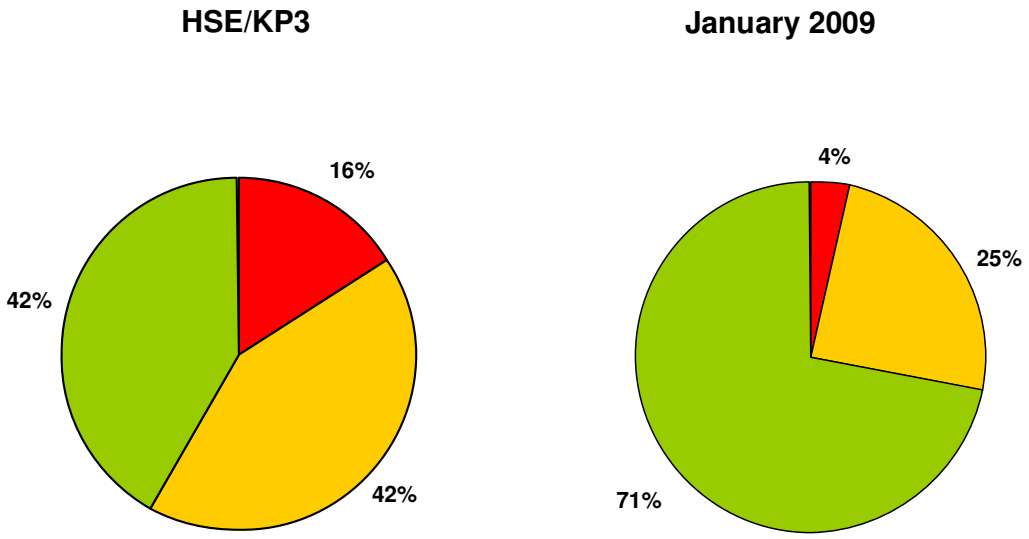
Note that the pie chart on the right represents the situation that existed at the end of January 2009. The significance of the remaining maintenance management 'red light' issues are fully recognised by the companies concerned and are being actively managed; interim mitigation measures are in place in all cases. All work relating to these issues is scheduled for completion by June 2009.

4 Physical State of Plant

The physical state of safety-critical plant has improved significantly over the last few years – as confirmed by the verification body and asset integrity specialist: while improvement in non-safety-critical plant and fabric maintenance has been less marked, there is nonetheless evidence to show that as work on safety-critical plant and equipment is being completed, the priority for addressing fabric maintenance is rising with examples of painting programmes, cable tray, deck grating and handrail repair or replacement etc on the increase. Some companies have now established key performance indicators for tracking fabric maintenance thereby ensuring that there is an increased focus on the execution of fabric repair and maintenance work scopes. Fabric maintenance on normally unattended installations can be particularly challenging – 'walk to work' jack-up installations or vessels have been and are being used in an attempt to expedite the liquidation of this work. Most companies have identified that they will be involved in significant fabric maintenance/corrosion management programmes through 2009. Several companies have used, or have plans to use a flotel for extended periods to support this work. One company used one of its installations to pilot a new fabric maintenance strategy – this strategy is now to be implemented on its other installations during 2009.

In 2007 Oil & Gas UK set up a Corrosion Management Work Group in conjunction with HSE and the verification bodies and assisted by the Energy Institute. The work group brought together a number of experienced corrosion management specialists. They produced a comprehensive corrosion management guide covering all the various types of corrosion likely to be encountered on offshore installations. A corrosion threats handbook was also produced to raise awareness of corrosion issues among those responsible for asset integrity matters, but who were not themselves corrosion specialists. The corrosion guide and the threats handbook have been used extensively in training programmes onshore and offshore. Over 700 copies of the threats handbook were distributed free to member companies. Further work is currently taking place to develop a guide for key performance indicators for the management of external corrosion.

