



# The Offshore Well Control Inspection Guide

## ***Open Government Status***

Fully Open

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19 January 2024

## ***Review History***

<b>Date</b>	<b>Changes</b>
19/01/21	Issue 4 of the IG – additional questions added to driller, company rep / senior toolpusher and mud logger questions sets. Transferred onto new IG format.
24/02/22	Issue 5 – OSDR to OMAR rebranding.

## ***Target Audience***

***OMAR Inspectors / ED Offshore Inspectors / ED Specialist Inspectors***

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## **Summary**

This inspection guide (IG) outlines an approach to the inspection of dutyholder's arrangements with respect to operational well control and the key areas that inspectors should consider when inspecting this topic. It also sets out the criteria for satisfactory and unsatisfactory performance factors against which dutyholder performance will be rated. References are made to technical standards and guidance that inspectors will use to form an opinion of legal compliance.

The Offshore Installations and Wells (Design and Construction, etc) Regulations 1996 (DCR) and the Borehole Sites and Operations Regulations 1995 (BSOR) requires the well operator and borehole site operator to ensure that suitable well control equipment is provided and deployed as required dependent upon the well operations that are to be undertaken.

## **Introduction**

The purpose of this IG is to provide information and guidance to OMAR / ED Inspectors to support the delivery of consistent and effective inspection of dutyholder arrangements to comply with DCR and BSOR.

This IG highlights key areas for inspection and provides a framework against which inspectors can judge compliance, assign performance ratings, and determine what enforcement action should be taken with respect to legislative breaches that may be found.

A separate inspection guide details inspection of Wells Personnel Competency  
[www.hse.gov.uk/offshore/ed-well-competence.pdf](http://www.hse.gov.uk/offshore/ed-well-competence.pdf).

This IG 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 wireline, 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. 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.

### ***Relevant Legislation***

For all oil and gas well operations, DCR 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.

For offshore operations, DCR Regulation 17(1) requires the well operator to ensure that suitable well control equipment is provided, while DCR Regulation 17(2) requires that the installation dutyholder deploys it when the well operations require it.

BSOR Regulation 9 Schedule 2(7) stipulates similar requirements for onshore oil and gas well operations.

DCR Regulation 21 requires that all personnel working on a well should be suitably informed, instructed, trained, and supervised so that risks associated with the well operation are reduced to as low as is reasonably practicable.

### ***Action***

Inspectors should review relevant well control documentation such as well control policy and procedures, prior to the installation visit and test compliance during the installation visit against the “success criteria” given in Appendix 1.

By the conclusion of the inspection, it should be possible to

- determine that the well control arrangements for the well / borehole site operator are suitable and sufficient

When carrying out inspections covered by this IG inspectors should

- assess dutyholder responses against the success criteria in Appendix 1
- use the performance descriptors in Appendix 2 to
  - determine the appropriate performance rating
  - the initial enforcement expectation
  - consider how and when the issues raised during an inspection are to be closed out

### ***Background***

Well control is a fundamental part of well operations in preventing an uncontrolled flow from the well. Therefore, it requires to be inspected by the Well Engineering and Operations inspectors, in a consistent manner.

### ***Other Relevant Inspection Guides***

Wells Personnel Competency Management System [www.hse.gov.uk/offshore/ed-well-competence.pdf](http://www.hse.gov.uk/offshore/ed-well-competence.pdf)

### ***Specialist Advice***

A well control inspection may be performed by the inspection management team (IMT) or other non-wells specialist in accordance with this inspection guide. However, if a non-wells specialist / IMT wishes to conduct an inspection of well control it is recommended that it should be performed in conjunction with an ED6.3 Well Engineering and Operations inspector.

If an inspection of well control is conducted without an ED6.3 inspector in attendance and significant concerns are identified by an IMT or non-wells specialist, an ED6.3 inspector should be consulted at the earliest opportunity and appropriate action decided.

