

# BSEE Standard Workshop

## May 8 2015

### University of Houston Hilton

**International Regulatory Agencies on Identified Issues**  
Quality Management (QM) and Equipment Reliability (ER)  
Session

(Petroleum Safety Authority of Norway)



# Petroleum Safety Authority Norway

## Independent agency from 2004

Established in 1972 as part of the Norwegian Petroleum Directorate

Regulatory responsibility for safety and the working environment in Norway's petroleum sector

Reports to the Ministry of Labour and Social Affairs

About 170 employees



# Overall goal

“The Petroleum Safety Authority Norway will set the terms for health, safety, the environment and emergency preparedness in the petroleum sector, follow up to ensure that industry players maintain high standards in this area, and thereby contribute to creating maximum value for society”



# SUPERVISION

Supervision is organised in six main groups. Each of these has a supervision coordinator ([link](#)) with product responsibility and formal decision authority, and a contact with the players.

1. Statoil (offshore operations).
2. ConocoPhillips, Shell, Eni, GDF Suez, Dong, Lundin, Det Norske, Suncor, Premier, RWE, Maersk, OMV, Rocksource.
3. BP, Marathon, Talisman, ExxonMobil, Total, BG, Wintershall, Noreco, Centrica, E.ON Ruhrgas, Idemitsu, licensees prequalified as operators, other licensees.
4. Statoil (land-based operations), Esso (Slagentangen), Naturkraft, Gassco.
5. Mobile units and drilling contractors.
6. Other contractors, Petoro.



# PROFESSIONAL COMPETENCE

The PSA is divided into six discipline areas. Each area is headed by a discipline leader [\(link\)](#) responsible for quality, human resources, expertise development and resource management.

1. Drilling and well technology
2. Process integrity
3. Structural integrity
4. Logistics and emergency preparedness
5. Occupational health and safety
6. HSE management



# Data Needs – Failure Reporting/Near Misses How are failures and near misses traced?

## Sources of information

- Supervisory activities: audits, investigations, case management, meetings with the industry, studies
- Notification of undesirable incidents
- Whistleblowers
- Trends in the level of risk – RNNP
- Drilling reports – DDRS



# Most serious subsea incidents

## **NCS:**

- In 2013 a bleed valve was set in the open position by a mistake, the estimated oil spill was 2.5 tonnes
- In 2003 the largest uncontrolled oil spill from a NCS subsea installation happened when 500 -800 m<sub>3</sub> of oil leaked out due to rupture in connection between manifold and production line to platform
- From July 2002 until January 2003 approx. 30 m<sub>3</sub> was released due to wrong operation of a valve on the manifold

There are also a significant number of leakages of control fluids reported in the “Hendelsesdatabasen” - The database covers information about leaks of hydrocarbons and control fluids on NCS- Based on the available information it is difficult to reveal the root cause of accidents

In 2012 approx. 16.5 m<sup>3</sup> control fluid more than planned was released over a period of 14 days  
Normal release is 4.2 m<sup>3</sup> in 14 days



**Uønsket hendelse på TRANSOCEAN SEARCHER den 15/01/2015  
07:00**

**TRANSOCEAN SEARCHER**



Facility kind : SEMISUB STEEL

Current phase : IN SERVICE

Meldingstype	<b>Melding</b>	Mottatt av	<b>SA</b>
Tidspunkt	<b>15/01/2015 07:00</b>	Følges opp av	<b>Heia Ola</b>
Operatør	<b>BG Norge</b>	Viderevarslet internt	<b>T-F ORS, LJD T-3 GD, OvH</b>
Innretning	<b>TRANSOCEAN SEARCHER</b>	Varslet til eksterne	<b>Kyst, Miljø</b>
Felt	<b>KNARR</b>	Operatør har varslet	
Område/system	<b>Konstruksjoner og maritime sys</b>	Kontaktpkt. hos operatør	<b>Erik Midtgaard 51916422</b>
Alvorlighetsgrad	<b>2 Enklere oppfølging</b>	Arkiv	<b>2015/103-</b>
Beredskapsorganisasjon aktivert	<b>N</b>		<b>Lukket</b>
Boreaktivitet stanset	<b>N</b>		
Produksjon stanset	<b>N</b>		
Mønstring livbåt	<b>N</b>		

**Beskrivelse av hendelsen**

This morning an unplanned spill to the sea of oil base mud (OBM) was observed. The unplanned spill to the sea was 200 litres (1.25 bbls) of Versatec oil based mud from the trip tank. The volume of base oil spilt to sea was 102 litres (0.64 bbls). There was no spill of red chemicals.

