

## Well Life Cycle Integrity

IOM<sup>3</sup> / Energy Institute Technical Meeting 12<sup>th</sup> March 2019

# Agenda

- UK “goal setting” Regulations
- UK wells guidelines
- Principles of well integrity
- UK well integrity guidelines content and development since 2012
- What’s new in issue 4 of the UK well integrity guidelines

# UK “goal setting” Regulation

## Regulation 13: General duty

*The well-operator shall ensure that a well is so designed, modified, commissioned, constructed, equipped, operated, maintained, suspended and abandoned that—*

- a) so far as is reasonably practicable, there can be no unplanned escape of fluids from the well; and*
- b) risks to the health and safety of persons from it or anything in it, or in strata to which it is connected, are as low as is reasonably practicable.*



STATUTORY INSTRUMENTS

1996 No. 913

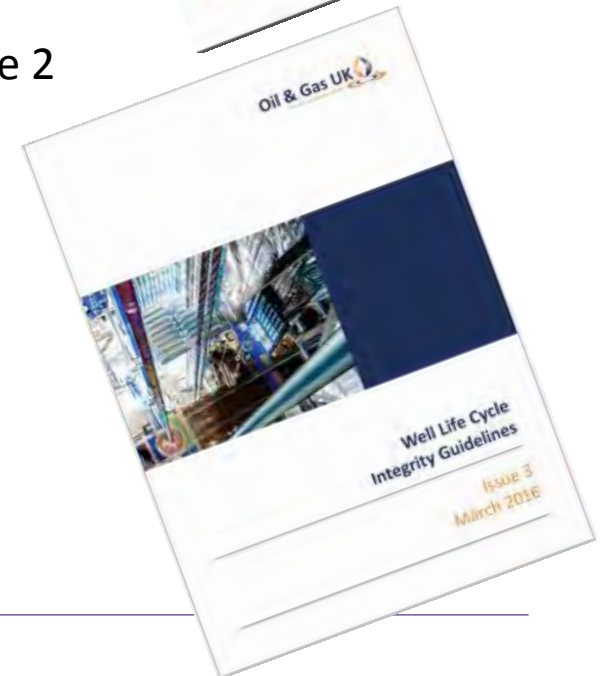
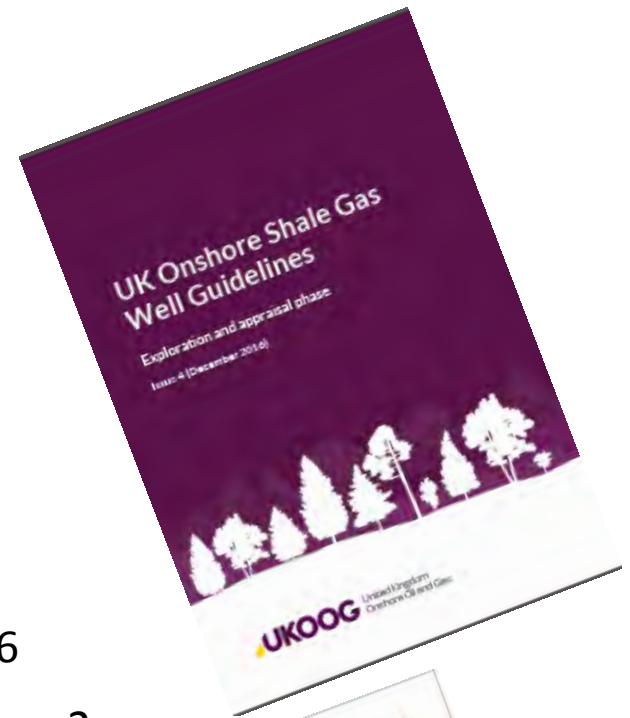
### HEALTH AND SAFETY

