

FACTS DO NOT JUSTIFY BANNING CANADA'S CURRENT OFFSHORE DRILLING OPERATIONS:

**A SENATE REVIEW IN THE WAKE OF BP'S
DEEPWATER HORIZON INCIDENT**

*Eighth report of the Standing
Senate Committee on
Energy, the Environment and
Natural Resources*

*The Honourable W. David Angus, Chair
The Honourable Grant Mitchell, Deputy Chair*

August 2010

Ce rapport est aussi disponible en français



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Honourable W. David Angus – Chair

Honourable Grant Mitchell – Deputy Chair

Honourable Tommy Banks

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Honourable Fred Dickson

Honourable Richard Neufeld

Honourable Linda Frum

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Honourable Daniel Lang

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Ex-officio members of the committee:

The Honourable Senators Cowan (or Tardif) and LeBreton, P.C., (or Comeau).

In addition, the Honourable Senators Baker, P.C., Campbell, Greene, Housakos, Johnson, Nolin, Raine and Rivard were members of the committee or participated from time to time during this study.

Staff of the committee:

Ms. Lynn Gordon, Clerk of the committee, Committees Directorate;

Ms. Chelsea Saville, Administrative Assistant, Committees Directorate;

Ms. Sam Banks and Mr. Marc LeBlanc, Analysts, and Mr. Tomasz Kasprzycki, Intern, Parliamentary Information and Research Services, Library of Parliament;

Ms. Tracie LeBlanc, Acting Communications Officer, Communications Directorate.

Committees receive their mandates from orders of reference adopted in the Senate Chamber. There are two types of orders of references that a committee may receive: an order of reference to consider a bill or Estimates, or an order of reference to carry out a special study. The following is the order of reference for this study.

Order of Reference – 40-3

STANDING SENATE COMMITTEE ON ENERGY, THE ENVIRONMENT AND NATURAL RESOURCES SPECIAL STUDY, ENERGY SECTOR

Extract of the *Journals of the Senate*, March 11, 2010:

The Honourable Senator Angus moved, seconded by the Honourable Senator Andreychuk:

That the Standing Senate Committee on Energy, the Environment and Natural Resources be authorized to examine and report on the current state and future of Canada's energy sector (including alternative energy). In particular, the committee shall be authorized to:

- (a) Examine the current state of the energy sector across Canada, including production, manufacturing, transportation, distribution, sales, consumption and conservation patterns;
- (b) Examine the federal and provincial/territorial roles in the energy sector and system in Canada;
- (c) Examine current domestic and international trends and anticipated usage patterns and market conditions, including trade and environmental measures and opportunities, likely to influence the sector's and energy system's future sustainability;
- (d) Develop a national vision for the long-term positioning, competitiveness and security of Canada's energy sector; and
- (e) Recommend specific measures by which the federal government could help bring that vision to fruition.

That the papers and evidence received and taken and work accomplished by the committee on this subject since the beginning of the Second Session of the Fortieth Parliament be referred to the committee; and

That the committee submit its final report no later than June 30, 2011 and that the committee retain all powers necessary to publicize its findings until 180 days after the tabling of the final report.

The question being put on the motion, it was adopted.

Gary W. O'Brien
Clerk of the Senate

Executive Summary

Executive Summary

For three months this spring and summer (April 20 to July 15, 2010), people around the world have been exposed 24/7 to the shocking spectacle of crude oil gushing uncontrolled into the Gulf of Mexico, threatening to foul sensitive ecological wetlands, pristine beaches, valuable fishing beds and vast bird and other wildlife sanctuaries. Thanks to the print, electronic and social media, BP's Deepwater Horizon disaster and the ongoing saga of trying to stem the "Black Tide" resulting from the blow-out of its Macondo offshore well has played out in a very public and dramatic way. Few could avoid seeing the non-stop video portrayal of thick black oil gushing into the Gulf waters from the breached well-head pipe some 5,000 feet below the surface. There were ultimately, as well, daily scenes of seabirds covered with the sticky, black substance.

Reactions around the globe have been many and varied. United States President Obama himself has been directly involved, visiting the site on several occasions and issuing highly charged comments and statements on a regular basis, and he has ordered an indefinite moratorium on deepwater offshore drilling, not only in the Gulf of Mexico but everywhere in the American offshore. BP's CEO, Tony Hayward, has been forced to resign his position. Activists have described the incident as possibly the greatest environmental disaster of all time. Some interest groups have supported the President's call for a drilling moratorium. Many others have opposed it. In countries with thriving oil and gas offshore exploration and development industries, debates as to whether to drill or not to drill are now ongoing. In most of these nations, urgent reviews of the regulatory regimes governing offshore operations are being conducted. At the same time, citizens in these nations are expressing consternation about "What if it happens here?" or "Can it happen here?", and "Are we exposed and what is our response capacity?"

Canada is no exception. Following the explosion of BP's Deepwater Horizon on April 20th, 2010 killing 11 workers, injuring 28 others and causing literally millions of barrels of crude oil to spew uncontrolled into the Gulf of Mexico, the reaction in Canada was immediate and, in some cases, extreme. Not only was there concern that the "Black Tide", propelled by ocean currents, might find its way to Canadian shores, but also Canadian wildlife proponents worried about the fate of Canada's migratory birds, including the legendary loon, which make their way south to winter and nest in the welcome marshes of Louisiana and in other Gulf Coast wetlands. As well, there was immediate public focus on Canada's "substantial" offshore oil and gas industry. Without fully understanding the nature and scope of Canada's offshore industry, many Canadians worried out loud, "What about drilling in and under our precious Arctic ice and waters, off the environmentally sensitive coast of British Columbia and beneath the frigid, and in many cases deep waters off the coast of Atlantic Canada?" By early May, a significant percentage of Canadians were said to be advocating an immediate, albeit temporary, halt to all offshore drilling and production activity in Canada. Many called for a permanent suspension of Canadian offshore operations. At the same time, Canadian federal and provincial regulators and legislators, led by the National Energy Board, began immediate reviews of our offshore regulatory regimes. They also dispatched task forces to monitor the disaster response operations in the Gulf of Mexico, to witness or participate in the investigations undertaken to determine what went wrong and to attempt to identify lessons to be learned for Canada

from BP's unfortunate incident.

Given the often conflicting media and other reports respecting the BP disaster and the propensity of citizens and governments to rush to judgement after major disasters, the Standing Senate Committee on Energy, the Environment and Natural Resources decided on May 26th to launch a relatively brief series of fact-finding hearings designed to determine as accurately as possible, within the available time frame, the current status of Canada's offshore oil and gas exploration and development industry, including the nature of the applicable regulatory regime(s) and Canada's present offshore disaster response capability. The idea was to either allay or validate the said fears of Canadians and to outline for them the "actual state of play in Canada's offshore", thus permitting them going forward to develop informed opinions.

During the six-week period from May 27 to July 8, 2010, the committee conducted nine public, televised hearings, heard the testimony of some 26 witnesses representing all or most interest groups, reviewed substantial documentation and held several in camera sessions to review the evidence. The committee's findings and recommendations are set forth in the body of this Report. There is no doubt that Canada has an active and potentially more active offshore oil and gas exploration and development industry, one which is of significant importance to the economic well-being of Canada at large and particularly of those provinces where offshore activity is currently taking place. The committee believes it is important to note that at present, such activity is only taking place in the offshore Atlantic waters adjacent to Newfoundland and Labrador, and Nova Scotia. In fact, there is only one active offshore deepwater drilling operation currently in process, namely Chevron's Lona O-55 exploratory well in the Orphan Basin of the Atlantic Ocean, some 430 km northeast of St. John's, Newfoundland. There are also several oil and gas development and production activities ongoing in the Atlantic offshore region. There is also a standing moratorium on any offshore exploration and drilling activities off the sensitive George's Bank.

As to the Arctic offshore, including the Beaufort Sea, there is no drilling currently taking place. Licences have been issued which do contemplate future drilling activity in Arctic waters, but no drilling has as yet been approved. It is anticipated that activity will begin in 2014.

On the West coast, in the Pacific Ocean waters off British Columbia, no offshore activity is taking place. A moratorium on Canadian West coast offshore operations was implemented in 1972 and continues in effect with both federal and provincial approval. No exploratory or drilling licences have been issued.

Meantime, the committee determined that Canada's offshore industry is subject to a regulatory regime that is modern, up-to-date and among the most efficient and stringent in the world, as compared with those in effect in other nations with active offshore industries. Canada's applicable legislation, rules and regulations, both for the Arctic and elsewhere, are presently under full review by the National Energy Board and Canada's regulators have processes in place to ensure that Canada benefits to the maximum from any and all lessons to be learned as a result of the BP disaster.

The committee considered whether it would be appropriate to recommend a temporary ban on or suspension of the above-mentioned Chevron deepwater drilling operation in the Orphan Basin. No evidence was adduced to justify any such ban or suspension and the committee is recommending that the said Chevron operation continue as planned, under close scrutiny and supervision by the regulators and with great caution and use of state-of-the-art technology in light of the Deepwater Hori-

zon incident. In addition, special attention should be brought to bear to ensure Chevron's oil spill response plans are adequate in the circumstances. Finally, the committee notes that the environment in which the Chevron exploratory drilling operation is taking place differs substantially from that where the Deepwater Horizon incident occurred in the Gulf of Mexico, not far from numerous ecologically sensitive wetlands and important fishing grounds and wildlife sanctuaries.

The committee has certain concerns about present offshore disaster response planning and capacity in Canada and discusses these in this Report. Research and development spending by the major oil companies is currently substantial, but the committee believes it should be increased, if possible, with emphasis on new and better technology for dealing with deepwater blow-outs and responding to catastrophic spills.

Generally, the committee recognizes that offshore exploration and development in the oil and gas industry is a highly risky and costly business. The need to balance the risk factors with the need for energy security and other economic considerations, plus the potential consequences of a major crude oil spill are obvious. Over-regulation and excessively rigid safety requirements could potentially discourage the petroleum industry from investing the massive sums of money already required to participate successfully in this complex business. The committee heard sufficient evidence to make it comfortable with Canada's (federal and provincial) approach to striking this risk/reward balance and with its new judgment-based and goal-oriented regulatory approach. Canada is a leading participant in the International Regulators Forum, a group of offshore industry regulators from the most active offshore drilling nations, including Norway, the United Kingdom, the United States, Australia, New Zealand, the Netherlands and Brazil. Interestingly, none of these nations have called for or imposed bans on current offshore drilling operations within their jurisdictions following the BP incident. One concern expressed by the committee in this Report relates to Canada's laws governing the liability and responsibility for loss and damage, including economic loss and environmental cleanup expenses following a major oil spill arising during an offshore drilling operation. Canadian rules in this area are somewhat confused and conflicting, and require a careful review and, at the very least, an upgrading to take into consideration present day economic realities.

In conclusion, the committee wishes to assure Canadians that Canada's offshore oil and gas industry is in good hands, that we could not identify any justification for a temporary or permanent ban or moratorium on current offshore operations, that Canada's regulatory regime is a good one, which is continually subject to upgrading and improvement based on experience such as the BP incident, and that any future offshore operations authorized to take place in Canadian jurisdiction, be they in Arctic waters, off the Pacific Coast or off Atlantic Canada, will be well and carefully regulated and controlled, given the experience of the Deepwater Horizon incident in the Gulf of Mexico. There are indeed areas where the committee has concerns and where improvements can be introduced on the legal, regulatory and operational levels. These are clearly outlined in this Report.

List of Recommendations

RECOMMENDATION 1	The committee does not recommend banning current offshore drilling either permanently or temporarily while Canada's government regulators re-evaluate the regulatory regime, safety measures and contingency plans in light of the Deepwater Horizon oil spill.
RECOMMENDATION 2	The committee recommends exploring in greater detail the structure and role of the offshore petroleum Boards to determine whether there may be in fact a material conflict between regulatory roles.
RECOMMENDATION 3	The committee recommends a thorough discussion by regulators and industry respecting whether and under what circumstances relief wells should be prescribed. As was the case in the Gulf of Mexico, a relief well can take several months to complete; therefore, it follows that current US relief well drilling requirements appear to be inadequate to maximize oil slick containment and minimize environmental damage. As well, drilling two exploratory wells instead of one may inadvertently increase the likelihood of a blowout.
RECOMMENDATION 4	The committee recommends that there be greater collaboration between all those responsible for responding to an oil spill in developing, preparing and practicing in advance of an event.
RECOMMENDATION 5	The committee recommends that all offshore operators be required to organize Tier Three spill response tabletop drills at regular intervals.
RECOMMENDATION 6	The committee recommends a comprehensive review of the issue of liability, including whether the thresholds should be adjusted to reflect current economic realities.

One

Background

Chapter One

Background

On 20 April 2010, the Deepwater Horizon¹, an offshore oil drilling rig leased by British Petroleum (“BP”) operating in the Macondo oil field in the Gulf of Mexico at a depth of approximately 5,000 feet, exploded and sank. Eleven workers were killed in the explosion, and 28 were injured. The explosion damaged equipment, releasing crude oil uncontrollably from an underwater well at a rate estimated to be between 20,000 to 40,000 barrels (3.2 to 6.4 million litres) per day, significantly higher than the original estimate of 5,000 barrels per day.²

On 15 July 2010, a cap was fitted over the underwater wellhead, giving new hope that the ongoing release of crude oil could finally be stopped. The oil slick has made land-fall on over 500 miles of beaches and marshland along the US Coast.³ Some business analysts are reportedly estimating environmental and economic damages of the spill to reach \$73 billion.⁴ The completion of two relief wells was initially considered to be the best hope for relieving the pressure of the direct flow of oil, thus allowing BP to manage the leak temporarily and implement the more permanent solution of pumping mud and cement into the well. This is known in the trade as a “static kill”, and this procedure began on 3 August. On 4 August US President Barack Obama stated, “efforts to stop the well through what’s called a “static kill” appear to be working -- and that a report out today by our scientists show that the vast majority of the spilled oil has been dispersed or removed from the water. So the long battle to stop the leak and contain the oil is finally close to coming to an end. And we are very pleased with that.”⁵ As of 8 August, pressure tests indicate the cement plug is holding. A relief well is expected to be completed by 15 August, and will be used to pump more drilling mud and cement into the broken well in a “bottom kill”, which will permanently seal the broken well.

This unfortunate event is a dreadful reminder that accidents can and do happen, despite the best practices and oversight supposedly in effect. The Deepwater Horizon incident naturally raised concerns over the possible occurrence of a similar incident in Canada. While it would not be prudent to speculate on the exact causes of the Deepwater Horizon disaster, it is appropriate that we pause to carefully assess the safety and emergency response assets and procedures associated with and related to offshore oil and gas drilling activities in Canadian jurisdictions. At the same time, the committee considers it important that the relevant authorities and the public take care not to over-react to this unfortunate incident by introducing or calling for unnecessary or inappropriate measures which could cause severe damage to the Canadian offshore industry.

1 For a timeline of the Deepwater Horizon Disaster, please see *Appendix A*.

2 Deepwater Horizon Unified Command, Press Releases, Admiral Allen; [Dr. McNutt provide updates on progress of scientific teams analyzing flow rates from BP's well](#), June 10, 2010. Estimates on the amount of oil being released by the underwater well are difficult to determine. The US government estimate is between 20,000 and 40,000 barrels per day. In an appearance before the US House of Representatives Committee on Energy and Commerce, Subcommittee on Energy and Environment, an engineering academic stated that the flow rate could be between 56,000 and 84,000 barrels per day, based on an analysis of a video of oil flowing out of the well: US House of Representatives Committee on Energy and Commerce, Subcommittee on Energy and Environment, briefing entitled, “Sizing up the BP Oil Spill: Science and Engineering Measuring Methods,” Wednesday, 19 May 2010, <http://energycommerce.house.gov/documents/20100519/Wereley.Presentation.05.19.2010.pdf>

3 [The Ongoing Administration-Wide Response to the Deepwater BP Oil Spill](#), 8 July 2010.

4 Businessweek, [Oil spill's economic damage may not go beyond Gulf](#), 28 June 2010.

5 The White House, [Remarks by the President to the AFL-CIO Executive Council](#), 4 August 2010.

Two

The Canadian Context

In this chapter:

- 2.1 British Columbia's oil and gas industry
- 2.2 Arctic oil and gas industry
- 2.3 Atlantic oil and gas industry

Chapter Two

The Canadian Context

Following the BP incident, there were suggestions that there was a significant number of Canadians who favoured suspending offshore drilling in Canada until the Government of Canada can review the risks, and many Canadians apparently are in favour of banning offshore drilling altogether.⁶ As a result, the Standing Senate Committee on Energy, the Environment and Natural Resources (“the committee”) decided on 26 May to hold special fact-finding hearings designed to determine the actual current status of Canada’s offshore oil and gas exploration and development industry, including emergency response assets and the adequacy of the current regulatory regime of offshore oil and gas drilling and production in Canada. The results of these hearings will also play an important role in shaping recommendations for the committee’s ongoing study on developing a Canadian Sustainable Energy Strategy.⁷

2.1 British Columbia’s oil and gas industry

British Columbia is the second-largest natural gas producer in Canada, and oil and gas activities are vital to the BC provincial economy. In 2008, the oil and gas industry provided \$4.09 billion in provincial revenue from onshore production fields, and industry investment was estimated to be \$8 billion.⁸ All natural gas produced in BC comes from onshore fields; while there are an estimated 43.4 trillion cubic feet of potential oil and natural gas reserves offshore,⁹ there has been a de facto federal and provincial moratorium on oil and gas activities in the Pacific Ocean off BC since 1972.

BC exports most of the natural gas it produces, primarily to the US. However, other markets beckon: the International Energy Agency recently stated that China has now overtaken the US as the world’s largest energy consumer.¹⁰ With increasing global appetites for energy, the proposed Northern Gateway Pipeline project for transporting oil from Edmonton, Alberta to Kitimat, BC, for export, would be well placed to capitalize on new markets.

In summary, whilst onshore activities thrive, **there is currently no drilling in waters off Canada’s west coast**, and none is presently contemplated.

2.2 Arctic oil and gas industry

The National Energy Board (“NEB”) is responsible for “frontier lands” – that is, Crown-owned lands in Canada’s North and offshore areas not covered by provincial/

6 Ekos Politics, [Most Canadians want offshore drilling suspended or stopped](#), Ottawa, 20 May 2010.

7 The committee’s interim report on developing a Canadian Sustainable Energy Strategy, entitled, “[Attention Canada! Preparing for our Energy Future](#)”, was tabled in the Senate on 29 June 2010.

