

Step-Change → **Improvement in S & E Performance**

An Enhanced Safety Regulatory Regime

Houston BOEMRE Meeting - Sept 7, 2010

Robin Pitblado, Director for SHE Risk Management Services
Sept 7, 2010

Key Points

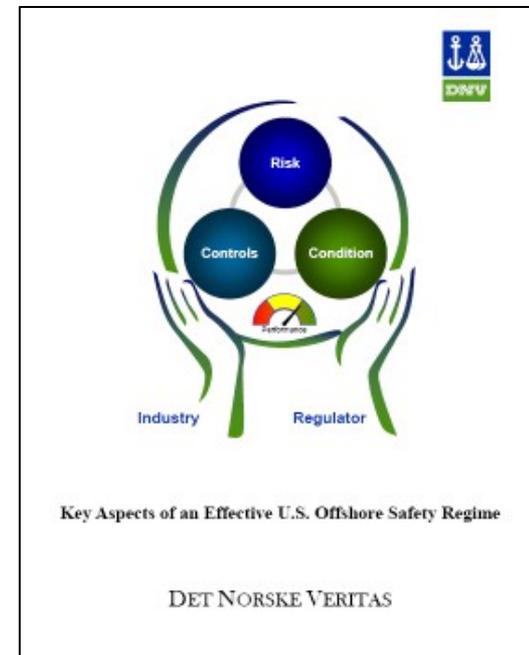
- DNV Credentials
- The Vision – Step Change improvement for Safety and Environment
- Regulation – blend of Prescription and Performance
- Decision basis – risk informed
- Clear roles – BOEMRE and Industry

DNV Credentials

- Det Norske Veritas is a maritime and offshore Classification and safety company
 - Founded in 1864 with Corporate mission “**Protecting Life, Property and the Environment**”
 - 9000 total staff – 800 in USA
 - Array of services focused on offshore safety and environment
 - Offshore Classification with specific DRILL Class Notation for GoM
 - Approved for CVA Role – Certified Verification Agent
 - Structural and stability assessments
 - Safety assessments – fire and explosion risk, escape and evacuation studies
 - Safety and environmental management system reviews and certification

- Recent major contributions on offshore safety
 1. DNV Position paper on Effective Offshore Regulatory Regime (July 2010)
 2. Comparison USA and Norway drilling regulations (Aug 2010)
 3. Major Blowout Environmental Modeling – Nordland (Apr 2010)
 4. Launched JIP for Advanced Well Management (Aug 2010)
 5. Recommended Practice for BOP Recertification in GoM (June 2010)

- DNV creates, integrates and shares best global practices
 - DNV helps to create solutions with the industry
 - Currently running 100+ Joint Industry Projects (research projects)



What the O&G & Process Industry both has and has not achieved

✓ Over the last 20 years the industry has attained a **step change** (factor of ten) improvement in occupational safety

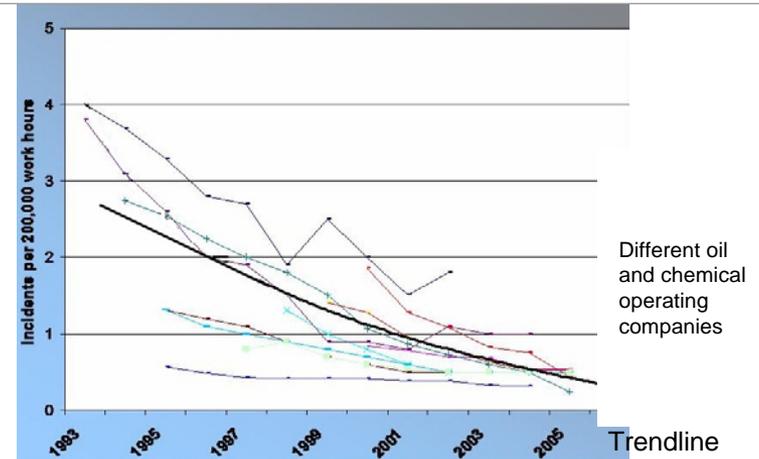
- Graph shows factor of 3 in last 10 years

✗ USA and EU Process Industry

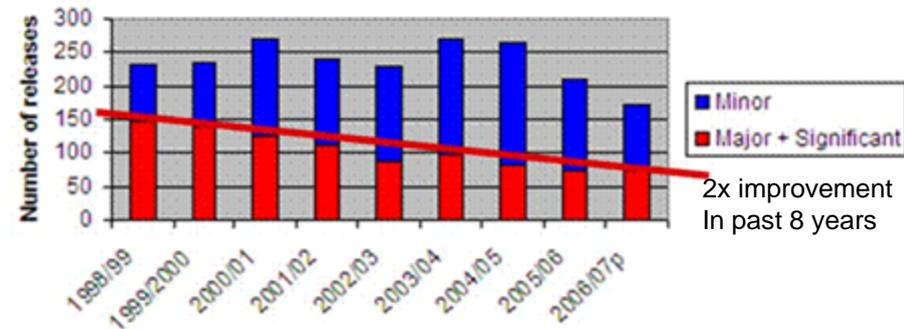
- Neither EU nor USA has demonstrated significant improvements for onshore major accidents (OSHA PSM, EU Seveso Directive)
- Chemical Safety Board and Baker Panel highlighted after Texas City that Process Safety (major accidents) and Occupational Safety (personal accidents) are NOT the same

