HID Inspection Guide Offshore

Inspection of Control of Work arrangements

Contents

Summary

This inspection guide is for use by Inspection Management Team and other inspectors who are inspecting duty holder arrangements for the Control of Work (CoW). CoW includes three primary elements: Hazard Identification and Risk Assessment (HIRA), PTW and Isolation Management. By far the most important element is HIRA which covers Task Risk Assessment, Permit to Work and the Safe Isolation & Reinstatement of Plant. It does not cover operational risk assessments, which are the subject of a separate inspection guide.

Introduction

This Inspection Guide (IG) describes how you may inspect control of work procedures used at offshore installations. Control of work in this context includes hazard identification and risk assessment, permit to work systems and the arrangements for the safe isolation and reinstatement of plant. This guidance also describes some of the common deficiencies identified with duty holders' use of the Integrated Safe System of Work ("ISSOW") CoW procedure because of the high proportion of production installations at which ISSOW is used.

The generic requirements for all CoW systems are not described here though as this is comprehensively outlined in HSE's key guidance publications: *HSG 250, "Guidance on permit-to-work systems"* and *HSG 253, "The safe isolation of plant and*

equipment". Duty holders may use any form of CoW procedure, as long as in so doing they comply with the key relevant statutory provisions.

This guide is not exhaustive, but covers a range of issues and circumstances. It is not envisaged that you will explore every aspect covered, but rather, will exercise your judgment to direct the intervention and gather sufficient information to determine adequacy of the relevant SMS aspect.

Action

The aim of this Inspection Guide (IG) is to provide information and guidance to offshore inspectors to support the delivery of consistent and effective offshore CoW interventions. It does this by highlighting key areas essential to an effective CoW process, so that these can be covered during inspections, providing a framework for inspectors to judge compliance, assign performance ratings, and decide what enforcement action to take should they find legislative breaches. In doing so, it complements HSE's Enforcement Policy Statement (EPS) and Enforcement Management Model (EMM).

Success criteria (fundamental requirements) are listed under the inspection topics (see appendix 2); these cover the key issues that inspectors should consider when carrying-out inspections against each core intervention issue. In some instances, not all of the success criteria will apply so inspectors should make a judgement regarding which of these are relevant in each case. If the relevant success criteria cannot be met, inspectors should assess how serious the consequences of failure to comply could be. This will inform their decision making in terms of the performance ratings that they assign and the enforcement action they take (if any) based on the findings of the inspection.

Inspection of this topic contributes to HSE's Offshore Strategy for avoiding catastrophe, which requires duty holder CoW procedures to be sufficiently effective to manage the risk of hydrocarbon releases. This guidance indicates how you should assess the effectiveness of duty holder CoW arrangements for managing the risk of HCRs and other hazardous activities, such as confined space entry, work at height, pressure testing.

HSG 250, "Guidance on permit-to-work systems" and *HSG 253, "The safe isolation of plant and equipment"* provide detailed descriptions of the elements of suitable & sufficient PTW/SIRP systems, how they should be operated and how duty holders should monitor, audit and review their systems/procedures.

You should use these as the basis for inspecting the effectiveness of duty holders' PTW and SIRP systems. Most established duty holders have systems that are compatible with those described in these two publications. Inspectors will have to inspect how duty holders operate their systems so that they can form an opinion as to whether they are actually followed, and if the hazards identified and the risk controls provided are suitable and sufficient.

Effective inspection of CoW systems requires a systematic check on whether duty holders are actually following their own procedures. This involves inspecting the whole CoW system, from how the duty holder decides which work has to be undertaken under a permit, through to the suitability of the risk control measures identified. To do this you should develop an understanding of the duty holders' CoW systems and check that they are compatible with HSG 250 & HSG 253, or an equivalent standard.

You should then check how the systems are used in practice. This should include a check of whether the system is followed and of how effective this is in identifying and implementing the relevant risk control measures. As most PTW and SIRP procedures tend to be broadly compatible with HSGs 250 & 253, the key regulatory objective is to identify whether there are systematic failings in following the procedures, or in identifying and implementing risk control measures and to take appropriate action to ensure that any failings are rectified.

IMT inspectors should undertake such interventions themselves, but sometimes they may need to seek assistance from topic specialists where an additional opinion on the suitability of technical the risk controls is required.

Background

Instructions or procedures are adequate for most work activities, but some require extra care. A 'permit to work' is a more formal system stating exactly what work is to be done, where, and when. A responsible person should assess the work and check safety at each stage. The people doing the job sign the permit to show that they understand the risks and precautions necessary.

Permits are effectively a means of communication between site management, plant supervisors and operators, and those who carry out the work. Examples of high-risk jobs where a written permit to work procedure may need to be used include hot work such as welding, vessel entry, cutting into pipe-work carrying hazardous substances, and work that requires electrical or mechanical isolation. It is also a means of coordinating different work activities to avoid conflicts.

It should be emphasised that a permit to work is not a replacement for robust risk assessment, but can help bring the risk assessment 'to life', at the sharp end, where it matters.

A formal definition of a PTW system is:

"*A method which ensures that all foreseeable hazards of high hazard operational and maintenance activities are identified and appropriate precautions specified to eliminate the hazards or control the risks. Details of the hazards and precautions are effectively communicated to all involved in the work, thereby safeguarding their health and safety*".

HSE studies showed that a third of all accidents in the UK chemical industry were maintenance related and that the single largest cause was a lack of, or deficiency in, PTW systems.

CoW systems are an essential element of an offshore duty holder's safety management system. The duty holder must have a system of hazard identification and risk assessment as well as written permits for any work in circumstances where the nature and scale of the risk arising from the work to be carried out demands a stringent system of control. Risk assessments undertaken under regulation 3 of MHSWR should enable the duty holder to identify when the system should be used and what the suitable and sufficient risk control measures should be. Once identified, the duty holder must ensure that no such work is carried out unless a competent person has issued a permit, and that the work is carried out in accordance with the terms of the permit and the risk assessment supporting it.

Many duty holders have integrated their Safe Isolation and Reinstatement of Plant (SIRP) procedures into their CoW system to produce an overarching "Control of Work" procedure.

Common failures in CoW systems are a failure to follow the PTW or SIRPs procedures, risk assessments that are not suitable and sufficient to identify the risks, and/or the control measures and a combination of the two.

Effective CoW procedures have well understood characteristics and methods of operation. The inspection checklists in HSGs 250 & 253 (appendices 5 & 6) can be used to benchmark duty holders. This guide outlines some approaches to inspecting the efficacy of arrangements that are in place and are based on those that have been used for enforcement and other regulatory work. SIRP procedures are a key aspect of PFEER regulation 9 compliance due to the importance of CoW in the preparation and undertaking of breaking containment of plant and equipment of hydrocarbon duty. Any failure of the SIRP procedures to identify the correct isolation & reinstatement requirements for a given task may also represent non-compliance with PFEER regulation 9.

The purpose of this guidance is to assist you in checking the suitability of duty holders' CoW procedures and particularly that these procedures are actually being followed.

Key principles in PTW systems

1. The issue of a permit itself does not make a job safe.
2. PTW systems are about communicating all relevant information (including hazards, controls, roles and responsibilities) to all personnel involved.
3. There are pros and cons of paper versus electronic systems; do not assume that an electronic system is more effective than a paper-based system.
4. If there are a number of permits, they should be displayed at an appropriate location, in a systematic arrangement that enables staff to check which equipment is e.g. isolated or undergoing maintenance.
5. All users in the PTW system should be trained to a level appropriate to their role in the system.

