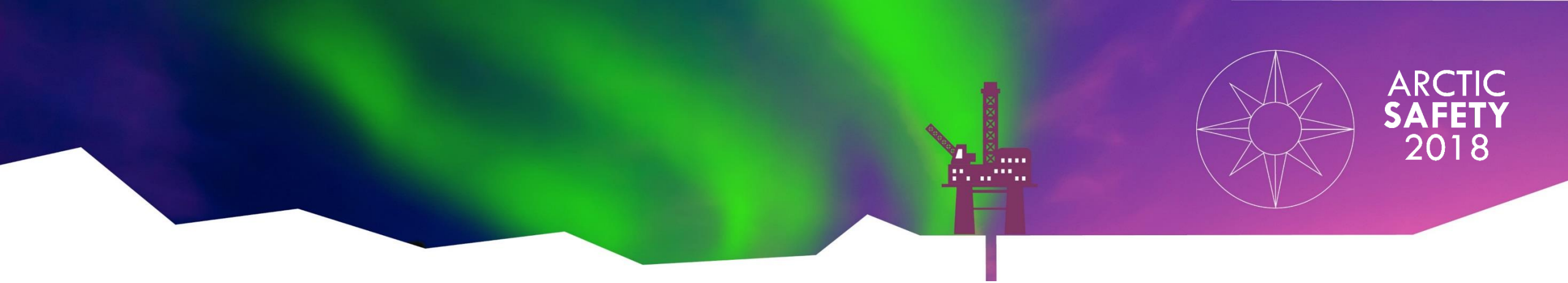

Accident prevention in the Barents Sea

A safety authority perspective on blowout risk

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Petroleum Safety Authority

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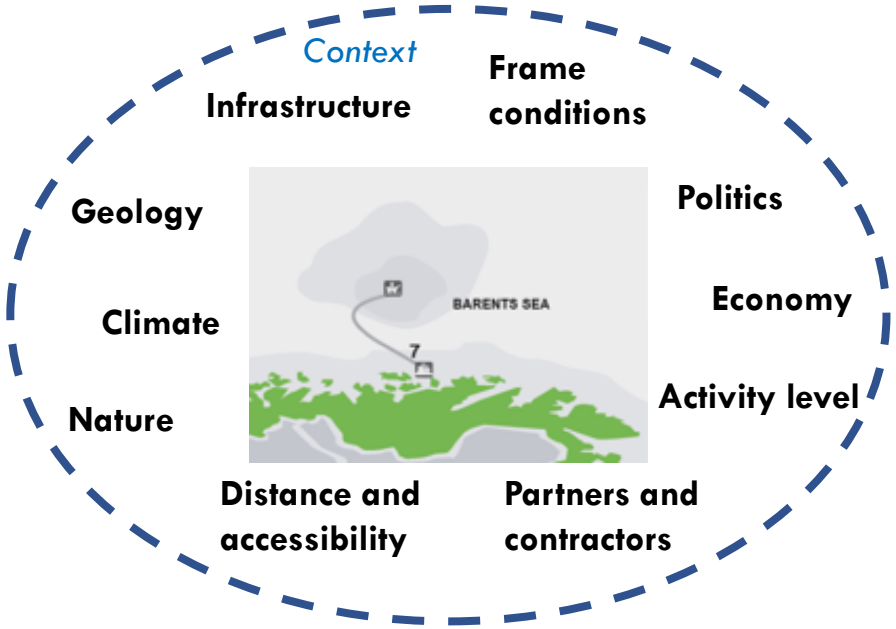
Accident prevention in the Barents sea

Priority – enable prevention of **major accidents**



PSA **needs** to

- **understand** petroleum activities and its challenges in **context.**
- to **mobilise** and **intervene** proactively when required.

It requires

- **continuous** attention
- **information** and **knowledge**
- **uncertainty** awareness

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Assessment of blowout risk

Project background – why and why now?