### ***Organisation***

#### **Recording and Reporting**

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

## Appendix 1 Inspection Questions and Success Criteria

### DRILLER

Name:

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
<b>Well Control procedures</b>			
1	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.	
2	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 circulation 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.	
3	Did you receive information about wells specific risks for this operation?	Drillers may be involved in pre-spud meetings on or offshore and should have access to a programme to review. Well specific risks should be communicated to the driller and senior toolpusher as safety critical personnel.	
4	Describe the process for preparing the well control sheets?	Drillers should be involved in preparing these sheets, either doing it by themselves or supervising the assistant driller preparing them. The toolpusher should then regularly verify samples of these sheets. The practice of toolpushers preparing the sheets and passing to the driller misses this verification step.	
<b>Well Control Equipment</b>			

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
5	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.	
6	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 downhole. 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.	
7	Are well control valves on the rig floor with appropriate crossovers?	The driller should be aware of which threads are in use within the drill string and assure that the correct crossovers are available.	
<b>Well Control Drills</b>			
8	What types of well control drills are performed and who is tested?	There should be a variety of well control drills based on relevant scenarios for the well operations being undertaken. All safety critical positions should be tested regularly including mud loggers, derrickman, and drillers.	
<b>Well Control Training</b>			
9	If they see the well flowing what would be their initial action?	They should shut the well in using the specified BOP procedure, inform their supervisor, and then start recording pressures and volume gained.	

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
10	Does the driller require any permission to shut in the well, or activate the shear rams?	This should be no. They 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.	
<b>Communications</b>			
11	Does the driller have good communications with the mud loggers and vice versa?	<p>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.</p> <p>Are all teams aligned in which system (rig or 3rd party) is to be used and units to be recorded / reported agreed?</p>	

## Senior Toolpusher and Company Rep

The senior toolpusher and well 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.

**Name:**

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
<b>Well Control Procedures</b>			
1	Whose well control procedures (well operator or drilling contractor) are being followed?	There must be clear understanding whose procedures are in force.	
2	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 minutes for the low test, 10-15 minutes is commonplace for the high-pressure test, although Oil and Gas UK guidelines recommend a minimum of 5 minutes, during which time pressures should remain constant.	
3	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.	
4	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.	

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
5	Are these tests in accordance with their procedures?	This is to check awareness and use.	
6	What assurance activities do you perform in relation to well control? How are these recorded?	Both senior toolpushers and company reps should regularly sample drill floor well control paperwork to check for accuracy and compliance to procedures. These verification activities should be documented. Well Control Function Tests, BOP Pressure Test Plans, and BOP Test Records should be verified and documented. Well Control Drills should be varied and based on relevant scenarios in relation to the specific well's risks.	
<b>Well Control Equipment</b>			
7	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.	
8	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 toolpusher and driller know what they cannot shear and are there any instructions in place / risk assessment mitigating this. Has effective communication / training been carried out?	
<b>Well Control Drills</b>			
9	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.	

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
10	What types of well control drills are performed and who is tested?	There should be a variety of well control drills based on relevant scenarios for the well operations being undertaken. All safety critical positions should be tested regularly including mud loggers, derrickman, and drillers.	
<b>Communications</b>			
11	Do they 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 <sub>2</sub> S etc. interface document? Specific actions or local procedures developed for a particular client been communicated and visual references placed in appropriate locations?	
12	When changes to the well programme are required how are well control risks identified and communicated to the drilling team?	Programme changes should occur under a management of change process, risks should be assessed and mitigated. Any changes should be communicated to the drill crew and included in the drilling instructions issued by the company man. If changes are made to procedures or standing instructions the senior toolpusher should ensure rig floor paperwork is updated to the latest revision.	
13	Who does the mud logger inform when they see signs of the well flowing?	The mud logger should inform the driller immediately if they see the well flowing. Following this action, they may then, depending on the procedures used, inform the company rep, senior toolpusher etc.	

## Subsea Engineer, Chief Engineer or Chief Mechanic

Name:

Job Title:

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
<b>Well Control Equipment</b>			
1	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.	
2	Is the BOP and ancillary well control equipment (choke manifold, BOP control unit) a safety and environmental critical element (SECE) and part of the installation's verification scheme?	The BOP etc. should be part of the installation's verification scheme, be a SECE and have a performance standard.	
3	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 verifier?	The BOP should be treated like any other piece of safety critical equipment / SECE and be subject to some inspection of its fitness for purpose by the verifier.	
4	Is the BOP maintenance up to date? What is the backlog?	Same as any other piece of safety and environmental critical equipment (SECE). Is it maintained in accordance with the planned maintenance routine etc?	

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
5	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.	
6	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.	