6. Links between related permits should be clear, consider simultaneous tasks and interdependent activities.
7. The system must be able to maintain safety if work continues over a shift change.

Organisation

Targeting

Inspections should be carried-out in accordance with ED duty holder intervention plans.

Timing

Inspectors should undertake CoW inspections as part of the agreed ED Offshore Intervention Plan; when intelligence indicates intervention is necessary, or as part of an investigation following an incident.

Resources

Resource for the undertaking of CoW interventions will be agreed as part of the ED Offshore Work Plan or by agreement between discipline specialist team-leaders and inspection management team-leaders, as appropriate.

Recording & Reporting

The duty holder performance ratings should be entered on the Inspection Rating Form (IRF) tab of the relevant installation Intervention Plan Service Order. Findings should be recorded in the normal post inspection report and letter.

Further References

1. http://www.hse.gov.uk/pubns/books/hsg250.htm Key guidance in this area, applicable to all industries where permit-to-work systems are used. This includes a checklist for the assessment of systems.

2. http://www.stepchangeinsafety.net/knowledgecentre/publications/publication.cfm/publicationid/31 Step Change's PTW pocket-card.

3. http://www.ogp.org.uk/publications/safety-committee/guidelines-on-permit-to-work-systems/ This guide gives a basic understanding of the Permit to Work (PTW) system in the E&P industry. The guide provides a full definition, discusses when the systems are applicable and where the principal responsibilities lie, suggests an appropriate form for the certificate and outlines the training and competence required for key personnel. It stresses the need for effective communication within the PTW system and for regular verification and monitoring of the system. Extensive guidelines on the preparation of a PTW system, the process of using the system and the completion of a permit are provided, as well as an inspection check-list, a

check-list for the review of PTW systems and a sample check-list of potential hazards.

4. http://www.hse.gov.uk/humanfactors/topics/ptw.htm - HSE's microsite for human factors; page on PTW systems.

Contacts

ED Offshore: ED1.2 specialist inspectors

Appendices

- Appendix 1: Inspection Guidance
- Appendix 2: Performance Assessment
- Appendix 3: Offshore Case Studies
- Appendix 4: High-level questions for inspecting CoW systems
- Appendix 5: Detailed questions to support and intervention on CoW
- Appendix 6: Primer on Integrated Safe System of Work ("ISSOW")

Appendix 1: Inspection Guidance

You should have an effective working knowledge of HSG 250 and HSG 253 before planning CoW inspections.

Suitability of the Procedures

The key reason for you to consider the suitability of the procedures is to enable you to gain an understanding of how the CoW should be used to control risks. You should request copies of the duty holder's CoW system, including hazard identification and risk assessment, PTW and SIRPs procedures, prior to the offshore phase of the inspection and develop an understanding of the procedures including the specific terminology.

Both HSG 250 & 253 describe the essential components and operational principles of PTW and SIRPS procedures respectively. If a duty holder's PTW or SIRP procedure does not substantially cover the essential elements as described in this guidance then it is unlikely to enable compliance with MAR regulation10 or MHSW regulations 3 & 5.

Inspection in Practice

PTW systems may be described in the safety case; or you may have obtained a detailed PTW Procedure from the duty holder. A PTW system cannot be inspected on the basis of these paper documents – the key is to inspect how the system is implemented in practice. A suggested inspection plan is provided below, although you may modify this according to your experience or duty holder specifics. Further questions and inspection points are provided later in this guidance.

1. Briefly review the PTW written procedure in order to understand the format of the system; key roles and responsibilities etc.
    a. Are roles and responsibilities listed? You can test these later.
2. Meet the PTW Co-ordinator (or PTW Controller) in their office in order to talk through the system; how they manage it (their training?), and talk you through a sample of recent or live permits;
3. If you have time, you may wish to undertake a short Permit users course offshore – this will help you to understand their system, and may give you authorisation and access to search an electronic PTW system; enabling you to browse recent Permits;
    a. How many are live?
    b. Did the same person sign-off many permits, and could they have visited the workplace?
    c. Are they completed consistently?
    d. Are there suitable controls for all hazards identified?
    e. Are related documents (such as isolations) attached?
4. If you have time, follow a Permit through the complete system, from start to finish.

5. Take a live permit and associated documents (risk assessment, isolation certificates, Toolbox Talk etc.) to the workplace and talk to those undertaking the work:
    a. Are all of the hazards present at the workplace identified on the Permit (or on associated risk assessments)?
    b. Are the controls listed on the Permit in use?
    c. Do the hazards listed include precursors to major hazards?
    d. How could the work impact on the performance of an asset integrity barrier or SCE - and is this considered on the Permit/risk assessment?
    e. Are personnel familiar with the hazards and controls?
    f. Has anything changed since the Permit was issued?
    g. Is anyone present that isn't listed on the Permit and vice versa?
    h. Have any isolations been undertaken as planned?
    i. If there are interactions with other ongoing work – and is the team aware?
6. If possible, attend a Toolbox Talk, when the Permit and the work is discussed by the work team;
7. Attend a Permit meeting where relevant parties (usually OIM and Heads of Departments) discuss several Permits in the process of being authorised;
8. Attend a shift handover meeting where the Permits are discussed.

Links to other SMS topics
Interventions on the PTW system may be linked to other SMS topics, including: communications (especially handovers); competence; procedures; supervision; control of contractors; KPIs; and audit/review.

Links to topic specialists
If reviewing particular Permits in detail, you should consider involving the relevant topic specialist (mechanical, electrical, process safety etc). Relevant Human & Organisational (HOF) topics include usability, safety culture, human failures (particularly maintenance failures), identification of plant and equipment, workload, and risk perception – seek HOF topic specialists for further advice and support, if appropriate.

Having understood the duty holder's Risk Assessment/PTW/SIRP procedure you need to be able to decide if it is being complied with. Compliance relates to all aspects of the procedures, including arrangements for demonstrating the competence of those workers with roles in using the procedure.

A manageable number of HIRAs, PTWs or isolations should be chosen for inspection - probably no more than three. Ideally, you should attend the daily "work planning meeting", at which members of the offshore management discuss the day's work activities. The quality of the discussion, in terms of identifying suitable risk controls, and possible adverse interactions of different work activities in the context of other planned operations is often a good indicator of effective CoW.

Effective work planning meetings should involve meaningful discussion of risk controls, ideally with query or challenge if the controls identified are vague or insufficient. It is likely that you might be expected to comment on permits under

discussion and this would be an ideal time for you to question what might appear to be inadequate risk controls.

Once you have chosen HIRAs, PTWs or isolations for inspection you should spend time with one of the CoW authorities (eg relevant area authority) to discuss the hazard that the HIRA / permit / isolation is intended to control. The duty holder's personnel should be able to explain this and how the each CoW element provides the risk control.

On visiting the worksite where the PTW is being used, you should ask a member of the crew using the permit, eg performing authority or another member of the party, to explain their understanding of what could go wrong with the work being undertaken and how the PTW is being used to control the risk. Those undertaking the work should be able to describe the worst thing that could go wrong with the work, who would be affected and how. They should be able to explain how and why the risk controls identified in the HIRA/permit/isolation will prevent the worst from happening. This could be single or multiple fatalities depending upon the work activity.

