HAZARDOUS INSTALLATIONS DIRECTORATE
OFFSHORE DIVISION

KEY PROGRAMME 3
ASSET INTEGRITY

KP3 HANDBOOK
This is an abbreviated version of the handbook to show the range of activities the industry has been involved in.

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Preface

This handbook has been produced in support of the Asset Integrity Key Programme and includes useful information about the various projects that make up the full scope of the programme.

If a suitable printer is available the handbook can be printed in handy A5 booklet size, which enables convenient ready reference out of the office. The handbook is available on the bulletin board.

The bulletin board and this supporting handbook will be reviewed and updated at regular intervals.

Comments or suggestions on the content of this resource material can be directed at any member of the Installation Integrity Steering Group.

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Part 1 - Programme Background

Introduction

A significant proportion of the offshore infrastructure is approaching or exceeding the original anticipated design life. At the same time the demands to reduce costs have resulted in rationalisation of plant and equipment maintenance arrangements. This had led to concerns in HSE that this situation, unless effectively managed, will significantly increase the risk of major accidents on the UK continental shelf. HSE believes the goals of significantly improving installation integrity and securing a long safe future for the UKCS are inseparable and interdependent. This view is closely aligned to the vision of the UK oil and gas industry PILOT initiative.

PILOT is the successor to the Oil and Gas Industry Task Force (OGITF) that was created in 1998 in recognition of challenges faced by the industry. The PILOT concept aims to unite the senior management of operators, contractors, suppliers, unions and relevant Government Departments in creating a climate for the UKCS to retain its position as a pre-eminent active centre of oil and gas exploration and development and production and to keep the UK contracting and supplies industry at the leading edge in terms of overall competitiveness.

To make this vision a practical reality, specific deliverables were defined. A key outcome for the 10-year strategy for Industry/Government co-operation is that by 2010 the North Sea, and the UKCS in particular, will be the safest place to work in the worldwide oil and gas industry.

KP3 is aimed at making a major contribution to achieving this outcome.

Aim

The formal aim of KP3 is to ensure that duty holders effectively manage the risk of any failure of structure, plant, equipment or systems, which could either cause or contribute to, or prevent or limit the effect of, a major accident and/or cause fatalities.

In essence, KP3 is about the following:

- For OSD to use all its general and specialist resources to make an in-depth appraisal of duty holders' ability to manage the integrity of their installations in a manner that takes adequate account of health and safety;
- To identify deficiencies in maintenance and other activities that underpin life-cycle integrity;
- To use HSE influence and, where necessary, formal enforcement powers, to ensure that legal requirements are met and that any deficiencies threatening integrity are speedily remedied;
- To work with industry in a way that encourages good practice in integrity management, continuous improvement, and a minimisation of the potential for accidents.
Programme Drivers

Though by no means applying to all companies or all installations, evidence from inspection and investigation show that:

- There are weaknesses in the implementation of statutory provisions for Independent Verification designed to assure duty holders that their arrangements for securing the integrity of safety critical elements are adequate;

- Cost control, reduced offshore manning, and multitasking can - if poorly managed - have adverse effects on health and safety performance;

- Some backlogs of maintenance are unacceptable;

- A number of significant incidents have been due to maintenance or integrity failures;

- In addition there is a need to maintain the current level of improvement in reducing the numbers of Major and significant hydrocarbon leaks and reversing the rising trend in Minor releases.

Programme Components

The aims of the programme will be achieved by:

- Assimilating the findings of two pilot projects
  - a data assessment project (KP3/1)
  - a maintenance management/backlog inspections project (KP3/2) and outputs from the Belfry Workshop
- Into
  - a 3-year inspection programme focussed on key integrity/maintenance management issues (KP3/3)
  - coordination of other OSD Topic/Specialist work against the aim of the key programme
  - mapping of stakeholder initiatives against the aim of the key programme and development of joint supporting projects with external stakeholders such as UKOOA/IADC/Step Change (KP3/4)
  - sharing programme findings with all stakeholders.

It is the intention to implement KP3/3 on a year-by-year basis so that first year findings can be reviewed and the direction of the programme in future years adjusted accordingly.
The KP3/1 Pilot Project - Data Assessment

This pilot project was started on 1 October 2003 and completed on 28 November 2003.

Objective

The objective was to gather and review information that is relevant to installation integrity, in order to:

- show the need for the programme;
- investigate possible targets and measures that can be used to measure progress; and
- develop an information resource that can be used in other parts of the programme.

Sources of Information

A wide range of data was reviewed, including:

- notices issued by OSD;
- incident data, including various categories of Dangerous Occurrence, Injuries with a Major Hazard potential, threats to integrity (Regulation 9 of DCR);
- investigation reports prepared by OSD;
- inspection reports prepared by OSD;
- information from Key Programmes and Topic Programmes;
- accident databases, eg. WOAD;
- installation age profile;
- open reports;
- experience from other industries/countries.

HSE’s ORION system provides the primary source for Notices, Incident data and Inspection reports.

Summary of Findings

A wide variety of sources of information were reviewed, although this was limited to some extent by the time available. It is clear that there have been a number of integrity-related incidents and failures in recent years. It is also clear that there has been increased activity by OSD in connection with installation integrity matters over the last one to two years, probably driven by increased awareness of these incidents and failures.

It is already planned that the monitoring of hydrocarbon releases will continue, with associated targets for reducing the number year on year. A number of other measures have been examined, and although several may have some potential for development, no clear candidates have been identified that are highly useful and readily available. It is likely that any possible measures will need some form of voluntary reporting by industry.
The report contains a number of sources of information and guidance that may be of use to others involved with this programme and is appended in full at Annex 1.

The KP3/2 Pilot Project - Maintenance Management/Backlogs

Pilot Project Template

This pilot project commenced on 1 October 2003 and completed on 2 April 2004. Eleven inspections involving five major operators were undertaken using a standard template. The template headlines are as follows:

- Maintenance Policy/Strategy
- Enactment
- Predictive Analysis
- Number/Frequency of Breakdowns
- Performance Standards
- Backlog Justification
- Deferrals Process
- Traceability of SC definition
- ICP Interface
- Verification System
- Replacement Parts
- Repair Techniques
- Role of TAs
- Supervision
- Competence
- Capacity for human error
- System testing

Initial Findings

- Maintenance backlogs
  - some unacceptably high overall
  - some SCE maintenance unacceptably high
- Corrosion
  - frequent visual evidence, e.g. bolted, flanges/ex, equipment/handrails/structure
- Maintenance management systems
  - poor performance of some computer based systems
- Beach support
  - poor communications in relation to front line activities by reduced offshore workforce increasingly managed from onshore
- Planning
  - bureaucracy and workloads create conflicts in work planning process
• Supervision
  o supervisors burdened with paperwork. Little front line monitoring of work quality. Heavy emphasis on perceived "competence"

• Performance Standards
  o some inadequate. Some adequate but not followed

• Physical Evidence
  o Housekeeping often below par

• SCE Performance
  o 50% of functional tests on mitigation systems (eg. deluge) failed to meet performance standards

Evidence for Action

Based on eleven inspections, sufficient evidence was gathered to justify the following ongoing challenges

• Is the maintenance function adequately resourced?
• Is the planning of SC maintenance efficient?
• Is the quality of maintenance acceptable?
• Is the performance of SCEs reliable?
• Are inspection and audit standards optimal?
• Is supervisory and engineering support solid?

The Belfry Workshop

A good deal of the existing effort by IMT and Topic Teams is directed at ensuring installation integrity. The aim of the Belfry Workshop, held in January 2004, was to take into full account the fund of IMT/TT knowledge and experience and to use the workshop to add value to existing activity. This was done by identifying, reviewing and prioritising the key installation integrity issues to be addressed in the forthcoming year and beyond.

Prioritisation was undertaken against the following criteria:

• Hazard and Risk
  o nature and consequence
  o population at risk
  o occupational hazard/risks
  o historical accident/injury rates
  o commonality across sectors

• Legislative Compliance
  o level of compliance
  o compliance problems particular sectors
  o enforceability of Regulations
• Political Sensitivity
  o HSE/HSC priority - level of concern
  o public perception of risk
  o aversion to major risk
  o interest of particular stakeholders
  o workforce perception of risk

• Practicability
  o successful intervention likely
  o cost effective
  o HSE expertise available
  o virus (HSE's job?)
  o stakeholder interest/existing action
  o matched industry knowledge/competence

Forty-two issues were identified. The full list is attached at Annex 2. The top twelve issues were:

1. Integrity of piping repairs
2. Risk assessments and Hazops
3. Awareness of personnel
4. Valve failures
5. Hydrocarbon containment
6. ESDV issues
7. Maintenance quality and backlog
8. Lack of resources
9. Competence
10. Mitigation systems
11. Corrosion
12. (Ship Collision)

The template used for the KP3/2 pilot project has been reviewed against the Belfry Issues to produce a definitive template for inspections undertaken as part of the main KP3 inspection project - Part 2 refers.
Part 2 - Inspection Programme

Part 2.1 - Inspection Delivery

The inspection programme will be conducted as follows:

- The number of KP3 inspections to be undertaken during each work year of the project will be agreed and incorporated into the plan of work.

- Each inspection will be undertaken using a two-part (onshore/offshore) template, originally developed from the KP3/2 pilot and the Belfry Workshop but later modified during the 2004/2005 work year (the current versions - release 6 - are available on the internet as separate attachments).

- A multi-disciplinary team comprised of at least one IMT inspector and two topic specialists will carry out each inspection.

- Each inspection will take a total time of three weeks, to include an offshore inspection of at least three days duration plus pre and post onshore components and report preparation.

- The IMT inspector with responsibility for the installation to be inspected, if not the lead inspector, will be briefed on the inspection procedure and will retain the responsibility for inspection organisation and logistics. The installation inspector will have the right to accompany the inspection team but need not necessarily do so.

KP3 Inspection Team - Roles

A KP3 inspection team, by default, will consist of three inspectors: one IMT and two specialists. However, for very large installations, or where there are known problem areas requiring a larger team, it is perfectly possible to expand this number to four or more. Similarly, for example in the south where installations are much smaller, it may be possible to do justice to the agenda with a team of only two.

It is especially important in KP3 that all inspectors work as a multi-disciplinary team, due to the considerable areas of overlap in the inspection plan.