# Mud Loggers

Name:

Company:

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
<b>Well Control Procedures</b>			
1	What role have you got in relation to well control?	The mud logger provides a verification of the primary monitoring performed by the drill crew, trending volumes but also tracking parameters such as D Exponent that is intended to be a leading indicator of rising pore pressure. They will also be sampling cuttings and trending the figures. The mud loggers should not be the primary means of monitoring the well.	
<b>Well Control Equipment</b>			
2	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 downhole. 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.	
<b>Communications</b>			
3	Do they 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 <sub>2</sub> S etc, interface document? Specific actions or local procedures developed for a particular client been communicated and visual references placed in appropriate locations?	
4	Who does the mud logger inform when they see signs of the well flowing?	The mud logger should inform the driller immediately if they see the well flowing. Following this action, they may then, depending on the procedures used, inform the company rep, senior toolpusher etc.	

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
5	Does the driller have good communications with the mud loggers and vice versa?	<p>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.</p> <p>Are all teams aligned in which system (rig or 3rd party) is to be used and units to be recorded / reported agreed?</p>	

## Drill Crew

Names:

QUESTION		MODEL ANSWER	SATISFACTORY RESPONSE? / COMMENT
<b>Well Control Procedures</b>			
1	What well control training or information have you been given?	Typically drill crews are not required to take formal well control training until they are preparing to become a driller (Level 3 training). However, in practice Level 1 well control training may be offered as an optional course; Level 2 training may be taken by derrickmen, and most assistant drillers will have achieved their driller's level well control. Where the assistant driller deputises for the driller, they would need a formal well control certificate. Well control drills and training may also be included in occupational competence records.	
2	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.	
3	Have well specific risks been discussed with the crews?	Whole crew briefings can help identify specific risks such as HPHT or losses etc. Specific risks may be included in the daily drilling instructions and should be highlighted at pre-crew briefings and toolbox talks.	

## Appendix 2 Application of EMM and Dutyholder Performance Assessment

When inspecting the well examination scheme, dutyholder compliance is to be assessed against the relevant success criteria. The success criteria have been determined from specific regulatory requirements, defined standards, established standards or interpretative standards.

This assessment will determine the: EMM Risk Gap, the associated topic performance score together with the Initial Enforcement Expectation as shown in the table below.

The actual enforcement may differ from that consistent with the recorded topic score depending on dutyholder and strategic factors. However, should this occur then the relevant dutyholder and strategic factors should be identified in the inspection report.

### The Topic Score recorded on COIN must be consistent with the Initial Enforcement Expectation

Further guidance can be found at: <http://www.hse.gov.uk/enforce/emm.pdf>

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.

It should be noted that:

- **the recorded score should reflect the most significant compliance gap identified** relevant to the inspection guide.
- the IG and hence the allocated scores may not cover all the matters that were considered during the intervention.
- the intervention may not necessarily have used every part of the IG – consequently the score only reflects what was inspected. **The inspection report should make it clear what aspects of the IG the dutyholder has been scored against** (or it is clearly identifiable by a letter item).
- where the score only relates to limited aspect of the IG then consideration should be given to consulting the IG owner before finalising the score.
- proposed inspection scores should be reviewed / discussed by the full inspection team before finalising.
- the allocated performance score only reflects regulatory judgements about a duty holder's degree of compliance at a particular point in time.

### **Use of performance scores**

HSE uses the performance scores as one of the many inputs to prioritise and plan future regulatory interventions. Prioritising intervention's is fundamental to ensuring HSE delivers its major hazards regulatory strategy while supporting businesses and the GB economy. HSE aims to ensure that regulatory activity is proportionate to the risk to people taking account a dutyholder's performance in controlling risks. In general, this means that HSE will inspect major hazard installations and dutyholders with relatively poorer risk management performance more frequently and in greater depth than lower hazard installations and dutyholders where there is evidence of higher risk management performance.

## Appendix 3 References / Further Reading

- *A guide to the well aspects of the Offshore Installations (Design and Construction, etc) Regulations 1996 L84* [www.hse.gov.uk/pubns/books/l84.htm](http://www.hse.gov.uk/pubns/books/l84.htm)
- *A guide to the Borehole Sites and Operations Regulations 1995 L72* [www.hse.gov.uk/pubns/books/l72.htm](http://www.hse.gov.uk/pubns/books/l72.htm)
- *Well Life Cycle Integrity Guidelines Issue 4* March 2019 Oil and Gas UK
- *Guidelines on BOP Systems for Offshore Wells Issue 2* May 2014 Oil and Gas UK
- *Wells Personnel Competency Management System – OMAR / ED Offshore Inspection Guide* [www.hse.gov.uk/offshore/ed-well-competence.pdf](http://www.hse.gov.uk/offshore/ed-well-competence.pdf)