This preparation and site discussion should help to determine whether the CoW procedures have been followed and if the risk controls in place are suitable and sufficient (PTW), or compliant with the duty holder's procedures for isolations.

Tools for structuring inspection of permit-to-work systems

The HID Inspection Manual describes the key characteristics of PTW systems and includes checklists based on HSG65/POPMAR that inspectors can use when inspecting PTW http://www.hse.gov.uk/foi/internalops/hid/manuals/pmenf05.pdf. Although the Inspection Manual is intended for use by inspectors, it is an open document and so may be used by duty holders when monitoring and reviewing their PTW and other risk control systems. This checklist is comparable, but more detailed, than that contained in HSG250.

Appendices 5 & 6 comprise question sets to use when inspecting CoW arrangements. Using these questions should be sufficient to help form an opinion on compliance.

You should avoid recording "yes" or "no" answers to all the questions. Instead, you should focus on particular sections in detail, eg "Competence" or "Auditing", and find out how the duty holder's procedures work to manage the risk they create.

Focus on hazard identification and risk assessment

A major failing of PTW systems is failing to identify correctly the hazard and how control is to be achieved. Some duty holders use hazard/risk matrices for their PTW risk assessments that are unsuitable. For example, such matrices may have as their worst-case scenario a "fatality". Since a single fatality is a foreseeable consequence of work at height, or working with electricity, it is insufficient for dealing with work that could result in multiple fatalities, such as work on hydrocarbon systems. Whether a matrix is used, or not, the hazard must be correctly identified so that the correct controls can be implemented and monitored.

For example, intrusive work on hydrocarbon systems could result in a major ignited HCR with ignition and fire or explosion. The PTW should be clear on this and also on the possibility that several people could be killed. The efficacy of the risk controls has to be appropriate for the hazard. Some permits do not focus on the key hazards and risk controls. Instead, they attempt to cover trivial hazards such as minor COSHH or noise issues that should be covered by site standards. Those undertaking work need to be able to understand that the worst thing that could happen, to them and their colleagues, and what has been done to prevent this, and what part they would play in preventing the worst from occurring.

Some PTW systems also include a likelihood or probability component for their risk matrix. Some systems are fundamentally flawed with one example indicating a range of likelihoods from <5% ("low risk") to 50% ("high risk"), which do not fit within ALARP terminology. In practice, rather than focus on likelihood, it is more effective to identify the most effective procedural or technical risk controls and make sure that they are understood and used.

Common issues from inspection of PTW systems

The following are examples of issues that have been identified across several interventions on this topic. This list will be updated following further intervention experience.

1. The PTW system focuses on occupational safety issues - at the expense of major hazard control,
2. Permits and associated risk assessments focus on how the person undertaking the work could be harmed; without any consideration of the harm that the person could do to the system (e.g. by introducing latent failures, such as actions that will compromise a safety defence). In other words, there is no analysis of how human actions could impact on the performance, reliability or availability of asset integrity barriers;
3. Permits are assessed individually without any consideration for interactions between other work in progress on site;
4. A lack of clarity amongst staff as to which tasks require a Permit;
5. The workforce see the PTW system simply as paperwork to be completed; and do not see it as an important means of ensuring safety;
6. A perception amongst the workforce that the PTW system is simply a tool to protect management should an incident occur;
7. Controls on the PTW including standing site instructions, that can be taken as given (e.g. wearing of standard PPE);
8. Vague controls listed on the Permit, such as "gloves", when in fact a specific type of glove was required given the materials that were to be handled.
9. PTW system places large burdens on the workforce (e.g. completing lengthy paperwork, or requiring numerous signatures of personnel who may not be easily accessible;
10. High PTW workload or other pressures on key signatories, which prevent them from checking worksite conditions or other key aspects of Permits;
11. The format of the written Permit does not reflect or support the Permit signatory, risk assessment or cross-referencing process;
12. The conditions at the workplace differ to those described on the Permit, possibly because the workplace was not visited by those generating the

Permit (usually a requirement of duty holders' procedures); or because the conditions changed;
13. The hazards listed on the Permit do not reflect those at the workplace;
14. A lack of controls listed on the Permit for hazards identified;
15. Contractors having a formal role in the PTW system (i.e. not just users of Permits) without receiving any relevant training;
16. Information on Permits simply copied from previous documentation, without a review to determine whether it is still accurate or relevant;
17. Insufficient time allowed on handover to discuss all ongoing or suspended permits with the oncoming personnel;
18. A lack of rescue plans for a confined-space entry; and
19. Guidance and support focussed on using the PTW software, rather than on the PTW system itself.

Inspection of Safe Isolation & Reinstatement of Plant

CoW procedures, both electronic and "hard copy" often have their own compliance monitoring checklists. These checklists are usually compatible with HSG 250 & 253 guidance on monitoring but duty holder monitoring activities are sometimes of a superficial, "tick-box" nature. Many duty holders have a KPI of numbers of isolations or PTW "audited" by offshore managers. Although such "audits" are generally compliance monitoring exercises, the ability to use them to find non-compliance, good-practice and apply learning from both is crucial. It is unlikely that a tick-box approach will be sufficient to identify failure to comply with MAR regulation 10 or MHSW "risk assessment" requirements.

It is likely that most duty holders will have SIRP procedures that are compatible with the requirements described in HSG 253: The safe isolation of plant and equipment. - HSE Books, although this should be checked as part of the inspection and enforcement considered if the procedures are not capable of providing sufficient risk control. A key deficiency is for DHs not to implement the standard of isolations that their own procedures require, and for their monitoring and audit systems not to identify such failings. Inspectors should check that DH monitoring and audit is sufficiently effective to identify non-compliances with their SIRPs procedures, to determine the reasons for non-compliance and address these reasons effectively.

Although inspectors can use the checklists in HSG253, a more effective approach would be to inspect how the duty holder undertakes monitoring and audit. Many DH SIRPs procedures include a monitoring element (eg ISSOW Isolation Control Certificate "Audits"). Inspection of such DH monitoring has found that there is sometimes a tendency to confirm compliance rather than to seek out non-compliance and ask the reasons why. If DH monitoring activity does not identify deficiency then it is unlikely to be working effectively. Inspectors should determine how DHs train their personnel to undertake such monitoring work and how they act on the findings.

Inspection of a sample of isolations in relation to the DH's SIRPs procedure is invariably useful. An effective means of doing this can be for inspectors to ask the DH to show how their offshore personnel select and undertake SIRP compliance monitoring. Inspectors can ask the DH monitor to talk them through the process through preparation and then out on the site. Any non-compliance with the procedure

identified by the DH monitor and/or the inspector should be addressed and any systemic failings identified.

Appendix 2: Performance assessment

HSGs 250 and 253 identify the key characteristics required of Control of Work procedures to facilitate compliance with the key relevant statutory provisions, particularly MAR regulation 10, PFEER regulation 9 and MHSW regulation 3. In practice, most CoW procedures currently in use across the UKCS are likely to feature the required characteristics defined in the guidance. If a duty holder's CoW procedures do not, then it is likely that they are deficient and will not enable duty holders to comply with the RSPs, even if followed.

Most CoW non-compliance comprises failure to follow the duty holder's own procedure. The checklists in this guidance and HSGs 250 & 253 provide sufficient criteria to help determine the gap between what compliance should look like and how it is at a particular installation.