**Tiltak i Ptil**

21.1.2015 (OHe) Sendte følgende e-post:

Hei  
Viser til følgende innrapporterte hendelse med utslipp av oljebasert mud på Transocean Searcher 15.1.2015, vår ref 2015/103:

"This morning an unplanned spill to the sea of oil base mud (OBM) was observed. The unplanned spill to the sea was 200 litres (1.25 bbls) of Versatec oil based mud from the trip tank. The volume of base oil spilt to sea was 102 litres (0.64 bbls). There was no spill of red chemicals"

"Ber i forbindelse med denne hendelsen om svar på følgende:

- Vil hendelsen bli gransket?
- I så fall på hvilket nivå vil granskingen bli utført?
- Vil hendelsen føre til noen umiddelbar forandringer eller modifikasjoner på det involverte utstyret og/eller evt. prosedyrer?
- Hvilke tiltak vil bli iverksatt på kort og på lang sikt for å unngå tilsvarende hendelser i fremtiden?

Ber om å få en oppsummering av funn og tiltak (eventuelt etter gransking)."

Example from  
«Hendelsesdatabasen»





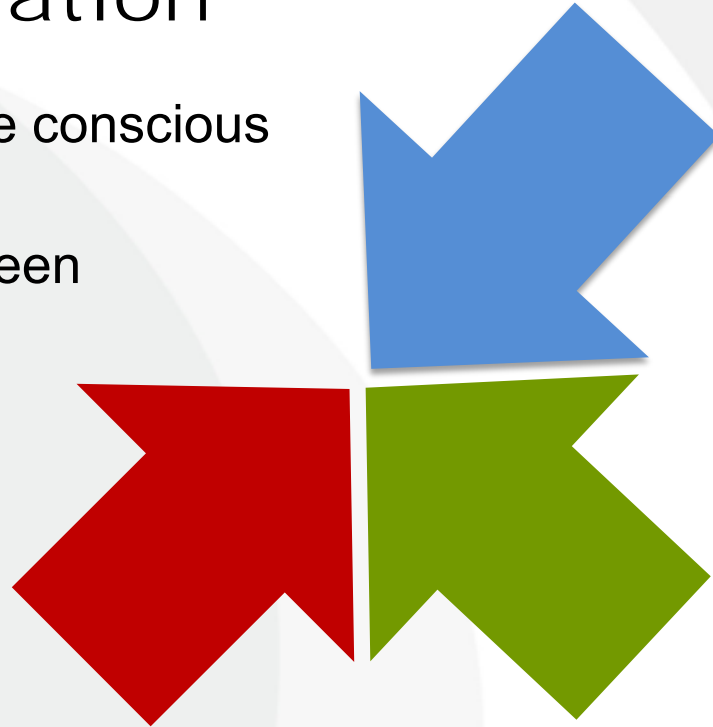
# Openness and trust

- Openness is a precondition for the exercise of the PSA's regulatory responsibilities
- Norwegian society has great expectations of openness
- Publication on psa.no  
Publication of audit reports, use of responses, consents, investigation reports, etc, in order to disseminate knowledge and experience  
The website receives close to 25 000 unique visitors per month
- Freedom of access to case documents  
Everyone can apply for access. Norwegian law imposes strict restrictions on information which can be kept confidential. The PSA received 3 239 requests for access in 2013
- Technical seminars staged by the PSA



# Distinctive features of the Norwegian approach to regulation

- Ensuring that companies are conscious of their responsibilities
- Tripartite collaboration between companies, unions and government
- Trust and openness