The IMT inspector will lead the inspection, as is normal practice, and maintain their role as inspection facilitator. They also, together with the IMT team leader, will make enforcement decisions - although these may be based on the advice of the specialists, as appropriate.

Specialist 1 will be responsible for the planning and execution of the KP3 aspect of the inspection, the roll-out presentations to the duty holder, the selection of a system to test, the body of the KP3 debrief, the production of the report and follow-up items, and the eventual close-out. Any of these tasks can be delegated to Specialist 2 or the IMT in the interests of cascading experience, but Specialist 1 remains accountable for the KP3 inspection delivery. The responsibilities include completion of the KP3 inspection template including the traffic light classification system. The template, inspection report and a copy of the letter to the duty holder should be forwarded to the KP3 admin team (VPN 526 8007 Tel: 01603 828007) within 15 working days of the completion of the inspection.
Specialist 2 will have two functions: Firstly, to support Specialist 1 in the delivery of the breadth of KP3. Secondly, he will operate for at least some of the time within his discipline, insofar as it contributes to KP3. It will be for the team to decide to what extent specialist discipline areas of inspection are included in the plan, and adequate consideration should be given to the requests made by the IMT in this decision.

**Preparation for the Inspection**

Send to the duty holder at an appropriate time prior to the inspection:

1. A copy of the templates
2. A letter introducing KP3, detailing the personnel to be seen and listing the documentation required prior to the visit. Suggested wording to be used in the letter is given at Annex 3.

**KP3 Demonstration of Safety Critical System Operation**

It is not the intention in this testing programme to put duty holders under duress, or introduce unnecessary production loss. At the same time, it is essential for HSE, in the process of our KP3 inspections, to get a first hand feel for the physical performance of sample SCEs. Therefore inspectors should negotiate with OIMs in selecting systems to test, taking both the above requirements into account.

The testing of these systems may take time to prepare; therefore requests for demonstrations should be made in good time, ideally on the first day of the inspection. Any necessary preparation, including PTWs, inhibits and risk assessments, is the responsibility of the duty holder, who has at all times the option of cancelling or deferring the test on the grounds of ensuring a safe operation.

**Some Suggested SCEs for Test**

A total of 16 tests are included in the KP3 inspection scope. These include;

- HVAC dampers - introduce test gas or test smoke into fan ducting;
- Fire detection system - check operation of multiple detectors, with voted input to ESD;
- Gas detection system - check operation of multiple detectors, with voted input to ESD;
- Blowdown valves - check individual operation by "blocking in" manual valves - see maintenance routines;
- ESD interstage valves (on non-operating trains) - check closure against performance standard by direct methods or operation of ESD loop;
- Deluge (wet test) - select one area for test. Check all parameters in accordance with the performance standards. Consider simulated failure of sequential fire pumps;
- Fire pump operation - in response to a number of different initiators.
Inspectors may also choose to witness any testing of safety critical equipment that the duty holder has planned during the inspection visit, e.g. HIPS calibration checks, riser valve full or partial closure checks, etc.

Details of the results of the safety critical system tests carried out during the 04/05 inspection programme are given at Annex 5. There are large variations in the numbers of each tests that has been carried out. In order to obtain a representative sample of the full range of system tests inspectors have been requested, where appropriate, to select tests that have been tested less frequently in the past.

<table>
<thead>
<tr>
<th>System</th>
<th>No of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State of Plant</td>
<td>45</td>
</tr>
<tr>
<td>Deluge test</td>
<td>11</td>
</tr>
<tr>
<td>Fire pump test</td>
<td>22</td>
</tr>
<tr>
<td>ESD valves</td>
<td>13</td>
</tr>
<tr>
<td>Fire detectors</td>
<td>10</td>
</tr>
<tr>
<td>Gas detectors</td>
<td>6</td>
</tr>
<tr>
<td>HVAC dampers</td>
<td>22</td>
</tr>
<tr>
<td>Emergency lighting</td>
<td>11</td>
</tr>
<tr>
<td>HIPS</td>
<td>0</td>
</tr>
<tr>
<td>PA Systems</td>
<td>1</td>
</tr>
<tr>
<td>Riser Valve</td>
<td>1</td>
</tr>
<tr>
<td>EX Equipment</td>
<td>3</td>
</tr>
<tr>
<td>TR Doors</td>
<td>1</td>
</tr>
<tr>
<td>Emergency Comms.</td>
<td>1</td>
</tr>
<tr>
<td>Ballast/Bilge</td>
<td>3</td>
</tr>
<tr>
<td>Crane</td>
<td>1</td>
</tr>
</tbody>
</table>

**Identification of Best Practice**

The KP3 inspection programme will also capture areas of asset integrity good/best practice. Inspectors should report any instances in enough detail to identify the elements that make the example best practice. Any examples provided will be fed back to the industry via the UKOOA Asset Integrity Working Group.
Part 2.2 - Templates & Reporting

Templates

To provide for a focused process and to ensure consistently of approach, the KP3 inspection programme will be undertaken using a set of inspection templates.

Notes on Use of the Templates for Production Installations

The purpose of maintenance is to preserve plant and equipment in a fit for purpose condition so as to maximise plant availability. Legislation requires that work equipment is maintained in an efficient state, in efficient working order and in good repair. In this context, 'efficient' relates to how the condition of the equipment might affect health and safety and how its deterioration could put persons at risk.

Maintenance can be assessed by inspecting both the condition and functionality of plant, and by inspecting the maintenance system. Assessment of the condition will be carried out during the KP3 offshore inspections and assessment of the maintenance system will take place onshore and offshore. The purpose of assessing the maintenance system is to determine whether the condition of the plant arises through good management or by accident. It will also help identify areas of poor performance and areas of better practice for promulgation to industry.

To assist in the assessment process, two templates have been produced; one aimed at Technical Authorities (TA) onshore, and a second template aimed at Offshore Team Leaders (OTL). The templates are intended to help improve the targeting and consistency of KP3 inspections.

It is suggested that the question areas covered in the TA template be addressed to the following personnel:

a) The person who controls the resources required to implement an effective maintenance system. Typically, the Asset Manager.

b) The persons responsible for setting the technical standards to ensure that the correct maintenance is carried out to an acceptable quality. Typically, the Integrity Assurance Engineer and other Technical Authorities.

c) The person responsible for running the maintenance system. Typically, the Maintenance Manager.

It is suggested that the question areas covered in the OTL template be addressed to the following personnel:

a) Persons who supervise maintenance activities. Typically, Offshore Team Leaders, maintenance supervisors, the Offshore Inspection Engineer, and the Offshore Installation Manager.

b) Persons who undertake maintenance activities. Typically technicians, craftsmen and contractors.

You may wish to involve other persons such as the ICP, and those responsible for operating the maintenance information system such as the maintenance planner.
The templates contain a large number of questions. Please try to answer them all. If you do not have time to cover all sections, please indicate this on the template.

While interviewing, you may wish to take advantage of the PACE technique described in HSE Investigative Interviewing course. Essentially, this takes the form of one inspector asking the questions and a second taking notes on the responses. The second interviewer has responsibility for keeping the interview on track and for going back to clarify inconsistencies, etc.

**Template Traffic Light System**

The KP3 steering group have devised a simple traffic light system to summarise the results from each inspection and to simplify the presentation of KP3 findings to inspectors and to the industry. Each section of the template is provided with a traffic light box for the inspection team to complete. Simply tick the red, amber, green or white box according to your findings. Inspectors should continue to use their discretion.

<table>
<thead>
<tr>
<th>NON COMPLIANCE/ MAJOR FAILING</th>
<th>ISOLATED FAILURE/ INCOMPLETE SYSTEM</th>
<th>IN COMPLIANCE/OK</th>
<th>NOT TESTED/NO EVIDENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Following the inspection, evidence will be assessed and professional judgement applied to decide, in the normal way, what, if any, enforcement action should be taken. The function of the traffic light is to indicate failings and/or compliance for analysis and presentation purposes. Where enforcement action has been taken, the traffic light will be amber or red.

The traffic light colours are defined as follows:

**NON COMPLIANCE / MAJOR FAILING**

Non-compliance with legislation

Major failing of system (hardware or management) or partial failure with a history of failure

Minded to serve notice

Issues in this category **must** be expressed in the letter to the duty holder

**e.g.**

(a) No system for authorising deferrals of SCE maintenance

(b) Complete failure of SCE to meet performance standard

(c) Multiple failure of SCE

(d) No competence system for supervisors or TA’s

(e) No clear system for review of effectiveness of SC maintenance performance (PUWER Reg 5)

**ISOLATED FAILURE/ INCOMPLETE SYSTEM**
Isolated failure of a well-defined system

Incomplete procedures/systems.

Partial failure of SCE, eg:

a) Fire pump starts but back up fails, or vice versa
b) ESDV closes 2 seconds longer than required by performance standard

Issues in this category should be expressed as recommendations in the letter to the duty holder.

**IN COMPLIANCE/OK**

Tested or inspected but with no significant issues found

Complies with regulations, etc.

**NOT TESTED/NO EVIDENCE**

Not tested or no evidence

There are concerns or information is unclear - re-inspect at later date

Issues in this category should include an explanatory note.

**Reporting**

KP3 inspections will be reported using standard inspection report forms. Following completion of the inspection, the completed inspection report and templates should be forwarded to the KP3 inspection analysis subgroup together with a copy of the letter to the duty holder.
Part 2.3 - Legislative Framework & Enforcement Policy
(excluding well operations and pipelines)

Legislative Framework

HSWA S2(2)(a) General Duties

The provision and maintenance of plant systems of work that are, so far as is reasonably practicable, safe and without risks to health.

PUWER Reg 4(1) Suitability of Work Equipment

Every employer shall ensure that work equipment is so constructed or adapted as to be suitable for the purpose for which it is used or provided.

The risk assessment carried out under Regulation 3(1) of the Management of Health and Safety at Work Regulations will help to select work equipment and assess its suitability for particular tasks.

PUWER Reg 5(1) Maintenance

Every employer shall ensure that work equipment is maintained in an efficient state, in efficient working order and in good repair

Regulation 5 builds on the general duty in the HSWA which requires work equipment to be maintained so that it is safe. Maintenance of work equipment is about the state to be achieved (ie. that work equipment is in an efficient state, in efficient order and in good repair) and not the process by which that is achieved.