4. Physical State of Plant Traffic Lights



Note that the pie chart on the right represents the situation that existed at the end of January 2009. Over 55% of remaining red light plant-related issues have been identified through rigorous operator self assessment processes that took place following the completion of KP3 inspection programme. There is a general consensus among those with remaining 'red light' issues that they will continue to be considered 'red' until work has been fully completed and despite having already made substantial progress. NB The specialist asset integrity consultant visited some of the companies with remaining red light issues and commented as follows - *"For most companies the self-evaluation tended to be made conservatively, indeed some had awarded themselves a more severe rating than would be expected from the Regulator".*

There is every indication that all the remaining plant-related 'red light' issues will have been fully resolved by summer 2009.

5 Matters giving "significant cause for concern"

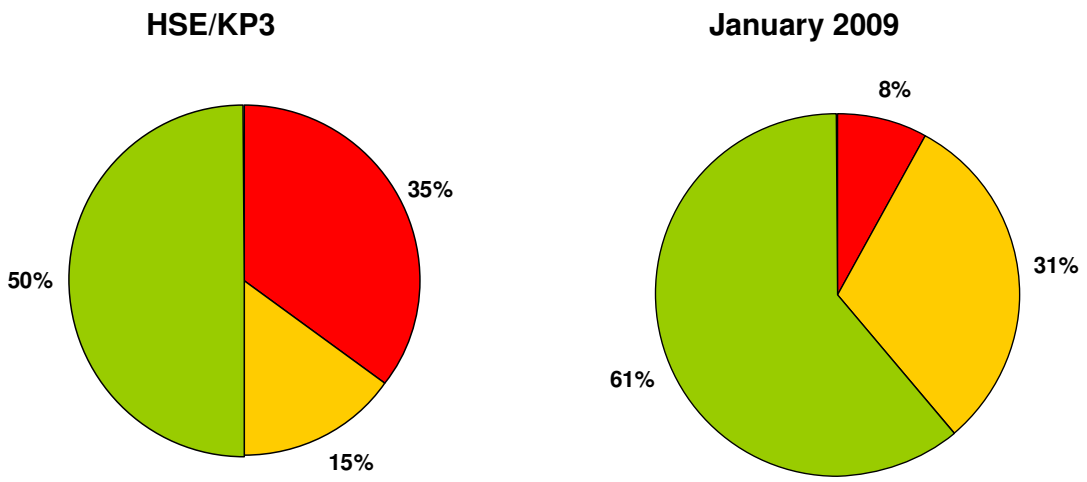
The KP3 report identified three safety-critical elements as giving 'significant cause for concern' across the whole industry; these were TR HVAC, deluge and TR doors.

5.1 TR HVAC

A 'good practice' guide for maintenance and testing HVAC dampers was developed and published in 2006 by an industry/HSE workgroup. This, together with in-company initiatives and through increased training and awareness of appropriate technicians, has resulted in much enhanced understanding of HVAC systems by offshore personnel. Some installation operators employ full-time HVAC technicians.

A substantial and sustained effort has been put into addressing the reliability and integrity of HVAC damper systems. For some operators the concerns voiced in the KP3 report led to a critical review of the whole of the temporary refuge safety-critical systems and their performance standards. There has generally been an improvement in test procedures (including 'full loop' testing) together with an increase in the test frequencies (frequently in conjunction with the independent verifier) HVAC data recording has also been improved. Remaining red light issues are being actively managed to resolution before summer 2009.