# Principal features of the regulations

## **The regulations are based on performance (functional) requirements, which:**

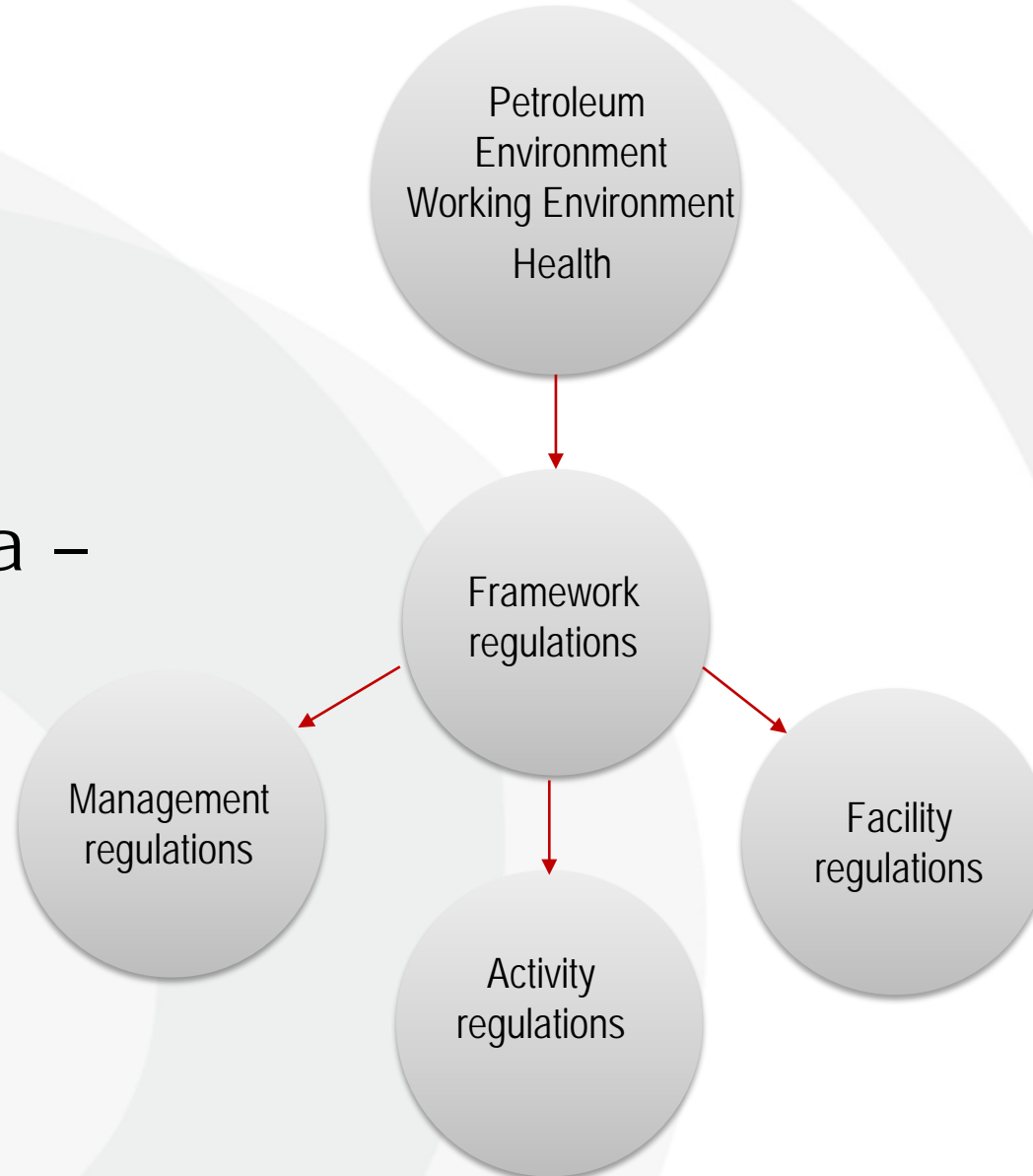
- give the industry the freedom to choose its own good solutions
- underpin the allocation of responsibility
- refer to norms and industry standards, providing predictability for users and indicating the standard which solutions are expected to meet

## **The regulations require the companies to set risk targets and to manage their operations in relation to these**



## National legislation covering

# Regulatory structure in the HSE area – offshore operations



# Main priorities

- **The PSA identifies a set of main priorities (MPs) each year as its most important areas of activity**
- **These are determined on the basis of such aspects as:**
  - knowledge of safety challenges
  - developments in the risk picture
  - areas which have proved to need extra attention
  - areas where a commitment yields the biggest safety gain.
- **MPs form the basis for the PSA's planning**



# Main priorities for 2015

SAFE  
LATE LIFE



THE FAR  
NORTH



BARRIERS



MANAGEMENT  
RESPONSIBILITY



# Quality Management and Subcontractor Oversight

- PSA has its own supervision group following up contractors/subcontractors
  - Status-meetings/audits/workshops/seminars
- The Operator company has the overall responsibility for following up all of their contractors/subcontractors – and have to see that they are in line with the rules and regulations from the authorities ([Framework HSE Section 7 Responsibilities pursuant to these regulations](#))
  - Status-meetings/audits/daily routines/procedures....