Safety Case Regulations Reg. 2 Definition of SCE

"safety-critical elements" means such parts of an installation and such of its plant (including computer programmes), or any part thereof:

a) the failure of which would cause or contribute substantially to; or

b) a purpose of which is to prevent or limit the effect of, a major accident.

It makes reference only to the failure consequence of causing, contributing, preventing or limiting the effect of a major accident, i.e. there is no reference to risk, frequency, probability, foreseeability or reasonable practicability. Duty holders should therefore identify SCEs on a consequence basis, not risk, initially at systems level, but subsequently broken down into component parts as appropriate.

Whilst a system may be safety critical, not all component parts within that system will necessarily become SCEs. Therefore consideration of the consequence, combined with sound engineering judgement, should play an essential part in determining the verification work scope and examination requirements for each SCE.

Safety Case Regulations Reg. 2(5a) Suitable Written Scheme of Verification

Suitable written scheme for ensuring, the means described in Reg..2(6)7B, that the SCEs:

a) are suitable, and

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b) remain in good repair and condition

Safety Case Regulations Reg. 2(6b) Means of Verification

a) examination, including testing where appropriate, of the SCEs by independent and competent persons
b) examination of any design, specification, certificate, CE marking or other document, marking or standard ...
c) examination by such persons of work in progress
d) the taking of appropriate action following reports by such persons
e) taking of other steps pursuant to Reg 19 and Schedule7
f) taking of steps incidental to (a) to (e) above.

The purpose of a verification scheme is to ensure that SCE are or will be suitable. Therefore while the SCR do not specifically require performance standards to enable judgements to be made on suitability, performance requirements for each SCE need to be established. Various sources can assist in establishing performance standards, e.g. codes and standards, PFEER performance standards, technical specifications, historical data, etc.

Particular care should be taken to ensure duty holders are acting positively on any non-conformance with their performance standards. However, non-conformance with a performance standard is not necessarily a breach of law.

Where Inspectors identify significant deficiencies such as those listed below, formal enforcement action should be considered.

- No written verification scheme exists;
- Not all SCEs have been identified;
- Verification scheme exists but is not suitable;
- Independent competent persons clearly lack competence;
- Independent competent persons clearly lack independence;
- SCEs becoming unsuitable or not remaining in good condition or repair;
- Scheme reviews not being carried out;
- Records do not exist;
- Verification scheme not put into effect.

Safety Case Regulations Reg. 2(7) Independent Person

A person shall be independent only where;

a) His function will not involve the consideration by him of an aspect, of a thing liable to be examined, for which he bears or has borne such responsibility as might compromise his objectivity; and

b) He will be sufficiently independent of a management system, or a part thereof, which bears or has borne any responsibility whor an aspect of which he might consider, of a thing liable to be examined, to ensure that he will be objective in discharging his function.

This provides the basis for determining independence.
Safety Case Regulations Reg. 19 20 and 21

Regulations 19

1) The duty holder for an installation shall ensure that a record of the safety-critical elements and the specified plant is made.

(2) After a record has been made in accordance with paragraph (1), the duty holder shall ensure that, in accordance with paragraph (3)—
   a) comment on that record by an independent and competent person is invited;
   b) a verification scheme providing for the matters contained in Schedule 7 is drawn up by or in consultation with such person;
   c) a note is made of any reservation expressed by such person as to the contents of—
      (i) that record; or
      (ii) that scheme; and
   d) that scheme is put into effect.

(3) The matters set out in paragraph (2) shall be completed—
   a) in the case of a production installation, before completion of its design; and
   in the case of a non-production installation, before it is moved into relevant waters with a view to its being operated there

Regulations 20

The duty holder shall ensure that, as often as may be appropriate—
   a) the verification scheme for his installation is reviewed and, where necessary, revised or replaced by or in consultation with an independent and competent person; and
   b) a note is made of any reservation expressed by such person in the course of drawing it up.

Regulations 21

The duty holder shall ensure that effect continues to be given to the verification scheme for his installation, or any revision or replacement of it, while that installation remains in being.

Regulations 19-21 require a duty holder to prepare, put into effect and maintain a verification scheme (as defined in regulation 2(5)). Production and non-production installations come into UK jurisdiction at different stages. For a new production installation, a verification scheme must be put in hand before the completion of design work. A summary of the scheme must be included in the design notification (Schedule 1). The scheme applies to the installation throughout its life until it is dismantled.

Schedule 7

1 The principles to be applied by the duty holder for the installation in selecting persons -
a) to perform functions under the scheme; and
b) to keep the scheme under review.

2 Arrangements for the communication of information necessary for the proper implementation, or revision, of the scheme to the persons referred to in paragraph 1.

3 The nature and frequency of examination and testing.

4 Arrangements for review and revision of the scheme.

5 The arrangements for the making and preservation of records showing -
   (a) the examination and testing carried out;
   (b) the findings;
   (c) remedial action recommended; and
   (d) remedial action performed.

6 Arrangements for communicating the matters specified in paragraph 5 to an appropriate level in the management system of the duty holder for the installation.

PFEER Reg. 5 Assessment

Assessment:

Identification of events leading to:

A major accident involving fire or explosion

The need for EER

Establish appropriate standards of performance to be attained by anything provided by measures for:

(i) ensuring effective evacuation, escape, recovery and rescue to avoid or minimise a major accident

(ii) otherwise protecting persons from a major accident involving fire or explosion

A performance standard is a statement, which can be expressed in qualitative or quantitative terms, of the performance required of a system, item of equipment, person or procedure, and which is used as the basis for managing the hazard - eg. planning, measuring, control or audit - through the life cycle of the installation. The Regulation does not specify what performance standards should be - that is for the duty holder to decide, taking into account the circumstances on the particular installation.

As part of the assessment process the duty holder is required to establish performance standards for the measures provided. The requirement for the establishment of appropriate
performance standards is in addition to the requirement for them in the SCR, which is limited to those measures for protection of persons and not prevention.

Inspectors will find that performance standards provide an extremely effective route to probing compliance with PFEER in relation to major accident hazards. These performance standards may be described in terms of functionality, survivability, reliability and availability. Probing the justification and the achievability of a standard for particular inspection/enforcement approach to PFEER.

**PFEER Reg. 9 Prevention of Fire and Explosion**

(1) The duty holder to take appropriate measures with a view to preventing fire and explosion, including:

(a) safe production and use, etc
(b) prevent uncontrolled release
(c) prevent accumulation of combustible substances
(d) prevent ignition.

**PFEER Reg. 19 Suitability and Condition of Plant**

(1) plant on the installation provided in compliance with PFEER

(a) is so constructed or adapted so as to be suitable for the purpose for which it is used or provided for
(b) is maintained in an efficient state, in efficient working order and in good repair

**DCR Reg. 8 Maintenance of Integrity**

(1) The duty holder shall ensure that suitable arrangements are in place for maintaining the integrity of the installation, including suitable arrangements for:

(a) periodic assessment of its integrity; and
(b) the carrying out of remedial work in the event of damage or deterioration which may prejudice its integrity.

A duty holder is responsible under DCR Regulation 8 for ensuring suitable arrangements are in place for maintaining the integrity of the installation, including suitable arrangements for periodic assessment of its integrity and carrying out remedial work in the event of damage or deterioration.

Elements of an installation structure can be SCE's under the SCR verification scheme therefore the duty holder, in consultation with an ICP, requires to determine their suitability and ensure they remain in good condition and repair during the installations life cycle. There is no intention to duplicate work required in setting performance standards or compiling maintenance and examination work scopes required to comply with the Regulations. Work undertaken to comply with DCE Regulation 8 can be used to contribute to the requirement to comply with the SCR verification scheme, and vice versa, providing both sets of legal provisions are met. A verification scheme which involved some activities which might be classed as maintenance would not be sufficient to fully discharge the requirements of DCR Regulation 8.
Should the same company be responsible for ICP examinations and repair work required as a result of these examinations, then robust management systems, eg. 'Chinese walls' must be in place which ensure independence and objectivity between the persons responsible.

**Enforcement Policy**

The offshore stakeholder community is generally supportive of the OSD's installation integrity initiative. UKOOA fully supports the programme with a dedicated industry working group to promote the aim of KP3. IADC, The Offshore Contractors Association and the Verifications Bodies have signified their keen interest and support.

The steering group will monitor consistency of enforcement decisions off-line and advise all teams of perceived variations.
Part 2.4 - 2004/2006 Inspection Programme

Twenty-three inspections were programmed for the 04/05 work year and twenty-four were completed, ie 104% of the inspection target was achieved. Section 2.2 gave information on the use of the templates and traffic light classification system for reporting on KP3 inspections. Information on the analysis of the 2004/05 KP3 inspection reports is given at Annex 5.

A total of one Prohibition Notice and four Improvement Notices, across three installations, were served under the KP3 programme during 2004/5.

Part 2.5 - 2005/2006 Inspection Programme

Forty KP3 inspections were authorised for 2005/06, thirty-five target installations were identified and a total of 30 were completed. In addition, there were also a number of inspections carried out as a result of technical projects aligned to KP3.

Ten mobiles were included in the inspection plan. The template for floaters has been adjusted to take account of marine aspects, but follows the same broad format as the original template - (the current versions are available on the internet as separate attachments).

Part 2.6 - 2006/2007 Inspection Programme

Fifty target installations have been authorised for KP3 inspections for 2006/07. In addition, there will also be a number of inspections as a result of technical projects aligned to KP3.

Mobiles, floating production and storage, well test equipment and underballanced drilling contractors, and NUIs are included in the plan.

Part 2.7 - Investigation Strategy

The KP3 project includes a commitment to increase investigation of loss of integrity incidents. In February 2005, the Divisional Management Team took the decision that all offshore hydrocarbon releases classified as major or significant should be investigated by OSD. The arrangements relating to the investigation of offshore hydrocarbon releases are detailed in SPC/ENF/100 - see Annex 4. The new arrangements commenced on 1st April 2005. The arrangements for integrity related incidents generally are outlined in SPC/TECH/OSD/34 - see Annex 4.

SPC/TECH/OSD/34 (Annex 4) also describes arrangements to ensure timely notification of incidents to relevant Specialist teams.
Part 3 - The Topic Team Coordination Initiative

In June 2004 the DMB approved a proposal for a methodology to capture topic teamwork that contributes to meeting the aim of KP3.

