

Executive Summary

Comparing the Arctic Offshore Oil and Gas Drilling Regulatory Regimes of the Canadian Arctic, the U.S., the U.K, Greenland, and Norway

1 What is the purpose of this document?

The National Energy Board (NEB) regulates offshore oil and gas drilling and production in the Canadian Arctic. It is responsible to ensure that operators carry out drilling activities safely, and in ways that protect the environment and, through that, the way of life in the North. The NEB initiated this study as part of its Arctic Offshore Drilling Review.

The study compares Canada's Arctic offshore regulatory regime with the regimes of four other countries with Arctic offshore drilling operations: United States (U.S.), United Kingdom (U.K.), Greenland, and Norway. The main report and this summary identify similarities and differences of key aspects of the regimes: management systems, drilling and well activities, facility and drilling systems, well control, independent verification of safety, and oil spill response. The study does not cover leasing or environmental assessment, and does not say if one system is better than another.

2 What is a 'regulatory regime for offshore drilling'?

The regulatory regime includes the laws that a country uses to govern offshore drilling activities and the regulations that provide details of how to follow the laws. The regulatory regime applies to things such as environmental protection, safety, employment standards and work environment, health protection, emergency planning, oil spill response, and liability for accidents.

Different countries use different approaches, and many have a regime that includes elements of two basic approaches:

- Prescriptive: tells operators what they must do.
- Performance- or goal-based: identifies goals that operators must achieve, but allows them to choose how to do it.

Regulatory Regime: Overall Approach and Legal Basis	
Canadian Arctic Offshore	<p>A hybrid approach; a blend of traditional prescriptive regulations with performance-based regulations.</p> <p>The NEB¹ regulates Arctic offshore drilling using the <i>Canada Oil and Gas Operations Act</i> and regulations; other general legislation governs some aspects of offshore drilling.</p>
U.S.	<p>Mainly prescriptive regulations, often incorporating industry standards.</p> <p>The U.S. has one main statute and various other general laws that regulate specific aspects of offshore drilling.</p>
U.K.	<p>Performance-based approach; operators must continually demonstrate that they are taking measures to minimize hazards and risks to “as low as reasonably practicable”.</p> <p>The U.K. also has one main statute and various other general laws that regulate specific aspects of offshore drilling.</p>
Greenland	<p>Performance-based; operators must adopt international best practices.</p> <p>Greenland has concentrated most aspects of the regulatory regime for offshore drilling into one Act.</p>
Norway	<p>Performance-based approach with guidelines and recommended standards.</p> <p>Norway uses many separate statutes to regulate different aspects of offshore drilling.</p>

The study focuses on the acts and regulations that make up the regulatory regime. But policies and other processes and documents may affect the regime, and become part of the overall regulatory approach to offshore drilling and production. For example:

- Any environmental, social, and/or economic assessments that countries carry out before they allow exploration and production.
- The resources, capacity, and expertise available to the official regulator.

¹ The National Energy Board regulates all offshore oil and gas exploration and production activities except those offshore of Nova Scotia and Newfoundland and Labrador where these activities are regulated by the joint federal-provincial Canada - Nova Scotia Offshore Petroleum Board and the Canada - Newfoundland and Labrador Offshore Petroleum Board respectively.

- Whether or not the same or a different agency has authority to grant legal rights to explore and develop oil and gas resources, and collect royalties; and to regulate environmental protection, health and safety, and related issues.
- The number and kinds of agencies that must coordinate their work to administer and enforce the offshore drilling regulatory regime.
- The guidelines and best practices that may or may not be included in the regulatory regime.

3 Key Concepts

Blow-out preventer (BOP): A valve on top of a well that can be closed if there is a loss of control of formation fluids.

Casing or well casing: A hollow steel pipe placed in a well during drilling. It lines and supports the well, and is cemented into place. It must be strong enough to withstand a number of forces and stressors. For example the well casing can prevent the well from caving in, prevent fluids from escaping, and allows the operator to extract petroleum during well production.

Cementing: A process of inserting cement slurry - water, cement, and other additives - inside the casing and out through the bottom of the casing string, into the annulus – the void between the casing and the borehole. Cementing gives the borehole strength and protects the casing from corrosion from formation fluids. It helps to isolate dangerous high-pressure zones between the well on the ocean floor and the surface.

Diverter: Equipment that operators use to direct shallow gas away from the installation, through side outlets (diverter line).

Dynamic positioning systems (DPS): Enable floating drilling rigs to maintain their position over an offshore well, using thrusters, rather than fixed mooring anchors. The thrusters are located in the hulls of the drilling rig. A sensing system automatically activates the thrusters to maintain the rig's location.