The key performance descriptors for CoW are those relating to "compliance". Compliance in this context means with the duty holder's own CoW procedure. As the majority of CoW procedures require risks to be controlled to levels that are ALARP, failure to undertake suitable and sufficient CoW risk assessment is a failure to comply with the CoW procedure. As CoW procedures are intended to be used to protect people from high hazard activities, and a key feature of them is that of on-going compliance monitoring then the identification of significant non-compliance with CoW procedures should require formal enforcement action.

When inspecting CoW there are three areas to be considered;

a) Are the duty holder's PTW and SIRP procedures compatible with the characteristics identified in HSGs 250 and 253, or equivalent guidance?

b) When inspecting the outputs of a suitable sample of duty holder's CoW and/or SIRP procedure, you will have to decide whether the risk controls identified and implemented are sufficient to protect people from the hazards arising from the work and so deliver compliance with the relevant legislation. This decision will be made in the same way as for other inspection topics by comparing the standard of control achieved against the relevant benchmarks and applying the principles of the EMM.

c) You will reach conclusions on overall effectiveness of the duty holder's CoW system. These should be recorded using the assessment criteria listed below. Those duty holders who either do not have a system, or have a system that is substantially ineffective will fall in the very poor or unacceptable categories. Where there is a system in place and there is evidence of a number of examples where it results in controls that are ineffective or inappropriate it will fall in the poor category.

The following descriptors may be used to assist in determining the appropriate score for the dutyholder.

a) **Unacceptable**- There are no PTW or SIRP systems in place for control hazardous work activities

b) **Very Poor**- There are PTW and SIRP systems, but either these have not been implemented or the outputs are such that the systems are largely ineffective in identifying, implementing and maintaining appropriate control measures.

c) **Poor**- There are PTW and SIRP systems in place and they are being followed, however, there are numerous examples where the systems have not resulted in the implementation of effective control measures.

d) **Broadly Compliant**- There are systems in place, they have been fully implemented and used and most relevant work activities have suitable risk controls place.

e) **Fully Compliant**- The systems have been fully implemented and are effective in identifying appropriate control measures for all the sort of work activity that is sufficiently hazardous to require the controls that PTW and SIRP are intended to provide.

f) Exemplary- The PTW and SIRP procedures are fully compliant with HSGs 250 and 253, the correct control measures are invariably in place and understood, the monitoring and review processes are identifying deficiencies and delivering improvements and the workforce see the procedures as a help to rather than a hindrance.

EMM RISK GAP					
EXTREME	SUBSTANTIAL	MODERATE	NOMINAL	NONE	NONE
TOPIC PERFORMANCE SCORE					
60	50	40	30	20	10
Unacceptable	Very Poor	Poor	Broadly Compliant	Fully Compliant	Exemplary
Unacceptably far below relevant minimum legal requirements. Most success criteria are not met. Degree of non-compliance extreme and widespread. Failure to recognise issues, their significance, and to demonstrate adequate commitment to take remedial action.	Substantially below the relevant minimum legal requirements. Many success criteria are not fully met. Degree of non-compliance substantial. Failures not recognised, with limited commitment to take remedial action.	Significantly below the relevant minimum legal requirements. Several success criteria are not fully met. Degree of non-compliance significant. Limited recognition of the essential relevant components of effective health and safety management, but demonstrate commitment to take remedial action	Meets most of the relevant minimum legal requirements. Most success criteria are fully met. Degree of non-compliance minor and easily remedied. Management recognise essential relevant components of effective health and safety management, and commitment to improve standards.	Meets the relevant minimum legal requirements. All success criteria are fully met. Management competent and able to demonstrate adequate identification of the principal risks, implementation of the necessary control measures, confirmation that these are used effectively; and subject to review.	Exceeds the relevant minimal legal requirements. All success criteria are fully met. Management competent, enthusiastic, and proactive in devising and implementing effective safety management system to 'good practice' or above standard. Actively seek to further improve standards.
EMM INITIAL ENFORCEMENT EXPECTATION					
Prosecution / Enforcement Notice.	Enforcement Notice / Letter.	Enforcement Notice / Letter.	Letter / Verbal warning.	None.	None.

Appendix 3: Case Studies

Offshore Case Study 1: Failure to implement PTW system
Inspection of a drilling contractor found a series of issues with their (paper-based) PTW system; including third parties not receiving PTW training; lack of understanding amongst staff as to the reason for their signatures on the PTW documentation; an unclear job description for the permit controller; and no evidence of training for the permit controller. Furthermore, there was no evidence of audit of the PTW system to assess whether (i) the system is being complied with, and (ii) whether the system is in fact appropriate, sufficient and suitable for the duty holder's requirements.

The inspectors concluded that "*you failed to make and give effect to such arrangements as are appropriate for the effective planning, organisation, control, monitoring and review of hazardous work activities, in that your permit to work system has not been implemented effectively*".

An Improvement Notice was issued, citing MHSWR (Regs 5 and 13) and MAR (Regs 10 and 11). The Schedule to this IN outlined the following measures required for compliance:

1. *Reviewing the permit to work system, including procedure PR123xyz and associated documents to ensure that the process is fully described and defined against relevant statutory provisions and actual working practices.*
2. *Ensuring that roles and responsibilities of those involved in the permit to work system, including (the drilling contractor) and third parties, are clearly defined and communicated.*
3. *Putting in to place management arrangements to establish and maintain the training and competence of all those involved in the permit to work system, including third parties.*
4. *Putting in to place arrangements for monitoring and review activities to ensure that the implementation of the permit to work system has been effective.*
5. *Putting in to place a process for the management review on the effectiveness of the permit to work system.*

Offshore Case study 2: Failure to consider major accident hazards
During inspection of an FPSO, I undertook training on the Permit to Work system (approx 40 minutes of CBT). Following this training, I was assigned a userID and therefore able to interrogate the system to search for permits, either by date or by department, or by keyword.

Inspection of a selection of permit documentation highlighted that the permit to work system (and associated risk assessments) focussed on occupational or personal safety risks. The process did not always consider major accident hazard or loss of containment issues. Furthermore, the risk assessment process focussed on injuries to individual personnel, rather than how those personnel could introduce undetected deficiencies to equipment or critical safety systems. One of the letter items stated that:

"Risk assessments as part of the Permit to Work process do not consider how personnel could introduce 'latent' failures, or undetected deficiencies, into the system. For example, your assessments do not consider human failures during maintenance such as use of wrong specification parts, leaving tools inside plant and equipment, or failing to restore valves to the correct state. These failures may not be immediately evident and may reduce the effectiveness of standby or safety equipment; for example, to cause SCE such as active fire protection to be unavailable on demand. In other words, although your risk assessment processes consider how the "system" could harm an individual or group of personnel; you do not appear to address how the person could 'hurt' the "system".

The company is reviewing recent industry guidance on the identification and management of safety critical tasks; with a plan to develop their capability in managing human failures, such as those 'maintenance failures" referred to above.