# Lifecycle Management for Critical Equipment

- How is a product's traceability maintained throughout its lifecycle?
- PSA [“activity regulation chapter IX Maintenance”](#)
  - RCM analysis ([NORSOK Z-008](#))
  - Optimised PM' program set using criticality level from the RCM, on the equipment
    - Equipment cataloged/Tag'ed and transferred in to a computerbased maintenance program
    - Maintenance activities logged in the maintenance program
      - Possibility to trend historical data/KPI's





# Lifecycle Management for Critical Equipment

## «Soft Seal»

Material degradation (Ref DNV GL report issued march 2014)

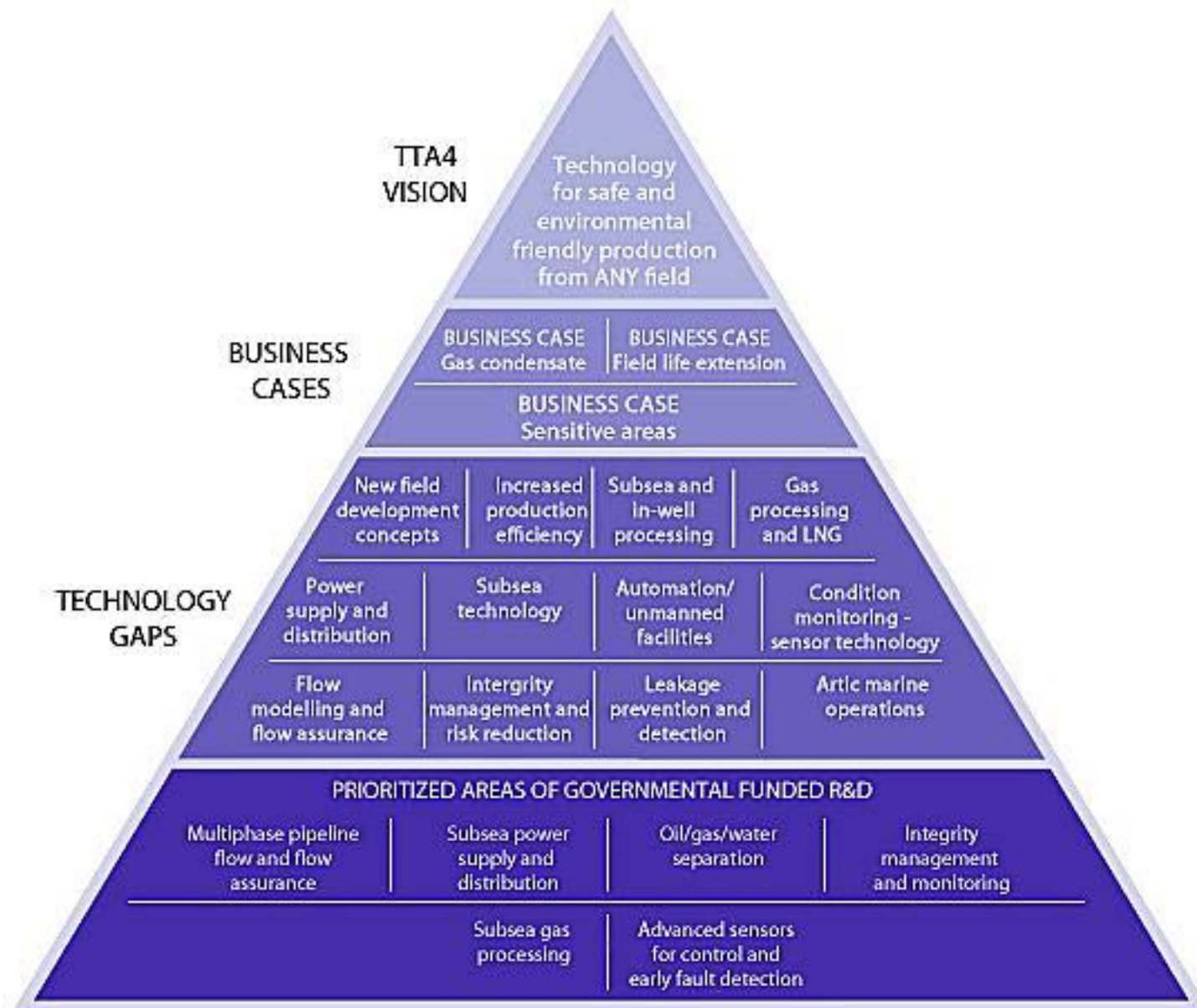
- [NORSOK M-710](#) – Industry have been choosing minimum criteria overlooking additional tests and requirements recommended in the standard
  - Standard has been revised in september 2014 (Edition 3)
  - Has requirements for ageing tests (8.2)
  - The requirements in ISO 23936-2 are referred regarding *“Qualification of elastomer materials”* (ageing and RGD)
  - *“Ageing characteristics shall as a minimum include test fluid and predicted design life at a given temperature”*