8 Government of British Columbia, Your B.C. Government, Workers, Oil and Gas, http://www.gov.bc.ca/yourbc/oil_gas/og_workers.html?src=/workers/og_workers.html

9 Energy Information Administration (US), International, Country Analysis Briefs, Canada, Natural Gas, <http://www.eia.doe.gov/cabs/canada/NaturalGas.html> See also Government of British Columbia, Ministry of Energy, Mines and Petroleum Resources, Oil and Gas Production and Activity in British Columbia, Statistics and Resource Potential, 1996 – 2006, http://www.empr.gov.bc.ca/OG/oilandgas/statistics/Documents/5839_OilnGas_Bro.pdf

10 International Energy Agency, Latest Information, “China overtakes the United States to become world’s largest energy consumer”, 20 July 2010, http://www.iea.org/index_info.asp?id=1479

federal management agreements (including the BC coast). This includes the Arctic offshore. The Arctic is believed to hold substantial oil, natural gas and gas hydrate reserves.¹¹ Although there has been ongoing oil production at Norman Wells in the Northwest Territories since 1920, and a modest amount of offshore exploration over the years in the Beaufort Sea, there is also currently **no drilling or offshore production in the Arctic**. Development in the Mackenzie Delta and Beaufort Sea Basin is not expected to proceed unless economic barriers such as the lack of infrastructure are resolved.¹² At the moment, several deepwater exploration licences have been issued for the Beaufort Sea, however drilling will not begin until at least 2014, and will be subject to strict conditions to be stipulated by the NEB flowing from its current in-depth regulatory review, precipitated by the Deepwater Horizon incident, and from lessons learned from said incident.¹³

2.3 Atlantic oil and gas industry

While the committee reviewed offshore drilling operations across Canada and heard evidence on the state of offshore activities on the west coast and in the Arctic, **the Atlantic offshore is the site of all current Canadian drilling activities and the site of all Canadian offshore oil and gas production**. Therefore, the committee has focused most of this study on drilling operations in the Atlantic; however we will refer to the Arctic and West coast regions as and where appropriate.

11 According to Indian and Northern Affairs Canada, there are potential reserves of 8.4 billion barrels of oil and 153 trillion cubic feet of natural gas in the Canadian Arctic. (Source: [Library of Parliament](#))

12 The proposed [Mackenzie Gas Project](#) involves the construction of a 1,196 kilometre pipeline system along the Mackenzie Valley that would link natural gas fields in the Mackenzie Delta to southern markets.

13 Patrick Borbey, Assistant Deputy Minister, Northern Affairs, INAC, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 July 2010.

Three

The Atlantic Offshore Areas

In this chapter:

- 3.1 Economic impact
- 3.2 Geographic extent of offshore oil and gas fields
- 3.3 Atlantic offshore oil and gas regulators

Chapter Three

The Atlantic Offshore Areas

The Canadian Association of Petroleum Producers reports that Nova Scotia's offshore contains 40 trillion cubic feet (Tcf) of natural gas potential and 1.3 billion barrels of oil. Based on a recent estimate by the Canada-Newfoundland and Labrador Offshore Petroleum Board, ("C-NLOPB") the Newfoundland and Labrador offshore contains 2.84 billion barrels of oil, 10.85 Tcf of natural gas and 478 million barrels of natural gas liquids.¹⁴

3.1 Economic impact

These significant petroleum reserves are an important facet of the provincial economies of Nova Scotia and Newfoundland and Labrador. The offshore oil and gas industry creates jobs, invests in research and development, education, training, and infrastructure, provides spin-off opportunities for local businesses, as well as contributes taxes and royalties, which are used to provide essential services in these provinces.

The offshore petroleum industry is a major economic driving force in Newfoundland and Labrador. Since 1997, the province's GDP has increased by 65 per cent - nearly half of which is attributed to the development of offshore oil production. The oil and gas sector now accounts for 36 per cent of gross provincial GDP. At the end of 2008, approximately 1 in 20 jobs in Newfoundland and Labrador were supported by the oil and gas industry in addition to the 3,455 individuals that were directly employed within the sector.¹⁵ Although Nova Scotia has only one commercial offshore production project operating at this time, the Nova Scotia Department of Energy expects to receive up to \$3 billion in gas royalties over the life of the Sable Offshore Energy Project.¹⁶ After the HST and personal income taxes, the oil and gas industry is the largest source of provincial government revenue. Collected royalties serve to pay down the provincial debt, as well as fund infrastructure and social programs across the province.¹⁷

3.2 Geographic extent of offshore oil and gas fields

The Newfoundland and Labrador offshore area covers 7.3 million hectares, an area of approximately two-thirds of the size of the Island of Newfoundland.¹⁸ The Nova Scotia offshore encompasses approximately 45.5 million hectares.¹⁹

Maps of these regions are in *Appendix B*.

14 Canadian Association of Petroleum Producers, [Industry across Canada](#).

15 C-NLOPB, Annual Report 2008-09.

16 Nova Scotia Department of Energy, [Economic Benefits from Offshore Petroleum Activity](#).

17 CAPP, [Nova Scotia's Oil and Natural Gas Industry](#).

18 C-NLOPB, [About the Canada-Newfoundland and Labrador Offshore Petroleum Board](#).

19 Stuart Pinks, CEO, C-NSOPB, [Speaking Notes for the Canada-Nova Scotia Offshore Petroleum Board on the occasion of presenting to the Senate \(Energy, The Environment and Natural Resources\)](#), 27 May 2010, at page 2.

3.3 Atlantic offshore oil and gas regulators

In their respective jurisdictions, the C-NLOPB and the Canada-Nova Scotia Offshore Petroleum board (“C-NSOPB”) regulate offshore oil and gas exploration and production.²⁰

A detailed overview of offshore oil and gas regulations in Atlantic Canada is reproduced in *Appendix D*.

²⁰ For more information, please see *Appendix C*.

Four

Atlantic Exploration and Drilling Activities

In this chapter:

- 4.1 Newfoundland and Labrador
- 4.2 Nova Scotia

Chapter Four

Atlantic Exploration and Drilling Activities

The regulatory regimes in place in Nova Scotia and Newfoundland and Labrador for offshore operations are very similar. Prior to any work or activity being conducted offshore, the operator is required to seek an Operations Authorization from the provincial regulator based on its overall intended drilling program. The operator is also required to obtain an Approval to Drill a Well for every well drilled.

4.1 Newfoundland and Labrador

Drilling off the coast of Newfoundland and Labrador has been going on since 1966. Since then, 355 wells have been drilled, of which 144 have been exploration wells and the remainder were delineation and development wells.²¹ Fifteen wells have been in what is considered deepwater, at depths exceeding 500 m.²² Offshore exploration licences have been granted in the Labrador Offshore, North Grand Banks, South Grand Banks, Laurentian Subbasin, Sydney Basin, and the Newfoundland and Labrador Western Offshore regions.²³ **At the moment, the only offshore exploration drilling activities taking place are at the Lona 0-55 exploration well by Chevron Canada Limited located 430 kilometres northeast of St. John's, at a water depth of approximately 2,600 meters in the Orphan Basin.** This is Canada's deepest offshore well to date, and is more than 1,000 meters deeper than the ruptured well in the Gulf of Mexico.²⁴

4.2 Nova Scotia

The first exploration well in the Nova Scotia offshore area was drilled in 1967. Since then 207 wells have been drilled at water depths of up to 2092 m.²⁵ The Sable Island area has been the site of most of the offshore drilling activity and significant gas discoveries have been made. Recently, exploration licences have also been granted approximately 160 kilometres southwest of the island.²⁶ There are eight active Exploration Licences totalling over one million hectares off the coast of Nova Scotia.²⁷ However, no drilling activity is currently taking place.²⁸

The C-NSOPB restricts nominations of offshore land parcels for potential exploration to three areas.²⁹ The Georges Bank prohibition zone is an important fishing area where a moratorium on offshore oil and gas exploration has been in place since 1988. The moratorium was recently extended until 2015 by both Canada and the Unit-

21 See Glossary in *Appendix G* for definitions of the different types of wells.

22 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

23 Map of Newfoundland and Labrador Offshore regions is located in Appendix B. There are 33 active exploratory licences in the Newfoundland and Labrador Offshore (Appendix F).

24 The ruptured Macondo well is at a depth of 1,500 meters (5,000 feet): Deepwater Horizon Unified Command, Press Releases, [Transcript Press Brief G-2129](#) - May 15 2010.

25 C-NSOPB, [Directory of Offshore Wells](#), 18 March 2010.

26 Nova Scotia Department of Energy, [Oil & Gas - Offshore Industry & Exploration History](#).

27 C-NSOPB, [Active Exploration Licences as of June 2010](#). See *Appendix F*.

28 Stuart Pinks, CEO, Canada-Nova Scotia Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

29 C-NSOPB, [Offshore Licence Map](#).

ed States.³⁰ The Sable Gully was designated as a Marine Protected Area under the *Oceans Act* in 2004.³¹ Meanwhile, the Donkin Coal Block Prohibited Area, off the east coast of Cape Breton Island, has been set aside for underwater coal resource development.³²

30 CBC news, [Georges Bank drilling ban extended](#), 13 May 2010.

31 C-NSOPB, [Marine Protected Area](#).

32 Donkin Coal Block Development Opportunity Act, S.C. 2007, c. 33.

Five

Atlantic Offshore Production

In this chapter:

- 5.1 Newfoundland and Labrador
- 5.2 Nova Scotia

Chapter Five

Atlantic Offshore Production

When an exploratory drilling program leads to the discovery of hydrocarbons and a declaration of significant discovery is made and approved by the regulatory Board, the operator is granted a Significant Discovery Licence. It provides the same rights to the discovery area as an exploration licence, but it remains valid indefinitely.³³ If it is determined that hydrocarbon reserves justify the investment of capital, a declaration of commercial discovery is made to the regulatory Board and a Production Licence may be granted to the applicant.³⁴

5.1 Newfoundland and Labrador

Newfoundland and Labrador produces more than 340,000 barrels of crude oil per day,³⁵ representing approximately 12.5 per cent of Canada's total crude oil production.³⁶ The offshore oil and gas industry makes a significant contribution to the province's economy accounting for over a third of provincial GDP while oil royalties amounted to approximately \$2.5 billion during fiscal year 2008-09.³⁷

There are currently three offshore oil producing projects in Newfoundland and Labrador, making the province the country's third largest conventional oil producer. All three are located in Jeanne d'Arc Basin of the North Grand Banks area, approximately 300 kilometres east of St. John's. On 31 May 2010, production at the White Rose development was expanded with the oil beginning to flow from its satellite North Amethyst field. Production from North Amethyst is expected to peak at 37,000 bpd.³⁸ A fourth project, Hebron, is expected to be sanctioned in early 2012 after which offshore construction and development drilling is set to begin.³⁹

33 The term of a Significant Discovery Licence is indefinite as long as the relevant declaration of significant discovery is in force, or until a production licence is issued for the relevant lands. There are 50 active Significant Discovery Licences in Newfoundland and Labrador and 35 in Nova Scotia (*Appendix F*).

34 There are 8 active Production Licences in Nova Scotia and in Newfoundland and Labrador (*Appendix F*).

35 C-NLOPB, [Annual Report 2008-2009](#).

36 In 2009, Newfoundland and Labrador produced approximately 35 per cent of Canada's conventional light crude oil, <http://www.economics.gov.nl.ca/E2010/OilAndGas.pdf>

37 CAPP, [Newfoundland and Labrador's Oil and Natural Gas Exploration and Production Industry](#).

38 Husky Energy, [Press Release](#), 31 May 2010.

39 ExxonMobil Canada, [The Hebron Project](#).

Table 1: Newfoundland Offshore Oil Production

Project	Reserves	Status	Owners	Operators
Hibernia	1.24 billion barrels of oil	In production since 1997 with 125,623 bpd (2009).	ExxonMobil, Chevron, Suncor, CHHC, Murphy Oil, StatoilHydro	Hibernia Management and Development Company
Terra Nova	354 million barrels of oil	In production since 2002 with 79,534 bpd (2009).	Suncor, ExxonMobil, StatoilHydro, Husky, Murphy Oil, Mosbacher, Chevron.	Suncor
White Rose	305 million barrels of oil	In production since 2005 with 62,457 bpd (2009).	Husky, Petro-Canada (Suncor).	Husky
Hebron	400 to 700 million barrels of oil	Under development. Production expected in 2017.	ExxonMobil, Chevron, Suncor, StatoilHydro, Nalcor.	ExxonMobil

Note: Reserves includes proven and probable reserves.

Abbreviations: bpd, barrels per day; ExxonMobil, ExxonMobil Canada; Chevron, Chevron Canada Resources; Suncor, Suncor Energy Inc.; CHHC, Canada Hibernia Holding Corporation; HMDC, Hibernia Management and Development Company; StatoilHydro, StatoilHydro Canada Ltd.; Husky, Husky Energy Operations Ltd; Murphy Oil, Murphy Oil Company Ltd; Mosbacher, Mosbacher Operating Ltd.; Statoil, Statoil Canada; Nalcor, Nalcor Energy.

Source: Canada-Newfoundland and Labrador Offshore Petroleum Board Annual Report, 2008 – 2009 at pages 34 – 36 (<http://www.cnlopb.nl.ca/pdfs/ar2009e.pdf>), and Canadian Association of Petroleum Producers, Newfoundland and Labrador's Oil and Natural Gas Exploration and Production Industry, Contributing to a Strong Provincial Economy, 2009 (<http://www.capp.ca/GetDoc.aspx?DocID=111534>), Centre for Energy, ExxonMobil Canada, Suncor Energy, Husky Energy, Hibernia Management and Development Company.

5.2 Nova Scotia

In 1992, the Cohasset-Panuke became Canada's first offshore light oil (condensate) project. There were no significant spills or well control incidents during the life of the project, and it is currently decommissioned.

There is only one offshore natural gas project currently in production in Canada. It is the Sable Offshore Energy Project, operated by ExxonMobil Canada, which produces natural gas from five separate fields in shallow water ranging from 20 to 75 metres in depth. These fields are about 225 kilometres off the east coast of Nova Scotia. This project is producing approximately 459 million cubic feet (MMcf) per day, mostly for export to the US market. This represents approximately two per cent of Canada's total natural gas production.⁴⁰

A second natural gas project, Encana's Deep Panuke Offshore Gas Development

40 Canada-Nova Scotia Offshore Petroleum Board, Letter to committee, File No 75,429/30,001, 23 June 2010.

Project, is under development on top of an offshore field in shallow water in the vicinity of Sable Island. Production is scheduled to begin in 2011, with up to 900 billion cubic feet (Bcf) of natural gas likely to be produced over the life of the project. Like the Sable Offshore Energy Project, Deep Panuke Offshore Gas Development Project will deliver gas ashore to Goldboro, Nova Scotia via a subsea pipeline.⁴¹ Together, these two projects will represent approximately 3.75 per cent of Canada's total daily average natural gas production.⁴²

Table 2: Nova Scotia's Offshore Oil and Gas Production

Project	Reserves*	Status	Owners	Operators
Cohasset-Panuke	Produced 44.5 million barrels of light oil	Decommissioned. Production from 1992 to 1999.	PanCanadian (now Encana), Lasmo	PanCanadian (Encana)
Sable Offshore Energy Project**	3 Tcf of natural gas	Produces an average of 350 Mcf/d of natural gas since 1999.	ExxonMobil, Shell, Imperial Oil, Pengrowth, Mosbacher.	ExxonMobil
Deep Panuke Offshore Gas Development Project	892 Bcf of natural gas	Under development. Natural gas production expected in 2011 with a peak output of 300 Mcf/d.	Encana	Encana

Note: * Reserves includes proven and probable reserves. ** On 8 July 2010, it was reported that ExxonMobil has decided not to extend the life of the Sable Offshore Energy Project. It is unclear how much longer the project will continue to operate.⁴³

Abbreviations: ExxonMobil, ExxonMobil Canada; Pengrowth, Pengrowth Energy Trust, Mosbacher, Mosbacher Operating Ltd.

Source: C-NSOPB, http://www.cnsopb.ns.ca/offshore_projects.php

41 Stuart Pinks, CEO, Canada-Nova Scotia Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

42 Canada-Nova Scotia Offshore Petroleum Board, File No 75,429/30,001, 23 June 2010.

43 CBC News, [Exxon ends N.S. natural gas project](#), 8 July 2010.

Six

Spills and Blowouts to Date

In this chapter:

- 6.1 Newfoundland and Labrador
- 6.2 Nova Scotia

Chapter Six

Spills and Blowouts to Date

Prior to BP's Deepwater Horizon incident, petroleum spills were usually associated with oil tanker accidents such as the Exxon Valdez spill of 257,000 barrels of oil into Prince William Sound, Alaska, on 24 March 1989. Spills from offshore oil and gas exploration and development projects can occur for a number of reasons and be of varying severity. According to Environment Canada, a blowout is the out-of-control escape of oil or gas under high pressure from subsurface reservoirs during drilling or production.⁴⁴

6.1 Newfoundland and Labrador

Oil rig disasters are not restricted to spills or blowouts, as the people of Newfoundland and Labrador are all too painfully aware. On the night of 14 – 15 February 1982, the Ocean Ranger, a semisubmersible drill rig, capsized and sank in a fierce storm in the Hibernia oil field, approximately 315 kilometres off the coast. All 84 crew members were lost. Subsequent inquiries found that the rig sank after seawater entered its ballast control room through a broken porthole, causing an electrical malfunction in the ballast panel controlling the rig's stability. The disaster resulted in regulatory changes focusing on training and safety practices and procedures offshore. These changes were not specifically related to well control or drilling practices.

According to the Chairman and CEO of the C-NLOPB, since the beginning of production of oil in that region, only “some 1,100 barrels of crude have been spilled in our offshore area, which is approximately 1 barrel per 1 million produced. There have been no blowouts in our offshore area.”⁴⁵

The biggest offshore oil spill in Canadian history occurred in November 2004 when a total of 1,000 barrels were discharged from the Terra Nova offshore oil production vessel.^{46,47} In comparison, the Gulf of Mexico incident released between 20,000 and 40,000 barrels a day. That equates to more in a single day than the combination of all the spills that have occurred at offshore Newfoundland and Labrador projects in ten years. “Obviously, we would prefer to have no injuries or spills, but we believe the record for our offshore area is quite respectable.”⁴⁸

It should also be noted, that unlike what is happening in the Gulf of Mexico, the committee was advised that an oil slick originating from a Newfoundland and Labrador offshore blowout would likely not affect Canadian shorelines. A Husky Energy representative attributed this possible scenario to the Labrador Current. The company evaluated several scenarios and observed that “in all cases, the models indicated that

44 Environment Canada, Glossary: [Offshore blowout](#). If a blowout occurs, royalties are not paid on the lost hydrocarbons. Royalty regimes are based on revenues and profits: see, for example, Nova Scotia's [Offshore Petroleum Royalties Act](#) and [Offshore Petroleum Royalties regulations](#).

45 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

46 C-NLOPB, [Oil spill incident data: NL offshore area 2004](#).

47 CBC News, [Environmentalists doubt N.L. ready for oil spill](#), 30 April 2010.

48 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

oil should head out into the open ocean.”⁴⁹ However, the waters on the continental shelf off the coasts of Newfoundland and Labrador and Nova Scotia support seabird and marine life populations that would be vulnerable to oil spills in the open ocean.⁵⁰

6.2 Nova Scotia

Hydrocarbon discoveries within Nova Scotia's offshore area have until now mainly resulted in natural gas and light oil (condensate) reserves. Accidents at these operations therefore do not cause a slick similar to that of the Deepwater Horizon incident and other crude oil spill incidents. Gas escapes into the atmosphere, while condensate forms a thin layer on the ocean surface, the thickness of which can be measured in microns. Condensates will quickly dissolve or evaporate.