This proposal was discussed at OD5 and OD3 team leaders at meetings on 7 and 23 July 04 respectively, and subsequently with representatives of well operations, pipelines and diving disciplines. It was generally thought to represent a beneficial way forward.

A Calling Notice, inviting submission of Topic Team KP3 Projects to the IISG, was issued on 6 October 2004.
Part 4 - The Working With Stakeholders Initiative

The aim of this project is to secure the cooperation of the industry throughout the currency of the programme.

The process is to work closely with stakeholders and stakeholder organisations and to share knowledge and discoveries. Also to map stakeholder initiatives against the aim of the key programme and to develop joint supporting projects.

Stakeholder organisations with a direct and declared interest in the KP3 programme are:

- Step Change
- United Kingdom Offshore Operators Association (UKOOA)
- International Association of Drilling Contractors (IADC)
- British Rig Owners Association (BROA)
- Offshore Contractors Association (OCA)
- Verification Bodies (IVBs)

Organisations with an indirect and declared interest in the KP3 programme are:

- Institution of Mechanical Engineers (I.Mech.E)
- Norwegian Petroleum Safety Authority (PSA)
- Dutch State Supervision of Mines (SODM)

Other organisations:

- International Marine Contractors Association (IMCA)
- North Sea Offshore Authorities Forum (NSOAF)
- International Regulators Forum (IRF)

The following pages summarise activity involving stakeholders.
Part 4.1 - Step Change

- Roger Fronks (RF) and Taf Powell attended Step Change Leadership Team (SCLT) meeting on 22 January 2004. RF made presentation on the background, aim and objectives of the programme. Pushback from some members on suggestion that commercial pressures had adversely affected health and safety performance but the perceived need for the KP3 programme was strongly supported by others. Request by OCA to present at upcoming partnership seminar arose from this meeting.

- RF made presentation on the background, aim and objectives of the programme to the Step Change OIM Network meeting on 20 May 2004. Well received by audience of about 30 OIMs and related grades.

- RF, Tony Blackmore and Taf Powell attended SCLT meeting 11 August 2004

- Alan Richardson gave presentations to the SCLT and UKOOA Installation Integrity Workgroup in January, February and May 06.

Step Change Strategy 2005

Step Change is a cross-industry group consisting of a Leadership Team, Support Team and 131 member organisations. In the past communications between Step Change and the oil and gas industry were not as effective as they could have been and there were too many initiatives being pursued. As a result the SCLT has revised and consolidated initiatives. There are now 3 main themes that Step Change is focussing on. These are represented in a temple model and are:

1. Recognise Hazard and Reduce Risk

2. Personal Ownership for Safety - cross industry workgroup (PRfS) have produced documents and tools which are in the final stages of roll out

3. Asset Integrity - Step Change monitoring and supporting this work.

Underpinning the model is ownership of and involvement in these three themes at all levels.
Part 4.2 - Industry Installations Integrity Work Group (IIWG)

The Work Group began with a meeting was held with UKOOA and IADC on 11 November 2003 (Fronks/White/Kyle/Cattini). A presentation was made on the background, aim and objectives of the programme. The proposals were well-received and immediate suggestions were made in respect of provision/updating of relevant guidance and the merits of organising a joint industry/HSE workshop.

A joint UKOOA/HSE workshop was held at the Treetops Hotel on 27 May 2004. Over 120 delegates attended representing operators, owners, contractors and verification bodies.

Meeting held 21 June 2004 at which, inter alia, formation of an Installation Integrity Working Group was discussed.

Inaugural meeting of Installation Integrity Working Group held on 28 September 2004. It was envisaged that the life of the workgroup would run from September 2004 to March 2006 with meetings every 6 to 8 weeks.

UKOOA has led the workgroup with support from HSE, and project managed the outcomes.

HSE has supported the workgroup by providing generic feedback from the KP3 inspection programme plus other relevant data and providing administrative assistance.

A full list of organisations represented on the workgroup is given in the ToR - see Annex 6.

The workgroup set up the following subgroups:

1. Definition of integrity
2. Key Performance Indicators
3. Toolkit of good practice

Presentations of KP3 progress have been made at all IIWG meetings, the most recent by A Richardson at in May 06.

Definition of Integrity

The following definition was agreed by the workgroup:

"Asset integrity" is the ability of the asset to perform its required function effectively and efficiently whilst safeguarding life and the environment.

"Asset integrity management" is the means of ensuring that the people, systems, processes and resources which deliver the integrity, are in place, in use and fit for purpose over the whole lifecycle of the asset.

Whole lifecycle comprises:

- Design
- Construction
- Installation
- Commissioning
- Operation
• Maintenance
• Assurance
• Decommissioning

Fit for purpose means:
• Dependable and effective/competent in meeting current performance requirements when required to do so

Asset means:
• All physical facilities required for the operation

Ensure means:
• Implementation of systems and processes
• Setting of standards
• Measuring and monitoring against standards
• Audit
• Verification

Performance Indicators

Three KPIs have been agreed:

1. **Loss of containment (number of reportable hydrocarbon releases)**
   
   Information for this KPI already collected for HSE HC release database.

2. **Number of significant non-compliances (uncorrected deficiencies with function, performance or management of defined Safety Critical Elements)** which have not been corrected within 30 days of the inspection
   
   The group chose this KPI because the verification process is defined by legislation and had a degree of consistency across all installations.

3. **Production losses associated with maintaining safety**
   
   This KPI has been agreed and existing data is to be provided by the DTI.

Good Practice Toolkit

The Toolkit was rolled out at the UKOOA/HSE Asset Integrity Seminar on 29<sup>th</sup> June 2006 at the Aberdeen Exhibition and Conference Centre. The Seminar included a keynote address from Doug Halkett, Transocean, Co-Chair Step Change in Safety and industry presentations on good practice from MOUK, BP and Talisman. Tony Blackmore, HSE, explained the basis of KP3 and Alan Richardson (HSE) presented the analysis of programme results to April 06.

The Toolkit follows a similar format to the Hydrocarbon Release Toolkit and is based on the installation lifecycle (topic, people, plant and process) and key topics under framework headings (design, construction, operations, change control, audit/monitoring and decommissions). The overall Toolkit format is as follows:

- Observed good practice
- Integrity lifecycle matrix
- Tool kit inter relationships & audit themes
- Tool #1 planning
- Tool #2 competence
- Tool #3 assessment/control & monitoring
- Tool #4 maintenance
- Tool #5 assurance & verification
- Tool #6 quality & audit

The Toolkit can be found at:

http://www.oilandgas.org.uk/issues/health/docs/AssetIntegrityToolkit.pdf

Good practice derived from the KP3 inspection programme will be included as a live document on the UKOOA and HSE websites. The UKOOA website will include a platform for Industry to input its own good practices.
Part 4.3 - Consultation with Other Stakeholders

International Association of Drilling Contractors (IADC)

An initial joint meeting was held with UKOOA and IADC on 11 November 2003 (Fronks/White/Kyle/Cattini). A presentation was made on the background, aim and objectives of the programme. The proposals were well received and immediate suggestions were made in respect of provision/updating of relevant guidance and the merits of organising a joint industry/HSE workshop.
Offshore Contractors Association (OCA)

The following seminar on 28 April 2004 was attended by about 100 OCA member delegates. The "Regulators View" session consisted, principally, of Stan Cutts feedback presentation on the findings of the Pilot Inspection Project. The presentation contributed well to the seminar theme and prompted good level of discussion.

Verification Bodies (ICPs)

Verification bodies have taken a full role in the IIWG and development of the Integrity Toolkit. They are also heavily involved in the update to the Guidelines For The Management of Safety Critical Elements initiated by Keith Harte, Upstream Technology Manager, Energy Institute. This work will be complete 1st Q 2007.
**Norwegian Petroleum Safety Authority (PSA)**

Roger Fronks made a presentation on KP3 to the PSA Special Working Group in Edinburgh on 04 December 2003.

**Dutch State Supervision of Mines (SODM)**

Roger Fronks made a presentation to Roel vandeLint on KP3 on 02 September 2004 further to the following request to Ian Whewell, OSD1.

Contact has been established with Vincent Classens in relation to the maintenance of TR HVAC damper systems.
Part 5 - Industry Senior Management Project

There is an opportunity in KP3 to challenge senior management in a company on their commitment to maintaining integrity. Senior management being defined as a level above asset manager. For small companies with one or two installations asset manager may be at the top of the management chain in the UK and hence is equivalent to senior manager. For large multinationals senior manager may be the field manager.

These senior managers set budgets and staffing levels for assets. Consequently they should use information to balance investment against the integrity of systems and hardware.

The challenge to senior management should take the form of a conversation using the following questions as an agenda for the discussion. In terms of timing for the challenge, this interview should take place after evidence has been obtained from inspection across a significant proportion of the asset/field.

- The process by which the senior management gains a view on the status of integrity for the installation process, structures and competence
- The criteria or indicators the company use to monitor trends in performance of the above
- The trigger points for the indicators that initiate investment
- The role asset integrity plays as part of corporate governance

The interview should be scheduled into the KP3 plan, it should be lead by at least the principle inspector in the team but can be supported from OSD3
Part 6 - Performance Indicators

Overview of the six steps to setting performance indicators

1. Establish the organisational arrangements to implement indicators
   - Appoint a steward or champion to take the initiative forward.
   - f) In larger organisations consider using a process safety steering committee.

2. Decide on the scope of the indicators – consider what can go wrong and where?
   - Select the organisational level to which indicators will apply, eg:
     - the whole organisation;
     - a single site or group of sites;
   - a) Base scope on:
     - main process safety risks;
     - areas where greater assurance on business risk is needed.

3. Identify relevant risk control systems (RCSs) in place to prevent major accidents. Describe the safety outcome for each RCS
   - List the important RCSs that control the risks.
   - c) Set a lagging indicator to show whether each of the desired safety outcomes is achieved.

4. Identify the critical elements of each RCS, ie those actions or processes which must function correctly to deliver the outcome
   - d) Identify critical elements of the RCS.
   - e) Set leading indicators to monitor whether that RCS is operating as
   - Set a tolerance for each leading indicator.

5. Establish data collection and reporting system
   - Ensure information/the unit of measurement for the indicator is available or can be established.
   - Decide on presentation format.