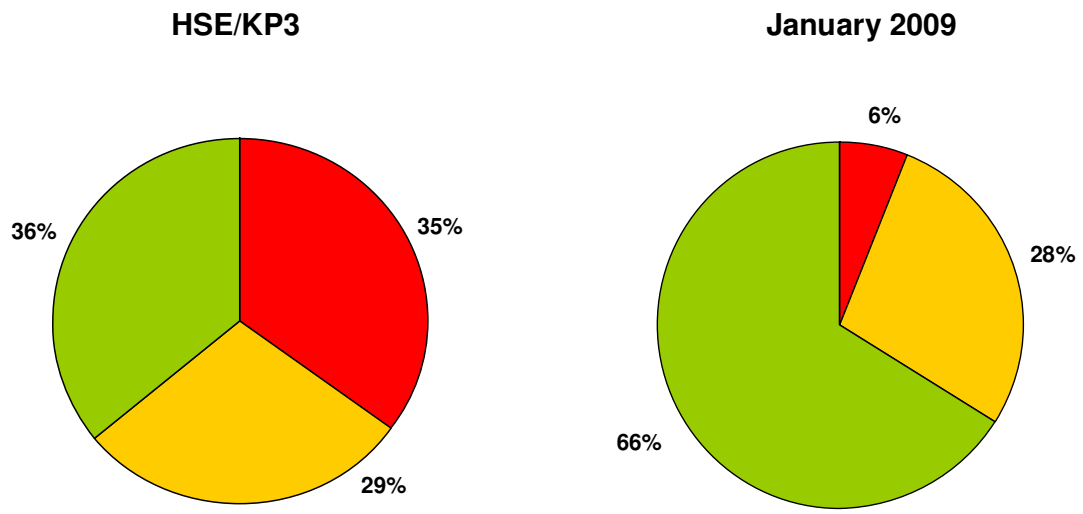
5.1 TR HVAC Traffic Lights



5.2 Deluge

Remedial action has been taken in all cases to address the types of problems identified in the KP3 report. Most operators, working closely with their independent verifier, have adopted a systematic approach to test, identify and resolve issues. One company is currently going through a deluge system design reappraisal in the light of current knowledge (as suggested in the KP3 report) – though this was after addressing the more immediate deluge functionality issues. On one installation the operator has replaced part of its deluge system with oscillating fire monitors following reappraisal of deluge needs. Remaining red light issues are being actively managed to resolution before summer 2009.

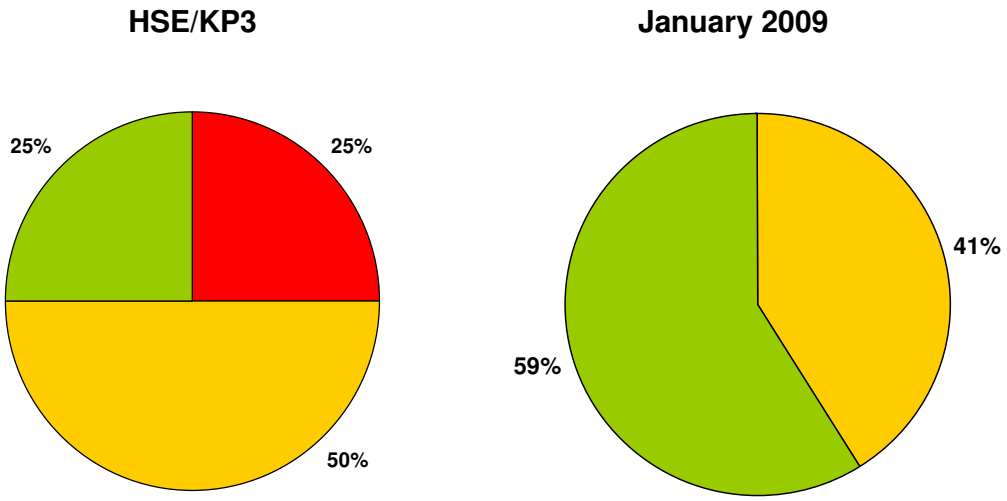
5.2 Deluge Traffic Lights



5.3 TR Doors

The need to ensure that TR doors continue to be effective in sealing the temporary refuge in the event of an emergency is clear. A number of TR doors have now been replaced, latches repaired and many door seals renewed. Work is ongoing at some installations, but no' red light' issues remain.