However, blowouts can still occur at offshore natural gas projects and two have taken place in the Nova Scotia offshore area. The first, a Shell exploratory gas well at a water depth of 153 metres, experienced a blowout in 1984. During the course of 13 days, the well released 70 million cubic feet (MMcf) of gas and 1.7 thousand cubic feet (Mcf) of condensate a day⁵¹ Stuart Pinks, the current CEO of C-NSOPB, described the situation as follows:

That particular case was on a semi submersible rig. The blowout preventer did not function. There was a kick. The kick actually damaged some of the controls for the blowout preventer, and there was not the secondary types of controls that we would see today. The results of that particular incident led to some technological changes to provide more reliability. The well was successfully killed after about 13 days with very limited type of environmental damage.⁵²

The second, a Mobil exploratory gas well at a water depth of 38 metres, experienced a different type of a blowout, referred to as a subsurface blowout, in April 1985. Mr. Pinks described the incident in more detail during his testimony for the committee:

Casing down in the hole had failed.⁵³ Again, it was natural gas. Natural gas from one formation underground was allowed to seep up and go into another formation underground, so it was contained underground. There was no release to the ocean or to the atmosphere.⁵⁴ That particular well did require the drilling of a relief well to successfully cap that well. That was not a failure of the blowout preventers; that was a failure of casing down hole.⁵⁵

Mr. Pinks also reminded the committee that these events occurred 25 years ago and that “technology has changed significantly since that point in time.”⁵⁶

49 Paul McCloskey, Vice-President, East Coast Operations, Husky Oil Operations Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 17 June 2010.

50 Ian L. Jones, Professor Department of Biology, Memorial University, 13 May 2010, http://www.mun.ca/serg/NL_sea-birds_offshore_risk.html

51 Environment Canada, [Blowout of the Oil Rig “Vinland”](#).

52 Stuart Pinks, CEO, Canada-Nova Scotia Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

53 See Glossary in *Appendix G*.

54 There is, however, a release of greenhouse gases into the atmosphere.

55 Stuart Pinks, CEO, Canada-Nova Scotia Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

56 Ibid.

Seven

The Regulatory Approval Process for Offshore Drilling Programs

In this chapter:

- 7.1 The change from prescriptive to goal-oriented regulation
- 7.2 “World standard” for offshore regulations?
- 7.3 Differences in regulations for Arctic offshore drilling

Chapter Seven

The Regulatory Approval Process for Offshore Drilling Programs

Offshore drilling is an inherently risky endeavour. At the same time, offshore resources contribute significantly to the local, regional and national economies. The challenge for operators and regulators is to balance safety and environmental risks with economic and energy security considerations.

While risks can be identified, assessed, minimized and mitigated, they cannot be eliminated altogether. Risk management, therefore, is a crucial element of offshore activities. As Gaétan Caron, Chair and CEO of the NEB explained:

The famous [equation] of risk is probability times consequence equals impact. Even if someone could suggest that the probability of an incident in the Arctic Ocean is small, when you multiply a small probability with a very high consequence, you need to have an outcome that is acceptable to society.⁵⁷

A key responsibility of regulators is to attempt to “ensure that the operators reduce [risks] to as low as is reasonably practicable, but reasonably practicable means that at some point in time, they can occur.”⁵⁸

For its part, industry approaches offshore operations “with the goal to complete the activity without an incident or injury, and risk is assessed, mitigating measures are applied to achieve a risk level as low as reasonably practicable without eliminating the possibility of conducting the activity.”⁵⁹ If risks cannot be identified and mitigated, projects will not proceed: “if we cannot [identify and mitigate the risks], we will not do it.”⁶⁰

As was stated to committee members, “Ultimately, however, ... the determination of whether the residual risk is acceptable is a matter for public policy and it must be government and the regulator who make the determination in the public interest.”⁶¹

The committee was impressed by how fully engaged Canada’s offshore regulators are with their responsibilities in managing risks and opportunities on behalf of Canadians, and is satisfied, on the basis of the evidence before it, the risks are being managed appropriately at the present time.

A number of witnesses from both the regulatory and industry side assured the committee that Canada’s current legislative and regulatory regime, like that of Norway’s,

57 Gaétan Caron, Chairman and CEO of the NEB, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

58 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

59 David Pryce, Vice-President, Operations, Canadian Association of Petroleum Producers, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

60 Glenn Scott, President, ExxonMobil Canada Ltd, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 29 June 2010.

61 David Pryce, Vice-President, Operations, Canadian Association of Petroleum Producers, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

is among the most stringent and robust in the world. Indeed, Canada is a leading member of the International Regulators Forum, a group of nine regulators of health and safety in the offshore upstream oil and gas industry.⁶² This group meets annually to discuss matters of mutual concern, including lessons from incidents, research findings, and regulatory initiatives in a continuing effort to develop and enhance best practices.

As an example of its knowledge sharing focus, the community of international regulators is currently reaching out to and has had informal communications with officials from Greenland which is about to undergo its first offshore drilling program.⁶³ Gaétan Caron, Chairman and CEO of the NEB, elaborated on the nature of this relationship between regulators:

We have heard about Greenland planning to drill on their side of the Canada Greenland border. They have requirements in place to ensure that exploratory offshore oil and gas activities are undertaken in a manner that protects people and the environment. We understand that last week Greenland authorized the drilling of two offshore wells in the Davis Strait this year. We are in the process of developing a memorandum of understanding with the Greenland Bureau of Minerals and Petroleum, which is the authority in Greenland that is our equivalent. The MOU will guide both regulators as we seek opportunities to cooperate and share information and best practices in the safety and environmental regulation of offshore drilling activities.

In addition to the MOU, the Board and the Greenland Bureau of Minerals and Petroleum will outline how the NEB will be present on the drilling rigs this summer as observers at key times of the drilling process.⁶⁴

Prior to obtaining authorization for a proposed offshore oil and gas exploration or development project, a project proponent must satisfy a number of specific safety, environmental and contingency conditions as set out in the regulations. First, before drilling programs are even contemplated and before licences are issued, the Boards undertake a Strategic Environmental Assessment (SEA) of potential operations in the area.⁶⁵

Once an SEA is conducted, a separate environmental assessment of the proposed project must be conducted. The operator must have obtained a certificate of fitness from an independent third party certifying authority, together with a letter of compliance from Transport Canada for the drilling installation, and the operator must file safety and training plans, and an environmental protection plan which includes a contingency plan, emergency response plan and oil spill response plan as required by regulations.

In addition, proponents must submit documentation respecting financial responsibility. Finally, they must provide a declaration of fitness attesting that

62 International Regulators Forum members are regulatory bodies from Norway, the United States, United Kingdom, Australia, New Zealand, Brazil, Canada and the Netherlands.

63 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

64 Gaétan Caron, Chairman and CEO of the NEB, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

65 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

the equipment and facilities to be used during their program are fit for the purpose, the operating procedures relating to them are appropriate, the personnel employed are qualified and competent and the installation meets all necessary Canadian standards. Only after all of this documentation is presented to and approved by the Board may an operator proceed with the application.

Drilling and well control are critical aspects of offshore operations and are addressed extensively in this regulatory framework. This involves a review of the operator's well planning and technical capabilities in respect of well and casing design, well control matters, kick prevention and detection, establishment of severe weather operating limits, a review of emergency disconnect requirements and an assessment of the relief well drilling arrangements.⁶⁶

The regulatory requirements are supplemented by guidance documentation provided by the regulatory Boards. These set out guidelines as to how operators should achieve compliance in conducting their offshore activities. For example, over 20 separate guidelines are posted on the Canada-Nova Scotia Offshore Petroleum Board website and communicated to industry.⁶⁷

No regulations or guidelines set specified minimum standards for equipment such as well casings or pipes and blowout preventers. Rather, each well is unique and is planned and designed according to its objectives and the specific environment in which it will be placed. For example, operators must provide evidence demonstrating the particular well design is appropriate for the pressure and depth to which it will be drilled before an authorization to drill a well is granted.⁶⁸

The industrial equipment used in the construction of a well and well control, including blowout preventers, is certified by an independent, internationally recognized certifying body approved by the regulator.⁶⁹

7.1 The change from prescriptive to goal-oriented regulation

In December 2009, a new Canadian regulatory regime governing offshore oil and gas activities was introduced. Prior to this date, the regulations were more prescriptive or rules-based, meaning they specified in greater detail the technical requirements and equipment necessary for offshore drilling. They are now goal-oriented, setting out the desired safety, environmental, resource management and industrial goals without prescribing details of how these must be achieved. During his testimony to the committee, Gaétan Caron, Chairman and CEO of the National Energy Board, explained the change in regulatory approach:

First, and most importantly, I would like senators to be assured that the new drilling and production regulations that have been in place since December 2009 are stronger and more effective than any regulations we have had in place in the past. They are comprehensive and they have clear legal objec-

66 Ibid. See also the regulations set out in *Appendix D* to this report. The Nova Scotia regulatory requirements are identical to those of Newfoundland and Labrador.

67 See, for example, C-NSOPB website, [Lands Management](#), Publications; [Geoscience](#), Publications; [Health and Safety](#), Publications; and [Environment](#), Publications.

68 Paul McCloskey, Vice-President, East Coast Operations, Husky Oil Operations Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 17 June 2010.

69 Ibid.

tives regarding safety and environmental protection. They combine the best of prescriptive elements and goal based requirements, defining the outcomes of good regulation.

The old regulations represented an out of date, one size fits all system, sometimes labelled as “check-box regulation.” The new regulations require companies to demonstrate that they can operate safely in specific situations, using the most advanced technology tailored to their circumstances. The onus is on industry to demonstrate to us that they can protect their workers, the public and the environment. If the operator cannot demonstrate this, they cannot drill.⁷⁰

The advantage of prescriptive rules and regulations is that they leave less room for misinterpretation. On the other hand, they could be viewed as rigid and less adaptable to new and changing technologies, and might require consistent review and updating, thus creating uncertainty. Since regulations can take more than two years to develop and implement, this may not be ideal. The Minister of Natural Resources described a benefit of goal oriented regulation this way:

When I was talking about being goal oriented, it is to ensure we have the flexibility and the room, if we have new technology that is more effective, to keep this [flexibility]. As I stated earlier, having this is not to say this is in the absence of regulation. This is a style of regulation that ensures the regulations will improve with technology.⁷¹

7.2 A “World standard” for offshore regulations?

There is some concern about the lack of regulations specifying minimum standards for drilling equipment and operations. Perhaps a middle ground encompassing the flexibility offered by goal-oriented regulations and the guidance and certainty of prescriptive regulations may be found in Norway’s offshore regime, which is a balanced regime consisting of the two forms of regulations. The committee heard from Craig Stewart of the World Wildlife Fund-Canada, who described Norway’s regulatory regime as a “world standard”:⁷²

Norway went in the 1990s specifically to a goal oriented regime, but then when a few minor incidents occurred, they realized they needed to pull back from that and needed that balance of prescriptive with a framework that encouraged innovation. That is an example showing they learn very well. Very quickly after observing events overseas and within their own country, they have adjusted quickly and managed to achieve that balance, we think, rather well.⁷³

7.3 Differences in regulations for Arctic offshore drilling

North of 60 degrees latitude in Canada, oil and gas activities are managed by two complementary, yet independent government regulators, Indian Affairs and Northern

70 Gaétan Caron, Chairman and CEO of the National Energy Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

71 The Honourable Christian Paradis, Minister of Natural Resources Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 June 2010.

72 Craig Stewart, Director, Arctic Program, World Wildlife Fund-Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 3 June 2010.

73 *Ibid.*

Development Canada (INAC) and the NEB (see Figure 1). INAC is in charge of exploration and development of Canada's oil and gas resources on federal lands in the Northwest Territories, Nunavut and northern offshore.

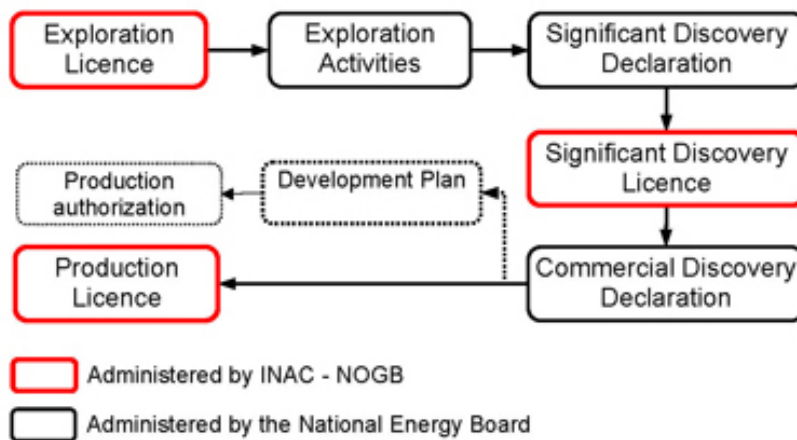
[INAC] works in partnership with northern and Aboriginal governments and organizations to govern the allocation of Crown lands to the private sector for oil and gas exploration, develop the regulatory environment, set and collect royalties, coordinate relevant science initiatives and approve benefit plans before activities actually take place.⁷⁴

In 2007-08, INAC issued exploration licences for six parcels in the Beaufort Sea. Companies retain exclusive rights, for a period of nine years, to explore and study the feasibility of oil and gas development. Actual drilling activities also need to be approved by the NEB. To date, no drilling has been approved pursuant to these licences.

No project is approved unless the National Energy Board is satisfied that the operator's drilling plans include robust safety, emergency response and environmental protection plans that meet the Board's approval. Every single project that is authorized by the Board must be safe for workers and the public and must protect the environment.⁷⁵

Offshore drilling applications are assessed under the *Canada Environmental Assessment Act*, the *Canada Oil and Gas Operations Act*, and by the Inuvialuit Environmental Impact Screening Committee.

Figure 1: Overview of oil and gas management process in Arctic Offshore Areas



Source: Indian and Northern Affairs Canada, <http://www.ainc-inac.gc.ca/nth/og/rm/index-eng.asp>

74 Patrick Borbey, Assistant Deputy Minister, Northern Affairs, INAC, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 July 2010.

75 Gaétan Caron, Chairman and CEO, NEB, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

Eight

Assessing Canadian Regulations in light of the Deepwater Horizon Incident

In this chapter:

- 8.1 NEB review of Arctic offshore drilling requirements
- 8.2 Government of Newfoundland and Labrador review of offshore spill prevention and remediation
- 8.3 C-NLOPB review of deepwater drilling in Orphan Basin
- 8.4 The role and structure of the offshore petroleum Boards
- 8.5 Differences between Canadian and US offshore regulatory regimes

Chapter Eight

Assessing Canadian Regulations in light of the Deepwater Horizon Incident

The committee was told that “regulations and regulators are designed to require that the risk of an offshore incident occurring is reduced to a level as low as reasonably practicable. This is a reality that safety regulators deal with as part of our responsibilities. It is precisely for this reason that safety regulators focus on ways to improve safety and prevent accidents from occurring.”⁷⁶

The Deepwater Horizon disaster prompted the following responses from Canada’s government and regulators.

8.1 NEB review of Arctic offshore drilling requirements

The National Energy Board announced a review of Arctic safety and environmental offshore drilling requirements on 11 May 2010.⁷⁷ **There is no current drilling activity in the Arctic;** however, licences have been issued that contemplate some drilling operations to begin by 2014. In a news release issued 10 June 2010, the National Energy Board stated that it “expects to complete this review before receiving applications for drilling in the Arctic offshore.”⁷⁸ **Therefore it would appear plans for offshore drilling in the Arctic are on hold.**

The World Wildlife Fund-Canada told the committee that it was pleased to see the NEB and the Premier of Newfoundland and Labrador proactively announce inquiries into their respective offshore activities. Their Arctic Program Director, Craig Stewart, however did suggest the establishment of a nationwide review under the Inquiries Act of all offshore oil and gas regulations, with a view to establishing a consistent set of regulations across Canada.

This inquiry should be time limited – 6 months, for example, and national in scope, that is, encompass all potential offshore drilling on all coasts. It should address whether and where we should drill, as well as how we drill.⁷⁹

Following the Deepwater Horizon incident, a number of inquiries and reviews have been initiated by Canadian regulatory bodies, and the committee feels additional further inquiries may well be redundant.

76 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

77 National Energy Board, News Release, “National Energy Board Announces Review of Arctic Safety and Environmental Offshore Drilling Requirements”, 11 May 2010.

78 National Energy Board, News Release, “[National Energy Board Invites Participation in the Public Review of Arctic Offshore Drilling Requirements](#)”, 10 June 2010.

79 Craig Stewart, Director, Arctic Program, World Wildlife Fund-Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 3 June 2010.

8.2 Government of Newfoundland and Labrador review of offshore spill prevention and remediation

On 12 May 2010, the Government of Newfoundland and Labrador began a review of offshore oil spill prevention and remediation requirements and practices in the province.⁸⁰

8.3 C-NLOPB review of deepwater drilling in Orphan Basin

In light of the situation in the Gulf of Mexico, in a news release dated 20 May 2010 the Canada-Newfoundland and Labrador Offshore Petroleum Board announced special oversight measures for the Orphan Basin drilling program, where the deepest exploration well in Canada is being drilled in a project led by Chevron Canada Limited.⁸¹ Chevron must report daily to an oversight safety team, and meet with the team every two weeks and provide results of blowout equipment and other tests observed by a Board member. Further, prior to penetrating any subsea hydrocarbon targets, Chevron must suspend its operations to review and verify that all appropriate equipment, systems and procedures are in place to allow operations to proceed safely and without risking pollution of the environment. Chevron must also assure the Board that an oil spill rapid response team is in place prior to penetrating any such targets.

8.4 The role and structure of the offshore petroleum Boards

A question was raised about the structure of the two Atlantic offshore petroleum Boards in that they are simultaneously responsible for maximizing hydrocarbon recovery, value and benefits, and for environmental protection and safety. This dual role is set out in the Boards' mandates and mission statements.

According to the C-NLOPB,

In the implementation of its mandate, the role of the C-NLOPB is to facilitate the exploration for and development of the hydrocarbon resources in the Newfoundland and Labrador Offshore Area in a manner that conforms to the statutory provisions for:

- worker safety;
- environmental protection and safety;
- effective management of land tenure;
- maximum hydrocarbon recovery and value; and,
- Canada/Newfoundland & Labrador benefits.⁸²

Similarly, the C-NSOPB states that it is “responsible for the regulation of petroleum activities in the Nova Scotia Offshore Area.”⁸³ The Board describes its principal re-

80 Government of Newfoundland and Labrador, News Release, “Consultant Retained for Review of Offshore Oil Spill Safety Practices”, 12 May 2010.

81 C-NLOPB, News Release, [C-NLOPB Announces Special Oversight Measures for Orphan Basin Drilling Program](#), 20 May 2010.

82 C-NLOPB, Mandate and Objectives, http://www.cnlopb.nl.ca/abt_mandate.shtml

83 C-NSOPB, Mission Statement, http://www.cnsopb.ns.ca/call_for_bids_09_1/cnsopb/mission.html

sponsibilities as including:

- health and safety for offshore workers;
- protection of the environment during offshore petroleum activities;
- management and conservation of offshore petroleum resources;
- compliance with the provisions of the Accord Acts that deal with Canada-Nova Scotia employment and industrial benefits;
- issuance of licences for offshore exploration and development;
- resource evaluation, data collection, curation and distribution.⁸⁴

The structure of the Atlantic offshore petroleum Boards is in contrast with that of the regulatory regime for offshore regions north of 60 degrees latitude, in which licensing (and hence value) and safety functions are performed by separate entities. The NEB provides the regulatory oversight and INAC takes care of bidding and leasing for offshore oil and gas projects. These roles are therefore separated.