The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996

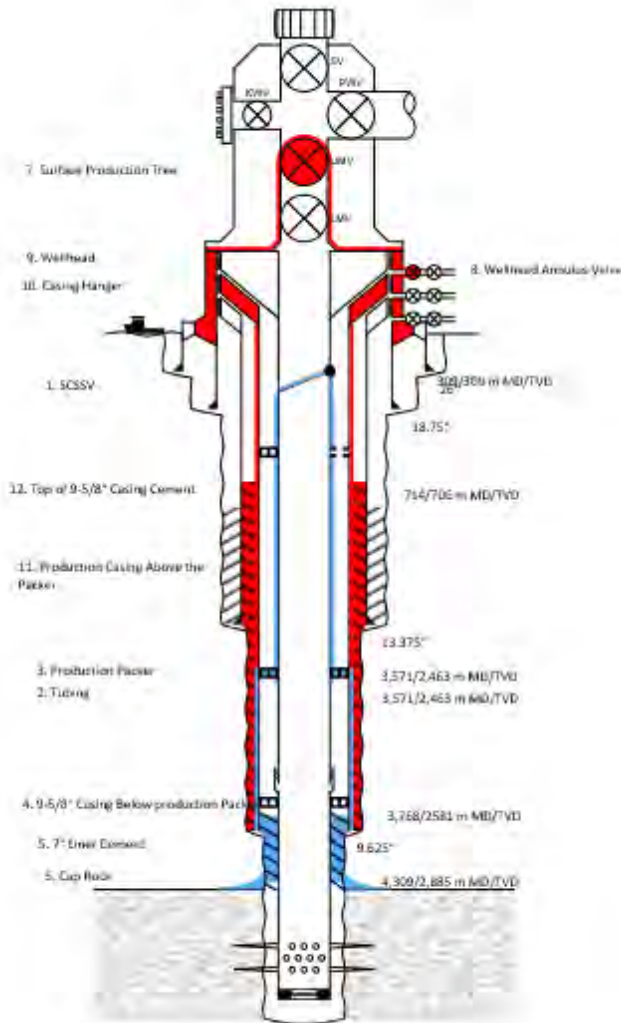
Made	- - - -	25th March 1996
Laid before Parliament		28th March 1996
Coming into force	- -	30th June 1996

# UK wells guidelines

- Well life cycle integrity issue 4 February 2019
- Well decommissioning issue 6 June 2018
- Competency of wells personnel issue 2 August 2017
- Competency of well examiners issue 2 August 2017
- Well examination issue 2 August 2017
- Onshore shale gas wells issue 4 December 2016
- High pressure high temperature wells issue 1 October 2016
- Qualification of materials for the abandonment of wells issue 2 October 2015
- Offshore blowout preventer systems issue 2 May 2014
- Relief well planning for offshore wells issue 2 March 2013



# Principles of well integrity



Example well barrier schematic using software from wellbarrier.com

- Well integrity is defined to be ‘the application of technical, operational and organisational solutions to reduce the risk of uncontrolled release of formation fluids throughout the life cycle of a well’.
- There should be at least two well barriers available throughout the well life cycle. The removal, or degradation, of a well barrier should be carefully considered to ensure that well integrity risks remain ALARP
- Duty holders should provide an effective management system and ensure that personnel are competent in the tasks they are required to do. A vital part of the competence is the ability to recognise significant changes and to ensure programmes are modified to deal with these changes. The ‘human element’ is very important in all aspects of well integrity.

# UK well integrity guidelines content & development since 2012



## GENERAL



WELL

LIFE

CYCLE

1. Summary
  2. Key regulatory requirements for well integrity
  3. Process safety and the well integrity management system
  4. Well integrity, barriers, BOPs and well control:-
    - Pressure testing
    - Risk assessment
    - Management of change
- Appendices:-
    - Background to the guidelines
    - Divestment information
    - Reference documents
- Well design & operations planning
  - Drilling
  - Well testing
  - Completion
  - Commissioning
  - Operate & maintain
  - Intervention & workover
  - Abandonment
  - Special cases

# What's new in issue 4 (1 of 4)

## General Updates throughout

- References to recent guidance and publications.
- Considerations for gas storage wells.
- Address findings from HSE Inspections.