5.3 TR Doors Traffic Lights



6 Dealing with the Underlying Issues

The KP3 report identified a number of underlying issues and common failures that were contributing to poor asset integrity management

6.1 Leadership

The level of understanding or appreciation by senior management of major hazard risk control and in particular the major hazard risks posed by their own operations has been enhanced through focussed Asset Integrity Workshops. Incidents such as Texas City provided another driver with individual company programmes flowing from their review of the lessons from the Baker Report. The significant business risks that arise from operating an installation with degraded safety systems are now more widely understood by senior management teams than they have ever been previously. Business leaders are now better informed on a routine basis through receipt of understandable data from sophisticated performance monitoring arrangements. The enhanced visibility of asset integrity status is enabling business leaders to make informed decisions about resource prioritisation for their assets.

An example of safety leadership within the industry is that once a year the managing directors from over 80 companies get together for a full day to discuss safety issues. Following a request from the managing directors at the May 2007 safety leadership day, Step Change in Safety developed an Asset Integrity Workshop aimed at raising senior management awareness and understanding of asset integrity management. During 2008 a total of 25 workshops were delivered, attended by over 400 senior managers from operating companies and contractors.

Industry leaders are also in agreement that asset integrity and process safety is, and will remain, a priority for foreseeable future. At the annual managing directors' Safety Leadership Day on Thursday, 19 March 2009 (attended by over 80 MDs), a commitment was made that there would be continued investment in safety, asset integrity and skills; the following joint statement was published by Oil & Gas UK and Step Change in Safety on behalf of the industry:

> **"Good practice in safety and sustained investment in developing the skills of the workforce always make the best business sense. This is even more crucial when business decisions are difficult. There will therefore be no change in our resolve to help the UK offshore oil and gas industry to become the global leader in safety performance.**

Our goal continues to be to make the UK the safest place to work in the worldwide oil and gas industry and a recognisable global centre of excellence in workforce training and development.

This industry will continue to invest directly in safety, asset integrity, skills and training throughout the economic cycle and we will support Step Change in Safety and OPITO The Oil & Gas Academy to ensure safety continues to be our top priority. We can do no less".

6.2 The Engineering Function

The Engineering and Technical Authorities in a company act as a backstop against continuing operations with degraded safety-critical equipment – this is an important strategic role, the importance of which has been recognised again and re-embedded within operating companies, and their resources significantly increased. In March 2008 an "Offshore Industry Engineering Function Workshop" was held; there was a high degree of engagement by Engineering and Technical Authorities from operating companies and contractors (including fabric maintenance contractors). The objectives of the workshop were to raise awareness of HSE concerns on asset integrity with a particular focus on the role and effectiveness of the engineering function and to develop a broad industry consensus on the way forward. Following the workshop industry senior leaders were provided directly with important feedback from the event by personal letter from the Asset Integrity Steering Group Chairman. Key messages from this event were built into the Asset Integrity Workshops for senior industry leaders.

6.3 Skill shortage

The Industry recognises the need to recruit, develop and retain a highly skilled workforce and the important linkage between skills, competence and safety performance.

Since the publication of the KP3 report a new Skills Academy has been established for the industry. OPITO - The Oil and Gas Academy was created in December 2007. Completely funded and directed by all sections of the industry, including the Trade Unions, the Academy is intended to provide a more focused approach to ensuring the availability of a safe, skilled and effective workforce now and into the future. HSE are granted observer status on the Board of the Academy.

In the first year of operation the academy has taken a number of new initiatives and has continued to operate the Technician Training Scheme in conjunction with ECITB. This is the most successful modern apprenticeship scheme anywhere in the UK. At the end of 2008 there were 323 OPITO managed young people in the scheme which provides a feed of around 100 high quality new technicians and process operators into the industry each year. The industry has publicly committed to recruit a further tranche of more than 100 apprentices in 2009, despite the present economic downturn.

