

# Revision update NORSOK D-010, Rev.4

WIF Workshop  
6.6.2012

by Terje Løkke-Sørensen, add energy

# The short version

- We received over 300 comments, variable degree of relevance / complexity.
- 20 technical editors working
- 80% complete in processing comments, 55% overall
- There will be changes: formation strength, cement height/bonding, P&A , MPD, more
- Original target date for issuing industry hearing is 1.11. (~~30.3~~).
  - **>Your last chance to make a difference!**



# Why update?

- Standard Norge has a requirement for periodic revision. Last revised Aug. 2004
- Change proposals has been received
- Recommendations from OLF Well Integrity and P&A Forum are transferred to D-010
- Assess experience / learning from Montara/Macondo incidents
- Make it more international?

NORSOK STANDARD

D-010  
Rev. 3, August 2004

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Well integrity in drilling and well operations

This NORSOK standard is developed with broad petroleum industry participation by interested parties in the Norwegian petroleum industry and is owned by the Norwegian petroleum industry represented by The Norwegian Oil Industry Association (OLF) and Federation of Norwegian Manufacturing Industries (TBL). Please note that whilst every effort has been made to ensure the accuracy of this NORSOK standard, neither OLF nor TBL or any of their members will assume liability for any use thereof. Standards Norway is responsible for the administration and publication of this NORSOK standard.

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# The Work → Milestones

## Work

- ✓ Invite industry to submit comments
- ✓ Read and evaluate comments
  - Formulate changes (80% complete)
  - QA check changes (ongoing)
  - Tidy up language throughout the standard
  - Issue rev.4 for hearing
  - Processes comments from hearing
  - Final issue

## Revised Milestones (original dates)

- ✓ Obtain comments – round 1 (24.08.11)
- ✓ Obtain comments – round 2 (15.11.11)
- ✓ Kick-off meeting w. Editor Group (26.10.11)
  - New: Issue draft to EGD/DMF (15.8.12)
  - Issue draft for Industry Hearing (~~30.3.2012~~ 1.11.2012)
  - Industry hearing ( 8 4 weeks)
  - Final (4 12 weeks) -> ~~30.6.2012~~ 1.5.2013
- 10 months delay, mainly due to:
  - large number of comments
  - difficult comments/issues
  - Editors busy with other work

# Who does what?

- T.Løkke-Sørensen has been engaged by Standard Norge to coordinate the work
- Editor group process comments and formulate changes
- Standard Norge:
  - Ensure compliance with general NORSOK requirements
  - host LiveLink / e.mail
  - provide secretarial support
  - coordinate hearings
- OLF Expert Group Drilling and DMF will act as reference group and provide guidance and quality assessment

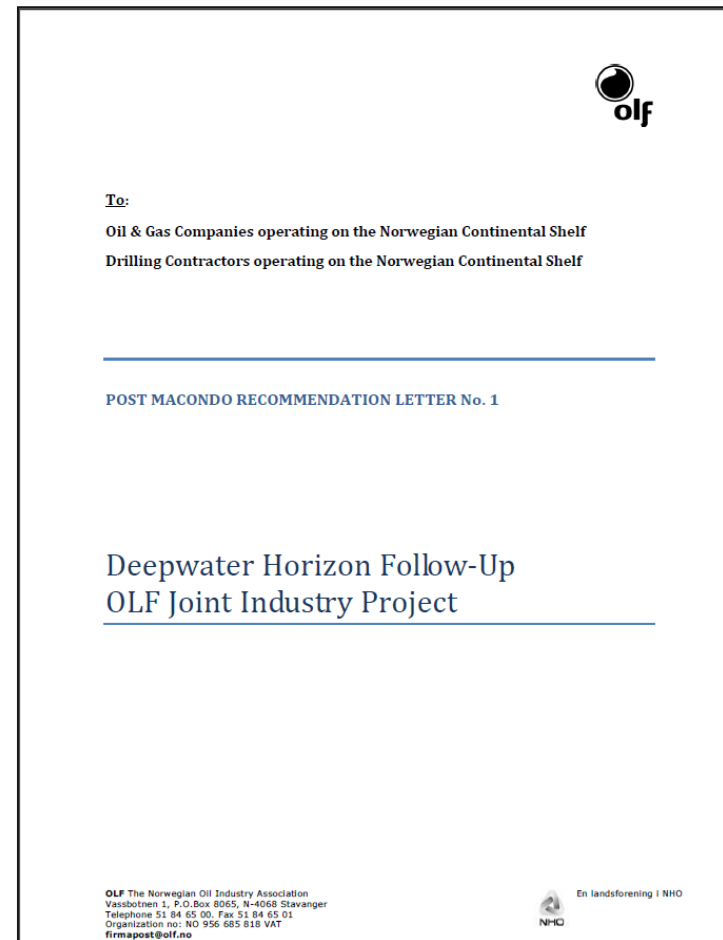
Clauses
<b>1. Scope</b>
<b>2. Normative and informative references</b>
<b>3. Terms, definitions and abbreviations</b>
<b>4. General principles</b>
<b>5. Drilling activities</b>
<b>6. Testing activities</b>
<b>7. Completion activities</b>
<b>8. Production activities</b>
<b>9. Sidetracks, suspension and abandonment activities</b>
<b>10. Wireline operations</b>
<b>11. Coiled tubing operations</b>
<b>12. Snubbing operations</b>
<b>13. Under balanced drilling and completion operations</b>
<b>14. Pumping operations</b>
<b>15. Well Barrier Elements Acceptance Tables</b>
<b>Annex A (Normative)</b>