The above was perhaps the most significant issue from inspection of the PTW system. However, review of a small selection of permit documentation offshore (taking perhaps a couple of hours) revealed a number of other deficiencies with the system, including:

- Hazards were identified on permits, but no precautions or controls were given; for example, "Liquid or gas under pressure"; "Spark potential" and "Electricity 24 volts" were listed as hazards but no precautions or controls were included on the permit or associated documentation.
- Hazards listed on the relevant Toolbox Talks were not consistent with those listed on the Permit. For example, one permit lists the following hazards identified during the toolbox talk "Manual handling"; "Slips, trips & fall"; "Adverse weather conditions" and "Working in excessively noisy area". Against all of these hazards, "Covered by Permit" has been hand written on the Toolbox Talk; however, none of these hazards are identified on the Permit.
- PPE such as gloves, eye protection and hearing protection are listed in several permits. However, the wearing of these items of PPE (along with overalls and a hard hat) are mandatory outside of the accommodation, and are therefore not "additional". Where such PPE is a site instruction, it is not necessary for this to be controlled through the Permit to Work system. Where additional or specific PPE is considered necessary, the specific PPE should be noted on the Permit, for example, nitrile gloves for handling chemicals, or heavy duty gloves for handling sharp-edged materials.

Offshore Case study 3: Untrained Area Authorities
Inspection of a drilling contractor resulted in the following letter item:

"*Third party personnel are signing Permits as Area Authorities - even though they are not listed on the most recent record of Area Authorities, and they are doing so after only receiving a basic overview of the Permit to Work system.*

You are not conforming with your accepted Safety Case for this installation, which states that "The OIM ensures that personnel appointed to operate this [PTW] procedure in the offshore environment have adequate training, proven competence and sufficient Management support to continually apply, develop and improve the Permit to Work system".

The issue was addressed by the company no longer allowing third parties to act as area authorities; and all assigned area authorities were given specific training for their roles and responsibilities.

Offshore Case study 4: No effective systems and procedures for the safe isolation & reinstatement of plant

Safe isolation of plant and equipment is a key aspect of effective permit to work system.

Inspection of a drilling contractor resulted in an Improvement Notice. This IN stated that the driller was contravening HASWA 1974 (S2.1 and S3.1) and MHSWR1999 (Reg. 5.1). The reasons for this opinion were:

"That you have failed to make and give effect to such arrangements as are appropriate for the effective planning, organisation, control, monitoring and review of hazardous work activities, in that you do not have effective systems and procedures in place for the safe isolation and re-instatement of plant and equipment".

The Schedule to the above Notice was as follows:

"This notice can be complied with by undertaking the following:

1. *Develop processes and/or procedures for the safe isolation and re-instatement of plant and equipment. In the development of these you should include in your consideration the following:*
    a. *Effective planning, including risk assessment and appropriate isolation scheme selection*
    b. *Training and competency requirements;*
    c. *Roles and responsibilities;*
    d. *Linkage to related processes and procedures such as the permit to work system;*
    e. *Effective monitoring, audit and review*
2. *Take into account HSE's guidance entitled 'The safe isolation of plant and equipment' (HSG 253) in the compliance of the above"*

Offshore Case Study 5: Failure to monitor compliance with SIRPs etc

Investigation of a significant HCR at a floating production unit revealed that the duty holder had failed to ensure that its SIRPs procedure was being followed. An unplanned shutdown due to export pipeline unavailability provided the installation management an opportunity to make further progress on some major plant maintenance. The work scope was extended beyond an existing boundary isolation. This involved the breaking of containment of a hydrocarbon line linked to the flare system. Contrary to the duty holder's SIRP procedure, the standard of the isolation was not checked by a member of the production operations team before a fitter broke containment at a flange. The flange was broken and the work was paused. Contrary to procedures, a blank flange was not fitted. Some hours later, process conditions changed and a plume of gas was seen coming from the opened flange. The leak was controlled by a worker using a wrench to operate a suitable but poorly maintained isolation valve.

HSE's investigation revealed that it had become custom and practice for operators not to confirm isolations. Although the operators understood the P&IDs, the fitters worked to isometrics and did not have the plant understanding the operators had assumed.

The duty holder was operating a paper-based PTW system. It included a checklist for the "auditing" (ie compliance monitoring) of PTW and isolations. Our investigation checked many examples of these monitoring checklists and found that each one had the same boxes ticked, even to the extent of the "wrong" box being ticked over and over again. It was clear that the monitoring work was entirely superficial and ineffective and that was reflected in the deficient work control on site.

Improvement notice 300966189 was served under MAR regulation 10. It required the duty holder to review and revise its procedures for ensuring that work was carried out in accordance with its own PTW procedure.

Offshore Case Study 6: Systemic failure to comply with electronic PTW procedures.

An inspection focussed on the use of an ISSOW CoW procedure at a fixed production installation revealed several failures to follow basic aspects of the procedure. An improvement notice was served with this wording:

"The arrangements in place for securing that persons work in accordance with the permit to work system are not effective. Examples of this are:1) WCC 00XX, valid from 19:01 on 28/2/20XX to 06:38 on 29/2/20XX, and WCC 00XX, valid from 07:01 on 29/02/20XX for one shift, had the same person acting as performing authority and they would therefore be unable to discharge their duties as this would require them to work for at least 24 hours. WCC 00XX, valid from 07:00 on 15/2/20XX to 18:53 on 15/2/XX, and WCC 00XX, valid from 19:00 on 15/2/12 to 06:47 on 16/2/12, also had the same performing authority. 2) WCCs 00XX, 00YY, 00ZZ, 00AA, 00BB and 00CC show multiple secondary work locations (14 in the case of 00DD) such that the actual location of work being carried out may not be known to the Area Authority. This means that he would not have the opportunity to discharge his permit responsibilities. 3) Your arrangements for monitoring and auditing WCCs have not been effective in that they did not identify and address matters such as those above."

The duty holder had recently undertaken their own audit of CoW activities and concluded that they were in compliance. Following the improvement notice they undertook a review of their compliance at their offshore installations and onshore COMAH activities and found comparable non-compliance at all sites. They implemented an improvement programme and shared their findings with peers.

Offshore Case Study 7: PTW risk controls not being followed or understood

An inspection of CoW at a major offshore installation dismantling project found that permit authorities were not visiting worksites to ensure that the risk controls identified by the PTW HIRA process were in place, understood and being followed. An improvement notice with the following wording was served under MAR 10:

"You have failed to implement effective arrangements for securing that persons work in accordance with the terms of your Integrated Safe System of Work ("ISSOW") permit to work system. In particular, some Performing Authorities are not working in accordance with their ISSOW responsibilities, and work being undertaken under some ISSOW permits does not follow the risk control measures specified by those permits".

The duty holder agreed with our inspection findings and had no valid grounds for appeal in that despite focusing additional supervisory resource on what was a high-profile project with many work fronts, it was easy for us to identify basic failures in this key risk control system.

Offshore Case Study 8: Repeat failure to comply with SIRPs/PTW

We investigated a major gas HCR at a fixed production installation. Permitted work required some PSVs to be removed for maintenance. The duty holder's electronic CoW procedure required that a production operator should confirm that the correct isolations were in place before the fitters broke containment to remove the valves. Although the operator did confirm that one of the valves was suitable isolated, this was not done for subsequent valves on the same permit. The fitters removed the wrong valve, which was not isolated and was on hydrocarbon service. Gas began escaping as soon as the flange was opened up. The fitters alerted the CCR and made their way to safety. Gas detectors were activated in locations not subject to permitted work (ie because the wrong PSV was being worked on) and the CCR team decided to undertake a precautionary blow-down. This resulted in several tonnes of gas being blown down through the break in containment just made. Fortunately, there was no ignition.