A concern was expressed that having the same agency responsible for both production and safety, as is the case with the Atlantic Boards, could at least give the appearance of an internal conflict.⁸⁵

In testimony before the committee, the Chair and CEO of the C-NLOPB stated, “We do not promote the industry. That is the role of governments. Our role is one of regulatory oversight of operator activity.”⁸⁶

Industry representatives support the Atlantic Boards’ “holistic approach to regulation”⁸⁷, noting that safety is paramount in the regulatory regime:

Safety in the regulatory context includes protection of the workers as well as protection of the environment, but it is also embedded in the design of vessels, installations and equipment associated with the offshore. We think that separating the board’s responsibility would be counterproductive to ensuring the holistic oversight of the industry and could potentially lead to inconsistent or conflicting direction. In our view, safety and operations are two sides of the same coin in that equipment and operating practices are integral to safety.⁸⁸

The committee considers it would be worthwhile exploring in greater detail the structure and role of the offshore petroleum Boards to determine whether there is in fact a material conflict between regulatory roles. This is in part because of allegations by various interest groups that it would be more appropriate to separate the safety mis-

84 C-NSOPB, Mission Statement, http://www.cnsopb.ns.ca/call_for_bids_09_1/cnsopb/mission.html

85 Craig Stewart, Craig Stewart, Director, Arctic Program, World Wildlife Fund-Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 3 June 2010.

86 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

87 David Pryce, Vice-President, Operations, Canadian Association of Petroleum Producers, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

88 Ibid.

sion from that of economic development.

8.5 Differences between Canadian and US offshore regulatory regimes

The committee noted numerous differences between the Canadian and US regulatory regimes and reached the view that the current Canadian system is more cohesive and efficient.

At the request of the committee, Encana, the developer of the Deep Panuke offshore Nova Scotia natural gas project, described three key differences between regulatory regimes in Canada and in the U.S. Gulf Coast (pre-Deepwater Horizon) for offshore oil and gas operations.

Canada made the transition from prescriptive to goal-based regulations which took place on 31 December 2009. According to Encana, offshore regulations in the U.S. Gulf of Mexico “are more prescriptive than those of Canada in the areas of drilling, cementing, well completion and blowout prevention.”

The Canada-Nova Scotia and the Canada-Newfoundland and Labrador Offshore Accords both define the position of a Chief Safety Officer (“CSO”). As set out in the governing legislation, the CSO is responsible for administering the health and safety regulations of offshore oil and gas activities. Notably, the CSO can order an operation to shut down in whole or in part if the CSO believes it is dangerous.⁸⁹ Regulations in the US Gulf Coast currently do not provide safety officers with similar broad powers and responsibilities.

Finally, only the Canadian regulatory regime has a provision that requires any drilling installation to be issued a certificate of fitness.⁹⁰ According to Encana, this third party certifying authority (with the approval of the CSO) “ensures a base level of safety criteria for equipment.”⁹¹

⁸⁹ *Canada-Newfoundland Atlantic Accord Implementation Act*, section 193.

⁹⁰ For more information, see Glossary in *Appendix G*.

⁹¹ Malcolm Weatherston, Project General Manager, Deep Panuke Project, Encana, Letter to committee, file reference DM-CR-RE-10-0180/0203DM, 24 June 2010.

Nine

Offshore Drilling Research and Development

In this chapter:

- 9.1 Offshore R&D expenditure guidelines
- 9.2 Offshore R&D expenditure activities
- 9.3 The Committee's concerns

Chapter Nine

Offshore Drilling Research and Development

Drilling a well several kilometres below the seabed at a water depth of more than 2.5 kilometres is an impressive scientific and technological feat. Given this, the committee was interested to know about offshore operators' research and development endeavours, particularly with respect to the science and technology to deal with a potentially catastrophic event such as the Deepwater Horizon incident.

9.1 Offshore R&D expenditure guidelines

Under the terms of the Atlantic Accords, offshore operators are required to spend a certain amount of money per year on research and development, and education and training within the applicable province.⁹² Guidelines from the offshore petroleum Boards set out formulae on how these expenditures are calculated. Although they do not stipulate how the money must be spent, the respective Boards approve plans as long as they are reasonable and consistent with the fundamental principles of the legislation.⁹³

Encana's commitments to the C-NSOPB Nova Scotia Benefits Plan entail the establishment of a provincially administered fund for the purpose of R&D, education and training, and supporting disadvantaged groups. During the development phase of the Deep Panuke Project, Encana will be making annual payments equivalent to 0.5 per cent of its allowed capital cost to the fund. During the natural gas production phase, Encana's annual contributions will be made based on approximately 0.5 per cent of the gross revenue of the project.⁹⁴ Meanwhile, since 1995, the Sable Offshore Energy Project has made R&D expenditures totalling \$26.7 million, including \$931,000 for 2009. ExxonMobil and the other SOEP partners have pledged to contribute up to \$3 million for continued R&D activities by 2012.⁹⁵

The C-NLOPB determines the total R&D expenditure requirement over the life of an offshore petroleum project based on a Statistics Canada benchmark,⁹⁶ total recoverable reserves and long term petroleum product prices. The C-NLOPB accepts 0.5 per cent of total project capital cost over the duration of this phase as a reasonable expenditure that meets *Benefits Plan Guidelines*. Meanwhile, during the production phase, offshore operators are responsible for the difference between the total project requirement and the spending that was incurred during the development phase. In Newfoundland and Labrador, on average, offshore companies "spend about \$25 million to \$35 million per year collectively" to meet these expenditure requirements.⁹⁷

92 *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, section 45(3)(c).

93 Canada-Newfoundland and Labrador Offshore Petroleum Board, Industrial Benefits, Legislation and Guidance, [Guidelines for Research and Development Expenditures](#), October 2004; Canada-Nova Scotia Offshore Petroleum Board, Canada-Nova Scotia Benefits, Publications, Guidelines, [Industrial Benefits and Employment Plan - Nova Scotia Offshore Area](#) (1994).

94 Encana, [Deep Panuke Project commitments regarding Nova Scotia Benefits](#).

95 Sable Offshore Energy Project, [Annual Report 2009](#).

96 Statistics Canada, Catalogue No. 88-202-XIB, Oil and Gas extraction R&D expenditures.

97 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

9.2 Offshore R&D expenditure activities

According to C-NLOPB, during development phase, offshore projects generally commit their required R&D expenditures towards education and training programs. During production, the spending focus shifts to actual research and development activities. It should be noted that the offshore Boards do not determine how R&D expenditures are spent. In any case, research and development activities as well as education and training performed within the province are both legitimate and eligible expenditures during any project phase.⁹⁸

ExxonMobil Canada spends about \$10 million a year in Newfoundland and Labrador through the R&D expenditure requirement on a wide range of activities. The president of ExxonMobil Canada informed the committee that “many of the opportunities that come forward and that we fund are safety related.” One example he provided was that of a lifeboat simulator project funded through the Petroleum Research Atlantic Canada.⁹⁹

For its part, Chevron, which is currently drilling Canada’s deepest offshore well, stated:

We invest R&D funds in oil spill technologies, drilling technologies and improving safety. I can speak to one in particular. We are looking at oil spills in ice infested waters. We cofounded an industry project in the Barents Sea. Oil was spilled in the ice and recovery methods were investigated. We indeed spend significant sums of money on research and development. ... The R&D expenditures [mandated under the Atlantic Accord legislation and guidelines] are in the hundreds of millions of dollars over the next 10 to 20 years to be spent in Newfoundland and Labrador.¹⁰⁰

Newfoundland and Labrador offshore operator Husky Oil told the committee that they have invested \$30 million in R&D activities over the past five years within the province. Approximately \$5 million were used on environmental issues such as the development of single vessel sites recovery systems and to support a seabird rehabilitation centre. Furthermore, they are “open to looking at other investments in research and development ... to improve technologies of recovery or containment. The challenge is finding the right investment vehicle and concept to invest in. We are happy to pursue that.”¹⁰¹

9.3 The Committee’s concerns

It appears from the evidence that technology to stop underwater blowouts a mile below the surface has not progressed at the same pace as the technology to drill wells at that depth. It was noted by the C-NLOPB that since new guidelines were put in place in 2004, R&D activities represented 46 per cent of mandated R&D expenditures, “to date, no specific projects have been identified by any of the project Opera-

98 C-NLOPB [Guidelines for R&D expenditures](#).

99 Glenn Scott, President, ExxonMobil Canada Ltd, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 29 June 2010.

100 Mark MacLeod, Vice-President, Atlantic Canada, Chevron Canada Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 10 June 2010.

101 Paul McCloskey, Vice-President, East Coast Operations, Husky Oil Operations Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 17 June 2010.

tors in relation to avoidance and containment of deepwater blowouts.”¹⁰²

It would be reassuring to know that research and development into technologies for drilling at greater depths in more remote areas is matched with corresponding R&D to respond to and contain potential spills in those areas. The committee was assured by witnesses that as more is learned about what, exactly, happened in the Gulf of Mexico, there will be greater emphasis on research into how to avoid and react to such deepwater failures.¹⁰³

In summary, the committee was impressed with the extent of R&D expenditures by the major players in the Canadian offshore industry, but formed the view that more such spending is desirable, and would have a positive outcome respecting the development of new technology addressing catastrophic incidents (Tier Three, see section 12.3, below).

It is interesting to note that four of the major oil companies, following the Deepwater Horizon disaster, have joined forces to establish a common response organization to be available to operators in the Gulf of Mexico in the event of a future major incident.

102 Max Ruelokke, Chairman and CEO, C-NLOPB, Follow-up letter to the committee, 9 June 2010.

103 See, for example, Patrick Borbey, Assistant Deputy Minister, Northern Affairs, INAC, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 July 2010, Gaétan Caron, Chairman and CEO, NEB, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010 and Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

Ten

Blowout Preventers and Relief Wells

In this chapter:

10.1 Blowout preventers

10.2 Relief wells

Chapter Ten

Blowout Preventers and Relief Wells

A blowout preventer (BOP) is an assembly of heavy-duty valves attached to the wellhead to control well pressure and prevent a blowout.¹⁰⁴ If a BOP fails and a blowout does occur, drilling a relief well is “the best known method so far” to bring the well under control.¹⁰⁵ Depending on the required drilling depth, a relief well can take several months to complete and therefore to control a blowout.

10.1 Blowout preventers

Ideally, drilling mud in a well is maintained at the necessary density to prevent an uncontrolled escape of oil and gas from a reservoir.¹⁰⁶ The BOP is the backup system that connects the wellhead to the drilling rig on the sea surface. It is a large apparatus with built-in redundancy (up to 50 feet in height, 15 feet in width and up to 200 tonnes in weight) that sits on top of the wellhead on the seabed and can be used to shut off the flow from the well.¹⁰⁷

The *Newfoundland Offshore Petroleum Drilling and Production Regulations* and the *Nova Scotia Offshore Petroleum Drilling and Production Regulations* both require drilling operators to install reliable well control equipment to prevent blowouts during all well operations. Although there is no specific mention of BOPs in Canada’s current applicable legislation and regulations, the joint C-NSOPB and C-NLOPB *Draft Drilling and Production Guidelines* do state that operators are “expected to ensure that BOPs and related pressure control equipment have a rated working pressure greater than the well design maximum calculated surface pressure.”¹⁰⁸ Furthermore, the document also includes guidelines for BOP pressure-testing and BOP-related risk-reducing measures for deepwater operations.

Information regarding offshore oil and gas regulations relating to contingency plans and BOPs is detailed in *Appendix D*.

104 C-NSOPB Glossary.

105 Gaétan Caron, Chairman and CEO, NEB, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 22 June 2010.

106 Glenn Scott, President, ExxonMobil Canada Ltd, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 29 June 2010.

107 Al Pate, General Manager, Exploration and Production Services, Husky Oil Operations Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 17 June 2010.

108 Canada-Newfoundland and Labrador Offshore Petroleum Board and Canada-Nova Scotia Offshore Petroleum Board, *Drilling and Production Guidelines (Draft, 31 December 2009)* at page 58, http://www.cnlopb.nl.ca/pdfs/guidelines/drill_prod_guide.pdf When the new federal Drilling and Production Regulations were promulgated in December 2009, the Atlantic offshore petroleum regulators issued Draft Drilling and Production Guidelines. These draft guidelines are for stakeholder consultation and reference by interested parties to assist in the transition to the new goal oriented regime. The guidelines are for a one-year trial basis, and will be revised as necessary during this period based on feedback and experience gained from their use. Authorizations and approvals issued by the Atlantic offshore regulators under the previous regulations will remain in effect in respect of ongoing drilling and production activities in the Atlantic offshore area. When these expire, they will be renewed in accordance with the new regulations. See C-NSOPB, News, CNSOPB Issues Draft Guidelines for New Drilling and Production Regulations, 30 December 2009, http://www.cnsopb.ns.ca/news_dec_29_09.php

10.2 Relief wells

As mentioned earlier in this report in section 6.2, only one offshore relief well has been drilled in Canada to date. The West Venture N-01 service relief well was completed to seal the 1985 Mobil gas well blowout in offshore Nova Scotia. The drilling took place from under 40 metres of water to a total depth of 3,632 metres.¹⁰⁹

The committee formed the impression that the change from prescriptive to goal-oriented regulations for Canadian offshore oil and gas operations may have led to confusion regarding relief well requirements. There do not appear to be any statutory requirements explicitly requiring a relief well during offshore drilling in the Atlantic.

However, during his appearance in front of the committee on 8 June 2010, the Minister of Natural Resources, the Hon. Christian Paradis, stated that no offshore drilling can take place in Canada unless the operator submits a relief well capacity plan to the responsible agency.¹¹⁰ The minister also outlined what is necessary in an emergency plan:

The emergency plan must include information about the availability of a rig to do a relief well. There is also information about the equipment needed and the rig needs. The plan must spell out and plan a contingency for relief wells for sure; this is part of their directives.¹¹¹

As noted above in section 4.1, the only offshore drilling currently taking place in Canada is being conducted by Chevron at the Lona O55 exploratory well. According to the Minister of Natural Resources and Eric Landry, Director, Energy Sector, Natural Resources Canada, the company has complied with present regulations by having made arrangements with a rig operator that is able to commence drilling a relief well on location within 12 to 14 days in the case of an emergency.¹¹²

According to the joint C-NSOPB and C-NLOPB *Draft Drilling and Production Guidelines*, offshore oil and gas operators are expected to have survey tools and data capable of determining the location of the wellbore with sufficient accuracy to enable relief well drilling operations.¹¹³

Furthermore, the *Guidelines Respecting Drilling Programs* state the following with respect to relief well drilling arrangements:

Operators are expected to identify an alternate drilling installation for relief well purposes and provide a description of its operating capability, its location, contractual commitments, state of readiness and the schedule for mobilization to the well site. The source of supply for a backup wellhead system and all consumables required to set conductor and surface casing for the re-

109 C-NSOPB, [Directory of Wells](#).

110 The Honourable Christian Paradis, Minister of Natural Resources Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 June 2010.

111 The Honourable Christian Paradis, Minister of Natural Resources Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 June 2010.

112 In current regulations for offshore drilling in the Arctic, there is a requirement to have a second drill ship on site so that you can actually drill a relief well in the same season.

113 C-NSOPB and C-NLOPB, [Drilling and Production Guidelines](#), 31 December 2009. Canada-Newfoundland and Labrador Offshore Petroleum Board and Canada-Nova Scotia Offshore Petroleum Board, Drilling and Production Guidelines (Draft, 31 December 2009) at page 54, http://www.cnlopbnl.ca/pdfs/guidelines/drill_prod_guide.pdf

lief well should also be identified.¹¹⁴

The Chairman and CEO of the C-NLOPB warned the committee that altering the current law and regulations to include the necessity of drilling relief wells as a part of every exploration program may have unintended consequences:

It is an interesting balance because a certain amount of risk is associated with drilling any well into a hydrocarbon formation. If you decide to drill twice as many wells as you need, you effectively double the risk. This is not to say the regulations cannot change, but there would be a lot of discussion about whether that was an appropriate step to take.¹¹⁵

Information regarding offshore oil and gas regulations relating to contingency plans and relief wells is set out in *Appendix D*.

114 C-NLOPB, [Guidelines respecting drilling programs](#) at page 15.

115 Max Ruelokke, Chairman and CEO, Canada-Newfoundland and Labrador Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

Eleven

Organizations Involved in Oil Spill Response Preparedness

In this chapter:

- 11.1 The Canadian Coast Guard
- 11.2 The Eastern Canada Response Corporation

Chapter Eleven

Organizations Involved in Oil Spill Response Preparedness

The committee was assured that offshore regulators and operators are continually seeking to improve best practices and enhance safety measures. An important source of education is learning from previous incidents. For example, in the aftermath of the 1989 Exxon Valdez oil spill, a Public Review Panel on Tanker Safety and Marine Spills Response Capability (the Brander-Smith Panel) was established by the federal government. It reviewed Canada's oil spill preparedness and concluded Canada was ill-prepared to respond to major or catastrophic spills. The Brander-Smith report's findings regarding Canada's oil spill preparedness led to legislative changes to the *Canada Shipping Act* in 1993 and the establishment of *Canada's Marine Oil Spill Preparedness and Response Regime* in 1995. Although the aim was to improve ship-source spills preparedness capacity, it benefits oil spill responses from offshore platforms as well. In the event of an oil spill in the Atlantic offshore, the Canadian Coast Guard and the Eastern Canada Response Corporation, which was established as a result of the Brander-Smith report, will both be involved in the cleanup response.¹¹⁶

11.1 The Canadian Coast Guard

The Canadian Coast Guard, a Special Operating Agency within the Department of Fisheries and Oceans, is the lead federal response agency for all ship-source and mystery-source pollution spills into the marine environment. This includes spills on or into water by ships, or spills on water in connection with the loading or unloading of pollutants from ships at oil handling facilities. It does not, however, include spills from offshore oil rigs. When rigs are drilling, they are not considered "ships" for Coast Guard purposes. That said, the Coast Guard representatives who appeared before the committee stated that the Coast Guard is prepared and authorized to provide response assistance outside its mandate, to any marine pollution incident in Canadian waters.¹¹⁷

The Canadian Coast Guard has a National Contingency Plan which establishes the framework, approach and operational precepts used to respond to a marine pollution incident at the regional, national and international level. It provides details on training and exercising, response procedures and management structure, National Response Team concept, cost recovery, equipment maintenance, spill reporting and various agreements with other departments and agencies. This plan is revised and updated from time to time as necessary and applicable. When the final report or reports on the causes of the Gulf of Mexico disaster are released, the Coast Guard indicated it intends to examine them to determine lessons learned and whether the Coast Guard can improve its own regime and response capability.¹¹⁸

116 René Grenier, Deputy Commissioner, Canadian Coast Guard, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 15 June 2010.

117 Ibid. Drilling rigs are considered ships while travelling to and from a drill site, but not when they are drilling at the drill site.

118 Ibid.

11.2 The Eastern Canada Response Corporation

The Eastern Canada Response Corporation (ECRC) is a private-sector funded and operated response organization, certified under the *Canada Shipping Act, 2001* to provide marine oil spill response services.¹¹⁹ It is owned by oil companies Suncor, Imperial Oil, Ultramar and Shell. Atlantic offshore operators have a contract with ECRC to provide additional resources and expertise when necessary in responding to a spill. The corporation acts under the direction of the owner of the drilling rig (the “responsible party”) to provide a plan of action, equipment, resources and operational management in the event of a spill and clean-up effort.