# Editor Group

NORSOK D- 010 rev. 4	Main Editor	Co-editor
	Name, Company	Name, Company
<b>1. Scope</b>	Terje Løkke-Sørensen	Michelle Monteau, Statoil
<b>2. Normative &amp; Informative Ref.</b>	Terje Løkke-Sørensen	Michelle Monteau, Statoil
<b>3. Definitions and Abbreviations</b>	Terje Løkke-Sørensen	Michelle Monteau, Statoil
<b>4. General Principles</b>	Tore Fjågesund, Lundin	Dag Sande, Statoil
<b>5. Drilling Activities</b>	Ørjan Bustnes, Spring Energy	Arne Hjelle, Statoil
<b>6. Testing Activities</b>	Gary McDonald, Wintershall	Arild Fosså , Statoil
<b>7. Completion Activities</b>	Lars-Endre Hestenes,BG	John Helge Olsen, Statoil
<b>8. Production Activities</b>	Anders Hjellen, BP	Hilde Brandanger Haga / WIF
<b>9. ST, Susp. &amp; Aban. Activities</b>	Garry Brewster, Talisman	Svein Inge Rafoss, Statoil
<b>10. Wireline Operations</b>	Alistar Buchanan, Statoil	Terje Olsen, COP
<b>11. Coiled Tubing Operations</b>	Kenneth Maribu, COP	Alistar Buchanan, Statoil
<b>12. Snubbing Operations</b>	Jack Nerdrum, Wild Well Control	Alistar Buchanan, Statoil
<b>13. Under Balanced D&amp;C Ops.</b>	Per Cato Berg, Statoil	Connor Stricklan, Shell
<b>14. Pumping Operations</b>	Kristian Haarestad, PTC	Not needed
<b>Annex A</b>	Ørjan Bustnes, Spring Energy	Not needed

# Sources of Comments

- Comments obtained through invitation - + 300
- Recommendations from OLF's Macondo report
- Recommendations from PSA's Macondo report



# Regulations vs. D-010

- D-010 has become an integral part of the guidelines to PSA's regulations and is often referred to
- "Shortcomings" is corrected by adding regulatory requirements
- We should consider to include these "Shortcomings" in D-010
- Rev.4 will be included in the regulations for 2014 (given release by August 2013).

Til § 84 Overvåking av brønnparametere

Kravet til innsamling innebærer blant annet at data som kan indikere en mulig brønnkontrollhendelse blir målt, registrert og behandlet.

For å oppfylle kravet til innsamling bør standarden NORSOK D-010 kapittel 4.7.2, 5.7.3 og 5.7.4.2 brukes, **med følgende tillegg:** ved prøving av formasjonens oppsprekingsstyrke bør det trykkprøves til maksimalt for-ventet trykk for brønnseksjonen.



# D-010 vs. Regulations

- D-010 has instructions which are specifically linked to PSA ->
- PSA has expressed no concern if these links are removed in order to make the standard less «Norwegian».

## **4.10.4 Special well incident reporting**

The Petroleum Safety Authority (PSA) shall be notified immediately in the event of shallow-gas is detected and in the event of well influx/inflow (kick) where the following steps have occurred:

- a) Positive indication of flow from wellbore.
- b) The wellbore is closed by shutting in the BOP/safety valve.
- c) Pressure or pressure build up is registered in the closed-in wellbore.
- d) Kill operation is initiated, which can be
  - 1) bull heading;
  - 2) driller's method or weight and weight method;
  - 3) volumetric method.

Additional information shall be reported by completing the relevant sections in SPA's Common Data Reporting system.

# OLF Macondo recommendations

## OLF's Macondo recommendations;

1.1 - Include the requirement for locking casing hangers in the applicable standard.

- ✓ 1.2 - Expand the requirements related to negative pressure testing in the applicable standard.
- ✓ 2.1 - Introduce and define the term 'critical cement job' in the relevant standard.
- ✓ 2.2 - Introduce the requirement for independent design verification of 'critical cement jobs' in the relevant standard

3.1 - Implement periodic physical testing of emergency subsea well control activation systems as a standard, and include the requirement in the relevant standard.