The Academy continues to develop and update industry safety standards, including those supporting the new MISTS training referred to elsewhere, as well as working with schools, colleges and Universities on a number of projects which promote the study of science and engineering and the oil and gas industry as an attractive career choice.

Oil & Gas UK's published analysis of the industry's demographics shows that the true picture of the age profile within the industry is actually much better than previously believed and there are increasingly positive trends which point to the attraction of a young, highly skilled and diverse workforce.

6.4 Learning and communication

Efforts to ensure that the whole workforce (from CEO down) understand the major hazard control loop, the barriers in place to prevent a major accident and the role that everyone can play in ensuring their integrity have been widespread. Within companies an important outcome has been greater consistency between assets and more consistent KPI reporting to senior management teams leading to analytical evaluation of inspection and maintenance findings.

Specific areas of 'good practice' have been shared more widely through the Step Change Asset Integrity website and through participation in a number of forums, workshops and seminars; and also by contributing to integrity related guidance.

2008 marked the 20th anniversary of the Piper Alpha disaster. Many of the younger generation in the industry were either not born or were too young to remember the disaster. During 2008 Oil & Gas UK organised a number of events to ensure the lessons learned from the disaster continue to be remembered. These included

- Lessons from Piper Alpha education presentations – four educational events were held for young people entering or new to the offshore industry. Presentations were

held for young technicians and for graduate level entrants to the industry. The presentations covered the disaster itself, key lessons and their relevance to the responsibility everyone has for offshore safety today.

- Lessons from Piper Alpha DVD – Building on the success of the educational presentations, Oil & Gas UK produced a DVD so that the key messages and lessons can be shared across the industry. The DVD has now been circulated widely across the UK oil and gas industry; worldwide over 1000 copies have been distributed to more than 16 countries.
- Managing directors' presentations – at the May 2008 Managing directors' day Oil & Gas UK gave a Piper Alpha presentation to remind MDs of the importance of leadership and maintaining corporate memory to ensure the lessons from the disaster continue to be learned and acted upon.
- MP/MSP briefings 17th/18th June 2008 – Oil & Gas UK gave briefings to MPs and MSPs in London and Edinburgh on the Piper Alpha disaster, its aftermath, how far the industry has progressed since then and how the key lessons continue to be reinforced

A newly developed Minimum Industry Safety Training Standard was introduced by Step Change in Safety from April 2009 to raise basic safety knowledge and awareness throughout the UK offshore oil and gas industry and to apply best practice training at a consistent level in safety critical areas. This mandatory training is aimed at both new starts to the industry and also for refreshing experienced personnel on a 4-year cycle. The 2-day OPITO approved training course is made up from nine elements. One of the nine elements is a 2-hour module with a focus on process safety and asset integrity. A reminder of Piper Alpha is included in the form of a short DVD clip.

7 An independent review of industry progress

To give further confidence that the industry's KP3 progress "self-assessment" was an accurate reflection of the true picture, a specialist asset integrity consultant was employed to undertake a cross check on a sample of the company responses. The purpose of the cross check was to provide a robust, balanced and independent appraisal of the progress made by the UK offshore industry in addressing the issues raised by HSE's Asset Integrity Report (KP3). Seven companies participated in the cross check on the basis that they were representative of large, medium and small operators with a range of installation types spread throughout the UKCS. The consultant chosen for this work had previously worked

for HSE for a number of years, and latterly for two years as KP3 Asset Integrity Programme project manager.

The yardstick used was the original ratings determined at HSE KP3 inspections, compared with the outputs from the Oil & Gas UK self-evaluation exercise. The self-awarded ratings and the appropriateness of the corrective measures adopted by each company were tested for validity and effectiveness. A series of interviews were conducted with key company personnel in accordance with a structured format to substantiate (on a sample basis) the veracity of the self-evaluation of asset integrity performance submitted to Oil & Gas UK at the end of January 2009. The interview structure was devised to capture specific actions taken by companies in addressing noted deficiencies highlighted in the original KP3 programme. In each case all original 'red light' issues were checked, most 'ambers' and a few 'greens'.