As part of its certification process, the ECRC conducts a number of mandatory operational and simulated exercises on an annual basis. It must also maintain enough equipment in a state of preparedness and have adequate response plans for spills of at least 10,000 tonnes of oil, representing approximately 60,000 barrels of oil.

There are four response organizations in Canada including three on the Atlantic coast, of which ECRC covers the largest territory. ECRC has mutual aid support agreements with Point Tupper Marine Services Ltd and Atlantic Emergency Response Team Inc. who are responsible for oil spill responses in the waters surrounding Point Tupper, Nova Scotia and St John, New Brunswick, respectively.¹²⁰ The Western Canada Marine Response Corporation covers the waters bordering British Columbia.

119 Response Organizations are funded by petroleum and shipping industries through fees set by the *Canada Shipping Act*.

120 James Carson, President and General Manager, Eastern Canada Response Corporation, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 15 June 2010.

Twelve

What Happens if There is an Oil Spill?

In this chapter:

- 12.1 Tier One — On site Response
- 12.2 Tier Two — Regional Response
- 12.3 Tier Three — Global Response
- 12.4 The Committee's Concerns

Chapter Twelve

What Happens if There is an Oil Spill?

A Chevron representative told the committee that “[there] are no instances where we can reduce risk to absolutely zero.”¹²¹ The Minister of Natural Resources concurred with this sentiment by reminding the committee he cannot state with absolute certainty that a spill will not happen in Canada, and the best that we can do is to make sure regulations take advantage of scientific progress to continually trend risks towards zero.¹²²

In the unfortunate event of an oil spill at one of Canada’s Atlantic offshore operations, the *Draft Drilling and Production Guidelines* clearly state the primary responsibilities of the operator:

The onus is on the operator to immediately take the action necessary to rectify the loss of well control such as a blowout at surface, an uncontrolled underground flow of fluids from one formation into another, broaching of fluids at the seafloor or any other loss of well control. The operator is obligated by this regulation to immediately take action to rectify the situation, notwithstanding any ambiguity with respect to any conditions attached to any well approval, and to take such actions with full consideration of safety and the need to protect the environment and to conserve resources.¹²³

Each offshore operator must have a contingency plan ready to be activated in the event of an oil spill. Such plan is a requirement of the offshore petroleum regulations that must be prepared by the operator and is reviewed by the Board before an authorization to drill is granted.¹²⁴ These plans describe, *inter alia*, how operators plan to contain, mitigate and clean up an oil spill.

12.1 Tier One – On site Response

In the case of any spill, the offshore operator is in charge and must activate its response plan.¹²⁵ Operators have a tiered response program, with each tier providing equipment and resources appropriate to the size of the spill. Small, Tier One, spills can be dealt with immediately by the operator itself on site, while others would require further outside assistance, in addition to the operator’s on-site resources and assets. As described by Mark MacLeod of Chevron:

The first tier is in the event of a small spill, whereby we would activate resources on board the [drill ship] and the supply vessel standing by. A certain amount of boom and equipment absorbent would be brought to bear.¹²⁶

121 Mark MacLeod, Vice-President, Atlantic Canada, Chevron Canada Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 10 June 2010.

122 The Honourable Christian Paradis, Minister of Natural Resources Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 June 2010.

123 C-NSOPB and C-NLOPB, [Drilling and Production Guidelines](#), 31 December 2009 at page 59.

124 See for example, [Newfoundland Offshore Petroleum Drilling and Production Regulations](#), section 6(j).

125 René Grenier, Deputy Commissioner, Canadian Coast Guard, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 15 June 2010.

126 Mark MacLeod, Vice-President, Atlantic Canada, Chevron Canada Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 10 June 2010.

Meanwhile, the responsible government agency, C-NLOPB or C-NSOPB, acts in a monitoring role. It does, however, have the authority to supersede the operator if it determines that the response is inadequate. This situation was described by the CEO of the C-NSOPB in testimony before the committee:

Depending on the significance of the spill, our role would range from monitoring the operator's activities to giving direction to the operator or in the most severe or extreme cases to managing the spill response.¹²⁷

The tiered response system forms a cascade. As such, a Tier Two response will incorporate on site equipment and resources from a Tier One response. A Tier Three response will bring additional resources on top of the assets and personnel mobilized during Tier Two.

12.2 Tier Two – Regional Response

If the oil spill is of a greater magnitude and cannot be immediately contained by equipment on site, offshore operators mobilize a Tier Two response. As all Atlantic offshore oil and gas projects have a contract with ECRC to provide assistance with oil spill cleanup responses, this organization is brought in at this stage. A representative from Husky Energy explained to the committee what a Tier Two response plan looked like for his company:

We will mobilize equipment from onshore. We, as operator, have purchased our own equipment, including state-of-the-art Norwegian skimmers and booms. These are held for us by ECRC. Other operators on the Grand Banks also have equipment that can provide mutual aid. That is the equipment we refer to in Tier Two along with the equipment that ECRC has.¹²⁸

When ECRC responds to a spill, it works as a contractor for the offshore operator, who has oversight and final say on whatever oil spill response plans are:

ECRC's role in a spill is to provide operational management, which includes spill management and planning. We would prepare a plan. There would be an emergency phase and in the background we would be preparing a longer-term response plan. That response plan would be developed in conjunction with government agencies as well as the responsible party [the offshore operator]. The responsible party, in cooperation with the lead agency, would sign off on that plan and we would continue with the response.¹²⁹

The magnitude of a Tier Two spill corresponds to petroleum discharges of up to 10,000 tonnes. This amount, which represents roughly 60,000 barrels of oil, is the equipment preparedness certification standard required by Transport Canada for response organizations.¹³⁰

127 Stuart Pinks, CEO, Canada-Nova Scotia Offshore Petroleum Board, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 27 May 2010.

128 Paul McCloskey, Vice-President, East Coast Operations, Husky Oil Operations Limited, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 17 June 2010.

129 James Carson, President and General Manager, Eastern Canada Response Corporation, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 15 June 2010.

130 Ibid.

12.3 Tier Three – Global Response

A severe oil spill or simultaneous small spills that exceed regional resource capacity trigger the Tier Three response plan. This is the ultimate step in the tiered response and therefore signifies a critical situation, such as a blowout. All available resources are pooled to assist in the containment. Offshore operators such as ExxonMobil are international corporations that can bring in equipment and expertise from abroad:

We have a team of people who are trained every year in global response. They go around to various locations to train for tabletop scenarios. They have knowledge, contacts and access to resources virtually around the world that ExxonMobil can call in at our disposal if need be. That would be the third tier of response.¹³¹

Representatives from Chevron and Husky Energy who also appeared before the committee provided similar descriptions of their global emergency response capabilities. As for ECRC, their plan response escalation includes the following:

At that point, Tier One and Tier Two will still be deployed. We will also call upon additional resources to assist in the effort. This will potentially include mobilization of Coast Guard resources, additional ECRC resources from other places in Canada and international support. We have a contract with Oil Spill Response Limited, OSRL, which is based in Southampton in the United Kingdom. They can deploy significant resources, including a couple of Hercules aircraft to fly in additional equipment.¹³²

It should be noted that of the offshore operators that appeared before the committee, only the representative from ExxonMobil confirmed that their company regularly practices Tier Three response capability tabletop drills.¹³³

12.4 The Committee's Concerns

There is some concern with respect to the way the offshore operator and the ECRC work in responding to a spill. The committee heard that the ECRC would not see an operator's contingency spill plan in any detail until there is a spill and a response is needed. This suggests ECRC is an integral part of a response plan that they do not see until after a spill that is large enough to require ECRC's assistance. If this is truly the case, the committee believes this is cause for serious concern.

The recent increase in scrutiny of offshore response plans has led to greater transparency on the part of regulators such as the C-NLOPB. In a recent significant move, it has made all of its Oil Spill Response Plans available to the public in largely unedited form.¹³⁴

Given the importance of the plan and the need to respond quickly and effectively to a potentially devastating oil spill, it seems reasonable to expect there should be greater collaboration between responders in developing, preparing and practicing in *advance* of an event.

131 Glenn Scott, President, ExxonMobil Canada Ltd, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 29 June 2010.

132 James Carson, President and General Manager, Eastern Canada Response Corporation, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 15 June 2010.

133 Glenn Scott, President, ExxonMobil Canada Ltd, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 29 June 2010.

134 C-NLOPB, News Releases, [C-NLOPB makes operator oil spill response plans available](#), 22 July 2010.

Thirteen

Liability for Damages Caused by an Oil Spill

In this chapter:

- 13.1 Absolute liability fund
- 13.2 Civil liability fund
- 13.3 Demonstrated financial capacity
- 13.4 The Committee's Concerns

Chapter Thirteen

Liability for Damages Caused by an Oil Spill

In a decision of the US District Court on 3 August 2010, District Judge Laura Taylor Swain opined: “There is a general imperative to hold appropriate parties accountable for oil spills that cause major economic and environmental danger.”¹³⁵ Judge Swain said this in her decision in the case of the *Prestige*, which broke up and sank off Spain in November 2002, creating severe oil pollution off the Spanish Coast. Some 77,000 tonnes of fuel oil (approximately 500,000 barrels) polluted the coast in Spain’s worst environmental disaster ever. In this decision Judge Swain dismissed the claim of the Government of Spain for one billion dollars against American Bureau of Shipping, the classification society that allegedly certified the *Prestige* as seaworthy.

Companies drilling in Canada’s offshore areas are responsible for preventing, mitigating and managing any oil spills from their operations. They are liable for cleaning up a spill and for paying for third party losses or damages.¹³⁶ Third party damages are claims for specified damage, loss and injury from people or groups other than the offshore operator. It is important to note there is a distinction between a company’s financial responsibility to clean up a spill and for its legal liability to pay any third party losses or damages. The responsibility to clean up a spill is unlimited; there is no cap on the money an operator must spend on this. The *Canada Oil and Gas Operations Act* and the Atlantic Accords require that those responsible for a spill take all reasonable measures to contain and clean up the spill.¹³⁷ If such measures are not being taken, the legislation empowers the offshore regulators to direct the management of the spill response.¹³⁸

13.1 Absolute liability fund

Offshore operators face an escalating scale of financial responsibility for damages and losses. To begin with, the two Atlantic offshore petroleum Boards require anyone drilling to have in place a \$30 million absolute liability fund.¹³⁹ North of 60 degrees latitude, this fund must be \$40 million.¹⁴⁰ Absolute liability means that the operators are responsible for any losses or damage caused to third parties, regardless of their carelessness or fault. That is, those claiming damages do not have to prove any fault or negligence on the part of the company. If there is a spill that results in damage or loss, the operator must pay, whether they are at fault or not.

13.2 Civil liability fund

The next step of financial responsibility is an additional \$70 million; however, it re-

135 *Reino de Espana v. American Bureau of Shipping et al*, U.S. District Court, Southern District of New York (Manhattan), No. 03-03573.

136 Under the *Canada Oil and Gas Operations Act*, the National Energy Board may require a deposit relating to liability for loss, damage, costs or expenses: section 5(4). The Board can determine the extent of an authorization holder’s liability: section 13.13.

137 *Canada Oil and Gas Operations Act*, section 25(3); *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act*, section 161(3) and *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, section 166(3).

138 *Canada Oil and Gas Operations Act*, sections 25(4)-(6); *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act*, sections 161(4)-(6) and *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*, sections 166(4)-(6).

139 *Canada-Newfoundland Oil and Gas Spills and Debris Liability Regulations*, section 3(c); *Canada-Nova Scotia Oil and Gas Spills and Debris Liability Regulations*, section 2.

140 *Oil and Gas Spills and Debris Liability Regulations*, section 3(b).

quires proof of fault or negligence on the part of the drilling company or operator.¹⁴¹ All offshore regulators – the NEB and the two Atlantic offshore petroleum Boards – require that they have access to a \$70 million fund out of which third party losses can be paid upon proof of wrongdoing by the operator. Companies can establish this fund through bonds, insurance, promissory notes or other financial security.

13.3 Demonstrated financial capacity

The purpose of the third level in an operator's financial responsibility is to demonstrate their capacity to meet any financial liability that may occur in conducting the drilling program. The operator can be required to provide evidence to the Boards that they have a minimum of \$250 million to fund well control, well safety and spill clean-up expenses. The amount set by the regulators depends on the particular circumstances of a drilling operation and ensures that the company can pay damages of at least that amount.¹⁴² Third-party claims require proof of fault or negligence on the part of the operator, and if the company has been negligent or is at fault, there is no limit to their liability.

13.4 The Committee's Concerns

An offshore operator faces an absolute liability maximum of \$30 million (\$40 million in the Arctic offshore) in those instances where it is not at fault or negligent, and unlimited liability where it has been negligent. However, there may be situations where the operator has not been negligent and damages exceed \$30 million, such as when a drilling rig or ship is struck by lightning or suffers damage from a storm, resulting in a spill.

As the disaster in the Gulf of Mexico demonstrates, this \$30 million figure may be woefully inadequate. Moreover, this limit on liability could permit offshore operators to avoid paying the full cost of spills occurring as a result of their operations, perhaps paying only a small fraction of the overall third-party claims for economic loss. Governments may then have to step in to fill this financial void.

The committee has noted significant reviews of the liability and responsibility issues are underway and strongly support such reviews.

As a result of major environmental disasters like the Prestige, the Exxon Valdez and now the Deepwater Horizon, nations have wrestled with the establishment of appropriate liability regimes to provide for compensation of those suffering economic loss and the cost of remediating environmental damages. There is little uniformity at the present time and Canada's own regime appears to be confused and likely out of date, given current economic conditions.

The committee realizes this is a complex subject which requires a balance between fair compensation for the aggrieved and reasonable limits for the operators such that they not be deterred from engaging in offshore drilling. However, the committee did not study this issue in depth.

141 C-NSOPB and C-NLOPB, [Guidelines respecting financial responsibility requirements for work or activity in the Newfoundland and Nova Scotia Offshore Areas](#), section 4.1(f).

142 Mark Corey, Assistant Deputy Minister, Energy Sector, Natural Resources Canada, Proceedings (Evidence), Standing Senate Committee on Energy, the Environment and Natural Resources, 8 June 2010.

Fourteen

Where to From Here? The Committee's Recommendations

In this chapter:

- 14.1 Offshore oil and gas activities
- 14.2 Current offshore drilling
- 14.3 Canadian offshore industry safety record
- 14.4 Offshore oil and gas regulatory regime
- 14.5 Research and Development
- 14.6 Blowout preventers and relief wells
- 14.7 Offshore spill response
- 14.8 Financial responsibility

Chapter Fourteen

Where to From Here? The Committee's Recommendations

Over the past months, Canadians have been watching and reading about the unfolding disaster in the Gulf of Mexico. From the initial explosion and tragic loss of life, to the continuing efforts to contain an oil slick that is threatening livelihoods and may be an environmental catastrophe of an unprecedented magnitude, the Deepwater Horizon oil spill is a stark reminder of the risks posed by offshore petroleum exploration.

Canada has a thriving offshore oil and gas industry that is expected to grow in the coming decades. In the aftermath of the Deepwater Horizon incident, Canadians are concerned and are justified in questioning the safety and regulation of our offshore drilling industry. In fact, a majority appear to favour suspending offshore drilling in Canada until the government can review the risks, and others feel it should be banned permanently.¹⁴³

As stated at the outset, the committee took the initiative to organize a series of fact-finding hearings with regulators, government officials, oil spill response organizations, industry representatives and environmental experts to assess the state of actual activities in the Canadian offshore, including drilling regulations, prevention measures and response capabilities. The committee felt it was important to review Canada's offshore activities in a rational manner to better understand the facts of the situation and avoid conclusions that may be based on misunderstanding.

The Canadian offshore regulatory regime is well organized and well regulated. It is among the most stringent and efficient in the world. It is under review on a continuing basis and projects are regulated on the basis of judgment rather than prescriptive rules. Canada participates with other offshore drilling nations in the International Regulators Forum to continually enhance best practices.

The committee has heard persuasive testimony that Canadian governments, offshore regulators and operators are taking measured and appropriate steps to review safety and environmental regulations in light of the Deepwater Horizon disaster to ensure offshore activities are being conducted as safely as possible. The National Energy Board has announced a comprehensive review of Arctic safety and environmental offshore drilling requirements.¹⁴⁴ The Government of Newfoundland and Labrador resisted calls for suspending the Chevron deepwater project in the Orphan Basin and has begun a comprehensive review of offshore oil spill prevention and remediation requirements and practices in the province.¹⁴⁵ The C-NLOPB instituted special oversight measures for Chevron for its deepwater well drilling program in the Orphan

143 Ekos Politics, [Most Canadians want offshore drilling suspended or stopped](#), Ottawa, 20 May 2010.

144 National Energy Board, News Release, ["National Energy Board Announces Review of Arctic Safety and Environmental Offshore Drilling Requirements"](#), 11 May 2010.

145 Government of Newfoundland and Labrador, News Release, ["Consultant Retained for Review of Offshore Oil Spill Safety Practices"](#), 12 May 2010.

Basin.¹⁴⁶ Moreover, those involved in Canadian offshore activities will be studying the final reports on the Deepwater Horizon incident and learning from their findings, including amending legislation, regulations and guidelines if necessary.

However, while we await these reports, findings and recommendations, we do feel it useful to comment on our observations from this study.

The following is a summary of the committee's findings along with its concerns and its recommendations, where appropriate:

14.1 Offshore oil and gas activities

In the course of its hearings, the committee investigated the state of offshore operations across Canada, from sea to sea to sea. **There is currently no offshore drilling on the West coast or in the Arctic.** All offshore oil and gas activity is taking place in the waters off the coasts of Nova Scotia and Newfoundland and Labrador. As a result, the committee's hearings focused on the Atlantic offshore where there are three actively producing offshore oil and one offshore gas project.

The committee understands that offshore oil and gas activities are vital to the economies of Nova Scotia, Newfoundland and Labrador, New Brunswick and Prince Edward Island, as well as of Canada as a whole.¹⁴⁷

14.2 Current offshore drilling

The Chevron Lona 0-55 deepwater exploration well, off the coast of Newfoundland and Labrador, is the only active drilling program in Canadian waters. In Newfoundland and Labrador, the Hebron project is currently under development with drilling slated to begin after 2012 and oil production in 2017. In Nova Scotia, the Deep Panuke Gas Development Project is also under development, with production set to begin in 2011.

The committee has not heard sufficient evidence which would lead it to recommend banning current offshore drilling either permanently or temporarily while Canada's government regulators re-evaluate the regulatory regime, safety measures and contingency plans in light of the Deepwater Horizon oil spill.

However, given the various reviews and studies that are now taking place, it did seem to the committee that there exists in effect an unstated temporary hold on any new offshore drilling projects. Clearly, each new licence application is being carefully scrutinized and considered on its own merits.

RECOMMENDATION 1

The committee does not recommend banning current offshore drilling either permanently or temporarily while Canada's government regulators re-evaluate the regulatory regime, safety measures and contingency plans in light of the Deepwater Horizon oil spill.

146 Canada-Newfoundland and Labrador Offshore Petroleum Board, News Release, "[C-NLOPB Announces Special Oversight Measures for Orphan Basin Drilling Program](#)", 20 May 2010.

147 According to the Centre for Energy, New Brunswick has benefitted from the construction of the natural gas pipeline originating from the Sable Offshore Energy Project. There is also an interest in oil and gas exploration in Prince Edward Island. To date, one offshore permit has been granted off the eastern tip of the province ([map](#)).