There was a successful prosecution following our investigation of this incident. Not long after the prosecution, an inspection on another of the same duty holder's installations found deficiencies in the provision of information, instruction and training for the operation of the duty holder's improved PTW procedure as indicated by the wording of the improvement notice that was served:

"That you failed to ensure comprehensive instructions for the permit to work procedure on the "XXXX" offshore installation were put in writing and brought to the attention of every person who has to do anything with the permit system."

Such an apparent repeated failure to manage CoW suggests that this duty holder may have had a number of other SMS deficiencies of which these failings were symptomatic.

Offshore Case Study 9: Duty Holder improves MAH focus of CoW

This duty holder had been subject to considerable proactive scrutiny from us on the efficacy of its CoW arrangements and we had served an improvement notice under MAR 10 at one of its installations.

The duty holder recognised that the value of its permits was being devalued by low risk work being undertaken under permit. The DH revised its procedure to make it clear that only work of particular defined hazards would be conducted under its PTW procedure and that lower hazard activities would be controlled by site standards etc. Furthermore, trivial hazards such as those associated with COSHH and noise etc issues were to be excluded from the permits and controlled by site standards. This was to help focus on the most significant hazards and their controls.

The duty holder also recognised the problems associated with permitted work being carried on across shift such that the original risk assessment process might cease to be quite so “live”. To address this they used a human factors consultant who developed an approach wherein permits were raised for discrete, shift-long elements of the overall work. This approach has become known as “chunking” and appears to have been emulated by other duty holders.

Appendix 4: High-level questions for inspecting CoW systems; particularly useful for undertaking a brief first-pass intervention.

Policy
What is the purpose and objective of the permit-to-work system and what are its scope and limitations? For example, the purpose of the permit-to-work system is to establish control over high-risk maintenance or other unusual work.

Organising
Control
Who will be responsible for operating and running the system? For example, who will devise and design the system? Who will implement it? Who will monitor and review performance and audit its operation?
Co-operation
How will system users be involved in its development to ensure its acceptance and effective working? How will deficiencies and weaknesses and failings in the system be reported?
Communication
What communication is necessary to ensure the effective operation of the system and between the various parties issuing and using a permit? What documentation is involved and how can it be designed to be clear, effective and simple to use?
Competence
What training, qualifications, skills and level of competence are required for:

- those issuing permits?
- those doing work under permits?
- those monitoring, reviewing performance etc?

Implementing
What workplace precautions are necessary for each type of permit? What are the rules of the system and how does it work? Are the rules simple so that they can always be easily applied? Are there sufficient resources to ensure that the system can be applied in full? What are the performance standards for the various individuals involved - who does what, when, and how?

Measuring performance
How will the implementation and effectiveness of the system be measured? For example, will there be a periodic inspection of the work activity and of a sample of permits to ensure proper completion and effective use?

Reviewing performance
How will the findings from the measuring activities be used to review and improve the system?

Auditing
How will the system be independently audited and verified?

Appendix 5: Detailed questions to support an intervention on COW systems

POLICY

Key Issue:

Is there an effective policy for site-specific risk assessment of high hazard operational and maintenance activities and the control procedures - normally managed by a permit-to-work system?

Key Characteristics:

- Senior management can clearly describe the purpose of their permit-to-work system or justify any alternative system used.
- The permit-to-work system should be adequately resourced to ensure that the system has sufficient capacity (available competent signatories) to cope with peak demands.

ORGANISING - Control

Key Issue:

Is there an adequate management system to implement the policy on risk assessment and controls for high hazard operational and maintenance activities?

Key Characteristics:

- Responsibilities for oversight, design, documentation, operation, monitoring and review of system clearly allocated.
- Personal responsibilities in job descriptions or performance standards, with clear objectives, and subject to appraisal.
- Identification of personnel with responsibility for: issuing permits, identifying hazards, making plant safe, checking that plant is safe, supervision of the work and its completion to the required standard. Suitable authorisation of personnel with special responsibilities.
- Acceptance of responsibilities by those involved.
- Performance of those with responsibilities under the permit-to-work system subject to routine appraisal.

ORGANISING - Co-operation

Key Issue:

Are there adequate and appropriate arrangements to secure the trust, participation and involvement of persons involved in high hazard operational and maintenance activities?

Key Characteristics:

- Individuals involved with the permit-to-work system co-operate to ensure that it is appropriately designed, introduced and implemented. This will include: raising awareness of the permit system, access to key persons, and provision of training.
- Arrangements for consulting users during permit design to ensure practicability and usability.
- Arrangements to ensure all relevant personnel, including contractors, are made aware of the permit systems and are trained in their operation.
- Co-ordination between jobs to ensure that unforeseen hazards are not introduced.
- Ready access to the permit authoriser when required.
- Close liaison between the permit authoriser, operations staff, and the person in charge of the work to ensure provision is made for: interactions between jobs, shift changeover and hand-back of the permit.
- Permit recipients sign the permit to indicate they have read, understood and accept the permit conditions.
- Cross-referencing to other relevant certificates e.g. isolation certificates.
- Securing commitment, ownership, and acceptance of the value of the PTW system.

ORGANISING - Communication

Key Issue:

Are there adequate arrangements to secure information flow between those involved in high hazard operational and maintenance work.

Key Characteristics:

- Formal and thorough communication between all of the parties involved in the work. Permits should never be used as a substitute for full discussion between permit issuers and those in charge of the work.
- Sufficient written instructions to: identify all foreseeable hazards, ensure co-ordination between jobs, highlight the hazards, specify the precautions necessary to control or eliminate the hazard, ensure people new to the job and at shift changeover are made aware of the hazards.
- Information about new activities, changes in legislation or workplace standards, from reviews and audits communicated to the people who need to know.
- Documentation and communication of the rules/standards and control arrangements governing the PTW system.
- A permit form which is clear, easy to follow, and the lay-out follows the sequence of events in its life cycle. The text is legible and the task explicitly and unambiguously described.
- Records of live and suspended permits maintained.
- Clear specification of the location of the work to be controlled by the permit.
- Specification of the hazards, and the precautions required to control them both to people doing the work, those new to the job, **and** those who might be affected by it.

- A means exists of informing departments that items of plant/equipment will be the subject of a permit-to-work, for how long and the consequences.
- Measures to ensure that the right people, those who may be affected by it, know a permit has been issued and individuals know whether one permit affects another e.g. live and suspended permits displayed at the workplace.
- Mechanisms to alert fitters to particularly high risk tasks.
- Effective communications during shift changeover to ensure that the necessary precautions remain in place, new operational staff are fully aware of work being undertaken, and that new maintenance personnel are briefed on the hazards and precautions required.
- Communication of hand back, plant reinstatement and shift change procedures to all those involved with **and affected** by permits.
- Liaison, training and supervision arrangements for contractors.

ORGANISING - Competence

Key Issue:

Are there systems and arrangements to secure the competence of those working within high hazard operational and maintenance activities?