The general conclusions from the independent KP3 Cross Check report are included verbatim.

There can be no doubt that all companies who took part in this process have made substantial progress in asset integrity performance. There is also no doubt that the companies have been steered by the lessons learned during KP3 and the emphatic messages in the final KP3 report. In addition, some learnings resulted from extrinsic sources and events, such as the Texas City disaster and subsequent Baker Report.

The concentration of effort by duty holders has been on the "red" issues, the majority of which have been closed out. But at the same time, the original "amber" scores have been or are being dealt with, often the subject of more wide-ranging solutions and adaptations of the safety management systems. Many companies, for example, have chosen to reorganise their functional structure to be better placed to address the range of issues identified during KP3.

In the self-evaluation process, some companies have been conservative in assessing themselves against the traffic light system. This should not eclipse the considerable progress made within these template areas.

There are still remaining areas that need attention. For example, despite the considerable attention given to improvements in backlogs, supervision, competence and the maintenance of safety-critical elements, some companies still have much work to do –

however, the planning mechanisms and investment that underpin such work are largely in place and progress toward full compliance as represented by a "green" KP3 rating should not be far away.

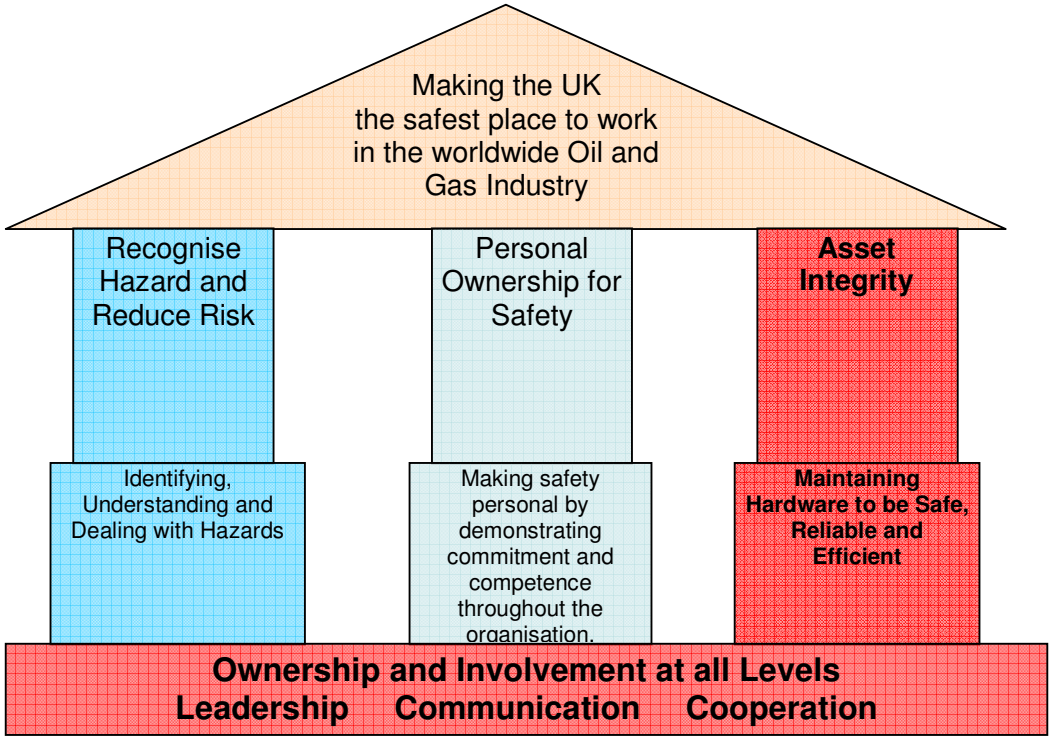
8 Workforce engagement

Workforce engagement on asset integrity has increased at all levels – from CEO and the senior management team, through asset and installation management, through the engineering and technical authorities, and through the offshore workers generally. Most companies have undertaken a series of asset integrity, process safety and corrosion related roll out presentations to staff and workers. Examples of additional workforce engagement activities include