6. Review
   - Review adequacy of process safety management systems.
   - Periodically review scope and viability of indicators.
Part 7 - Emerging Findings

The results of the pilot inspections have been borne out in the 2004/06 programme of mainstream KP3 inspections. The main deficiencies remain in the following areas, although now we know that they are taking on a mixed profile of improvement, as the message of KP3 takes root within the industry

- **Backlogs**
  - Definition of backlog different across the industry with no clear standard established. Understanding of the definition misunderstood onshore/offshore. The level of safety critical backlog is still high in places. Actual levels are often unknown due to high levels of spurious data recorded in systems, double counting and failure to close out work orders. No assessment of criticality and prioritisation of maintenance. Shifting of backlog to deferred badly managed.
  - SCE and non SCE backlog often confused, Interaction between Scand non SC systems not assessed or understood.

- **Corrosion**
  - Inspection and corrosion management is giving concern and more work needed

- **Maintenance of SCEs**
  - Poor links to between WOs and performance standards. No guidelines on pass/fail criteria included. No requirements for function testing after commissioning. Poor or absence of risk assessment for failed SCEs and corrective maintenance.
  - Problems with the level of information recorded, preventing reliability/availability of systems and performance history to be established. Poor data checking onshore/offshore. As found condition not recorded.

- **Technical support**
  - A mixed picture often due to low numbers of offshore visits by TAs and high levels of project workload

- **Planning**
  - a slow but steady improvement

- **Deferrals**
  - Weak procedures, authorisation by offshore with no onshore input and absence of consultation with TAs. No/weak risk assessment.
Maintenance team leaders are often multi-disciplined leaving maintenance quality inspection and solving of technical issues in the hands of Technicians. Often an absence of Lead Technicians.

Some examples of good practice

- **Performance Stds**
  - Performance standard requirements for testing following maintenance are often poorly defined

- **SC Systems (Tests)**
  - Unacceptable level of failure in some areas (TR HVAC systems in particular)

- **Physical State of Plant**
  - Poor for both safety critical and non safety critical

- **Corrective Maintenance**
  - Ratio of corrective to planned too high in many cases. No risk assessments carried out or wrong level of expertise involved. No implementation of mitigation measures. No reference to criticality of SCERe. Links to major hazard mitigation.
Annex 1 - EP3/1 Report

KEY PROGRAMME 3: INSTALLATION INTEGRITY

PROJECT 1: DATA REVIEW AND ANALYSIS

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DISCUSSION REGARDING MEASURES AND TARGETS
SUMMARY

Objective:

To gather and review information that is relevant to installation integrity, in order to:

- Show the need for the programme,
- Investigate possible targets and measures that can be used to measure progress, and
- Develop an information resource that can be used in other parts of the programme.

Sources of information:

- Notices issued by OSD
- Incident data, including various categories of Dangerous Occurrence, Injuries with a Major Hazard potential, Threats to integrity (Regulation 9 of DCR)
- Investigation reports prepared by OSD
- Inspection reports prepared by OSD
- Information from Key Programmes and Topic Programmes
- Accident databases, e.g. WOAD
- Installation age profile
- Open reports
- Experience from other industries/countries

ORION provides the primary source for Notices, Incident data and Inspection reports.

Summary of findings:

A wide variety of sources of information have been reviewed, although this has been limited to some extent by the time available. It is clear that there have been a number of integrity-related incidents and failures in recent years. It is also clear that there has been increased activity by OSD in connection with installation integrity matters over the last one to two years, probably driven by increased awareness of these incidents and failures.

It is already planned that the monitoring of hydrocarbon releases will continue, with associated targets for reducing the number year on year. A number of other measures have been examined, and although several may have some potential for development, no clear candidates have been identified that are highly useful and readily available. It is likely that any possible measures will need some form of voluntary reporting by industry.

This report contains a number of sources of information and guidance that may be of use to others involved with this programme.
NOTICES

ORION contained 100 Prohibition Notices and 253 Improvement Notices on 15/12/2003. These notices include a number of Diving-related notices and ‘occupational health’ related notices (e.g. noise, COSHH) that are not of direct interest here. These have been screened out, as have those where there is no little information about the offence.

Remaining Notices with possible relevance to major accidents are summarised in Excel spreadsheets:

OrionProhibitionNoticeReview.xls
OrionImprovementNoticeReview.xls

The first spreadsheet contains 17 Prohibition Notices that have a strong link to major accidents. These vary in number from 2 to 6 in any one year. The Notices include reactions to hydrocarbon releases (e.g. Brent B, Ninian South, NW Hutton), lifting and crane operations, and also one marine case (Pride North Sea) involving several Notices. There is one Notice explicitly dealing with inadequate numbers of competent staff (Rough).

The second spreadsheet contains 138 Improvement Notices that have a strong link to major accidents. These are distributed as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Notices</td>
<td>36</td>
<td>43</td>
<td>28</td>
<td>23</td>
<td>8</td>
</tr>
</tbody>
</table>

Note that the 1999 figures did not cover the full year due to the change in systems during that time.

A number of the Improvement Notices are linked to particular incidents, as with the Prohibition Notices. The others cover a large spread of subject areas, although some common threads can be identified, e.g. integrity of hydrocarbon systems, integrity of other hardware, adequacy of verification schemes. A small number of Notices have been issued for backlogs of maintenance on safety critical elements and associated ineffective management.

The spreadsheets show that a considerable number of topics and issues have been addressed through enforcement action. Some of these are mentioned above. The Notices have not been subject to extensive analysis so it is difficult to draw conclusions about the completeness or consistency of the enforcement action. Nevertheless, it is clear that a number of serious matters relating to installation integrity have been raised recently and that the number of Notices shows no sign of reducing.

INCIDENT DATA

This section describes incidents obtained primarily from ORION. It should be noted that some of this information has been captured in other work, e.g. some of the Key or Topic Programmes, in the ‘Accident databases’ section, and in the ‘Open reports’ section.
Dangerous occurrences

ORION contained 7950 notifications on 15/12/2003. These are distributed as follows:

<table>
<thead>
<tr>
<th>Type of dangerous occurrence</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collapse – Offshore (10), Scaffold (6), Seabed (1), Structure (0)</td>
<td>17</td>
</tr>
<tr>
<td>Collision Offshore</td>
<td>93</td>
</tr>
<tr>
<td>Contact Electricity</td>
<td>1</td>
</tr>
<tr>
<td>Evacuation Offshore</td>
<td>21</td>
</tr>
<tr>
<td>Explosion/Fire (4), Explosion/Misfire (2)</td>
<td>6</td>
</tr>
<tr>
<td>Fail – Breathing (20), Diving (148)</td>
<td>168</td>
</tr>
<tr>
<td>Fail Fairground</td>
<td>2800*</td>
</tr>
<tr>
<td>Fail Freight</td>
<td>9</td>
</tr>
<tr>
<td>Fail Lift Machinery</td>
<td>571</td>
</tr>
<tr>
<td>Fail Pipeline</td>
<td>89</td>
</tr>
<tr>
<td>Fail Radiation</td>
<td>7</td>
</tr>
<tr>
<td>Fail Vessel</td>
<td>121</td>
</tr>
<tr>
<td>Fail Well</td>
<td>585</td>
</tr>
<tr>
<td>Failure Offshore</td>
<td>1110#</td>
</tr>
<tr>
<td>Fall Offshore</td>
<td>5</td>
</tr>
<tr>
<td>Fire Offshore (345), Fire/Explosion Electrical (109)</td>
<td>454</td>
</tr>
<tr>
<td>Loss of Buoyancy</td>
<td>9</td>
</tr>
<tr>
<td>Petrol Hydrocarbon (1678), Release Offshore (132)</td>
<td>1810</td>
</tr>
<tr>
<td>Pos Collision Off</td>
<td>42~</td>
</tr>
<tr>
<td>Release Agent (25), Release Dangerous Substance (4), Release Substance (3)</td>
<td>32</td>
</tr>
</tbody>
</table>

* Contains offshore incident data from 1991-99; transferred from Sun system
# Covers various incidents; about 60% are dropped objects
~ Covers a variety of errant vessel and attendant vessel incidents

The Figure on the next page shows the distribution of Dangerous Occurrences by year, taken from ORION. The number of incidents for 2003 is based on those received by the end of February 2004. Note that slightly different figures can be obtained from official HSE statistics reports (see later); these cover the financial year (i.e. April to March) and have had duplicate entries removed. It is interesting to note the drop in reported Dangerous Occurrences for 2003; it is possible that there are still some incidents that have not yet been reported. Unfortunately the official figures will not be available for some months yet.
Injuries with Major Hazard potential

These incidents are difficult to extract, because judgement is needed to identify them and this is inevitably subjective to some degree. It has not been possible to do this within the timescale of this report. Some of the incidents are likely to be included in ‘Accident databases’ below.

Threats to integrity (DCR Regulation 9)

This type of incident is recorded in ORION under the ‘Other’ Notification category. Several types of incident are identified; these include ‘DCR’ and ‘DCR Integrity Notification’ which appear to cover the same areas. Very few notifications have been received for these incident types; these are summarised below:

<table>
<thead>
<tr>
<th>Installation</th>
<th>Brief summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPSO</td>
<td>Significant wave contact; denting of bow plate and stiffener deformation</td>
</tr>
<tr>
<td>SS MODU</td>
<td>Stability degradation; failure of sea water cooling line leading to flooding</td>
</tr>
<tr>
<td>FPSO</td>
<td>Stability degradation; through-thickness crack in column to brace connection</td>
</tr>
<tr>
<td>MODU JU</td>
<td>Damage to leg bracing during jacking to pre-load air gap</td>
</tr>
<tr>
<td>Fixed</td>
<td>Turbine exhaust stack suffered excessive movement in wind due to loose bolts</td>
</tr>
</tbody>
</table>

A number of other relevant incidents have been reported instead in the RIDDOR Dangerous Occurrences categories, e.g. FPSO wave damage (November 1998), FPSO tank over pressurisation and hull damage (April 1999), FPSO close to angle of loll (April 1997), Flotel loss of position close to fixed platform (June 2001).

In addition to the MODU JU incident recorded above, three other Jack-up incidents involving foundation problems leading to leg damage do not appear to have been reported at all. These occurred in May 2000, January 2002 and April 2002.