Ongoing revision of "Forvaltningsplan for Barentshavet"

We need to describe **changes**, how they may **influence** accident risk, and what **needs attention** to prevent accidents.

Deepwater Horizon follow-up

Report to the President (2011) points out improvement in authority risk assessments as crucial to prevent accidents

CSB-report (2016) points at attributes of an effective regulatory model

History of method development

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Assessment of blowout risk

What may affect prevention and killing of a blowout?

Title	Reference	Initiator	Summary
HSE in petroleum activities	ASD, 2017	ASD	General description of conditions related to activity and industry. No particular Barents Sea information.
Norwegian climate 2100	Hansen-Bauer et al, 2015	MDir	Description of climate change in…sea areas throughout the 21th century…atmospheric climate, hydrology, permafrost, land slides and sea climate.

Method attributes

Knowledge basis

- collect, appraise and connect information
- independence (selection)
- transparency

Workshops

- appraise knowledge basis and existing understanding
- authority perspective
- address uncertainty

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Assessment of blowout risk

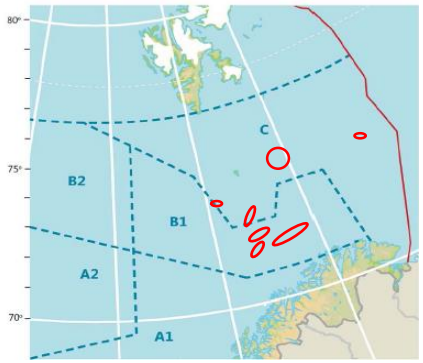
Uncertainty about accident scenarios

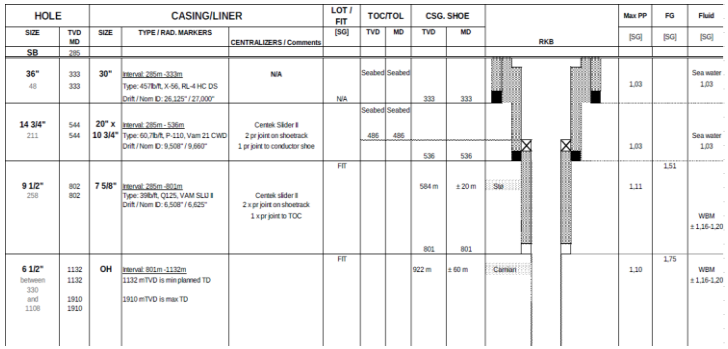
- Is existing regulation sufficient to address Barents sea accident scenarios?

Location – where?
Geology, reservoirs
(NPD)

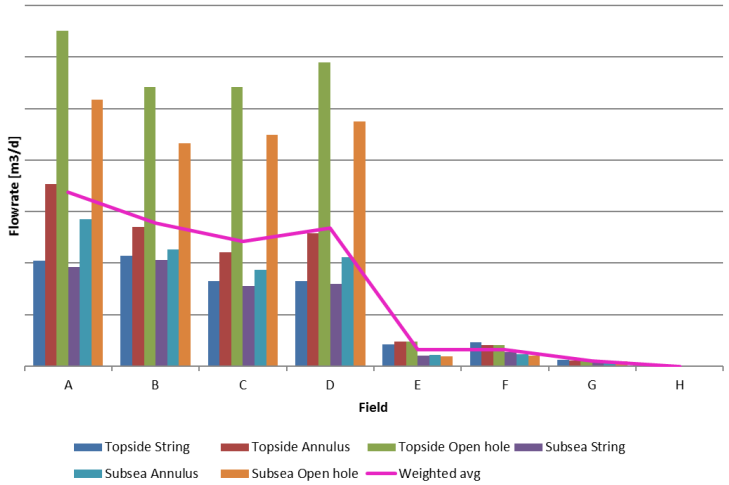
What kind of wells?
Well design, geometry
(PSA)

Blowout model
Combining uncertainties
(IRIS)





Parameter
Formation temperature profile
Number of reservoir zones
Reservoir depth
Reservoir pressure
Reservoir thickness
Oil gravity
Gas gravity
GOR
Inflow potential
Water depth
Trajectory