Emergency shutdown systems (ESD): Equipment intended to reduce the consequences from hazards associated with offshore drilling and production. For example: fire, uncontrolled flooding, or escaping hydrocarbons.

Oil spill response: Helps ensure that the operator and government respond quickly and effectively when a spill happens, to avoid or minimize negative effects on the environment and human health. Oil spill response can involve several levels of government, each with jurisdiction over different aspects of the response.

Relief well: A secondary well that operators drill from a separate drilling rig to release the pressure when there is uncontrolled flow at a well.

Well design: Typically considers the safety, equipment, and testing requirements that an operator must plan for before drilling the well. Most regulations require the operator to consider factors such as pore pressure, drilling fluid weights, casing setting depths, and geological formations.

4 How does Canada compare to other countries?

The five tables in this section compare the highlights of the offshore regulatory regimes in the Canadian Arctic, the U.S., the U.K., Greenland, and Norway in these key areas:

- Management systems
- Drilling requirements
- Well control
- Independent verification
- Oil spill response

See the main report for a more detailed comparison.

Management Systems	
<p>A framework of plans, processes and procedures used to ensure that an offshore facility will fulfill the regulatory requirements concerning health, safety and the environment, and meet safety and environmental objectives such as avoiding and preparing for accidents and emergencies.</p>	
Canadian Arctic Offshore	<ul style="list-style-type: none"> ▪ Must have a management plan and keep it current and up-to-date during operations. ▪ Must meet specific requirements for occupational health and safety, personnel competence and training, emergency preparedness, reporting and notification of accidents and emergencies, and performance monitoring and compliance.
U.S.	<ul style="list-style-type: none"> ▪ Has developed and started to implement Safety and Environmental Management Systems (SEMS) that apply to the design, construction, start-up, operation, inspection, and maintenance of all new and existing facilities. ▪ Must identify, deal with, and manage safety, environmental hazards, and impacts.

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U.K.	<ul style="list-style-type: none"> ▪ Must prepare and submit a management plan – called a safety case - to provide evidence that the operators have evaluated all major accident risks and taken measures to control them. ▪ Must meet requirements of a number of different regulations. ▪ Are more goal-based; Canada’s are more prescriptive.
Greenland	<ul style="list-style-type: none"> ▪ Must have health, safety, environmental management system based on regulator guidelines, including emergency response plans and previous experience in managing environmental emergency situations.
Norway	<ul style="list-style-type: none"> ▪ Must comply with certain levels of health, safety, and environment. ▪ Must ensure that all contractors, suppliers, and other participants have similar systems that conform to regulations. ▪ Are more prescriptive than Canada’s, though similar.

Drilling Requirements	
<p>Cover a wide range of activities. A few key areas are well design, well casing and cementing, emergency shutdown (ESD) systems, and dynamic positioning systems (DPS).</p>	
Canadian Arctic Offshore	<ul style="list-style-type: none"> ▪ Have a mix of performance and prescriptive requirements. ▪ Have well design regulations – conditions for safety and to prevent waste. ▪ Must design and install casing to meet safety goals, protect surrounding zones, withstand downhole pressure and other forces and stressors. ▪ Must have ESD and DPS; follow specific regulations.
U.S.	<ul style="list-style-type: none"> ▪ Must meet performance-based conditions and prescriptive regulations for casing and cementing; submit plans for well design and drilling procedures. ▪ Have specific regulations on the parts of an ESD. ▪ Have no specific regulations for a DPS.

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U.K.	<ul style="list-style-type: none"> ▪ Focus on performance-based regulations. ▪ Have no specific requirements for an ESD or DPS. ▪ Must meet conditions to minimize risk, ensure safety, and prevent fluids from escaping.
Greenland	<ul style="list-style-type: none"> ▪ Operators must submit a detailed drilling program, casing program and site survey plan. ▪ Have no regulations or guidelines for ESD, or DPS.
Norway	<ul style="list-style-type: none"> ▪ Have no specific requirements on well design or casing and cementing. ▪ Must have an ESD. ▪ Must use a DPS and follow general regulations related to how and when it must work, and how and when it's not needed.

Well Control	
<p>All countries require that operators can control the well. Some state what equipment to use (BOPs, diverters, safety valves); others allow the operator to choose. Some countries require operators to be able to control their equipment away from the rig. All countries require that operators show that they would be able to drill a relief well in case of a blowout.</p>	
Canadian Arctic Offshore	<ul style="list-style-type: none"> ▪ Must use a BOP during some well operations. ▪ Have no specific requirement to be able to remotely operate well control equipment. ▪ Must develop a well relief plan.
U.S.	<ul style="list-style-type: none"> ▪ Must use BOPs, diverter systems, and safety valves. ▪ Must be able to control the well control equipment from the rig and from another place away from the rig. ▪ Must show that operators have enough money and can access a second drilling rig to drill a relief well.