INVESTIGATION REPORTS

It has not been possible to examine these within the timescale of this report. However, it is likely that some of these incidents have been covered in some of the other sections of this report.

INSPECTION REPORTS

Around the middle of October 2003, a search of ORION for Inspection reports containing the text ‘SCE’ (as an abbreviation for ‘safety critical element’) found about
110 documents. A further search for the text ‘backlog’ yielded 106 documents, although a number of these had already been found by the ‘SC Esce’ search. Collectively the two searches found 142 separate documents.

The reports should only be considered as a sample; it is likely that many other reports exist that have a bearing on installation integrity but have not been identified by the search criteria that were used.

A number of the reports are linked to the Notices that were discussed in an earlier section. It is difficult to draw conclusions about the completeness and consistency of this inspection activity without further analysis and the review of a wider range of documents. However, it is clear from a brief review that difficulties have been encountered with a wide range of duty holders and installations. It is interesting to note that nearly half of the documents that were examined are for 2003. This suggests that backlogs and safety critical elements have become a much more common topic for inspection within the last year.

Several reports, mostly from 2003, contain specific information about maintenance backlogs and these references have been passed onto the KP3 Pilot Project (KP3/2).

INFORMATION FROM KEY & TOPIC PROGRAMMES

The table below summarises recent and current programmes that may be relevant to major accident hazards.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Target</th>
<th>Progress against target</th>
</tr>
</thead>
<tbody>
<tr>
<td>KP2</td>
<td>Risk management in the workplace</td>
<td>Zero fatalities and a reduction of 15% in drilling related accidents by 2006</td>
<td>(new programme)</td>
</tr>
<tr>
<td>TP2</td>
<td>Reduction in FPSO collision risks</td>
<td>Reduction of 25% in off-station shuttle tanker incidents by 2004</td>
<td>Achieved by 2003.</td>
</tr>
<tr>
<td>TP3</td>
<td>Incorporating health and safety in design</td>
<td>Reduction of 10% in adverse findings in design safety cases by 2004</td>
<td>Some encouraging signs although considerable scatter in results.</td>
</tr>
<tr>
<td>TP5</td>
<td>Lifting operations offshore</td>
<td>Reduction of 15% in incidents involving lifting and mech. handling by 2003</td>
<td>Completed in March 2003 (1 year early), shows target has been achieved. Some work has now been subsumed into KP2.</td>
</tr>
</tbody>
</table>

Of the above programmes, TP3 and TP5 probably have less relevance to the aims of KP3. Whilst TP3 is linked to the likelihood of major accidents, KP3 is directed more at existing installations where there is an infrequent need for major new design work. TP5 has concentrated on occupational-type accidents, although there is also a link to installation integrity in more serious lifting failures.

The work being carried out for KP2 is also directed more at occupational-type accidents, with the following themes (ref. SLC 2003/35):
• Supervision and monitoring
• Job design and control of handover
• Risk assessment

However these themes also have relevance to KP3 and there may be some possibility for joint working in this area.

TP2 has particular relevance to major hazards and installation integrity, and may form the basis of some topic-led work for KP3.

KP1 has helped to bring about a substantial reduction in the number of major and significant hydrocarbon releases. However, there are concerns that the improvement has not continued during 2003/04, and that the numbers may actually start to increase. This will not be known for sure for some months (until the final 2003/04 figures are prepared). KP1 will continue in a scaled-down form as part of KP3. The ten-part inspection programme has been used as a model for some of the pilot work for KP3.

ACCIDENT DATABASES

Two main accident databases have been identified;

• World Offshore Accident Database (WOAD)
• OREDA, dealing with equipment and component reliability data

In addition, data has been gathered for TP2 from industry for loss of station incidents, although this does not exist in a database as such. OREDA is often used as the source of failure rate data for QRA calculations, and has not been considered further here. HSE has had significant involvement with WOAD; this is discussed further below.

WOAD has been developed by DNV and gives an anonymous record of incidents worldwide. However, discussion between HSE and DNV showed that WOAD did not contain many marine incidents that were known to have occurred, primarily because WOAD only includes incidents that are in the public domain. This discussion led to HSE-funded research work that was intended to make more UKCS information (as held in ORION) openly available, whilst maintaining the requirement to keep the incidents anonymous.

The research work has led to the publication of two open reports:

Research Report (RR) 095; Accident statistics for floating offshore units on the UK Continental Shelf 1980-2001

Research Report (RR) 096; Accident statistics for fixed offshore units on the UK Continental Shelf 1980-2001

The statistics in the reports do not include ‘occupational hazards’. These reports contain population data, so that the incident rates can be calculated. Some useful trends can be identified from this information.
Some of the results are shown on the following Figures.

**Fixed platforms – accident frequencies (per unit-year)**

The results show fixed production platforms having a much higher accident frequency than other types of platform. This might be expected intuitively by considering the complexity of systems and activities present on a production platform. From the ‘Incident data’ section earlier, it is clear that hydrocarbon releases make up a substantial proportion of accidents.

The average value of 1.58 accidents per unit-year compares with a value from WOAD of 1.93 for fixed installations on the Norwegian Continental Shelf.

**Floating platforms – accident frequencies (per unit-year)**

The results for floating installations follow the trend for fixed in that accident rates for production platforms (i.e. monohulls and mobile production units) are higher than for mobile drilling units (MODUs). However, the trend is not so pronounced as for fixed platforms, which suggests that failures other than hydrocarbon releases are becoming significant.

The average value of 1.98 accidents per unit-year compares with a value from WOAD of 0.9 for floating installations on the Norwegian Continental Shelf.

**INSTALLATION AGE PROFILE**

A spreadsheet has been provided by the safety case monitoring team that gives the age of about 135 of the fixed installations located in the UKCS. Ages for about 90 of the mobile
installations are also given, although not all of these are likely to be in the UKCS at any one

The Figure below shows the age distribution (in 5 year periods):

The Figure shows a bulge in the distribution of the mobile installation fleet, reflecting the
extensive construction activity during the period 1975 to 1985 and much less thereafter. This
is shown in more detail in the Figure below for semi-submersible installations with accepted
safety cases, which was produced as part of a separate ageing structures initiative.

**Age profile of Semi-Submersible installations**

OPEN REPORTS

HSE produces accident and incident statistical reports (based on information submitted
under the RIDDOR Regulations and held on ORION) on a roughly annual basis. These have
been published previously as open Offshore Technology (OT) reports and more recently as
HID Statistics reports. The most recent of these is a provisional report for 2002/03 (HSR
2003 001). This states that there were reductions in the numbers of hydrocarbon release and
lifting machinery failures – indicating that the relevant key and topic programmes were
having an effect. The reports and associated short bulletins can be obtained from the
Offshore page of the HSE web site. Note that hydrocarbon release statistical reports are also
moving to the HSR series.
HSE organised a conference in 2001 (with industry support) entitled ‘Maintenance – Reducing the risks’. This is described in OTO 007/2001, available via the HSE web site. A number of actions were proposed in connection with issues surrounding maintenance management, e.g. determining optimum resources, multi-skilling, competence, and maintenance of safety critical elements. These were to be passed to the HSE/Industry ‘Senior Managers Forum’ for consideration, although it is not clear what further action took place.

UKOOA issued guidance on the Management of Safety Critical Elements in 1996. This is fairly brief and could probably be updated to take account of experience with verification since the guidance was developed. Some other notes and guidance on verification from UKOOA groups have been seen, but it is not clear whether these have ever been published.

Step Change has prepared the document: ‘Leading Performance Indicators – Guidance for effective use’. This uses a maturity model approach, with indicators considered to fall into one of three levels. The first level covers indicators that are fairly generic in nature and are not particularly pro-active in their effect on health and safety – this level is termed ‘Compliance’. Levels 2 and 3 are termed ‘Improvement’ and ‘Learning’ respectively, and are expected to be increasingly specific to particular organisations and workplaces.

Step Change has also prepared a publication, ‘Fatality Report’, dealing with recent drill floor and deck fatal accidents. This is linked more to KP2 but there are likely to be some common aspects as suggested earlier, e.g. underestimating the risks associated with routine tasks, insufficient time spent in supervision, procedures being ignored or subverted, risk assessments not being useful and meaningful.

The Sheriff’s determination for the recent Gordon Moffatt (Global Santa Fe) case raises concerns about the clarity of written procedures and the competence of supervisors.

EXPERIENCE FROM OTHER INDUSTRIES/COUNTRIES

HSE (HID) prepared a report on the wider investigation carried out as a result of three incidents that occurred during the summer of 2000 at Grangemouth. This can be obtained from the Chemical manufacture and storage page of the HSE web site. The report made several recommendations; these included the need for companies to develop major hazard key performance indicators (KPIs). The emphasis on reducing personal injury rates was also noted, with the suggestion that this may have diverted effort and attention from controlling major accident risks.

Chapter 8 of the HID LD1-4 Inspection Manual provides useful guidance on assessing risk control systems. This is organised under several relevant headings, e.g. Planned plant inspection, Planned maintenance procedures, Plant and process design. There are also several relevant SPCs prepared by HID LD e.g. Enf/60 – Chemical plant integrity NIP 2003/04, Tech/Gen/32 – Risk based plant inspection. There are general concerns over maintenance within the Railways Inspectorate, with particular focus on the management of contractors. A number of relevant issues are described in the Safety Case Assessment Criteria (available on the HSE Intranet).

Nuclear Safety Division has an extensive range of Technical Assessment Guides, especially ‘Maintenance inspection and testing of safety systems, safety related structures and components’. There are also a number of Technical Inspection Guides but these deal more with Licence Conditions (LCs specifically address management of change but not ongoing integrity).
The Norwegian Petroleum Directorate (now the Petroleum Safety Authority) have prepared a report on ‘Trends in risk levels’ for each of the last three years. The latest report (from 2003) concludes that risks have increased in the last two years, on the basis of a number of diverse indicators. These indicators typically fall into one of two broad types:

- Occurrence of accidents, incidents, near-accidents and injuries
- Reliability or availability of barriers installed to protect ‘exposed objects’

Many of the occurrence indicators are similar to the RIDDOR Dangerous occurrence categories. The barrier measures are a newer development and typically plot the ratio of failure on demand of systems such as fire and gas detection, riser ESDV, deluge valves, etc.