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Assessment of blowout risk

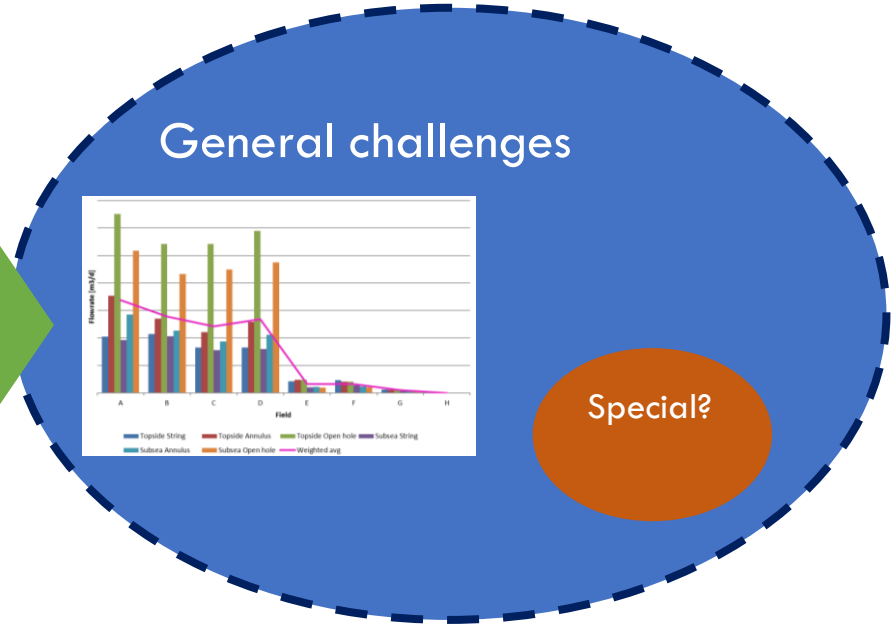
Results of this project so far

- Our picture of accident scenarios is well founded and rational.
- Existing regulation is not challenged by the blowout scenarios.

Location – where?
Geology, reservoirs
(NPD)

What kind of wells?
Well design, geometry
(PSA)

Blowout model
Combining uncertainties
(IRIS)



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Assessment of blowout risk

What are adequate conditions for low blowout probability in the Barents sea?

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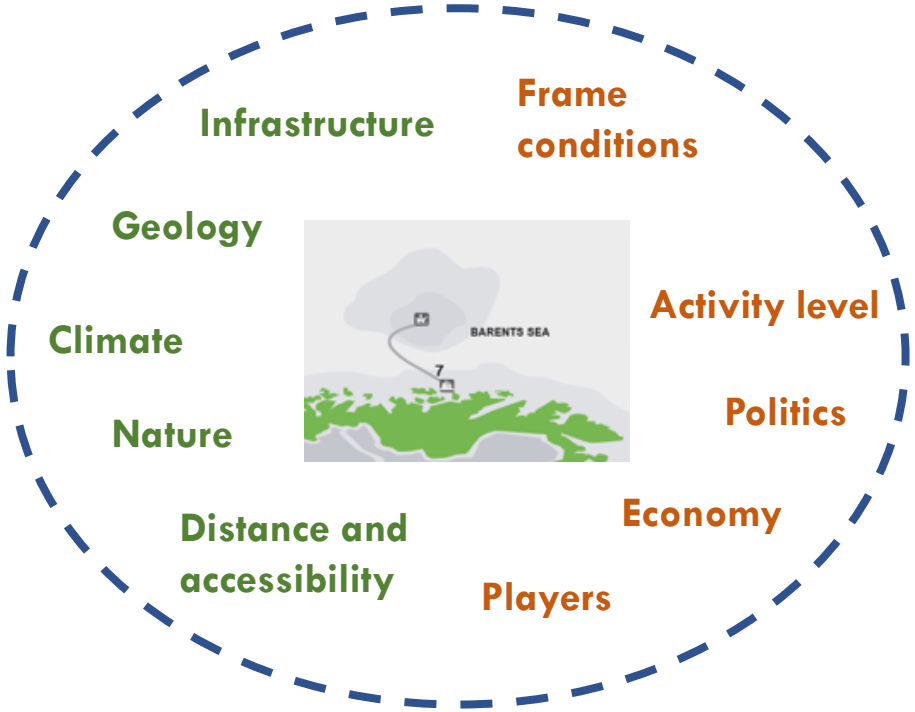
Conditions for low blowout risk

