ED Offshore Inspection Guide

Inspection of Well Control

Contents

Summary

This Inspection Guide is for use by Energy Division (ED) Inspection Management Team inspectors and other ED non-wells specialist inspectors who are undertaking a basic inspection of arrangements for Well Control during drilling, testing, completion and other well intervention or maintenance/repair (work over) operations. It provides questions to ask key personnel involved with such operations. These questions are designed to sample key components that provide for effective well control.

It provides a basis for both assessing compliance with the relevant statutory provisions and for assessing and scoring operator performance in line with HID's Targeting and Prioritisation policy for Offshore Installations (ref. 1).

Introduction

DCR (ref. 2) Regulation 13 requires the well-operator to ensure that a well is so designed, modified, commissioned, constructed, equipped, operated, maintained, suspended and abandoned that, so far as is reasonably practicable, there can be no unplanned escape of fluids from the well.

HSE guidance to the wells aspects of DCR (ref. 2) is available (ref. 3).

A separate Inspection Guide covers inspection of Wells Personnel Competency (ref. 4).

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This Inspection Guide covers well control during well construction and maintenance including drilling, testing, completion and other well intervention or maintenance/repair (work over) operations, including final decommissioning where the drilling blowout preventers (BOP) are in use. It does not include drilling or well intervention activities where wire-line, coiled tubing, managed pressure drilling or under-balanced drilling pressure control equipment is in use. It does not cover all aspects of these operations for which industry good practice guidance is available (ref. 5). Rather it provides questions to ask key personnel so that key components that provide for effective Well Control can be sampled.

The large topic of well control has for this purpose been broken down into sub-topics with sample questions for each:

a) well control procedures
b) well control equipment
c) well control training
d) well control drills
e) communications

Model answers are provided for each question so that the extent of compliance can be gauged.

Action

The need for inspections of well control arrangements for particular installations will be identified in the operator Proposed Intervention Priorities. Specific Well Control inspections will be scheduled in the annual installation Intervention Plan.

Where a Well Control inspection is called for in the Intervention Plan a basic well control inspection may be carried out by the IMT or other non-wells specialist in accordance with this Inspection Guide. See Appendix 1 for questions to be asked during such an inspection. A more detailed Well Control inspection may be carried out by a Well Operations specialist subject to availability.

Where significant concerns are identified by an IMT or non-wells specialist a Well Operations specialist should be consulted at the earliest opportunity and appropriate action decided.

Recording & Reporting

The duty holder performance ratings in accordance with Appendix 2 should be entered on the Inspection Rating Form (IRF) tab of the relevant installation COIN Intervention Plan Service Order. Findings should be recorded in the normal post inspection report(s) and letter.

Further References

1. HID Targeting & Prioritisation – Arrangements for Prioritising Major Hazard Inspections of Offshore Installations

2. Offshore Installations and Wells (Design, construction, etc) Regulations 1996

3. A guide to the well aspects of the Offshore Installations and Wells (Design, Construction, etc) Regulations 1996, L84, HSE

4. HID Offshore inspection guide – Wells personnel competency management system inspection guide

5. Well Life Cycle Integrity Guidelines, Issue 3 , March 2016, Oil and Gas UK

6. Guidelines on BOP Systems for Offshore Wells, Issue 2. May 2014, Oil and Gas UK

Contacts

ED Offshore: ED 6 Well engineering & operations inspectors

Appendix 1 Inspection Guidance

1. Well Control procedures

Questions for the Driller:

a) Are there any standing instructions for the driller on well shut in?

There should be some standing instructions on how the well will be shut in. This will be by the relevant method (hard, soft or fast method) of securing the well. Relevant BOP/Well control equipment schematics to support standing instruction (shut in sequence) for particular well work being undertaken. Awareness of Shear ram capability and sequence planned for particular project.

b) Is there a recent well control sheet on the rig floor which is completed as much as possible?

This is a sheet that will be completed with actual bit depth, mud density etc. at the time of a kick. However data that will not change like the water depth, depth of last casing shoe, slow circulating rates should be on this sheet so that arriving at the kill calculations is as efficient as possible. (Note - Slow circ rates change regularly dependent on well depth, hole / drill string configuration and mud rheology. When drilling these should be re-checked and recorded regularly every 1000ft / 12 hours etc) and on any occasion there is a significant change in mud weight.

Questions for rig crew member(s):

c) Are well control procedures discussed with the drill crew? What is your role?

The drill crew need to be aware of their role in shutting in the well for the operations going on at the time. Their role should be discussed for each shift and change in operations.

Questions for the Senior Tool pusher and Operator representative:

The senior tool pusher and operator representative should be asked the same questions. The answers should align with each other; it must be clearly understood by all parties on whose procedures have primacy

d) Whose well control procedures (well operator or drilling contractor) are being followed?

There must be clear understanding whose procedures are in force.

e) When was the last BOP pressure test? What was the result?

This should be at most 14 to 21 days prior to the date you are aboard. Pressure testing frequency should be specified in procedures; it should not exceed 21 days. If not was dispensation given and by whom. This is a high and low pressure test usually 5 mins for the low test, 10-15 mins is commonplace for the high pressure test, although Oil and Gas UK guidelines recommend a minimum of 5 mins, during which time pressures should remain constant.

f) When was the last BOP and BOP control unit function test? What was the result?

