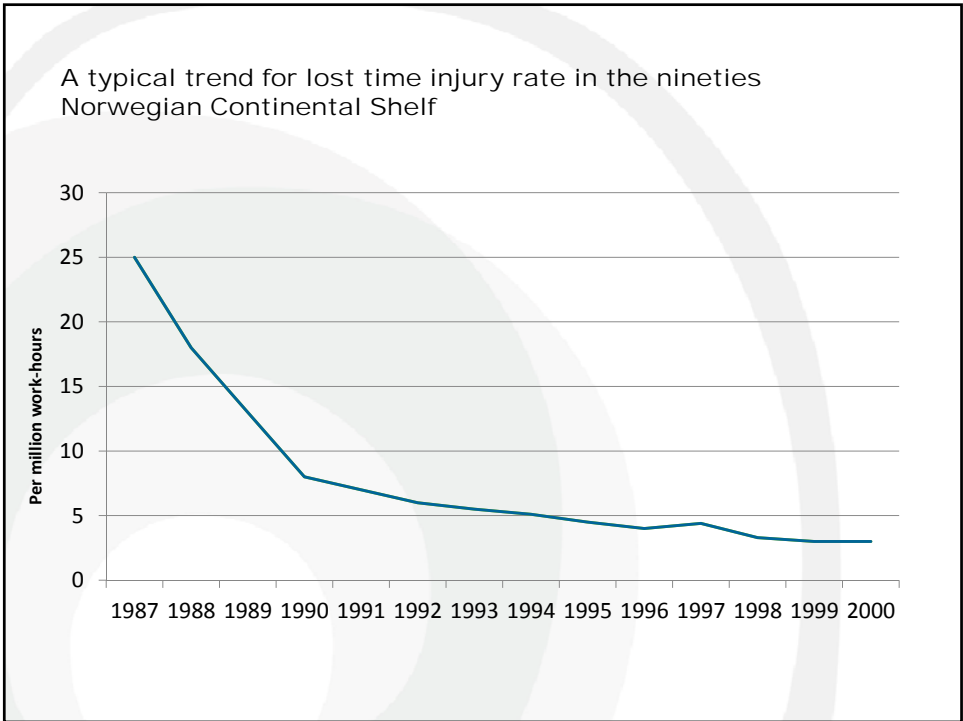


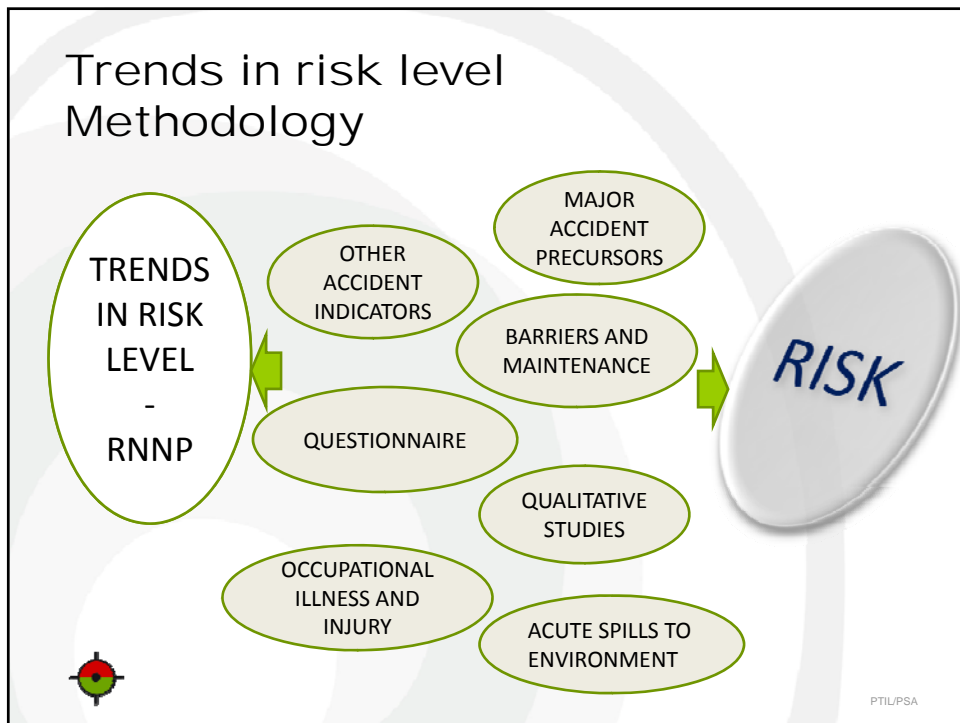
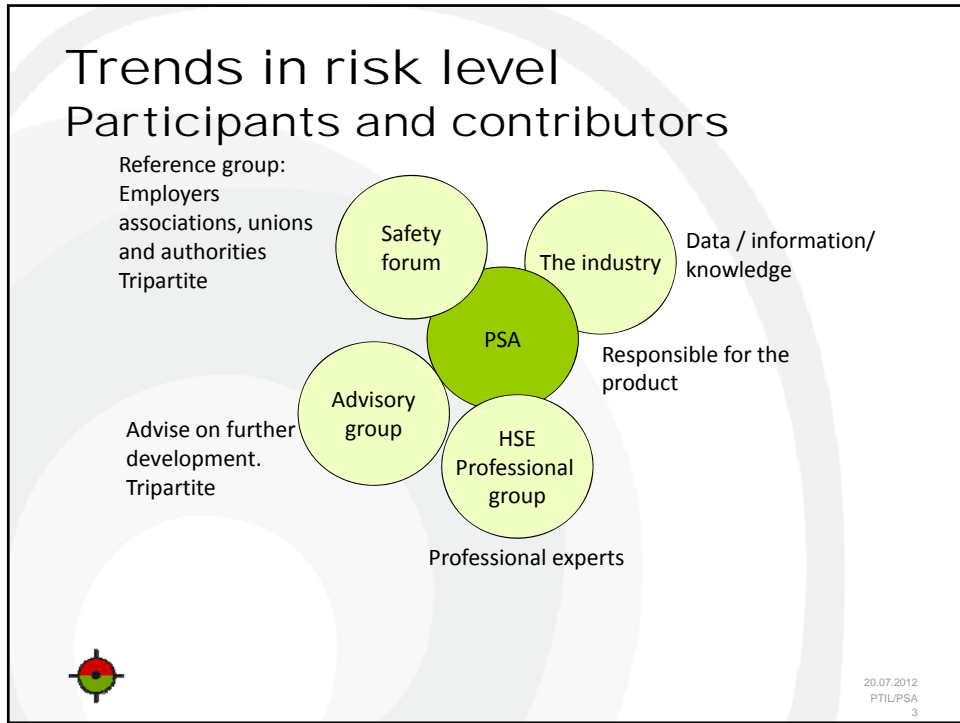
Trends in Risk Level Norwegian Petroleum Activity RNNP

Dr. Øyvind Lauridsen, Principal engineer,
Petroleum Safety Authority Norway (PSA)