Conditions that **cannot** be influenced



Area characteristics and **industry context** may have consequences for technical and operational conditions.

This may alter ability to prevent and stop an accident.

Conditions for low blowout risk

Process to qualify uncertainty

What can influence risk?

Preparations

- Collect and adapt information
- Inform participants

Drilling and well competence

What is of general importance?

What is special?

- Locations and geological conditions (NPD)
- Nature (weather, sea conditions, ice…)
- Industry context

What is influenced?

Prevention, drilling operation

Operation to kill blowout.

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Conditions for low blowout risk

Conditions that can be influenced

Accident risk is influenced by

- technology
- risk management
- frame conditions

Acquire, appraise and connect information

Conditions for low blowout risk

Process to qualify uncertainty

What can influence risk?

Experience from operations, supervisory activities, RNNP, standardisation work, investigations, research and development…

Adapt information → NCS experience → Barents sea experience

Company risk management;

- barrier management
- maintenance management
- adaptions to changes, new areas…
- use of new technology and knowledge

What is influenced?

Prevention, drilling operation

Operation to kill blowout.

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Conclusion

Providing adequate conditions for low blowout risk

Method development

Qualifies knowledge basis for the safety authority

- updated and relevant
- independent
- transparent

Provides information and facilitate cooperation (governmental agencies and industry)

Enables the safety authority to

- **understand** petroleum activities and its challenges in **context**
- **mobilise** companies adequately and
- **intervene** proactively when required (regulatory controls)

Attributes of an Effective Regulatory Model

…Those attributes related to the Macondo incident causal factors include [amongst others]:

- Regulator Adaptability
- Regulatory Assessment and Verification
- Regulator Transparency
- Independent, Qualified, and Adequately Funded Regulator

(CSB 2016, Vol. 4)

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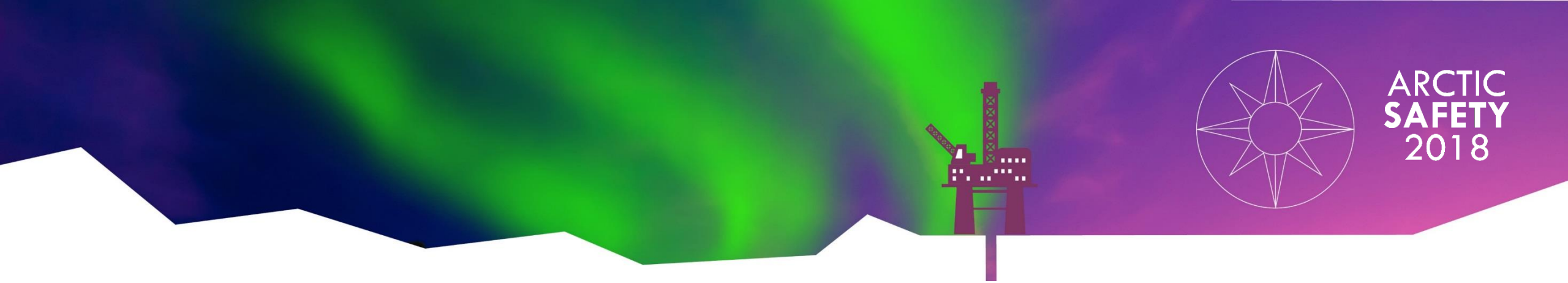

Thank you for your attention

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