The NPD (PSA) reports can be obtained via:

http://www.ptil.no/English/Frontpage.htm

**DISCUSSION REGARDING MEASURES AND TARGETS**

In order to measure the integrity of an installation, the ideal situation would be to have leading ‘health and condition’ indicators for all the safety critical elements and the associated management systems. Inevitably there are difficulties in devising and monitoring such indicators, including the subjective nature of certain measures and adequate allowance for judging their consequence or significance. This would also need industry commitment to collect this information and make it available to HSE.

The HSE Grangemouth report and the Step Change guidance on Leading Performance Indicators both suggest that indicators need to be developed by industry. The Step Change guidance further suggests that the best indicators are tailored to specific organisations and workplaces. This may lead to problems in finding a consistent set of indicators to use across the whole industry.

Dangerous occurrence data is collected by HSE under the RIDDOR Regulations, and this represents a source of information that is readily available. Hydrocarbon release information is already used as a key performance indicator (and will continue to be so), but it is important to note that the quality of this measure is enhanced through voluntary reporting by industry. This additional information includes release type and size (which allows the categorisation of the release into Minor/Significant/Major), the component or system from which the release emanates, and the underlying causation. To repeat this approach for other types of incident would almost certainly require further voluntary reporting from industry.

One advantage of the use of selected Dangerous occurrence data would be to allow benchmarking with Norwegian experience, where similar information is monitored on an annual basis. Conversely, one possible threat is that reporting may not be consistent across industry although this can be lessened by HSE guidance and follow-up.

Backlogs of safety critical maintenance and numbers of outstanding comments from verification bodies have been considered as possible surrogate measures. However, use of these is not without difficulty. Recent HSE inspections have paid increasing attention to backlogs, but there is some emerging evidence of some maintenance routines being reduced in frequency thus making a baseline difficult to establish. There is also much variation in the ways that different duty holders measure their backlogs. The outstanding comments from verification bodies will vary greatly in their significance, and may also be linked as much to the enthusiasm and diligence of the verifier as to the performance of the duty holder. Even if safety critical backlogs and verifiers comments cannot easily be used as measures or targets, they are still useful as pointers when carrying out inspection activity.
The barrier reliability/availability measures being used in Norway do offer one possible way forward, particularly as more operating experience and inspection results become available to duty holders. This may be worthy of further examination by relevant HSE topic teams. BP in the UK and Statoil in Norway have both developed systems for measuring the condition of safety critical systems, using a mix of quantitative (where available) and qualitative data. These use some form of traffic light or colour code as a visible indicator. BP envisaged using incident data over time to keep the ‘score’ obtained for each system or activity under review. This type of system is considered good practice and meets to a large extent the ideal situation described in the first paragraph above. It can also act to increase workforce engagement in integrity matters, which has been shown to be a current area of weakness. However, although it would be good for duty holders to be able to show that they are managing their own installations using such an approach, there will not necessarily be full consistency between them and so it may not prove to be a good means of judging overall performance of the industry. It may also be difficult to force all duty holders to follow such an approach.

It is likely that ‘input measures’ (i.e. amount of time spent by HSE on this programme, number of relevant inspections performed) will be used as an internal performance indicator. However, as these do not necessarily give any indication of the impact of the work done, they will not be sufficient measures in their own right. Qualitative outcomes from the activities should help to remedy this to some extent.

It should be noted that these views are the result of internal HSE consideration and discussion. Further dialogue with industry is needed as a reality check and also as a possible source of other ideas. A key point in any further discussions is that targets should only be adopted if there is some associated action plan by HSE and/or industry that will seek to bring about an improvement.
# Annex 2 - The Belfry Workshop

## KEY PROGRAMME 3 - INSTALLATION INTEGRITY

<table>
<thead>
<tr>
<th>No</th>
<th>Issues</th>
<th>Category</th>
<th>Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16 Integrity of piping/repairs, including guidance on temporary repairs</td>
<td>Maintenance management</td>
<td>3.4, 1</td>
</tr>
<tr>
<td>2</td>
<td>12 HAZOPs, Risk assessments, etc, no longer carried out</td>
<td>SMS</td>
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<td>3</td>
<td>13 Awareness of operational staff to hazards</td>
<td>SMS</td>
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<td>4</td>
<td>17 Valve failures</td>
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<td>5</td>
<td>1 Hydrocarbon containment - continue KP1 approach and follow up issues</td>
<td>KP1 continuation</td>
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<td>31 ESDV testing / leakage</td>
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<td>SI3,3.5</td>
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<td>7</td>
<td>3 Maintenance philosophy, procedures, significance of backlog?</td>
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<td>8</td>
<td>8 Lack of resources, Manpower reduction</td>
<td>SMS</td>
<td>2, 1</td>
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<tr>
<td>9</td>
<td>7 Competence</td>
<td>SMS</td>
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<td>10</td>
<td>14 Mitigation systems e.g. Gas detection, Ventilation, Deluge, PFP</td>
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<td>11</td>
<td>32 Corrosion management - CUI, drains, dead legs, etc</td>
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<td>5.1</td>
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<td>12</td>
<td>4 Ship collision risk management</td>
<td>Collision management</td>
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<td>13</td>
<td>9 Link between WSE, performance standards, maintenance</td>
<td>Maintenance management</td>
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<tr>
<td>14</td>
<td>34 All inspections to examine ICP comments</td>
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<td>18 Crane maintenance</td>
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<td>16</td>
<td>21 EX equipment maintenance</td>
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<td>27 Well control</td>
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<tr>
<td>18</td>
<td>11 Duty holder/ICP relationship; scope, terms of reference</td>
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<td>19</td>
<td>30 Riser integrity</td>
<td>Maintenance management</td>
<td>SI3</td>
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<tr>
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<td>20</td>
<td>10 Management of contractors</td>
<td>SMS</td>
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<td>21</td>
<td>29 Pipeline corrosion management</td>
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<td>22</td>
<td>36 Topic teams to examine whether performance standards are being met</td>
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<td>23</td>
<td>38 Shuttle tanker collision - continue TP2 follow-up</td>
<td>Collision management</td>
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<td>24</td>
<td>2 Structural fabric of ageing installations</td>
<td>Maintenance management</td>
<td>4</td>
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<td>25</td>
<td>6 Appropriate use of verification, remove confusion</td>
<td>Verification</td>
<td>2, 1</td>
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<td>26</td>
<td>20 SIL levels for HIPS</td>
<td>Suitability</td>
<td>3.5</td>
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<td>27</td>
<td>26 Well design</td>
<td>Suitability</td>
<td>2.4</td>
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<tr>
<td>28</td>
<td>28 Well examination, integrity monitoring</td>
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<tr>
<td>29</td>
<td>35 Topic teams to examine suitability of performance standards</td>
<td>Suitability</td>
<td>5.3</td>
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<tr>
<td>30</td>
<td>37 Lobby for more authority for ICPs, inspect or audit ICPs?</td>
<td>Verification</td>
<td>5.3</td>
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<td>31</td>
<td>39 Follow up P34 and P36 issues</td>
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<tr>
<td>32</td>
<td>5 Inadequate design and construction</td>
<td>Suitability</td>
<td>2</td>
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<tr>
<td>33</td>
<td>15 Monitoring Temporary Refuge habitability</td>
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<td>3.3</td>
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<tr>
<td>34</td>
<td>19 Inspection guidance - machinery</td>
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<td>3.4</td>
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<td>35</td>
<td>24 Make KP3 work for the Workforce</td>
<td>SMS</td>
<td>3.6</td>
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<tr>
<td>36</td>
<td>41 Audit of helideck operations and link to wider SMS issues</td>
<td>SMS</td>
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<td>37</td>
<td>22 Reliance on dynamic positioning</td>
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<tr>
<td>38</td>
<td>33 Duplex steel in HPHT situations</td>
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<tr>
<td>39</td>
<td>40 Develop improved marine system standards</td>
<td>Suitability</td>
<td>5.4</td>
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<td>40</td>
<td>23 Comms systems</td>
<td>Maintenance management</td>
<td>3.5</td>
</tr>
<tr>
<td>41</td>
<td>42 Reduce information deficit for structural integrity</td>
<td>Maintenance management</td>
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<tr>
<td>42</td>
<td>25 Target those in control using diverse evidence</td>
<td>SMS</td>
<td>3.6, TB</td>
</tr>
</tbody>
</table>
Annex 3 - Letter to Duty Holder

Suggested content for letter to duty holder prior to inspection:

In preparation for our inspection of the xxxxxxxx Installation, we wish to spend a working day at your premises in order to:

1. Explain our (KP3) project purpose and methodology. A Power Point facility would be helpful.

2. Conduct interviews as necessary to determine how installation integrity is being managed on the xxxxxxxx installation. As a rough guide, we estimate we will need the equivalent of a full working day to conduct this process.

May we suggest a day between xxxxxx and xxxxxxx

We will wish to speak to the following personnel:

- Asset Manager
- Those responsible for Maintenance Management
- Those responsible for Integrity Assurance
- It will be helpful also to have opportunity to speak to the ICP, the discipline engineers (technical authorities), and any personnel responsible for the maintenance planning process. (None of this latter group would be expected to participate full-time in the dialogue.

We request the opportunity to deliver a 30 minute PowerPoint presentation to the above personnel, plus any other interested parties, in order to introduce the new OSD initiative on Installation Integrity.

The following documentation is requested to be available for the onshore inspection:

b) The 4 most recent ICP reports for the verification process and written scheme of examination, comprising electrical, mechanical, structural and instrumentation disciplines

c) The following (current) maintenance data:

(a) Total No of PM jobs overdue
(b) Total No of PM man-hours overdue
(c) Total No of PM jobs on safety critical equipment overdue
(d) Total No of PM man-hours on safety critical equipment overdue
(e) Total No of corrective jobs outstanding
(f) Total No of corrective jobs on safety critical equipment outstanding
(g) Detailed list of corrective jobs outstanding
(h) Records of any authorised deferrals of maintenance on safety critical equipment

(3) Access to performance standards for Safety Critical Elements

(4) Records of all ESDV Riser valve tests conducted in the last 5 years
(5) List of all pipe work repairs (temporary or permanent) on hydrocarbon service and safety critical equipment

(6) Organogram of current maintenance management structure (onshore/offshore)

(7) Procedure for deferral of planned maintenance

(8) Job descriptions for all technical authorities
Annex 4 - SPC/ENF/100

HEALTH AND SAFETY EXECUTIVE | HID SEMI PERMANENT CIRCULAR
--- | ---
Hazardous Installations Directorate | SPC/ENF/100
Author Section: | OSD 3.1
OG Status: | Fully Open
Issue Date: | 29th April 2005
Cancellation Date: | 31st March 2007

STATUS: For Information

TO:
All OSD IMT Inspectors

ARRANGEMENTS FOR INVESTIGATING OFFSHORE HYDROCARBON RELEASES DURING 2005/6 AND 2006/7

PURPOSE
This SPC introduces new arrangements relating to the investigation of offshore hydrocarbon releases. The new arrangements commenced on 1st April 2005.