- Technical authorities visit the platform and discuss asset integrity issues
- Technician competence training on small bore tubing assembly
- Company wide safety initiative on personal responsibility for safety
- Focussed asset integrity training for middle managers
- Participation of offshore workers in fabric maintenance inspections, operational risk assessments and diagonal slice maintenance workshops
- Corrosion awareness campaign following publication of the Oil & Gas UK Corrosion Handbook
- Integrity Engineer presentations on safety-critical equipment to the offshore workforce
- Engagement with safety representatives through facilitated offsite workshops to address barriers to safe working and to seek input to the 2009 Safety Improvement Plan
- Maintenance and Integrity Forum with workshops, lunch and learn, bulletins and offshore visits
- Key members of the offshore workforce attend quarterly management review of asset integrity
- Major accident hazard awareness workshops for managers and supervisors at Spadeadam to observe live explosions under controlled conditions
- Programme to "re-energise" Safety Representatives through a bespoke training package
- TR HVAC awareness training

9 Step Change in Safety /Oil & Gas UK response to the asset integrity challenge

The industry response to the challenge of asset integrity management has been ongoing for several years, commencing in the late 1990's as a result of concerns relating to hydrocarbon releases. Throughout the last decade the industry has worked closely and fruitfully in partnership with the Regulator and as a result has developed a considerable body of asset integrity related guidance, much of which is now being replicated world wide through organisations such as the International Association of Oil and Gas Producers (OGP).



In 2004 'Asset Integrity' became the third pillar in the Step Change in Safety temple model strategy to make the UK the safest place to work in the worldwide oil and gas industry. The industry set up an Installation Integrity Work Group as a direct response to the start of the KP3 programme. The group involved over 30 operator and contractor companies together with representatives from the verification bodies. Among other matters the group developed an Asset Integrity toolkit containing comprehensive guidance with reference to good industry practice documents for effective safety-critical plant and equipment maintenance management.

Following completion of this work and in recognition that sufficient tools were now available a high level strategic group was set up in 2007 – the Asset Integrity Steering Group. The

remit of the group is to continue to work with HSE to secure continuing improvement in the management of asset integrity through the following priority areas

- Improved education and training on the management systems for ensuring asset integrity;
- More effective sharing of HSE and industry good practices and lessons learned, together with better communication of the good work and investment that is already being made to preserve asset integrity and safely and extend the life of upstream oil and gas facilities;
- A review of existing Industry Asset Integrity Key Performance Indicators; and,
- Engagement with Engineering and Technical Authorities.

The AISG currently has two subgroups reporting to it, one on cross-industry key performance indicators and the other examining the underlying causes of hydrocarbon leakage with a view to identifying strategies for better preventing them.

Three cross-industry key performance indicators have been developed with a view to being able to demonstrate whole industry progress in effective asset integrity management through these metrics. The three performance indicators are

- KPI 1 - Major and significant hydrocarbon releases
- KPI 2 - Verification non-conformity
- KPI 3 - Safety-critical maintenance backlog

HSE has kept data on reportable hydrocarbon releases for many years. Release rates plateaued for the last 3 years after a number of years when release rates halved; however there are signs of further improvement with no major hydrocarbon releases reported for the last 12 months (for the first time since Piper Alpha). Consistent data for the other two performance indicators (KPI 2 and KPI 3) has only been available since the end of 2007. Detailed analysis is only just beginning to be possible now that more data is available so it would be premature to identify any trends at this time. Nevertheless the data begins to look promising as potential indicators of industry performance and progress as a whole.