## Regulatory Guidance (Chapter 2)

- New section on onshore environmental regulation.
  - *“...Where there is a relevant Best Available Techniques (BAT) conclusion under the Environmental Permitting Regulations 2016 [Ref 141] or IED Regulations, following these guidelines will generally provide a demonstration that BAT have been applied...”*
- New section covering considerations from Maximising Economic Recovery Legislation.

## Well integrity management strategy (Chapter 3)

- Updated to describe process safety considerations for well integrity based on IOGP reports, included potential key performance indicators.



Southern California Aliso Canyon wellsite on 17<sup>th</sup> December 2015 following the release of 96,000 metric tons of methane from well SS-25, subsidence craters from attempts to plug the well ex Earthworks.

# What's new in issue 4 (2 of 4)

## Well integrity barriers and well control (Chapter 4)

- New section on structural integrity covering conductors.
- New guidance on the use of PTFE tape.
- Updated to reference API S53 4<sup>th</sup> Edition and include UK specific guidance from the BOP Guidelines. *This will allow Oil and Gas UK to retire the current BOP Guidelines.*

## Well Design and Operations Planning (Chapter 5)

- Added guidance on aquifer isolation.
- Removed guidance on site surveys and referenced IOGP Report No. 373-18-1 "Guidelines for the conduct of offshore drilling hazard site surveys."



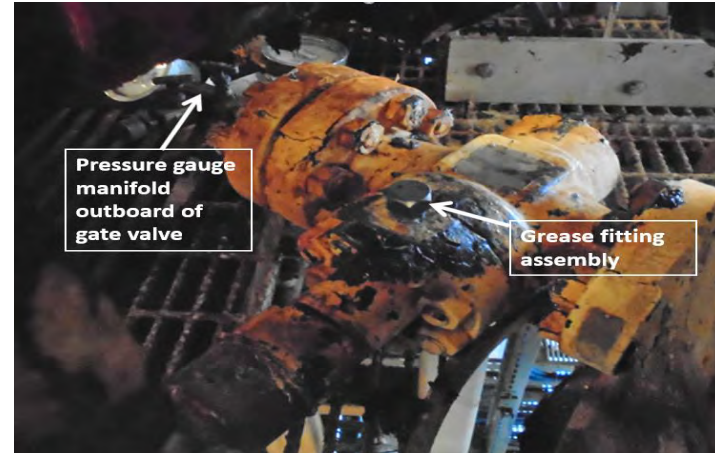
Examples of  
conductor  
failure **2018**



# What's new in issue 4 (3 of 4)

## Operate and maintain (Chapter 10)

- Removed section on late life wells and incorporated considerations throughout the document.
- Added guidance on well stock performance review based on BSI ISO 16530-1 well integrity life cycle governance.
- Added a section on risk assessment.
- Added guidance on annulus valves where if there is sustained casing pressure.
- Added guidance to escalate approval level required for repeat deferrals of remedials



**2018:** 420psi sustained casing pressure on annulus valve. Grease fitting ejected and 92.3kg of gas released. Note fitting partially made up due to PTFE tape.

# What's new in issue 4 (4 of 4)

## Intervention/Workover (Chapter 11)

- Added guidance on the use of a secondary potential barrier to effect a repair.

## Appendix 1

- Updated to summarise work done on issue 4.

## Appendix 2

- Removed the guidance on well status descriptors that is now covered under WONS and replaced with guidance on the information that an operator should hold on their wellstock and transfer on divestment.



**2018:** wireline cable used for production logging in a gas well. The cable dried out and gas leaked past the pressure control equipment. Wire and tools downhole.