BACKGROUND
In February 2005, the Divisional Management Team took the decision that all offshore hydrocarbon releases classified as major or significant should be investigated by OSD. For larger releases (here defined as those involving more than 25kg of gas, or more than 250kg of liquid) it is envisaged that early offshore investigation will normally be required. However at the lower end of the significant range for both gaseous and liquid releases, it will often be sufficient to submit an investigation report from the duty holder to detailed review, with offshore follow-up only occasionally needed. The thresholds quoted above are indicative and a degree of IMT judgement will be required in some cases. For example, offshore investigation may be viewed as appropriate for smaller releases, if the potential consequences are seen as particularly severe.

ACTION TO BE TAKEN
From 1st April 2005, IMTs should make an early assessment of the likely size and release classification of all hydrocarbon releases reported through the RIDDOR system. A ready reckoner program for estimating approximate release size is attached to this note. Use of the program will often require further communication with the duty holder to establish all of the required parameters. Where the estimated size exceeds the indicative figures, early offshore investigation would normally be arranged. In other cases the duty holder should be advised that OSD wish the circumstances of the release to be investigated and an investigation report to be submitted for OSD review. In all cases, a copy of the relevant release investigation report (OSD or duty holder) should be forwarded to The reports should then be Karen McKenzie, Room 203, Merton House, Bootle.

CANCELLATION DATE
This document should be destroyed 1st April 2007
FURTHER INFORMATION
For further information contact Stan Cutts, OD3.1, Bootle. (VPN 523 3135) or Graham Bankes (VPN 523 3150) of OD3.1, Bootle.

ATTACHMENT
Release size ready reckoner

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Review Date: 1 July 2007
Subject File: 261
Author Section: OSD 3.1
OG Status: Fully Open
Issue Date: 1 July 2006
Version No: 1

STATUS: For Information of OSD Inspectors

TO: All OSD Staff

INVESTIGATION OF INTEGRITY-RELATED INCIDENTS OFFSHORE

PURPOSE
To inform OSD inspectors of the investigation protocol to be applied to integrity related incidents offshore.

BACKGROUND
1. Recent offshore key programmes (KP1 and KP3) have highlighted weaknesses in integrity management across UKCS. Whilst the ongoing inspection programme and other pro-active measures within KP3 will continue to influence the industry to improve and adopt good practices, there remains a need to deal with incidents on a prioritised basis as they occur.

2. In recognition of this need, the Divisional Management Team has approved the following response to integrity-threatening incidents:

ACTION
3. All incidents that threaten installation integrity, or have implications for major accident hazard, including major and significant hydrocarbon releases, should
be reported by the IMT without delay to Helen Bree on ext.3162, who will alert the B2 Team Leader of the appropriate technical section.

4. All major and significant hydrocarbon releases offshore must be investigated by OSD. Where the investigation root cause analysis shows that any of these incidents result from corrosion, erosion or small bore tubing failures, a full scale OSD audit shall be launched to verify the duty holder's capacity to manage these issues. The relevant specialist Team Leader has responsibility for the co-ordination of these audits.

5. The KP3 Management Team will monitor the reporting and follow-up procedure for integrity related incidents.

FURTHER INFORMATION

Further information can be obtained from Alan Richardson, KP3 Programme Manager, VPN 523 Ext. 3177, or Stan Cutts, HoS, OSD3.1, VPN 526 Ext.8026.
Annex 5 - KP3 inspection programme – analysis

To view the traffic light classification for all installations visited during the period 2004 through to 2006 KP3 inspection programme, click on the icon below.

"lights for handbook.xls"

The slides from a presentation on the analysis of the 20004/05 inspections, made to the UKOOA/HSE Installation Integrity on 8 June 2005 are displayed below:
Offshore Safety Division

Key Programme 3

ASSET INTEGRITY

http://www.hse.gov.uk/offshore/programme.htm

Tony Blackmore
Operations Manager

To minimise the size of this document only the first slide is shown. The complete presentation can be downloaded from this link:
http://www.oilandgas.org.uk/issues/health/docs/3_assetintegrityjun06_Tony_Blackmore.pdf
Offshore Safety Division
Key Programme 3
ANALYSIS
http://www.hse.gov.uk/offshore/programme.htm

Alan Richardson
KP3 Programme Manager

To minimise the size of this document only the first slide is shown. The complete presentation can be downloaded from this link: http://www.oilandgas.org.uk/issues/health/docs/6_assetintegrityjun06_Altern_Richardson.pdf
Annex 6 - Industry Installation Integrity Workgroup

TERMS OF REFERENCE

Purpose:
To secure improvement in the management of offshore installation integrity by:

- Development and promotion of industry good practices and suitable performance measures.

Integrity refers to the risk of failure of structure, plant, equipment or systems which,

- Could cause or contribute to a major accident and/or cause fatalities.

- Prevent or mitigate the effect of a major accident and/or fatalities.

Objectives:

- Identify opportunities for Industry solutions based on feedback, from HSE inspections and other experience
- Develop and promote industry good practices
- Develop guidance on integrity management performance measures
- Monitor progress against integrity management performance measures and to agreed industry standards, perhaps for a trial period.
- Agree realistic achievable Industry integrity management improvement targets.
- Review hydrocarbon release trends as definite indication to integrity
- Decide on the mechanisms to effectively communicate and promote workgroup outcomes and deliverables.

Stakeholders:

Workgroup membership to include representatives from the following organisations:

UKOOA
IADC
OCA
HSE
WSCA
Energy Institute
Step Change
IUOOC
Verification Bodies

Step Change in Safety Leadership Team will monitor progress of the workgroup and provide direction as required.
UKOOA will lead the workgroup with support from HSE, and project manage the outcomes.

HSE will support the workgroup by providing generic feedback from the KP3 inspection programme plus other relevant data and providing administrative assistance.

The workgroup shall commence from its meeting in September 2004 and aim to finish by 31/03/2006.
## Annex 7 - Glossary

<table>
<thead>
<tr>
<th>Acronym/Term</th>
<th>Explanation</th>
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<tr>
<td>ACOP</td>
<td>Approved Code of Practice</td>
</tr>
<tr>
<td>BROA</td>
<td>British Rig Owners Association</td>
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<td>CD</td>
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<td>COSHH</td>
<td>The Control of Substances Hazardous to Health Regulations 1999</td>
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<td>CUI</td>
<td>Corrosion Under Insulation</td>
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<tr>
<td>DCR</td>
<td>The Offshore (Design &amp; Construction) Regulations</td>
</tr>
<tr>
<td>DMB</td>
<td>(OSD’s) Divisional Management Board</td>
</tr>
<tr>
<td>EMM</td>
<td>(HSE’s) Enforcement Management Model</td>
</tr>
<tr>
<td>EPS</td>
<td>(HSC’s) Enforcement Policy Statement</td>
</tr>
<tr>
<td>ESD</td>
<td>Emergency Shut Down</td>
</tr>
<tr>
<td>ESDV</td>
<td>Emergency Shut Down Valve</td>
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<td>FPSO</td>
<td>Floating Production, Storage &amp; Offloading</td>
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<tr>
<td>HAZOP</td>
<td>Hazard and Operability Studies</td>
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<tr>
<td>HF</td>
<td>Human Factors</td>
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<tr>
<td>HID</td>
<td>(HSE’s) Hazardous Installation Directorate</td>
</tr>
<tr>
<td>HIPS</td>
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<td>HSC</td>
<td>Health &amp; Safety Commission</td>
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<td>HSG</td>
<td>Health &amp; Safety Guidance</td>
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<td>HSWA</td>
<td>The Health &amp; Safety at Work etc Act 1974</td>
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<tr>
<td>I.Mech.E</td>
<td>Institution of Mechanical Engineers</td>
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<tr>
<td>IADC</td>
<td>International Association of Drilling Contractors</td>
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<tr>
<td>ICP</td>
<td>Independent Competent Person</td>
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<td>IISG</td>
<td>(OSD’s) Installation Integrity Steering Group</td>
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<tr>
<td>IMCA</td>
<td>International Marine Contractors Association</td>
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<tr>
<td>IMT</td>
<td>(OSD’s) Inspection Management Teams</td>
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<td>IRF</td>
<td>International Regulators Forum</td>
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<td>KP</td>
<td>Key Programme</td>
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<td>MODU</td>
<td>Mobile Operations Drilling Unit</td>
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<tr>
<td>OD</td>
<td>(HSE’s) Offshore Division</td>
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<tr>
<td>OGITF</td>
<td>Oil &amp; Gas Industry Task Force</td>
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<td>The Offshore Installations (Prevention of Fire and Explosion, and Emergency Response Regulations 1995</td>
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<td>PILOT</td>
<td>successor to the Oil and Gas Industry Task Force (OGITF)</td>
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<td>POPMAR</td>
<td>Policy, Organisation, Planning, Monitoring, Audit, Review</td>
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<td>PSA</td>
<td>(Norwegian) Petroleum Safety Agency</td>
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<td>PTW</td>
<td>Permit to Work</td>
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<td>The Provision and Use of Work Equipment Regulations 1998</td>
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<td>The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995</td>
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<td>SODM</td>
<td>(Dutch) State Supervision of Mines</td>
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<td>TA</td>
<td>Technical Authority</td>
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<td>TT</td>
<td>(OSD’s) Topic Teams</td>
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<tr>
<td>UKCS</td>
<td>United Kingdom Continental Shelf</td>
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<tr>
<td>UKOOA</td>
<td>United Kingdom Offshore Operators Association</td>
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<tr>
<td>WOAD</td>
<td>World Offshore Accident Database</td>
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