Key Characteristics:

- Individuals involved in design, implementation, monitoring and review of the permit-to-work system are competent to achieve the objectives.
- Selection criteria for permit staff including: relevant experience, knowledge of the plant, process/plant hazards, and risk assessment.
- Competencies in terms of: knowledge, skills, and experience are clearly defined and reviewed. These include abilities in methods of identifying and assessing the hazards, processes and plant involved. Formal assessment before appointment of authorised permit signatories and personnel responsible for carrying out isolation.
- Identification of existing skills/knowledge and consequential training programs.
- Appropriate training allocation; induction training provision for all persons involved in the system, basic training for fitters, with extended provision for authorised permit issuers.
- Training of contractors, usually recent site induction training.
- Site specific workplace training to ensure that it is relevant to the hazards of the industry, plant or processes and appropriate to the site PTW system; production and maintenance teams have a knowledge of each others work requirements.
- Competence routinely assessed by observation and testing of the understanding of hazards, risks and control measures.
- Training records for individuals which are reviewed periodically. Provision of refresher training where necessary.

PLANNING and IMPLEMENTING

Key Issue:

Are there adequate processes to generate plans and performance standards to implement the policy on high hazard operational and maintenance work?

Key Characteristics:

- Performance standards covering: design of the permit, when permits should be used, how the system should work and appropriate work procedures.
- Production and communication of written performance standards to all.
- Control of permit initiation. Issue of permits only for those jobs for which it is absolute necessary, i.e. there should not be job control systems for routine tasks.
- Issue of a permit by a person to themselves is prevented.
- Incorporation of contractors into the system to ensure that the same high standards of control, as applied to the company's own staff, are maintained.
- A clear description of the work to be done specifying unambiguously the plant involved, the job and location.
- Identification of all foreseeable hazards. Hazard identification as a formal written step in the permit initiation process. Requirement for work to be stopped if new hazards arise or recur.
- Clear rules on emergency action.
- Permits which document the precautions, and who is to take them. Clear allocation of responsibility for specific tasks. Specification of precautions with detail appropriate and proportionate to the risk.
- Implementation of permit suspension procedures if the work cannot be done immediately, or dealing with the situation where it is necessary to vary the work from that specified on the permit.
- Checks to ensure that the work equipment/plant is safe to bring on line once the permit-to-work tasks have been completed.
- Documentation of pre-start up procedures.
- Signing off procedures.
- Procedures for identifying jobs which appear routine but which differ slightly but significantly.
- The risk assessment methodology for application and criteria for use of PTWs.
- Procedures for variation from authorised practices.
- Documented isolation procedures for standard activities including; isolation standards related to risk, isolation certificates, leak testing, and security tagging.

MEASURING PERFORMANCE

Key Issue:

Is there adequate and sufficient measurement of performance of high hazard operational and maintenance work both before and after accidents/incidents.

Key Characteristics:

- The operation of the permit-to-work systems and the functioning of the system as a whole closely monitored through active and reactive monitoring.
- Written instructions detailing monitoring procedures for:
    1. Routine monitoring to check that: the permit form is being completed accurately, unambiguously and with sufficient detail, permits are being used for appropriate work, the hazards are being properly identified, the precautions stipulated in the permit are appropriate and are being followed, work activities are confined to those authorised by the permit, and hand-back procedures are being followed;
    2. Periodic monitoring of the PTW system documentation and operation, **by those not directly involved in the system on a plant**, to ensure that: the system is being applied as intended, the right activities are covered, the type of permit e.g. hotwork, confined spaces etc, adequately cover the work activities undertaken.
- Procedures for checking the work site, during permit issue, by permit authorizer/issuer.
- Procedures for checking that the work has been done as specified and the work equipment is safe to bring back on line.
- Independent checking of important actions to be taken under the permit system, and confirmation on the permit.
- Systems to ensure that no one is allowed to carry out permit work without training.
- Checks to ensure that the precautions are executed, and that the work is being done as specified.
- Procedures for reporting any incidents that have arisen during work carried out under a permit, and for reviewing procedures as necessary.

AUDITING

The design and operation of the permit-to-work system, should, periodically be subject to a formal audit. The auditor(s) should not be part of the system or have any responsibility for it.

The audit should verify that a permit-to-work system:

- Exists.
- Is properly designed.
- Is implemented.
- Is effective in meeting its objectives.

The audit should check that performance monitoring and reviews are occurring at the correct frequency and are addressing the right issues.

Managers should be able to explain the findings of audits which have been undertaken or audits planned for the future and their response to the findings.

REVIEWING PERFORMANCE

Key Issue:

Is there adequate and sufficient review of the performance of high hazard operational and maintenance activities to ensure that lessons learned are effectively put into practice to improve performance of the system?

Key Characteristics:

- Periodic review of the achievement of the objectives of the permit-to-work systems in respect of:
    - Permit design.
    - The relevancy of a permit to control the risks.
    - Identifications of hazards prior to work starting.
    - Duration of permit.
    - Precautions to be taken.
    - Permit display.
    - Variations from accepted procedures.
    - Updating the system in the light of new information about hazards of success/failure of the system.

Information about the operation of the system may arise from other management activities such as, risk assessment, HAZOPs, Failure Mode and Effects Analysis (FMEA), incident/near miss investigations etc.

Appendix 6 – Primer on Integrated Safe System of Work (ISSOW)

Background

ISSOW is an electronic CoW procedure that covers permit-to-work, safe isolation & reinstatement of plant and, with some duty holders, operational risk assessments (ORAs). Many production operators use versions of ISSOW. A software company working closely with one or more of the major oil companies developed ISSOW in the early 2000's.

All IMT inspectors should develop an understanding of ISSOW as they will encounter it in use by the focal point duty holders and/or those duty holders they are required to regulate through investigations, or when covering for other inspectors. All duty holders using ISSOW will have guidance, such as user manuals/handbooks, that inspectors should obtain copies of as part of their inspection activities. Duty holders' ISSOW manuals provide enough information for inspectors to be able to decide whether a duty holder's arrangements are sufficient for them to ensure that their PTW and SIRP activities are undertaken in accordance with their ISSOW procedures.

Although there are different versions of ISSOW, inspectors are likely to find that the versions they encounter are likely to have the key characteristics as identified in HSGs 250 & 253. The most likely deficiencies that inspectors need to identify are duty holder failures to follow ISSOW requirements.

ISSOW & PTW: A key feature of the PTW function of ISSOW is the Work Control Certificate (WCC). The WCC is in effect the PTW. The WCC should document the hazard(s) and the risk controls. For the safe isolation and reinstatement of plant, ISSOW used the Isolation Control Certificate (ICC).

Failures to look for:

1 **Failure of key roles to undertake the responsibilities assigned to them**: Inspectors should check whether individuals designated as Area Authorities, Performing Authorities, Control Room Operators, Area Operators etc are following the ISSOW procedures. Inspectors will have to identify particular WCCs to sample this. WCCs may be selected in terms of the nature of the hazard (eg any work on hydrocarbon systems, confined space entry or work at height).