# Lifecycle Management for Critical Equipment

- **Fasteners:** It has historically been too low attention to the quality of fasteners
  - a JIP was established in 2008
  - guideline gives guidance for developing fastener specifications
- The key to a successful condition monitoring program includes:
  - knowing what to monitor, how to interpret the data and when to put this knowledge in use
  - **NORSOK U-001** - *Subsea production systems. Rev. 3, Oct. 2002*
    - Under revision (Draft version September 2014)
      - Will have a listing/tables/histogram with listing of wellhead bending loads
      - Requirements for fatigue analysis/Methods/design factors
      - List of standard design loads for subsea wellhead/templates/drilling risers





Source DNV GL – Report No. 2014-0113, Rev. 03

**Structure of the OG21 TTA4 report “Future technologies for production, processing and transportation”/43/**



# PSA's relationship to US issues similarities/differences

- PSA is refering to Norsok, ISO, EN, DNV GL....
- Do not refer directly to API
  - Normative references to API, ASME and ASTM from several standards (Norsok/DNV GL ....)
- PSA regulation is «in principle» functional-based
  - Exceptions: BOP, PSV....([Activity regulation Section 51](#))
- PSA employees are involved as observers in standard-writing/revisions in relevant disciplines (Norsok/ISO...)



# Safety Critical versus High Criticality

- Expression – «Safety Critical»
  - «*Safety critical*» no clear definition in any standard
    - misunderstanding is that «*safety critical*» is identical to «high criticality»
    - «*Safety critical equipment/functions*» can typical have reliability requirements like a «*safety integrity level*» (Ref standard IEC 61508/61511)
  - Examples of typical «*safety critical*» equipment/functions:
    - BOP control function (Shear/seal) - «*Safety integrity level 2*» for a drilling BOP ( $1 \cdot 10^{-2}$ )
    - Typical PM will be function/no function type tests - No regular recertification/overhaul
  - Example of typical «*high criticality*» equipment/functions:
    - «*Dry chemical hand extinguisher*» - Typical PM will be regular replacement of medium



# PSA approach to AoC for MODU/LWI-Vessel

## **The purpose of the AoC arrangement**

The purpose of the AoC arrangement is to contribute to improved predictability for the actors of the industry, in matters concerning a mobile facility's suitability for activities on the Norwegian Continental Shelf (NCS) when measured against the legal requirements to health, environment, safety and emergency preparedness. Furthermore the arrangement shall constitute a basis for more efficient processes, i-e. applicant, operator and authority processes related to the application for consent to petroleum activities on the NCS.

An application for an AoC is a request for the authorities' decision, related to a specific mobile facility's technical condition, the applicant's organisation and management system, measured against the legal requirements that apply to the use of such facility on the NCS.



# PSA approach to AoC for MODU/LWI-Vessel

## Management System

- **Including description of**
  - Relevant parts of the applicant's basis organisation and organisational matters during normal operation and in emergency situations
  - Management and control system that have been established in order to manage the activity with respect to the facility, possibly by means of references to relevant manuals, handbooks. Etc.,
  - Governing documents for the facility,
  - Quality assurance requirements that the applicant has laid down for possible contractors and subvendors (including third party)
  - Arrangement or system for work force participation



# PSA approach to AoC for MODU/LWI-Vessel

- AoC is required on NCS for mobile facilities when operating in «live-pressurized» wells
- Acknowledgment of Compliance» (AoC)
  - AoC Handbook – description on how to get an AoC
  - Safety-case based – most commonly used
- The applicant must have a contract with an operator on Norwegian sector before submitting an AoC
  - Early-phase involvement by the PSA can be an option
- Verification by PSA' both in office and at construction-site
- Vessel documentation shall be complete and updated as close to as-built as possible
- Management system for operation shall be complete
- GAP-analysis towards Norwegian regulations, paragraph-wise