14.3 Canadian offshore industry safety record

Since 1966, 562 wells have been drilled in Atlantic offshore areas. Blowouts occurred twice at gas wells off the coast of Nova Scotia in 1984 and in 1985. Only one resulted in a minor release of gas and condensate into the environment. Meanwhile, spills from offshore operations in Newfoundland and Labrador occur at a rate of approximately one barrel of oil per million produced.

The committee has been assured that regulators and the offshore petroleum industry do not take past successes at avoiding and mitigating spills for granted and are continuing to be proactive and precautionary.

14.4 Offshore oil and gas regulatory regime

Offshore operators are required to satisfy a number of specific safety, environmental and contingency conditions set out in the appropriate regulations. The committee heard that there was a transition from a prescriptive to a goal-oriented regulatory approach on 31 December 2009. This new regulatory regime is considered by government regulators and industry to be more flexible and better adapted to new technologies. In addition to regulations, Atlantic offshore petroleum Boards have established numerous guidelines for operators conducting offshore activities.

Regulatory oversight in Arctic offshore areas is substantially different from the Atlantic Accords. The Canada-Newfoundland and Labrador Offshore Petroleum and Canada-Nova Scotia Offshore Petroleum Board are responsible for the leasing of offshore licences and industry oversight in their respective jurisdictions. In the Arctic offshore, Indian and Northern Affairs Canada is responsible for exploration and development of oil and gas resources through licensing, while the National Energy Board provides regulatory oversight and grants operations authorizations.

RECOMMENDATION 2

The committee recommends exploring in greater detail the structure and role of the offshore petroleum Boards to determine whether there may be in fact a material conflict between regulatory roles.

14.5 Research and Development

Offshore operators are required by the Atlantic Accords to put aside a fraction of project costs and revenues towards research and development as well as education and training activities within the province. Although these benefit plans must be approved by the respective offshore petroleum Boards, the company decides the type of activities that will get funded.

The committee did not hear evidence to suggest that that research and development into technologies for drilling at greater depths in more remote areas is matched with corresponding R&D expenditures into avoidance and containment of deepwater blowouts.

The committee was assured that as more is learned about what exactly happened in the Deepwater Horizon incident, there will be greater emphasis on research into how to avoid and react to such deepwater spills.

14.6 Blowout preventers and relief wells

As a result of the transition from prescriptive to goal-oriented regulations, requirements for blowout preventers and relief wells are not explicitly set out in offshore drilling legislation or regulations. That is, the applicable legislation or regulations do not specifically insist upon drilling relief wells in every case. Guidelines established by the regulators do provide certain details of the practices by which operators are supposed to abide when drilling offshore. For example, blowout preventers are required to be rated at higher pressures than the maximal calculated surface pressure for a particular well. Meanwhile, operators currently have an agreement with regulators as to have a drill ship on standby, ready to start a relief well, within 12-14 days of an emergency.

The committee was assured that as more is learned about what exactly happened in the Deepwater Horizon catastrophe, and especially regarding the well's blowout preventer, regulators will be able to prescribe appropriate amended blowout preventer guidelines for operators, if applicable.

RECOMMENDATION 3

The committee recommends a thorough discussion by regulators and industry respecting whether and under what circumstances relief wells should be prescribed. As was the case in the Gulf of Mexico, a relief well can take several months to complete; therefore, it follows that current US relief well drilling requirements appear to be inadequate to maximize oil slick containment and minimize environmental damage. As well, drilling two exploratory wells instead of one may inadvertently increase the likelihood of a blowout.

14.7 Offshore spill response

In the event of a spill, the Board-approved contingency plan of offshore operators requires the initiation of a three-tiered cascading spill response. The petroleum company is in charge and responsible for the response. The responsible offshore petroleum Board acts in a monitoring role and may opt to take control of the situation if it has reason to believe that the company is not providing an effective response. Small, localized spills are classified as Tier One and are handled on site by the operator. Larger spills escalate the response to Tier Two. Response organizations such as the ECRC are dispatched to assist the operator in the containment and clean-up efforts. A significant spill results in the ultimate Tier Three response and includes the mobilization of the global personnel and equipment resources.

RECOMMENDATION 4

The committee recommends that there be greater collaboration between all those responsible for responding to an oil spill in developing, preparing and practicing in advance of an event.

RECOMMENDATION 5

The committee recommends that all offshore operators be required to organize Tier Three spill response tabletop drills at regular intervals.

14.8 Financial responsibility

Both Atlantic offshore petroleum Boards have three mandatory levels of operator liability in case of third party damages from an oil or gas spill. Payouts from the \$30 million absolute liability fund for damage claimants are irrespective of fault or negligence. An additional \$70 million civil liability fund can be accessed by the regulatory Board in cases where there is proof of fault or negligence on the part of the offshore operator. Finally, the petroleum company wishing to drill in offshore areas must also be able to demonstrate to the Board that they have the financial capacity to pay any third party damages and spill cleanup costs amounting at least \$250 million. There is no ceiling on third party damage claims in the case of fault or negligence. There is also no ceiling on what offshore operators must pay to clean up a spill.

That said, the committee does not believe that \$350 million in funds is an acceptable amount that can be used to cover damages and clean-up efforts in the event of a major spill. In comparison, as a result of U.S. government pressure, British Petroleum has set up a \$20 billion escrow fund to deal with damage claims. In less than three months, BP has already disbursed more than \$3 billion on damage claims and the oil clean-up effort. The final costs to BP to cover all damages wrought by the spill may be considerably higher.

It should be noted that the Boards' liability thresholds have not increased since they were set in 1986. Therefore, in real dollar terms, that is, adjusted for inflation, the thresholds are much lower than when they were initially set. The committee can see no reason why these thresholds should diminish (in real dollar terms) over time. At a minimum, the thresholds should be adjusted to reflect current economic realities.

RECOMMENDATION 6

The committee recommends a comprehensive review of the issue of liability, including whether the thresholds should be adjusted to reflect current economic realities.

Appendices

In this section:

Appendix A — Deepwater Horizon Disaster Timeline

Appendix B — Offshore Regions (Figures)

Appendix C — The Atlantic Offshore Regulators

Appendix D — Overview of Offshore Oil and Gas Regulations in Canada

Appendix E — Oil and Gas Management Process in Atlantic Offshore Areas (Figure)

Appendix F — Various Tables

Appendix G — Offshore Oil and Gas Glossary

Appendix H — Witnesses

Appendix A

Deepwater Horizon Disaster Timeline

December 1998: Construction begins on the Deepwater Horizon oil rig in Ulsan, South Korea, by Hyundai Heavy Industries Shipyard.

February 2001: The rig is delivered and valued at more than \$560m.

20 April 2010: Explosion and fire on the BP-licensed Transocean drilling rig Deepwater Horizon, located in the Gulf of Mexico. Eleven people are reported missing and approximately 17 injured.

22 April: Deepwater Horizon rig sinks in 5,000ft of water. There are reports of a five-mile-long oil slick. Search-and-rescue operations by the US National Response Team begin.

23 April: The US coast guard suspends the search for missing workers, who are all presumed dead. The rig is found upside down about a quarter-mile from the blowout preventer.

24 April: Oil is found leaking from the well for the first time.

27 April: U.S. Minerals Management Service approves a plan for two relief wells.

29 April: President Obama pledges “every single available resource”, including the US military, to contain the spreading spill, and also says BP is responsible for the cleanup.

30 April: BP chairman Tony Hayward says the company will take full responsibility for the spill, paying for all legitimate claims and the cost for the cleanup.

6 May: BP confirms the arrival of three huge containment domes designed to collect much of the 5,000bpd leaking into the US Gulf from the Macondo blowout.

7 May: BP engineers use undersea robots to move the containment chamber over the larger of the two remaining leaks on the seabed. Efforts to close valves on a failed blowout preventer with underwater robots are abandoned.

8 May: BP’s containment dome hits a snag when a buildup of crystallised gas forces engineers to postpone efforts to place the chamber over the oil leak and draw the oil to the surface. Tar balls suspected to come from the leak wash up along a half-mile stretch of Dauphin Island, Alabama.

9 May: BP says it might try to plug the undersea leak by pumping materials such as shredded tyres and golf balls into the well at high pressure, a method called a “junk shot”.

10 May: BP announces plans to place a small containment dome, known as a “top hat”, over the blown-out well to funnel oil to the surface, as Hayward holds a press conference.

11 May: At a hearing before a U.S. Senate Committee, representatives of the three

oil companies involved in the Deepwater Horizon blame each other for the accident.

11 May: The National Energy Board announced that it will be conducting a review of Arctic safety and environmental offshore drilling requirements.

12 May: The Province of Newfoundland and Labrador announced a review of offshore oil spill safety practices.

12 May: BP lowers a five-foot-high dome to attempt to cover the smaller leak.

13 May: The Minister of Natural Resources Canada and the Nova Scotia Minister of the Department of Energy jointly announced the decision to extend the moratorium on oil and gas activities in Georges Bank until the end of 2015.

14 May: BP plans to insert a 4in-tube into the ruptured 21in riser pipe that would take the oil to the surface. If that fails, they will use the small containment dome that has already been lowered. Both methods are intended to reduce, not to stop, the leak.

20 May: Experts testifying at the congressional hearing put the figure at 20,000-100,000 barrels per day.

20 May: The Canada-Newfoundland Offshore Board announced a number of additional measures on the Chevron drilling project.

20 May: A survey conducted by Ekos Politics indicates most Canadians are in favour of suspending offshore drilling in Canada until the federal government can review the risks, or stopping it altogether.

26 May: BP pumps thousands of barrels of mud into the well in an attempt to plug the leak. The process, known as top kill, fails to overcome the flow of oil.

16 June: BP agrees to a \$20bn (£13.5bn) downpayment towards compensation for victims of the oil spill.

30 June: Hurricane Alex causes heavy seas, disrupting BP's clean-up efforts.

5 July: BP announces the cost of the oil spill has now risen to over \$3bn.

9 July: A US appeals court rejects the federal government's effort to restore an offshore deepwater drilling moratorium.

13 July: BP successfully installs a new, more tightly fitting containment cap on the ruptured wellhead.

15 July: BP stops the flow of oil for the first time in 87 days.

23 July: It is revealed that the Deepwater Horizon alarms were switched off at the time of the explosion to allow workers to sleep undisturbed.

26 July: The BP chief executive is to leave the company, to be replaced by Bob Dudley, a BP veteran currently overseeing the clean-up of the oil spill.

3 August: BP begins tests in advance of a "static kill" procedure, which involves pumping heavy drilling mud into the well. If the tests reveal the well can handle the

pressure of the static kill procedure, BP will begin pumping mud into the well from a nearby ship. The plan is to slowly force the escaping hydrocarbons back down into the reservoir by steadily pumping in the heavier mud. The dense mud essentially suffocates the flow of oil, forcing it back down the well into the reservoir. If this procedure is successful, BP will then be able to either cement the well from the top, or wait until the relief wells, which are due to be completed later in August, have reached the correct depth and cement the well from the bottom.

4 August: President Barack Obama states “efforts to stop the well through what’s called a ‘static kill’ appear to be working” and “the long battle to stop the leak and contain the oil is finally close to coming to an end.”

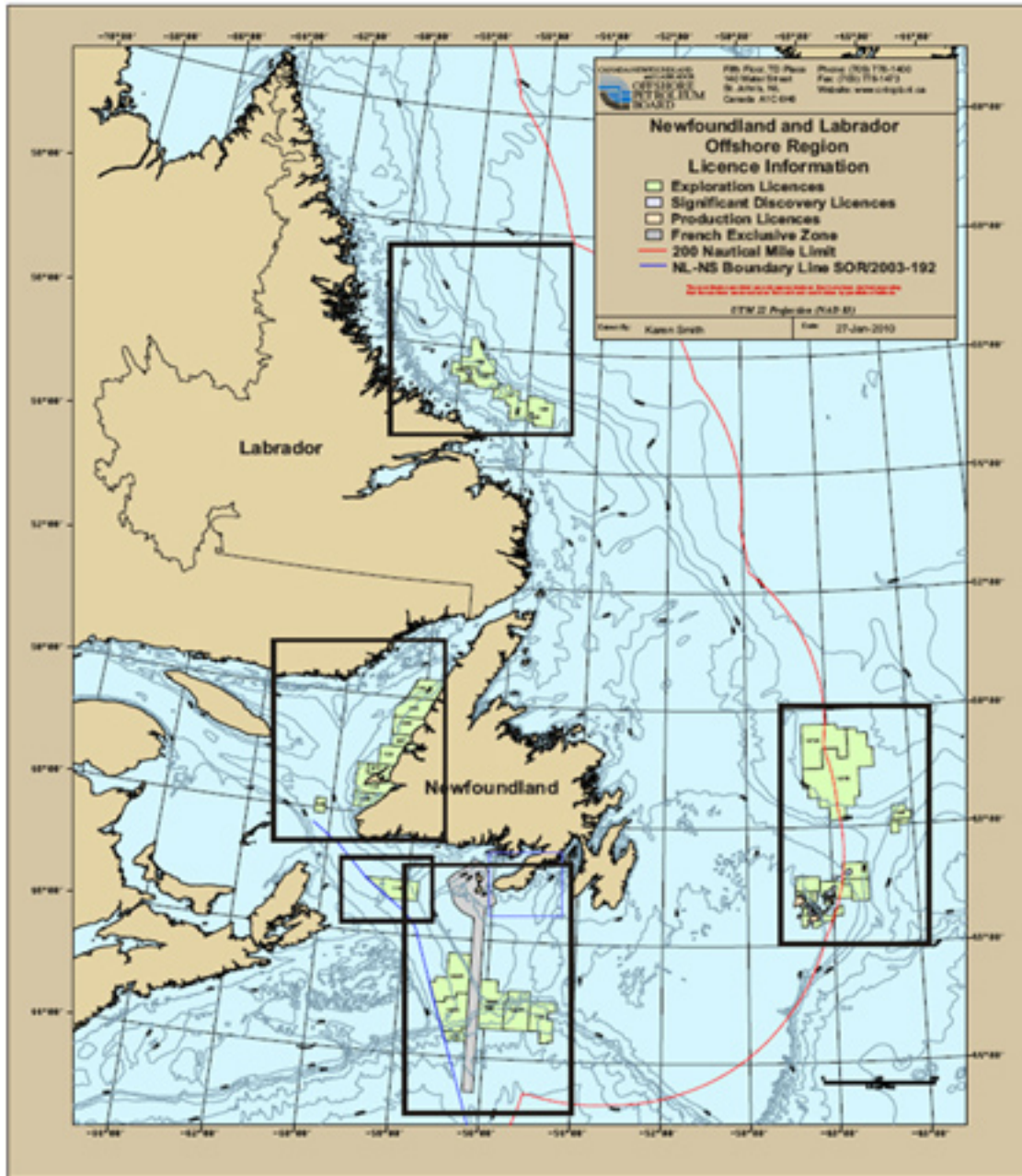
8 August: Pressure tests indicate that the procedure to prevent any more oil from spilling with a cement plug appears to have succeeded; the drilling of the relief wells continue so as to ensure the well is permanently sealed.

9 August: BP reports that it expects the relief well to intersect the main well by 15 August, depending on weather. Drilling mud and cement will then be pumped through the relief well into the broken well, sealing it permanently.

Source: Adapted from The Guardian, [BP Oil spill timeline](#).

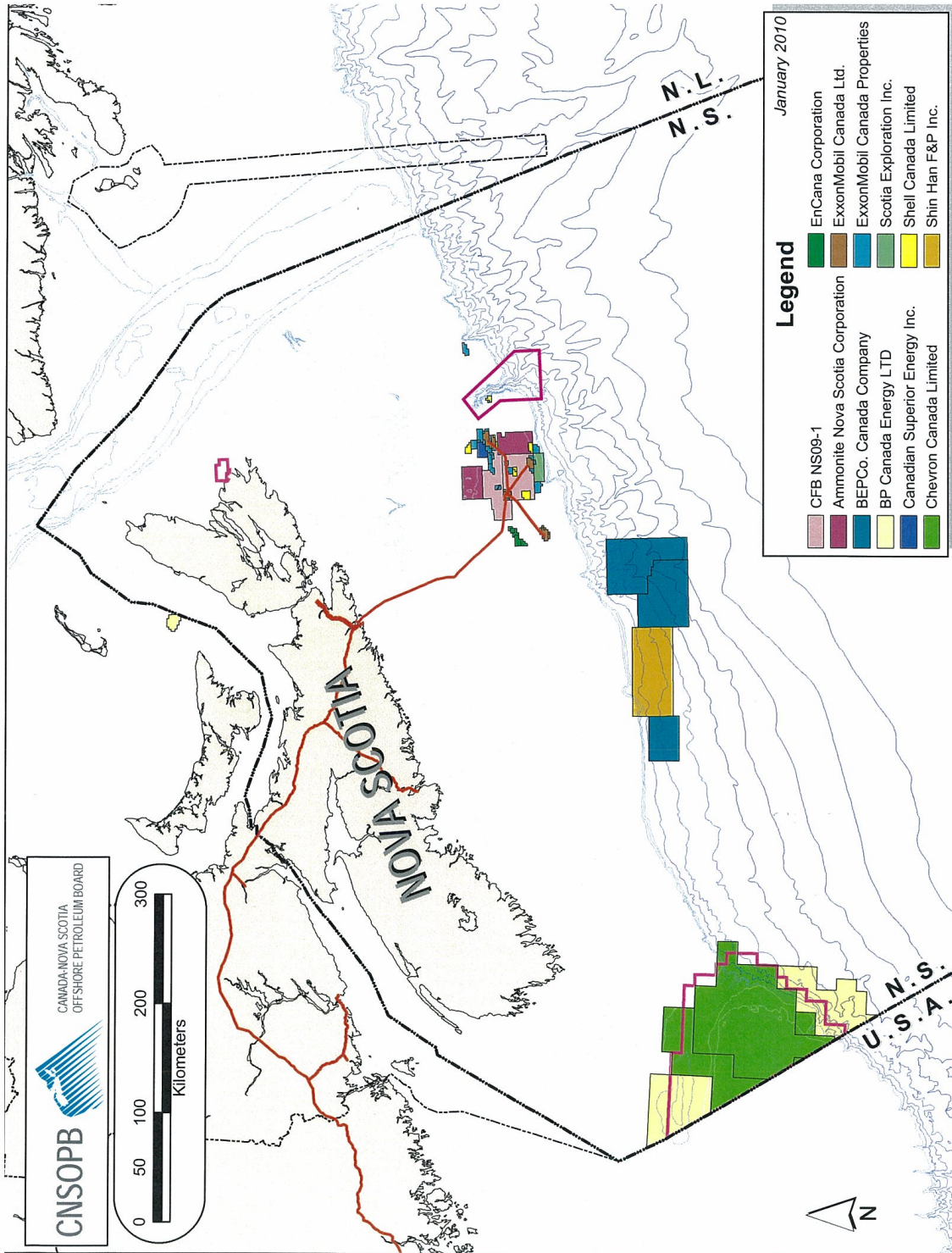
Appendix B

Figure 1: Newfoundland and Labrador Offshore Region



Source: C-NLOPB, Information and Reports, [Maps and Charts](#).

Figure 2: Nova Scotia Offshore Region



Source: C-NSOPB, Lands Management, Maps and Coordinates, [Active Exploration Licences in the Nova Scotia Offshore Area](#).