This should be within a 7 to 14 day window; API standard and Oil and Gas UK guidelines specify every 7 days as operations allow. The function test should be from different control panels to check their functionality.

g) Were all the BOP function tests (including redundant ones) tested independently?

A simple function test might not reveal failures of redundant components. If redundant components are not tested independently the arrangements could be vulnerable to a single point failure which in electrical/electronic equipment could occur at any time.

h) Are these tests in accordance with their procedures?

This is to check awareness and use.

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2. Well Control equipment

Questions for either the Subsea Engineer, Chief Engineer or Chief Mechanic, and Maintenance Supervisor:

a) Are the BOP hydraulic control schematics in an as built status?

Look at date of the on board drawings, the date of the last revision and ask if the mechanic or subsea engineer is aware of them.

b) Is the BOP and ancillary well control equipment (choke manifold, BOP control unit) a safety critical element and part of the installations verification scheme?

The BOP etc. should be part of the installations verification scheme, be a safety critical element and have a performance standard.

c) Who is the verifier (Independent Competent Person) for the installation and when did they last look at the BOP? Were there any issues raised by the ICP?

The BOP should be treated like any other piece of safety critical equipment and be subject to some inspection of its fitness for purpose by the ICP.

d) Is the BOP maintenance up to date? What is the backlog?

Same as any other piece of safety critical equipment. Is it maintained in accordance with the planned maintenance routine etc.

e) When were the gauges on the choke and kill manifold last calibrated? Is there a maintenance routine for them?

These gauges are critical to measuring pressures in the well during a kill operation and need to be reliable

***f*) Are all BOP control panels, including remote secondary panels, clearly labelled with the position of the different type of ram type and/ or size of ram?**

All panels, including remote panels, should have the position of the rams clearly and correctly labelled.

Question for the Senior Tool pusher:

g) Is the ram configuration identified on all the BOP control panels the same as that fitted to the various BOP ram cavities?

The labelling on the control panels for what type of ram is in each cavity on the BOP should accurately reflect what is in the BOP. Need for accurate BOP diagrams with Well specific datum clearly indicated and primary hang off rams / procedure clearly visible Hang-off applies only to subsea BOPs.

h) What pipe in the current string will the BOP shear rams cut? What pipe cannot be cut with the shear rams?

The shear rams will not be able to cut some drill collars and may not cut some drill pipe and some specialised tubulars. What we want to test is do the Tool pusher and Driller know what he cannot shear and are there any instructions in place / risk assessment mitigating this. Has effective communication / training been carried out?

Question for the Driller:

i) Is the installation's well flow indicator working and accurate?

This piece of equipment shows if the well is flowing. It is an indication that primary well control has been lost. It should be working and at 0% flow when the well is static.

Question for the Driller and Mud logger:

j) Is the Mud Pit Gain/Loss system operating and set up for correct pit and appropriate gain or loss volume relevant to the well section being drilled?

This piece of equipment monitors whether there is a loss or gain in fluid volume in the pit and indicates whether there may be a kick or a loss of situation down hole. It should be set up to monitor which pit(s) are being used for circulating mud around the well, and set to alarm at an appropriate change in volume.

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3. Well Control training

Question for the Driller:

a) If he sees the well flowing what would be his initial action?

He should shut the well in using the specified BOP procedure, inform his supervisor, and then start recording pressures and volume gained.

b) Does the Driller require any permission to shut in the well, or activate the shear rams?

This should be no. He should have the responsibility and authority to shut the well in, if there is doubt as to the primary well control and/or positive signs of it flowing, and if the situation requires it, use the shear rams as a last resort.

4.Well Control drills

Question for the Senior Tool pusher:

c) When was the last kick and trip drill, is there a record of it, is the frequency and method in line with the agreed well control procedures?

This should be weekly as a minimum and should be for both drill crews. The record should state what kind of drill it was, how long it took to shut in the well together with any other comments.

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5. Communications

Question for the Senior Tool pusher and/or Mud Logger:

a) Does he have a copy of the drilling programme, and have the relevant well hazards been communicated to the Driller?

There should be copies of the drilling program on the installation. The Driller and other key personnel on the installation should be aware of hazards from the well for example; shallow gas, over pressurised zones, losses, hole instability, H_2S etc. Interface document? Specific actions or local procedures developed for particular client been *communicated and visual references placed in appropriate locations?*

b) Who does the Mud Logger inform when he sees signs of the well flowing?

The Mud Logger should inform the driller immediately if he sees the well flowing. Following this action he may then, depending on the procedures used, inform the Company Rep, Senior Tool pusher etc.

Question for Driller and Mud Loggers

c) Does the Driller have good communications with the Mud Loggers and vice versa?

The Driller and Mud Loggers should have a very good line of communications and be in frequent contact. The Driller should have confidence in the abilities of the Mud Loggers and equipment they use. Are all teams aligned in which system (rig or 3rd party) is to be used and units to be recorded / reported agreed?

Appendix 2 Performance Assessment

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.