Example of major hydrocarbon release due to failure to follow ISSOW responsibilities – Isolations were in place so that pressure safety valves could be removed for routine maintenance. The performing authorities were relatively new to the large production installation and they were unfamiliar with P&IDs. It is a requirement of ISSOW that for any breaking of containment on such plant that an area operator, or control room operator, will visit the locus of the work and confirm that the breaking of containment will be undertaken only when there is an isolation in place that corresponds with the required standard required under ISSOW (see HSG 253 for isolation standards). On

this occasion the AO/CRO did not make such a site visit. Instead the performing authority went to the control room and described the location of the PSV that was to be removed next. The CRO agreed that this was one of the isolated valves, but it was not. When the workers had partly undone a flange, has started to escape. They had actually opened up live plant that was part of the flare system. When the gas alarms went off, those in the control room did not understand the reason for the release as there was no permitted work in that area of the installation. They were correct in that conclusion, but that was because the workers had broken containment in the wrong place. The decision was taken to blow-down the plant, which resulted in over 10 tonnes of gas being released through the flange that had wrongly been "broken". HSE investigation revealed that the duty holder's approach to complying with ISSOW's requirement for a CRO/AO to confirm isolation before breaking containment had been relaxed.

2 **Failure to undertake effective WCC monitoring:** All ISSOW systems have an in-built set of questions used for monitoring compliance with the requirements of the procedure. Different members of the duty holder's offshore management team are usually required to do a number of "audits" (ie monitoring exercises) per offshore trip. These integral ISSOW monitoring questions are likely to be compatible with those identified in HSG 250 (and 253). The key deficiencies are that the duty holder monitoring simply becomes a tick-box exercise seeking to confirm compliance rather than identify non-compliance. Even when non-compliance is identified, it may be that the duty holder's approach to investigation is such that individuals are blamed for non-compliance rather than seeking an understanding as to whether there may be systemic reasons why risk controls are not identified, or not followed etc.

The integral ISSOW checklist comprises individual questions with boxes in which to indicate compliance or not. Every few questions, there are dialogue boxes where more meaningful descriptive information can be recorded. Inspectors have encountered situations where the majority such duty holder monitoring exercises find only compliance and do not provide any dialogue.

Reasons for ineffective ISSOW monitoring can include insufficient training for those expected to undertake these activities. Duty holders must understand that not all of their managers will have the correct aptitudes to seek out non-compliance or deficiency. Duty holder KPIs typically record number of "audits" carried out rather than non-compliances found, patterns of non-compliance and systematic learning identified and applied.

Duty holder personnel will be able to show inspectors the records of WCC monitoring. Inspectors should be able to form an opinion on the efficacy of such activity from these records. In order to further inform this opinion, inspectors should ask the duty holder to demonstrate one or two WCC "audits", starting from the selection criteria and then moving onto the preparation for the audit and then the actual site visit. The preparation should enable the inspector to develop an opinion on the risk assessment and the risk control systems that have been identified. Intelligent selection criteria

could include a concern that the area authority concerned may not be as familiar with the duty holder's CoW procedure as other AAs. An example of this might be a platform drilling AA at a production installation.

The inspector should accompany the duty holder's "auditor" in order to form an opinion of the efficacy of the monitoring process. This will include an assessment of the quality and challenge of the discussions with those undertaking the work. If the duty holder personnel do not identify deficiencies hazard identification; clarity of risk control; information, instruction, training and supervision issues then the inspector should raise these and pursue accordingly. It is not unusual to find that key risk controls have not been identified or, if they have, they are not being used correctly, if at all.

3 Failure of challenge function at "Permit" meeting

A strength of ISSOW is that it facilitates effective discussion of PTW issues such as potential interaction of one permitted work activity on another. Most importantly, ISSOW's approach to visualising WCCs in relating to their locus means that it should be easy for those at the meeting to identify deficiencies in hazard identification and risk control.

One real-life example of this was a risk control of "good communications". When challenged, the AA advised that this required use of telephone not radio and that those receiving instructions would have repeat them back and explain their understanding.

4 Failure to undertake suitable and sufficient risk assessment

Some early versions of ISSOW, and some other PTW systems use a risk assessment matrix that does not differentiate between hazards most likely to cause a single person fatality (eg work at height or with electricity, air/water pressure etc) or one that could cause multiple fatalities, such as invasive work on high pressure/high volume hydrocarbon systems. Inspectors should address such fundamental failings by letter at least.

More common failures are those of basic risk assessment where the correct hazards are not identified and so suitable risk controls are unlikely to be implemented.

Example 1: Hydrocarbon release from well-head – A duty holder used a PTW to control the risks arising from the topping up of a well annulus with seawater. The major hazard arising from of opening valves up to put water into the well was poorly covered. The activity had the potential to release pressurised hydrocarbons from the well, which could have caused a fire and/or explosion killing those involved in the work. The WCC did mention the use of a positive displacement pump to put the seawater into the well, but this was not done. Instead, the WCC identified that water in the mud pits could be gravity fed into the well-head. It was assumed that the hydrostatic head from the mud-pits being above the well-head would provide enough pressure to

overcome the pressure within the well. The pressure gauge used to check the pressure at the well-head and had a scale hundreds of times more than the pressure differential between mud-pit and the well. When the valves were opened, gas flowed from the well and escaped from the mud-pit. This was a simple failure of the risk assessment. Following this WCC did not provide any protection.

Example 2: WCC used to allow working under a suspended load - A duty holder produced an ISSOW level 2 risk assessment as required when it was not possible to follow its own lifting procedures. The activity related to using diesel-bunkering hoses on an FPSO. The method required deck crew to work directly beneath the heavy hose and coupling as it was suspended by one of the main cranes for deployment. The duty holder's lifting procedure correctly identified the LOLER requirement for people not to work under suspended loads. Instead of identifying a method of controlling the risk, the WCC used for this activity simply required deck crew to minimise their time under the suspended load. When challenged by an inspector, the duty holder initially modified the method and later changed it completely. This situation represented both a failure of risk assessment and the duty holder's own compliance monitoring.

5 Use of risk controls for several trivial hazards on one WCC

The MAR 10 requirement that work is done in accordance with a permit is intended to ensure sufficient risk control for working with major or significant hazards. The WCC (or any PTW) should emphasise the key hazards, ie what's the worst that could go wrong, and the risk controls, ie what technical or procedural risk controls are needed to prevent that hazard harming people.

Offshore work activities include ones where several or many people could be killed directly or indirectly from a work activity. Such activities include much work on hydrocarbon and ballast systems. Other activities such as work at height, work with electricity, non-hydrocarbon pressure systems, confined space entry, lifting etc could foreseeably result in the death or injury of one or more people. Formal CoW systems such as ISSOW are meant to control the risks from such activities.

One of the features of ISSOW is that it has a list of drop down hazards and risk controls that can be used to populate a WCC. Sometimes those compiling and checking WCCs populate them and do not challenge many trivial hazards such as use of WD40 (risk control = use gloves & safety glasses etc) which can swamp the key hazards and risk control in pages of largely irrelevant material that should be covered by site standards. Such bloated and irrelevant WCCs can then be copied from job to job, thus exacerbating this tendency and normalising it.

Some duty holders have modified their ISSOW procedures so that some relatively routine and low hazard activities now fall outside ISSOW

requirements. This reduces the number of permits that are raised and facilitates more effective risk assessment and monitoring activities.

Many other duty holders are well aware that their approach to ISSOW is generating superfluous paper work so that the key hazards and risk controls may be hidden. Unfortunately, they are sometimes concerned that their own regulatory compliance activity may focus on such lower order hazards (eg WD40 and its COSHH assessment) if they are missing.

This tendency to copy older WCCs may also occur because those copied were accepted by installation management and not challenged by monitoring activities. This means that there can be a tendency not to think about each new task from the first principles of “what’s the worst that could go wrong with this and what do we have to do to stop that from happening etc”.