Appendix C

The Atlantic offshore regulators

In their respective jurisdictions, the Canada-Newfoundland and Labrador Offshore Petroleum Board and the Canada-Nova Scotia Offshore Petroleum Board regulate offshore oil and gas exploration and production.

The Canada-Newfoundland and Labrador Offshore Petroleum Board was established in 1986 as a joint federal/provincial agency pursuant to the federal [*Canada-Newfoundland Atlantic Accord Implementation Act*](#) and by the provincial [*Canada-Newfoundland and Labrador Atlantic Accord Implementation Act*](#). This legislation brought into law the principles established in a 1985 agreement between the federal government and the provincial government relating to offshore petroleum resources. The Board has 7 members; three appointed by the federal government, three appointed by the provincial government, and a Chair and CEO that is appointed jointly by the two governments.

The Canada-Nova Scotia Offshore Petroleum Board was established in 1990 as a joint federal-provincial agency pursuant to the federal [*Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*](#) and the provincial [*Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation \(Nova Scotia\) Act*](#). These Acts implemented a 1986 agreement between the federal government and Nova Scotia relating to offshore petroleum resources. This Board consists of 5 members. The Chair is jointly appointed by both the Government of Canada and the Government of Nova Scotia, and each government appoints two Board members.

Appendix D

Overview of Offshore Oil and Gas Regulations in Canada

In Canada, offshore oil and gas activities are governed by four federal Acts:

The [*Canada Oil and Gas Operations Act*](#) (COGOA) governs the exploration, production, processing, and transportation of oil and gas in marine areas under federal jurisdiction, and is the primary federal legislation that governs safety, environmental protection, resource conservation, and joint production agreements in Canada's oil and gas sector.

The [*Canada Oil and Gas Drilling and Production Regulations*](#) set out requirements for licences for exploration and authorizations drilling, including a mandatory safety plan outlining procedures, practices, resources and monitoring measures to ensure the safety of the proposed work.

The [*Canada Petroleum Resources Act*](#) (CPRA) governs the lease of federally owned oil and gas rights on frontier lands (the territorial sea, the continental shelf, and the Northwest Territories, Nunavut and Sable Island) to oil and gas companies for exploration and development.

The [*Canada-Newfoundland Atlantic Accord Implementation Act*](#) and the [*Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act*](#) outline the shared federal-provincial management of oil and gas resources off the coasts of Newfoundland and Nova Scotia, and establish respective offshore regulatory Boards. The Acts mirror the COGOA and the CPRA and are the enabling legislation for regulations governing oil and gas activities in their respective offshore areas.

The National Energy Board (NEB) regulates Frontier lands and offshore areas not covered by provincial/federal management agreements. The Board's responsibilities include "the regulation of oil and gas exploration, development and production, enhancing worker safety, and protecting the environment."¹⁴⁸

The Canada-Newfoundland and Labrador Offshore Petroleum Board regulates the exploration for and development of the hydrocarbon resources in the Newfoundland and Labrador Offshore Area. The principle applicable regulations are the [*Newfoundland Offshore Petroleum Drilling and Production Regulations*](#).

The Canada-Nova Scotia Offshore Petroleum Board regulates oil and gas activities in the Nova Scotia offshore region. Oil and gas operations there are governed by the [*Nova Scotia Offshore Petroleum Drilling and Production Regulations*](#).

To obtain authorization for a proposed offshore oil and gas exploration or development project, an oil and gas company must satisfy certain safety, environmental and contingency conditions, according to regulation.

The following sections outline the regulatory provisions specific to oil spill or blow-out prevention. The text is identical in both the Nova Scotia and Newfoundland and Labrador regulations, and it mirrors the text in the federal Canada Oil and Gas

148 The National Energy Board, <http://www.neb.gc.ca/clf-nsi/rthnb/whwrndrgvrnnc/rrspnsblt-eng.html#s4>.

Drilling and Production Regulations.

Safety Plan

Section 6 of both the Newfoundland Offshore Petroleum Drilling and Production Regulations and the Nova Scotia Offshore Petroleum Drilling and Production Regulations provides that an application for authorization to drill must be accompanied by “(c) a safety plan that meets the requirements of section 8.” The contents of the safety plan are detailed in section 8, as follows:

The safety plan shall set out the procedures, practices, resources, sequence of key safety-related activities and monitoring measures necessary to ensure the safety of the proposed work or activity and shall include

- (a) a summary of and references to the management system that demonstrate how it will be applied to the proposed work or activity and how the duties set out in these Regulations with regard to safety will be fulfilled;
- (b) a summary of the studies undertaken to identify hazards and to evaluate safety risks related to the proposed work or activity;
- (c) a description of the hazards that were identified and the results of the risk evaluation;
- (d) a summary of the measures to avoid, prevent, reduce and manage safety risks;
- (e) a list of all structures, facilities, equipment and systems critical to safety and a summary of the system in place for their inspection, testing and maintenance;
- (f) a description of the organizational structure for the proposed work or activity and the command structure on the installation, which clearly explains
 - (i) their relationship to each other, and
 - (ii) the contact information and position of the person accountable for the safety plan and of the person responsible for implementing it;
- (g) if the possibility of pack sea ice, drifting icebergs or land-fast sea ice exists at the drill or production site, the measures to address the protection of the installation, including systems for ice detection, surveillance, data collection, reporting, forecasting and, if appropriate, ice avoidance or deflection; and
- (h) a description of the arrangements for monitoring compliance with the plan and for measuring performance in relation to its objectives.

Environmental Protection Plan

Section 6(d) of both the Newfoundland Offshore Petroleum Drilling and Production Regulations and the Nova Scotia Offshore Petroleum Drilling and Production Regulations requires that an application for an authorization contain an environmental protection plan according to the requirements outlined in section 9. Section 9 states:

The environmental protection plan shall set out the procedures, practices, resources and monitoring necessary to manage hazards to and protect the environment from

the proposed work or activity and shall include

(a) a summary of and references to the management system that demonstrate how it will be applied to the proposed work or activity and how the duties set out in these Regulations with regard to environmental protection will be fulfilled;

(b) a summary of the studies undertaken to identify environmental hazards and to evaluate environmental risks relating to the proposed work or activity;

(c) a description of the hazards that were identified and the results of the risk evaluation;

(d) a summary of the measures to avoid, prevent, reduce and manage environmental risks;

(e) a list of all structures, facilities, equipment and systems critical to environmental protection and a summary of the system in place for their inspection, testing and maintenance;

(f) a description of the organizational structure for the proposed work or activity and the command structure on the installation, which clearly explains

(i) their relationship to each other, and

(ii) the contact information and position of the person accountable for the environmental protection plan and the person responsible for implementing it;

(g) the procedures for the selection, evaluation and use of chemical substances including process chemicals and drilling fluid ingredients;

(h) a description of equipment and procedures for the treatment, handling and disposal of waste material;

(i) a description of all discharge streams and limits for any discharge into the natural environment including any waste material;

(j) a description of the system for monitoring compliance with the discharge limits identified in paragraph (i), including the sampling and analytical program to determine if those discharges are within the specified limits; and

(k) a description of the arrangements for monitoring compliance with the plan and for measuring performance in relation to its objectives.

Contingency Plan

Under both the Newfoundland Offshore Petroleum Drilling and Production Regulations and the Nova Scotia Offshore Petroleum Drilling and Production Regulations, an application for an authorization from the respective petroleum resources board must be accompanied by mandatory contingency plans, including emergency response procedures, to mitigate the effects of any reasonably foreseeable event that might compromise safety or environmental protection, which shall

(i) provide for coordination measures with any relevant municipal, provincial, territorial or federal emergency response plan, and

(ii) in an offshore area where oil is reasonably expected to be encountered, identify the scope and frequency of the field practice exercise of oil spill countermeasures; (section 6(j))

Furthermore, section 36 of both sets of regulations requires the operator to “ensure that, during all well operations, reliably operating well control equipment is installed to control kicks, prevent blowouts and safely carry out all well activities and operations, including drilling, completion and workover operations.” This equipment includes blowout preventers and shear rams.

Relief wells are used to contain an oil leak by taking the pressure off the primary well so it can be capped after a rupture. A specific statutory requirement for a relief well is not found in the *Canada–Newfoundland Atlantic Accord Implementation Act* or the Newfoundland Offshore Petroleum Drilling and Production Regulations; nor is it found in the *Canada–Nova Scotia Offshore Petroleum Resources Accord Implementation Act* or Nova Scotia Offshore Petroleum Drilling and Production Regulations.

Rather, there are regulatory requirements for safety plans and contingency plans. A relief well is a part of a contingency plan; it is not, however, a specific statutory or regulatory requirement on its own. It is worth noting that when granting authorizations for oil and gas drilling, the NEB requires relief well capability as a condition “100 per cent of the time.”¹⁴⁹

The contingency for a relief well grew from concerns about drilling in the Beaufort Sea. Because of concerns about environmental damage should there be a well blowout or leak, since 1976 it has been a policy requirement of the federal government that operators have the capability to drill a relief well within months of constructing the primary well. This “same season relief well” policy was meant to significantly reduce environmental damage that would result if an oil blowout continued to release oil through the winter season unabated, as the Arctic drilling season is necessarily limited by weather and ice conditions.

The NEB was in the process of reviewing its policy on same season relief well capability in the Beaufort Sea.¹⁵⁰ That review was suspended in light of the Gulf of Mexico disaster. Instead, on 11 May 2010 the National Energy Board announced that it will be conducting a review of Arctic safety and environmental offshore drilling requirements. The Board expects to complete the review before receiving applications for drilling in the Arctic offshore.¹⁵¹

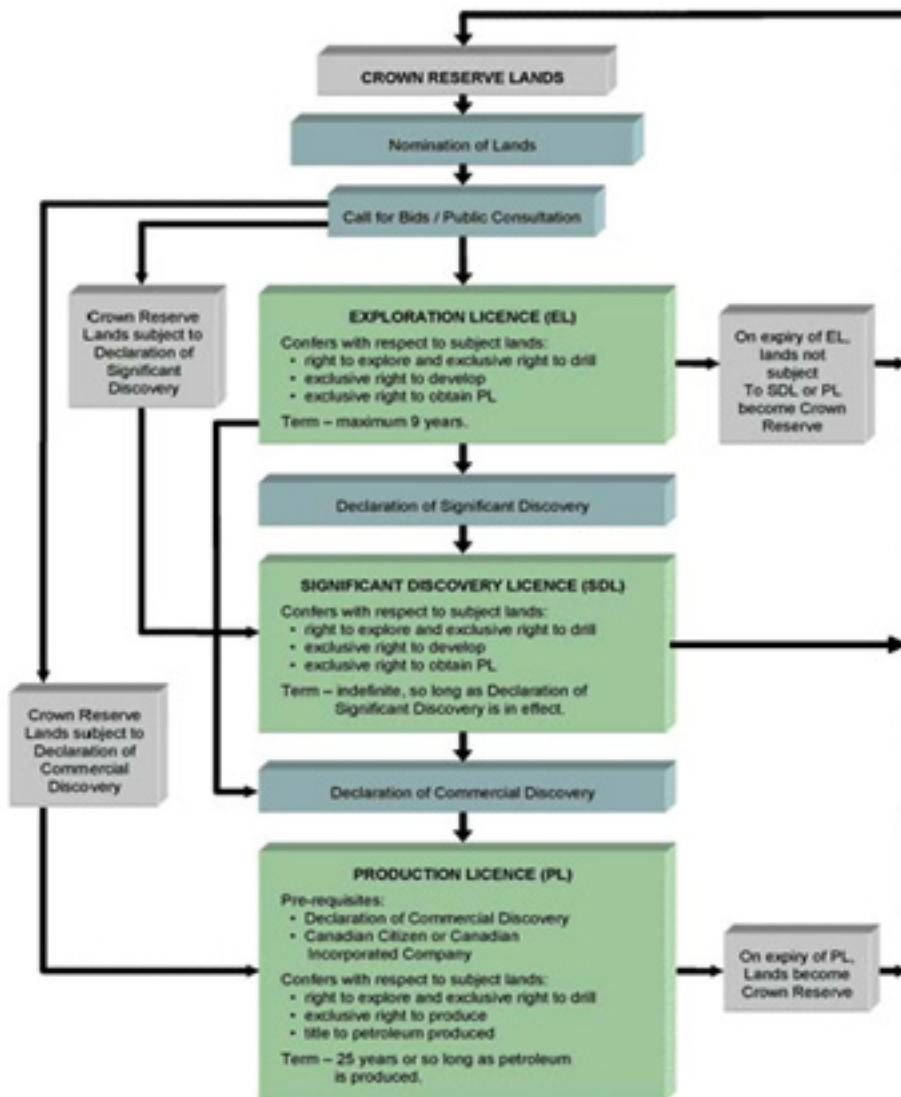
149 Personal conversation with National Energy Board official, 5 May 2010.

150 National Energy Board, New Releases, [National Energy Board Announces Review of Arctic Safety and Environmental Offshore Drilling Requirements](#), 11 May 2010.

151 National Energy Board, New Releases, [National Energy Board Invites Participation in the Public Review of Arctic Offshore Drilling Requirements](#), 10 June 2010.

Appendix E

Figure 3: Overview of oil and gas management process in Atlantic Offshore Areas



Source: C-NSOPB, <http://www.cnsopb.ns.ca/licensing.php>

Appendix F

Table 1: Active Exploratory Licences in Nova Scotia Offshore Areas

Licence Number	Area (ha)	Interest Representative	Effective Date
2407	113,840	BEPCo. Canada Company	01-Jan-2002
2409	11,116	Sonde Resources Corp.	01-Jan-2002
2417	55,500	Ammonite Nova Scotia Corporation	15-Sep-2008
2418	58,445	Ammonite Nova Scotia Corporation	15-Sep-2008
2419	23,512	Scotia Exploration Inc.	01-Jan-2009
2420	303,120	Shin Han F&P Inc.	01-Jan-2009
2421	249,757	BEPCo. Canada Company	14-Aug-2009
2422	271,208	BEPCo. Canada Company	14-Aug-2009

Note: Click on the licence number for more details about the Exploratory Licence (EL). From the effective date, a validation well must be drilled within five years for shallow water ELs and six years for deep water ELs (Period 1). Period 1 can be extended by one year with the payment of a Drilling Deposit. It can then be extended yearly with Board approval and payment of Extension Fees equivalent to rentals. Period 2 expiry is the maximum legislated nine year term of the EL.

Source: C-NSOPB, [Search Licences](#).

Table 2: Active Exploratory Licences in Newfoundland and Labrador Offshore Areas

Licence Number	Area (ha)	Interest Representative	Effective Date	Region
1073R	529,125	Chevron Canada Ltd.	3 Oct. 2008	Grand Banks
1074R	1,163,172	Chevron Canada Ltd.	3 Oct. 2008	Grand Banks
1090R	136,395	Husky Oil Operations Ltd.	14 Jan. 2010	Grand Banks
1092	35,674	Suncor Energy Inc.	15 Jan. 2010	Grand Banks
1093	7,080	ExxonMobil Canada Properties	15 Jan. 2005	Grand Banks
1094	13,485	Husky Oil Operations Ltd.	15 Jan. 2006	Grand Banks
1095	28,457	Suncor Energy Inc.	15 Jan. 2006	Grand Banks

1096	2,130	Husky Oil Operations Ltd.	15 Jan. 2006	Grand Banks
1099	24,838	Husky Oil Operations Ltd.	15 Jan. 2007	Grand Banks
1100	30,572	Statoil Canada Ltd.	15 Jan. 2007	Grand Banks
1101	21,009	Statoil Canada Ltd.	15 Jan. 2007	Grand Banks
1110	138,200	Husky Oil Operations Ltd.	15 Jan. 2009	Grand Banks
1111	134,227	Husky Oil Operations Ltd.	15 Jan. 2009	Grand Banks
1112	55,954	Statoil Canada Ltd.	15 Jan. 2009	Grand Banks
1113	19,430	Suncor Energy Inc.	15 Jan. 2009	Grand Banks
1114	121,348	Husky Oil Operations Ltd.	15 Jan. 2009	Grand Banks
1115	271,891	Husky Oil Operations Ltd.	15 Jan. 2009	Grand Banks
1117	9,558	Husky Oil Operations Ltd.	15 Jan. 2010	Grand Banks
1118	290,070	ConocoPhillips Canada Resources	15 Jan. 2010	Grand Banks
1119	73,931	ConocoPhillips Canada Resources	15 Jan. 2010	Grand Banks
1070	103,040	Canadian Imperial Venture Corp.	15 Jan. 2002	West Coast
1097	96,100	NWest Oil & Gas Inc.	15 Jan. 2006	West Coast
1098	159,872	NWest Oil & Gas Inc.	15 Jan. 2006	West Coast
1102	124,320	B.G. Oil & Gas Ltd.	15 Jan. 2007	West Coast
1103	216,164	NWest Oil & Gas Inc.	15 Jan. 2007	West Coast
1104	187,744	NWest Oil & Gas Inc.	15 Jan. 2007	West Coast
1105	51,780	Corridor Resources Inc.	15 Jan. 2008	West Coast
1116	211,985	PDI Production Inc.	15 Jan. 2009	West Coast
1120	140,210	Ptarmigan Energy Inc.	15 Jan. 2010	West Coast
1106	236,981	Husky Oil Operations Ltd.	15 Nov. 2008	Labrador
1107	236,525	Investean Energy Corp.	15 Nov. 2008	Labrador
1108	233,712	Husky Oil Operations Ltd.	15 Nov. 2008	Labrador
1109	232,460	Chevron Canada Ltd.	15 Nov. 2008	Labrador

Note: For more details about a Exploratory Licence (EL), please visit the C-NLOPB [Registry System Abstracts](#). From the effective date, a validation well must be drilled within five years for shallow water ELs and six years for deep water ELs (Period 1). Period 1 can be extended by one year with the payment of a Drilling Deposit. It can then be extended yearly with Board approval and payment of Extension Fees equivalent to rentals. Period 2 expiry is the maximum legislated nine year term of the EL.

Source: C-NLOPB, [Legal and Land information tables](#).

Table 3: Active Exploration Licences in the Beaufort Sea, Eastern Arctic Offshore and the Mackenzie Delta

Licence Number	Parcel Size (hectares)	Representative Name	Region
EL450	41,323	MGM Energy Corp.	Beaufort Sea
EL435	99,942	Shell Canada Limited	Beaufort Sea
EL447	103,711	ConocoPhillips Canada Resources Corp.	Beaufort Sea
EL448	108,185	Chevron Canada Limited	Beaufort Sea
EL452	196,497	ConocoPhillips Canada Resources Corp.	Beaufort Sea
EL449	202,380	BP Exploration Operating Company Limited	Beaufort Sea
EL453	203,635	BP Exploration Operating Company Limited	Beaufort Sea
EL446	205,321	Imperial Oil Resources Ventures Limited	Beaufort Sea
EL451	205,359	BP Exploration Operating Company Limited	Beaufort Sea
EL434	56,624	MGM Energy Corp.	Mackenzie Delta

Note: Click on the licence number for more details about the Exploratory Licence (EL).

Source: Indian and Northern Affairs Canada, [Oil & Gas Query Tool](#).