9.1 Leadership

An “Asset Integrity Workshop” was developed by the Step Change Asset Integrity Steering Group aimed at raising senior management awareness and understanding of asset integrity management. During 2008 a total of 25 workshops, involving over 400 senior managers,

were delivered to most of the production operation duty holders and key contracting companies.

The workshop provided a one day interactive work session for MDs and direct reports to ensure a good understanding of safety cases, verification of safety critical elements, associated performance standards, Step Change toolkits, guidance etc. It was a unique opportunity for the industry leadership to work with their teams in a very interactive way to develop a better common understanding of what Asset Integrity is all about. It also enabled the team to collectively agree action plans to improve asset integrity management at all levels. The workshop is now recognised as world class best practice. Workshops have been "exported" with several taking place in the Middle East and have even reached the attention of the Australian Regulator who considers it to be an example of world class best practice.

There will be an ongoing programme of Asset Integrity Workshops in 2009 to cover remaining operators. In addition there has been a demand for a repackaging of the course with the aim of targeting and informing senior middle managers; this is currently under development.

9.2 Asset Integrity Website

In January 2008, Step Change upgraded its website to provide a dedicated area for more effective sharing of good practices and lessons learned within asset integrity. When a company or individual identifies an item worthy of sharing, a brief summary is sent to Step Change and it is posted on the website. The website automatically sends alerts all registered MDs of user companies with an interest in asset integrity.

9.3 Workshops and seminars

Throughout the KP3 programme Oil & Gas UK (then UKOOA) worked closely with HSE to raise industry awareness and improve communication and understanding. A number of well-attended seminars and workshops have been held during and after the completion of the programme. These have included

- Maintenance workshop 2004
- Asset integrity seminar 2005
- Asset Integrity seminar 2006
- Learning from major Accidents 2007
- Asset Integrity Key Performance Indicators Briefing 2009

- Process Safety Seminar (planned for July 2009)

9.4 Guidance

Various subgroups have produced comprehensive asset integrity related guidance as follows:

- *Guidelines for the Management of Safety-critical elements* – to provide guidance for the effective management of safety-critical systems (ISBN 978 0 85293 462 3)

- *Guidelines for the Management of the Integrity of Bolted Joints for Pressurised Systems* – leaking joints are a main cause of hydrocarbon releases on UKCS. The guide provides a framework for management of bolted joints and assists companies to develop their own procedures (ISBN 978 0 85293 461 6)

- *Guidelines for the Management, Design, Installations and maintenance of Small Bore Tubing Systems* – to provide a reference framework of management and technical controls and procedures necessary to ensure the continuing integrity of small bore tubing systems (ISBN 0 85293 275 8)

- *Testing regime for offshore TR-HVAC fire dampers & TR pressurisation requirements* – HSE information sheet 1/2006 – produced in conjunction with HSE

- *Hydrocarbon Release Reduction Toolkit* – provides a central reference of good practices for managers, supervisors and the workforce.(currently being revised/updated) (ISBN: 1 903003 34 9)

- *Asset Integrity Toolkit* – provides a practical framework of "observed good practice" checklists and tools to facilitate and enable review of asset integrity management

- *Guidance for corrosion management in oil and gas producing and processing* – a good practice guide for the corrosion specialist (ISBN 978 0 85293 497 5)

- *Corrosion Threats Handbook* – a guide for integrity managers and the workforce more generally, especially those less familiar with corrosion matters (ISBN 978 0 85293 496 8)

10 Conclusions

This report demonstrates that substantial progress has been made in effective asset integrity management since publication of the KP3 report in October 2007. In fact cross-industry efforts have been sustained and continuing since 2004. There has been considerable investment in hardware, management systems and the resources available; however it is recognised that this is not a task that will ever be "finished", and continuing investment in effective asset integrity management is something that will always be required during the remaining life of the North Sea oil and gas industry.