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U.K.	<ul style="list-style-type: none"> ▪ Includes BOPs as part of a well and recommends diverter systems and safety valves. ▪ Have no specific requirements to be able to remotely operate well control equipment (like Canada). ▪ Must show plans for timing, resources, design of relief well.
Greenland	<ul style="list-style-type: none"> ▪ Must submit information on the well control equipment but do not require use of BOPs, diverters, and safety valves. ▪ Have no specific requirement to be able to remotely operate well control equipment (like Canada). ▪ Must develop a relief well plan (like Canada).
Norway	<ul style="list-style-type: none"> ▪ Must have intervention equipment (such as BOPs), safety valves, diverters; more specific than Canada. ▪ Must be able to control equipment from a place away from the rig. ▪ Must keep equipment in good condition (like Canada). ▪ Must be able to drill a relief well.

Independent Verification

A third party — an expert separate from the operator and regulator — reviews a facility's safety features, to ensure they meet a defined set of objectives. Safety features may relate to equipment, structures, and/or operations.

Canadian Arctic Offshore	<ul style="list-style-type: none"> ▪ Must submit a certificate of fitness prepared by one of five recognized and independent certifying authorities.² ▪ One program to verify both compliance with several different regulations and that the installation's features are fit for their purpose.
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² Government of Canada, *Canada Oil and Gas Operations Act* 1985, c. O-7, Section 5.12, <http://laws-lois.justice.gc.ca/eng/acts/O-7/FullText.html?term=response>; Government of Canada, *Canada Oil and Gas Certificate of Fitness Regulations* SOR/96-114, <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-114/FullText.html>.

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U.S.	<ul style="list-style-type: none"> ▪ Has two issue-specific programs: one to ensure the BOP meets technical requirements; one to ensure structural plans of certain high risk platforms comply with regulations and are fit for their purpose.
U.K.	<ul style="list-style-type: none"> ▪ Must ensure that critical aspects of a facility, that prevent or limit major accidents, are fit for their purpose. ▪ The regulations leave it to the operator, with their verifier, to develop the procedures for verification.
Greenland	<ul style="list-style-type: none"> ▪ Has a single independent verification program to ensure operators comply with industry or government standards. ▪ Does not prescribe detailed requirements for verification systems.
Norway	<ul style="list-style-type: none"> ▪ Has one comprehensive program to verify compliance with all regulations. ▪ Operators decide the need for verification and degree of independence, and design the program for each offshore facility.

Oil Spill Response	
<p>Oil spill response is generally a combination of actions from the operator and regional and national authorities.</p>	
Canadian Arctic Offshore	<ul style="list-style-type: none"> ▪ Must have a plan from the operator, including details of how to test and monitor it. Operators must have equipment to respond to emergency conditions. NEB can intervene if the operator is not doing enough. ▪ Must have regional and national plans; national plan details agencies’ responsibilities and general framework.
U.S.	<ul style="list-style-type: none"> ▪ Must have a plan from the operator, including how to test and monitor it. Operators must have equipment on hand to respond to worst-case scenario. ▪ Must have regional and national plans to coordinate the

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	response from governments and operators. National government can intervene if the operator is not doing enough.
U.K.	<ul style="list-style-type: none"> ▪ Must have a plan from the operator, based on risk of worst-case scenario; must regularly test the plan. Operators must have equipment to respond to spills in certain time. ▪ Must have a plan from national government. They can intervene if they feel that the operator is not doing enough.
Greenland	<ul style="list-style-type: none"> ▪ Must have a plan from the operator, as part of environmental assessment; no stated requirements to test the plan. Guidelines state that operators should have equipment on hand to respond to a minor spill. ▪ Has a program to coordinate government and operator response. National government has limited power to intervene.
Norway	<ul style="list-style-type: none"> ▪ Must have a plan from the operator. Operators must analyze the risks and calculate the equipment they need. Guidelines suggest testing the plan at least once a year. ▪ Must have national and regional government plans. The national government can intervene if the operator is not doing enough to deal with the spill.

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More information

The main report

- *Comparing the Offshore Drilling Regulatory Regimes of the Canadian Arctic, the U.S., the U.K, Greenland and Norway* (The Pembina Institute, 2011)
<http://www.pembina.org/pub/2227>.

National Energy Board

- Arctic Offshore Drilling Review website:
<http://www.neb-one.gc.ca/clf-nsi/rthnb/pplctnsbfrthnb/rctcffshrdrlngrvw/rctcffshrdrlngrvw-eng.html>

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