Table 4: Active Significant Discovery Licences in Nova Scotia Offshore Areas

Licence Number	Area (ha)	Interest Representative	Effective Date
082	14,871	BP Canada Energy Resources Company	15-Feb-1987
2120A	1,116	Shell Canada Limited	05-Jan-1990
2120B	1,860	Shell Canada Limited	05-Jan-1990
2120C	2,226	Shell Canada Limited	05-Jan-1990
2121	5,595	Shell Canada Limited	05-Jan-1990
2254	10,388	ExxonMobil Canada Properties	05-Jan-1990
2255A	5,565	ExxonMobil Canada Ltd.	05-Jan-1990
2255B	742	ExxonMobil Canada Properties	05-Jan-1990
2255C	1,484	ExxonMobil Canada Properties	05-Jan-1990
2255D	2,976	ExxonMobil Canada Properties	05-Jan-1990
2255E	2,226	ExxonMobil Canada Properties	05-Jan-1990
2255F	1,274	ExxonMobil Canada Properties	05-Jan-1990
2255G	5,050	ExxonMobil Canada Properties	05-Jan-1990
2255H	1,488	ExxonMobil Canada Properties	05-Jan-1990
2255L	371	ExxonMobil Canada Properties	05-Jan-1990
2255M	5,979	ExxonMobil Canada Properties	05-Jan-1990
2255N	687	ExxonMobil Canada Properties	05-Jan-1990
2255P	4,440	ExxonMobil Canada Properties	05-Jan-1990
2255Q	2,597	ExxonMobil Canada Properties	05-Jan-1990
2255R	3,339	ExxonMobil Canada Properties	05-Jan-1990
2259	4,810	ExxonMobil Canada Properties	05-Jan-1990
2269	746	ExxonMobil Canada Properties	05-Jan-1990
2276A	3,357	Shell Canada Limited	05-Jan-1990

2276B	5,968	ExxonMobil Canada Properties	05-Jan-1990
2276C	1,119	ExxonMobil Canada Properties	05-Jan-1990
2277A	8,219	ExxonMobil Canada Ltd.	05-Jan-1990
2277B	374	Shell Canada Limited	05-Jan-1990
2283A	1,488	ExxonMobil Canada Properties	05-Jan-1990
2283B	3,710	ExxonMobil Canada Properties	05-Jan-1990
2283C	372	ExxonMobil Canada Properties	05-Jan-1990
2286	4,103	ExxonMobil Canada Properties	05-Jan-1990
2298	4,440	Shell Canada Limited	05-Jan-1990
2299A	5,968	ExxonMobil Canada Properties	05-Jan-1990
2701	2,235	Encana Corporation	11-Jun-2007
2702	2,232	Encana Corporation	11-Jun-2007

Note: Click on the licence number for more details about a Significant Discovery Licence (SDL). The term of an SDL is indefinite.

Source: C-NSOPB, [Search Licences](#).

Table 5: Active Significant Discovery Licences in Newfoundland and Labrador Offshore Areas

Licence Number	Area (ha)	Interest Representative	Effective Date	Region
1009	6,390	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1042	3,897	Husky Oil Operations Ltd.	1 October 2003	Grand Banks
1035	1,420	Suncor Energy Inc.	27 October 1994	Grand Banks
1036	1,420	Chevron Canada Ltd.	27 October 1994	Grand Banks
1011	5,321	Husky Oil Operations Ltd.	28 March 1990	Grand Banks
1012	355	Imperial Oil Resources Ltd.	28 March 1990	Grand Banks
1006	5,325	Chevron Canada Ltd.	16 February 1990	Grand Banks

1007	3,195	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1046	5,320	Husky Oil Operations Ltd.	16 Dec 2004	Grand Banks
1037	1,065	Suncor Energy Inc.	25 March 1996	Grand Banks
1038	356	Suncor Energy Inc.	25 March 1996	Grand Banks
1039	2,492	Suncor Energy Inc.	25 March 1996	Grand Banks
1002	5,664	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1047	22,006	Statoil Canada Ltd.	22 February 2010	Grand Banks
1001	3,883	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1041	3,883	Chevron Canada Ltd.	26 Nov 2001	Grand Banks
1008	6,372	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
200A	8,765	ExxonMobil Canada Properties	4 April 1987	Grand Banks
200B	NA	ExxonMobil Canada Properties	4 April 1987	Grand Banks
200C	NA	ExxonMobil Canada Properties	4 April 1987	Grand Banks
1003	3,894	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1004	708	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1005	354	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
197	7,722	Imperial Oil Resources Ltd.	4 April 1987	Grand Banks
1013	2,136	Imperial Oil Resources Ltd.	28 March 1990	Grand Banks
1015	356	Imperial Oil Resources Ltd.	28 March 1990	Grand Banks
1016	712	Imperial Oil Resources Ltd.	28 March 1990	Grand Banks
1017	356	Husky Oil Operations Ltd.	28 March 1990	Grand Banks
208A	1,424	Suncor Energy Inc.	4 April 1987	Grand Banks
1031	7,045	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1010	3,550	ExxonMobil Canada Properties	16 February 1990	Grand Banks
1040	3,195	Statoil Canada Ltd.	8 January 2001	Grand Banks
1018	1,062	Husky Oil Operations Ltd.	16 February 1990	Grand Banks

1019	1,416	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1020	1,062	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1023	353	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1024	707	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1025	5,648	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1026	2,471	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1027	1,765	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1028	11,649	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1029	2,824	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1030	1,412	Husky Oil Operations Ltd.	16 February 1990	Grand Banks
1044	354	Husky Oil Operations Ltd.	15 January 2004	Grand Banks
1045	353	Husky Oil Operations Ltd.	15 January 2004	Grand Banks
185A	4,686	ConocoPhillips Canada Resources Corp.	4 April 1987	Labrador
184	5,643	ConocoPhillips Canada Resources Corp.	4 April 1987	Labrador
203	2,900	Suncor Energy Inc.	4 August 1987	Labrador
185B	7,592	ConocoPhillips Canada Resources Corp.	4 April 1987	Labrador
187	7,264	ConocoPhillips Canada Resources Corp.	4 April 1987	Labrador

Note: For more details about a Significant Discovery Licence (SDL), please visit the C-NLOPB [Registry System Abstracts](#). The term of an SDL is indefinite.

Source: C-NLOPB, [Legal and Land information tables](#).

Table 6: Active Significant Discovery Licences in the Beaufort Sea, Eastern Arctic Offshore and the Mackenzie Delta

Licence Number	Parcel Size (hectares)	Representative Name	Region
SDL096	353	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL135	610	MGM Energy Corp.	Beaufort Sea
SDL053	888	Imperial Oil Resources Limited	Beaufort Sea
SDL110	891	Imperial Oil Resources Limited	Beaufort Sea
SDL111	891	Imperial Oil Resources Limited	Beaufort Sea
SDL136	924	MGM Energy Corp.	Beaufort Sea
SDL097	1,059	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL134	1,220	MGM Energy Corp.	Beaufort Sea
SDL132	1,228	MGM Energy Corp.	Beaufort Sea
SDL133	1,228	MGM Energy Corp.	Beaufort Sea
SDL085	1,396	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL112	1,485	Imperial Oil Resources Limited	Beaufort Sea
SDL048	1,740	BP Canada Energy Resources Company	Beaufort Sea
SDL055	2,072	Imperial Oil Resources Limited	Beaufort Sea
SDL051	2,368	Imperial Oil Resources Limited	Beaufort Sea
SDL116	2,700	Imperial Oil Resources Limited	Beaufort Sea
SDL115	3,000	Imperial Oil Resources Limited	Beaufort Sea
SDL087	3,872	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL047	4,104	BP Canada Energy Resources Company	Beaufort Sea
SDL113	4,787	BP Canada Energy Resources Company	Beaufort Sea
SDL114	4,795	BP Canada Energy Resources Company	Beaufort Sea
SDL040	5,190	BP Canada Energy Resources Company	Beaufort Sea
SDL084	6,244	ConocoPhillips Canada Resources Corp.	Beaufort Sea

SDL038	6,620	BP Canada Energy Resources Company	Beaufort Sea
SDL088	7,133	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL058	7,168	Imperial Oil Resources Limited	Beaufort Sea
SDL091	7,488	Imperial Oil Resources Limited	Beaufort Sea
SDL049	7,627	BP Canada Energy Resources Company	Beaufort Sea
SDL037	8,034	BP Canada Energy Resources Company	Beaufort Sea
SDL054	9,768	Imperial Oil Resources Limited	Beaufort Sea
SDL041	10,059	BP Canada Energy Resources Company	Beaufort Sea
SDL089	10,512	BP Canada Energy Company	Beaufort Sea
SDL095	11,051	Imperial Oil Resources Limited	Beaufort Sea
SDL083	11,692	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL086	12,181	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL039	12,182	BP Canada Energy Resources Company	Beaufort Sea
SDL130	14,458	Devon NEC Corporation	Beaufort Sea
SDL126	16,618	ConocoPhillips Canada Resources Corp.	Beaufort Sea
SDL005	11,184	Husky Oil Operations Limited	Eastern Arctic
SDL015	304	Chevron Canada Limited	Mackenzie Delta
SDL031	306	Shell Canada Limited	Mackenzie Delta
SDL094	607	Imperial Oil Resources Limited	Mackenzie Delta
SDL016	610	Chevron Canada Limited	Mackenzie Delta
SDL059	612	Imperial Oil Resources Limited	Mackenzie Delta
SDL137	612	MGM Energy Corp.	Mackenzie Delta
SDL029	626	AltaGas Ltd.	Mackenzie Delta
SDL117	900	Imperial Oil Resources Limited	Mackenzie Delta
SDL027	906	Nytis Exploration Company Inc.	Mackenzie Delta
SDL026	912	Nytis Exploration Company Inc.	Mackenzie Delta

SDL025	1,216	Nytis Exploration Company Inc.	Mackenzie Delta
SDL034	1,232	Shell Canada Limited	Mackenzie Delta
SDL060	1,515	Imperial Oil Resources Limited	Mackenzie Delta
SDL028	1,809	Nytis Exploration Company Inc.	Mackenzie Delta
SDL057	1,812	Imperial Oil Resources Limited	Mackenzie Delta
SDL014	1,824	Chevron Canada Limited	Mackenzie Delta
SDL036	1,842	Shell Canada Limited	Mackenzie Delta
SDL017	1,866	Shell Canada Limited	Mackenzie Delta
SDL030	2,173	ConocoPhillips Canada (North) Limited	Mackenzie Delta
SDL056	2,410	Imperial Oil Resources Limited	Mackenzie Delta
SDL035	2,446	Shell Canada Limited	Mackenzie Delta
SDL093	2,462	Imperial Oil Resources Limited	Mackenzie Delta
SDL100	2,763	Shell Canada Limited	Mackenzie Delta
SDL052	2,997	Imperial Oil Resources Limited	Mackenzie Delta
SDL033	3,087	Shell Canada Limited	Mackenzie Delta
SDL018	3,366	Shell Canada Limited	Mackenzie Delta
SDL019	3,665	Shell Canada Limited	Mackenzie Delta
SDL092	3,915	Imperial Oil Resources Limited	Mackenzie Delta
SDL062	4,012	Imperial Oil Resources Limited	Mackenzie Delta
SDL061	4,504	Imperial Oil Resources Limited	Mackenzie Delta
SDL065	5,081	Imperial Oil Resources Limited	Mackenzie Delta
SDL064	5,854	Imperial Oil Resources Limited	Mackenzie Delta
SDL144	5,862	Suncor Energy Inc.	Mackenzie Delta
SDL063	6,089	Imperial Oil Resources Limited	Mackenzie Delta
SDL146	7,090	MGM Energy Corp.	Mackenzie Delta
SDL050	8,197	Imperial Oil Resources Limited	Mackenzie Delta

SDL131	8,508	MGM Energy Corp.	Mackenzie Delta
SDL032	30,117	ConocoPhillips Canada (North) Limited	Mackenzie Delta

Note: Click on the licence number for more details about a Significant Discovery Licence (SDL). The term of an SDL is indefinite. Not all SDLs in the table are located in offshore locations.

Source: Indian and Northern Affairs Canada, [Oil & Gas Query Tool](#).

Table 7: Active Production Licences in Nova Scotia Offshore Areas

Licence Number	Area (ha)	Interest Representative	Effective Date
2901	1,488	Encana Corporation	01-Apr-1991
2902	4,836	Encana Corporation	01-Apr-1991
2903	7,420	ExxonMobil Canada Ltd.	26-Jul-1999
2904	849	ExxonMobil Canada Ltd.	26-Jul-1999
2905	3,987	ExxonMobil Canada Ltd.	26-Jul-1999
2906	4,849	ExxonMobil Canada Ltd.	26-Jul-1999
2907	5,232	ExxonMobil Canada Ltd.	31-Oct-2003
2908	4,081	ExxonMobil Canada Ltd.	25-Nov-2004

Note: Click on the licence number for more details about a Production Licence (PL). A PL has a term of 25 years but may be extended if commercial production is continuing or is likely to recommence.

Source: C-NSOPB, [Search Licences](#).

Table 8: Active Production Licences in Newfoundland and Labrador Offshore Areas

Licence Number	Area (ha)	Interest Representative	Effective Date	Region
PL 1001	22,285	ExxonMobil Canada Ltd.	21 March 1990	Grand Banks
PL 1002	12,800	Suncor Energy Inc.	20 August 2001	Grand Banks
PL 1003	355	Suncor Energy Inc.	20 August 2001	Grand Banks
PL 1004	1,065	Suncor Energy Inc.	20 August 2001	Grand Banks
PL 1005	1,416	Suncor Energy Inc.	14 January 2003	Grand Banks
PL 1006	2,828	Husky Oil Operations Ltd.	10 August 2005	Grand Banks
PL 1007	2,832	Husky Oil Operations Ltd.	19 November 2007	Grand Banks
PL 1008	2,124	Husky Oil Operations Ltd.	19 November 2007	Grand Banks

Note: For more details about a Production Licence (PL), please visit the C-NLOPB [Registry System Abstracts](#). A PL has a term of 25 years but may be extended if commercial production is continuing or is likely to recommence.

Source: C-NLOPB, [Legal and Land information tables](#).

Appendix G

Offshore Oil and Gas Glossary

Barrel: A volume measurement of oil that is equivalent to approximately 159 liters.

Bcf: A volume measurement of natural gas measured in billions of cubic feet.

Blow-out (offshore): Result from gas, or gas and oil escaping out of control under high pressure from subsurface reservoirs during drilling or production. Oil may be released either at the water surface or on the sea bottom, depending on the type of drilling rig being used, and other factors.

Blow-out preventer (BOPs): an assembly of heavy-duty valves attached to the well-head to control well pressure and prevent a blow-out

Board: Refers to petroleum board with jurisdiction in the geographical area in question. For the Nova Scotia offshore area, it's the Canada-Nova Scotia Offshore Petroleum Board. For Newfoundland and Labrador, it's the Canada-Newfoundland and Labrador Offshore Petroleum Board. For the west coast of British Columbia and in the Arctic, it's the National Energy Board.

Bpd: Barrels per day is a unit of oil production rate. In the industry, it is sometimes abbreviated as bbl/d.

Casing: Steel pipe set in a well to prevent the hole from sloughing or caving and to enable formations to be isolated (there may be several strings of casing in a well, one inside the other).

Certificate of Fitness: A certificate issued by a certifying authority stating that a design, plan or facility complies with the relevant regulations or requirements, is fit for purpose, and can be operated safely and without posing a threat to the environment.

Condensate: The liquid resulting when a vapour is subjected to cooling or application of pressure. Also, liquid hydrocarbons condensed from gas and oil wells.

Deepwater: Definitions vary greatly. According to U.S. Department of the Interior, for the purposes of their 30 May 2010 deepwater drilling moratorium directive, the term describes depths greater than 500 feet (152 meters).

Delineation well: a well drilled near a discovery well to determine the physical extent, reserves and likely production rate of a new oil or gas field.

Development well: A well drilled for natural gas or crude oil within a proven field or area for the purpose of completing the desired pattern of production.

Discovery well: The first well drilled on a geologic structure which discovers significant quantities of hydrocarbons.

Exploration well: a well drilled in unproven areas.

Gas hydrates: ice-like substances composed of water and natural gas that form when gases combine with water at low temperatures and under high pressure.

Kick: An entry of water, gas, oil, or other formation fluid into the wellbore during drilling.

Mcf: A volume measurement of natural gas measured in thousand cubic feet.

MMcf: A volume measurement of natural gas measured in million cubic feet.

Petroleum: A naturally occurring mixture of hydrocarbons in gaseous, liquid or solid form.

Production well: A well drilled and completed for the purpose of producing crude oil or natural gas.

Recoverable reserves: That part of the hydrocarbon volumes in a reservoir that can be economically produced.

Relief well: a well drilled to assist in controlling a blow-out in an existing well.

Reservoir: A porous, permeable rock formation in which hydrocarbons have accumulated.

Shear ram: blowout preventer element that is like a clamp with steel blades designed to cut the drill pipe when the blowout preventer is closed.

Tcf: A volume measurement of natural gas measured in trillion cubic feet.

Wellbore: The hole drilled by the drill bit.

Wellhead: Steel equipment installed at the surface of the well containing an assembly of heavy duty hangars and seals (the wellhead is used to support the weight of casing strings hung from it and to contain well pressure).

Appendix H

Witnesses — 40th Parliament, 3rd Session

- May 27, 2010** *Canada-Newfoundland and Labrador Offshore Petroleum Board*
Max Ruelokke, Chairman and CEO
- Canada-Nova Scotia Offshore Petroleum Board*
Stuart Pinks, Chief Executive Officer.
- June 3, 2010** *WWF - Canada*
Craig Stewart, Director, Arctic Program.
- June 8, 2010** *Natural Resources Canada*
The Honourable Christian Paradis, P.C., M.P., Minister of Natural Resources
- Mark Corey, Assistant Deputy Minister, Energy Sector
- Eric Landry, Director, Frontier Lands Management Division,
Petroleum Resources Branch
- Tim Shanks, Advisor, Environment, Energy Sector
- Jeff Labonte, Director General, Petroleum Resources Branch
- June 10, 2010** *Chevron Canada Limited*
Mark MacLeod, Vice President, Atlantic Canada
- David MacInnis, Vice President, Policy, Government and Public
Affairs
- June 15, 2010** *Canadian Coast Guard*
René Grenier, Deputy Commissioner
- Alex Li, Director, Safety and Environmental Response
- Chantal Guenette, Manager, Environmental Response
- Eastern Canada Response Corporation (ECRC)*
James Carson, President and General Manager

- June 17, 2010** *Husky Oil Operations Limited*
Paul McCloskey, Vice President, East Coast Operations

Al Pate, General Manager, Exploration and Production Services
- Encana Corporation*
Malcolm Weatherston, Project General Manager, Deep Panuke,
Canadian Division, Atlantic Canada

William Zukiwski, Drilling & Completions Superintendent, Deep
Panuke, Canadian Division, Atlantic Canada
- June 22, 2010** *National Energy Board of Canada*
Gaétan Caron, Chair and CEO

Brian Nesbitt, Technical Leader, Engineering, Operations Business
Unit

Canadian Association of Petroleum Producers
David Pryce, Vice President, Operations
- June 29, 2010** *ExxonMobil Canada Ltd.*
Glenn Scott, President

ExxonMobil Development Company
Paul Schuberth, Drilling Technical Manager
- July 8, 2010** *Indian and Northern Affairs Canada*
Patrick Borbey, Assistant Deputy Minister, Northern Affairs

Michel Chenier, Director, Policy and Coordination, Northern Affairs

Kerry Newkirk, Director, Oil and Gas Management, Northern Affairs