3.5 - Establish a recommended practice for prepping BOP's for ROV activation in the relevant standard. -

*<http://www.olf.no/en/Activities/HSE-and-operation/Lessons-learned-for-the-Deepwater-HorizonMacondo-accident>*

# Industry Comments

Section 2: A: Chapter no.	3: B: Suggested text	4: C: Comments
3 3.1.32	secondary well barrier second barrier that prevents flow from a source	change from "object" to "barrier" or "well barrier", which better covers what is meant
3 3.1.46	well barrier element WBE object that alone can not prevent flow from one side to the other side of it self, but together with other well barrier elements can form a well barrier	the original sentence did not really cover the full meaning
3 3.1.19	permanent abandonment well operation where the well part of the well is plugged and abandoned permanently, and with the intention of never being used or entered again	poor grammar - change from "permanent abandonment" to "permanently abandoned"? alternatively change from well status to "well operation" or similar
3 3.1.26	primary well barrier primary well barrier that prevents flow from a source	change from "object" to "barrier" or "well barrier", which better covers what is meant
3 3 Terms, definitions and abbreviations		A clear understanding of the terms used on page 7 is essential for people to understand how to apply the well barrier techniques. Worth considering spending time to make all these as clear I believe that the definition could be clearer. The example given is "CT BOP". I've read the definition and considered the example many times but cant get it clear in my head
3 3.1,46		BOP connector, wellhead and surface casing can be such elements if drilling in deep water without riser margin. If these fail, you may also loose the primary barrier. This phenomena is not to be confused with a common barrier. It may also be worthwhile to describe this further in chapter 4.2.3.3. The remedy to this is initially similar to the common barrier, by awareness,
3 3.1 Terms and definitions	Add: Dependent barrier element= a barrier element whose failure can have a detrimental effect on the well integrity	
3 3.1.15 leak testing	add: Normally used in conjunction with testing to a pressure not exceeding maximum working pressure (also see 3.1.25 pressure testing)	Emphasize that this is to verify a maximum working pressure
3 3.1.25 pressure testing	Application of pressure to verify the design pressure of the equipment in question. Normally used in conjunction with factory acceptance testing or recertification where operational safety factors are not included (design pressure being higher than working pressure)	Emphasize that this is to verify a design pressure
3 3.1.26 Primary well barrier	A first object (typically weighted fluid) or envelope that prevents flow from a source. The primary well barrier is always in direct contact with the pressure source	The primary barrier is not necessarily one object (except for fluid), but mostly a chain of objects constituting an envelope. Emphasis that the primary barrier always sees pressure.
3 3.1.32 Secondary well barrier	A second barrier envelope beyond the primary barrier acting as redundancy. This should be shown as the ultimate closure as close to the inflow source as possible. This should not be confused with a second element in a sequence.	The secondary barrier is not one object, but a chain of objects constituting an envelope. It is important to emphasize that this is not number two in a sequence which many people believe. Should be aligned with text in 4.2.2.
3 3.1.40 temporary abandonment	Well status, where the well is abandoned with the intention that the operation will resume, or the well will be used for another purpose, within a specified time frame (from days up to months)	Shorten the text, and remove well control comment, there shall always be adequate well control functions in place (although not necessarily a drilling BOP)
3 3.1.51 well integrity	Add sentence before current text: The quality of being safe and robust in its design and use through ... (delete "to reduce .....")	Integrity in its common sense is "being honest and firm in your moral principles". We have translated a human behaviour to a technical term - it is believed that it is more appropriate to link this to being "safe and robust" rather than "reducing risk of formation fluids ....") Consider providing clear guidance on performing inflow tests on wells. leak testing guidelines are quite specific, perhaps inflow testing should be too
4 4.2,3,5		It should not be for the standard to tell what to report to the authorities, the authorities should prescribe this in their legislation. Statement like this also anchor the standard to Norway.
4 4.10.4 Special well incident reporting	Remove	
4 4.2.1 Well barriers general	Remove first paragraph	Repetition of definition 3.1.45

# Out - in

## 4. General

- Significantly altered
- Out:
  - WC equipment arrangement
  - Activity program content
  - SIMOPS & Critical Activities
- In (new/strongly enhanced)
  - When and how to make WBS
  - Inflow testing - how
  - Formation testing and acceptance
  - Reilef well plan & well capping
  - WI management system

## 8. Production

- Ref. previous presentation

**Wake up!!!**



# Out - in

## 9. P&A

- Significantly upgraded
- Out: -
- In (new/strongly enhanced)
  - Definition of suspension vs. temp. P&A
  - Examples of P&A options
  - Flow-chart decision making:
    - Section milling
    - Squeeze or circ. cement into annulus
  - WBEAC:
    - Casing cement, 30 m of bonded cement
    - Cement plug
    - Shale formation (new)
    - Alternative (to cement) casing bonding material (new)

## 13 UBD / MPD

- Significantly upgraded
- Out: -
- In:
  - MPD with surface BOP
  - Operating limits
  - WC action procedures and drills
  - WBEAC:
    - UBD/MPD choke system (new)
    - Statically underbalanced fluid column(nw)

!!!

WHEN IS YOUR LAST CHANCE TO  
COMMENT ON REV.4?

*A standard is worth nothing  
unless it is referred to!*

Knut Heiren, Standard Norge, 2004