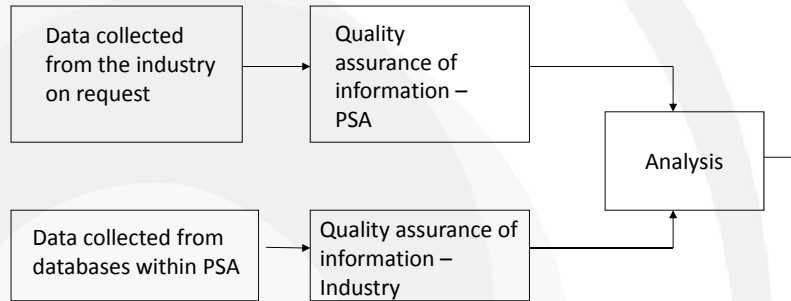
PTIL/PSA





Collecting data

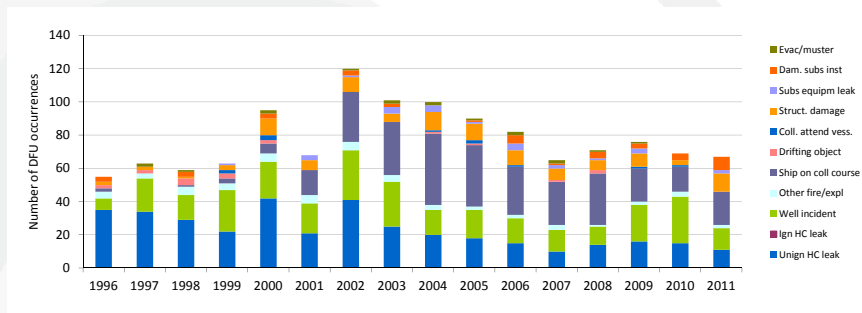
Quantitative information



20.07.2012
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5

Accident precursor frequency

'Major accidents'