✓ North Sea major accident safety has improved

- No major disaster since introduction of Safety Case / risk based legislation in UK / Norway (leaks have occurred, but none escalated)
- Reducing trend in Major hydrocarbon leaks
 - Factor of 2 in last 8 years – UK HSE Database



Hydrocarbon Releases 1998/99 - 2006/07 p



Vision – Step Change Improvement for Major Accidents

The Industry HAS already attained about 10x improvement in Occupational Health

- Starting point in 1980's was already very good performance
- Many doubted such a big improvement was possible

DNV believe major accidents can also be reduced by 10x – but with different tools

1. Revised regulatory regime: [Blend of Prescription and Performance regulation](#)
2. Address technical, human and organizational factors: [Key lessons from past accidents](#)
3. Enhanced and enforced risk management approach: [Addressing Risks, Controls and Condition](#)
4. Clear roles and responsibilities: [Clear to all](#)
5. Shared performance monitoring: [All needed information readily available to all](#)

DNV believes

- this is practical and economically feasible
- methods described here are in use with O&G companies somewhere – but not fully integrated anywhere
- and utilizes skills and experience available in the regulator, the industry, its contractors, and 3rd parties

1. Revised Regulatory Regime

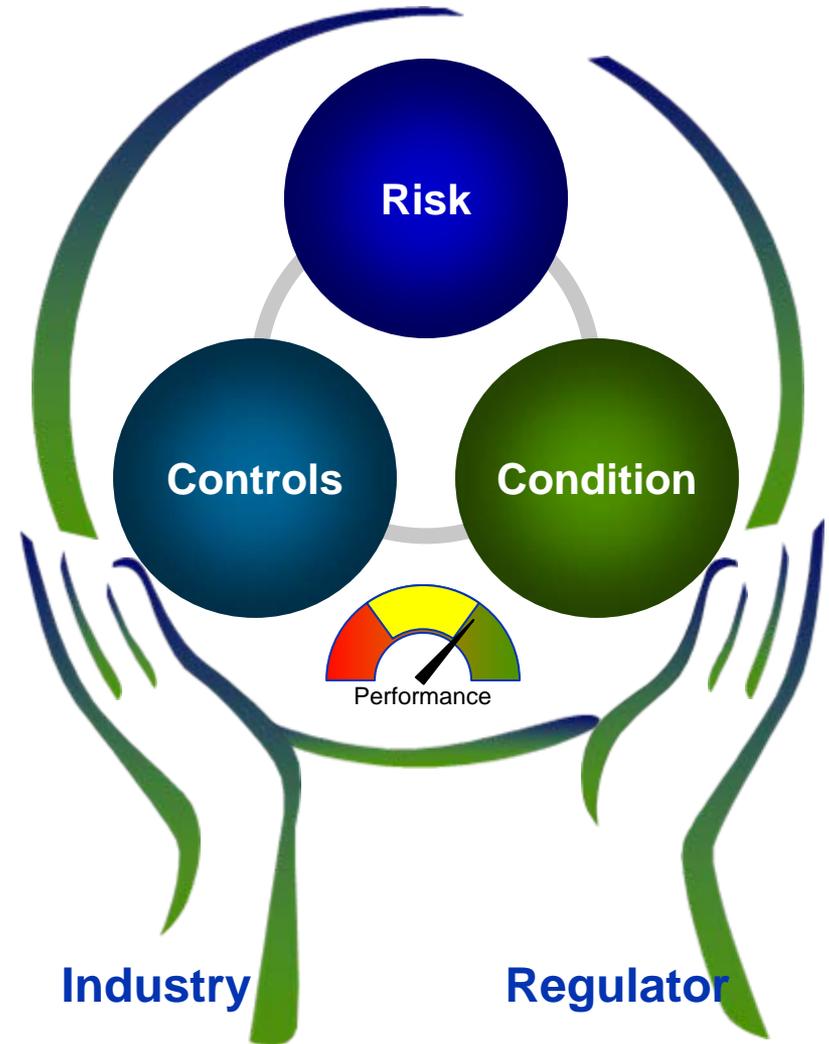
- BOEMRE and USCG have specialist manpower – but limited in number
 - Regulations should maximize its skills deployment to focus on the most important issues
 - No point in growing large specialist regulatory workforce that is very hard to keep current
 - Blend updated Prescription with newer Performance style regulation
- Industry has deeper knowledge of hazards and risk management
 - New wells or development approaches can introduce novel hazards
 - Industry can carry out risk assessments, define necessary controls and monitor conditions
 - The Operator carries the responsibility for proper Safety and Environmental protection
- Lessons should be learned from North Sea and Nuclear experience
 - Clearly define needed safety barriers and assign required performance and ownership
 - Regulator should ensure the competence of those doing inspections – not attempt all itself
 - Role for independent 3rd party (e.g. Class Societies in North Sea and INPO)
- Capture this in a **Safety Case-style Regulatory Regime**
 - Operator **demonstrates** the high level of safety that will be achieved and maintained
 - All key barriers are functioning at their required performance level

2. Address Technical, Human and Organizational Factors

- This lesson has been clearly learned from many past disasters
 - Esso Longford Fire / Texas City Explosion / Three Mile Island / NASA Challenger
- Purely technical solutions do not address all important failure modes
 - Process safety culture (i.e. major accidents) – not just occupational safety culture is important
 - Organizational structures encouraging continuous “mindfulness” of risks
- A step change will require all three aspects: Technical, Human and Organizational
 - Future regulations should mandate these aspects to be addressed
 - UK Safety case regulations require Human factors to be addressed explicitly

3. Fully Integrated Risk Model

- A fully integrated tool for
 - Designing for exemplary safety and environmental performance
 - Operating for exemplary safety and environmental performance
- Allowing for full communication between Operator, Contractor and Regulator
 - Equivalent focus on the Risk – the Controls – and the Condition
 - Transparent demonstration that safety is substantially enhanced

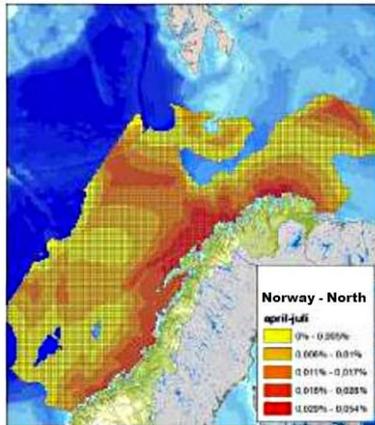


Risk Models demonstrate enhanced Safety & Enviro performance

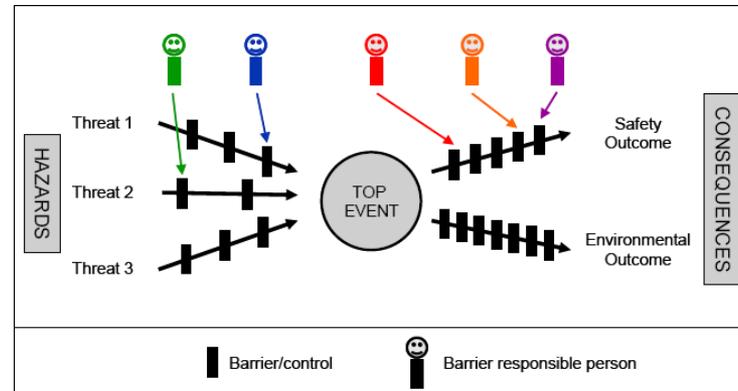
- Risk Modeling is needed at both Design and Operations Stages

- Risk modeling provides insights as to threats and how well the facility can respond
 - These show that Step-Change risk targets will actually be achieved – the Safety Case Demonstration aspect
 - Quantitative analysis at design time (like Nuclear PRA)
 - Qualitative at operations stage (for more effective communications)
- Match blended regulations of Prescription and Performance

Design Stage – predictions e.g. blowout spill fate



Operations Stage barrier models e.g. showing barriers and owners



- All risks known, all barriers defined (technical, people, organizational), responsibilities assigned
 - Demonstrate attainment of high safety targets

4. Clear Roles and Responsibilities

- Offshore operations involve many parties
 - Internally to the operator and also contractors, independent 3rd parties
- The Operator owns the overall risk and the Safety case
 - The regulator may “accept” a safety case, but does not usually “approve” it
- Bow Tie risk model clearly identifies responsibilities for maintaining barriers at specified performance level
 - Threats on left-side, Outcomes on right-side

5. Shared Performance Monitoring and Decision Making

- The best risk model is still only theory if it isn't implemented
 - Technical, human and organizational means are needed to keep it REAL
 - The status of all barriers must be continuously monitored
 - These must be shared with all who need to know (e.g. with modern IT tools)
 - Operator, Contractors, 3rd parties, regulator, and Offshore and Onshore locations
- Teamwork should be employed for key decisions
 - Decision rooms to address unusual situations or combinations of functional and degraded barriers (onshore and offshore personnel working together and with full knowledge)



Next Steps: The Regulator and The Industry

The Regulator

- Develop suitable regulations allowing a risk-based approach to happen
 - Blend of Prescription and Performance regulations
 - Require a safety case approach – for both Design Stage and Operations Stage

The Industry

- Support updates to Prescriptive Regulations
- Support the development of suitable Performance Regulations
 - risk models to demonstrate improvement in the Safety Case
 - include of Human and Organizational aspects into traditional technical risk models
 - Implement means to monitor barriers through lifetime and keep barriers functioning

Conclusion

- The Vision – Step Change improvement for Safety and Environment
- Regulation to be blend of Prescription and Performance
- Risk informed decision basis – supported by Safety Case
- Burden of demonstration is on industry, BOEMRE role is oversight and compliance enforcement

Safeguarding life, property and the environment

www.dnv.com



MANAGING RISK