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OLF recommended guidelines for classification and categorization of well control incidents

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App B Categorisation and classification matrix for well control incidents

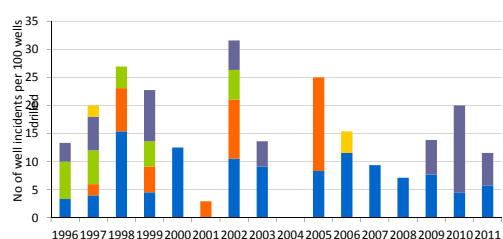
Matrix for categorization and classification of well control incidents
Drilling and Completion operations

Degree of seriousness	RNNP	Drilling and completion	Guidance
Level 1 - Red Critical well control incidents with high risk for personnel, environment and facility	MA*	1. Blowout	1. Blowout to environment or facility including underground blow out. Failure of primary and secondary barriers.
	3	2. High risk HC influx	2. Failure of primary well barrier. Activation of the secondary well barrier in critical kill operations with high risk of blowout.
	5	3. Serious shallow gas flow	3. Shallow gas incident with high risk for personnel, integrity or stability of the installation.
	New category	4. Serious shallow water flow	4. Shallow water flow with high risk for stability of an installation (jack-up, fixed installation or template)
Level 2 - Yellow Serious well control incidents	2	1. Medium Risk HC influx	1. Influx above kick margin, but possible to regain barrier with standard kill procedure.
	2	2. Fluid barrier lost	2. Loss situation without being able to maintain the hydrostatic pressure in the well and closure of BOP with pressure underneath.
	4	3. Medium shallow gas flow	3. Shallow gas incident with unsuccessful dynamic kill operations. Gas flowing to seabed or gas handled on installation.
Level 3 - Green Regular well control incidents	1	1. Low risk HC kick or water kick	1. Influx below kick margin, and successfully regained barrier with standard kill procedure without degrading well integrity.
	1	2. Low risk shallow gas	2. Shallow gas incident with dynamic kill operations. No gas handled on installation.
	1	3. Low risk shallow water flow	3. Shallow water flow incident with no risk for stability of installation.
Non Classified (NC)	NA	1. Uncontrolled non-contiguous gas/water migration in well - with all barriers in place	1. Typical when release a barrier element with gas/water trapped below and adequate procedures not initiated

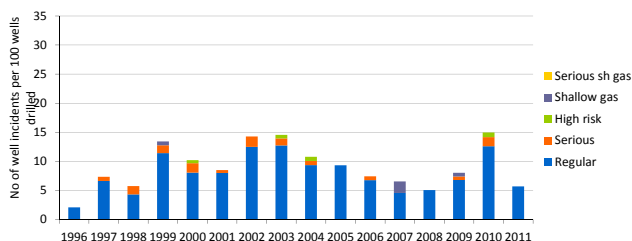
Pink = Alert to PSA according to management regulation §29
Blue = Notification to PSA according to management regulation §29

Well control incidents

Exploration drilling

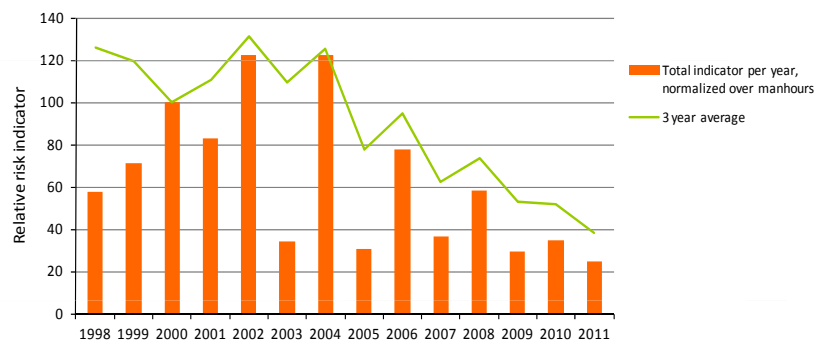


Production drilling



ISA

Major accident risk – Mobile Drilling Units Weighted risk indicator, potential loss of life



Normalized – working hours
Year 2000 = index 100

$$R = \sum_I \sum_J DFU_{ij} \cdot v_{ij}$$



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RNNP Summary Report 2011

PSA main priorities 2012 in relation to major accidents:

- Management and major accident risk
- Barrier management
- Prevent acute spills to environment



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