

**Exploring** the **FUTURE** of **Offshore** Oil and Gas  
**DEVELOPMENT** in **BC**: **Lessons** from the **ATLANTIC**

# PROCEEDINGS

May 17-18, 2000, Simon Fraser University

**Exploring the Future of Offshore Oil and Gas Development in BC:  
Lessons from the Atlantic**  
Simon Fraser University, Burnaby BC

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Simon Fraser University

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# **Exploring** the **FUTURE** of **Offshore** Oil and Gas DEVELOPMENT in **BC**: **Lessons** from the **ATLANTIC**

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## **Exploring the Future of Offshore Oil and Gas Development in BC: Lessons from the Atlantic** Simon Fraser University, Burnaby BC

Downturns in the Province's fishing and forestry industries have left BC coastal communities searching for economic alternatives that will ensure their survival. One such alternative is the development of offshore oil and gas reserves. While some coastal representatives are urging provincial and federal governments to lift the moratorium on exploration drilling that has been in place for nearly 30 years, others maintain that the risks to an already threatened fishery and marine ecosystem remain too great and the socio-economic benefits uncertain.

To address this important and timely debate, Simon Fraser University, Centre for Coastal Studies (formerly the Institute of Fisheries Analysis), in collaboration with Memorial University of Newfoundland, is sponsoring a two-day forum to bring stakeholders, leading experts and members of the public together to examine the facts. The forum will facilitate an informed public discussion on the current implications of offshore oil and gas development in British Columbia. Changes in the offshore oil and gas industry, and in our understanding of the impacts of oil and gas development on marine ecosystems since the issue was last contested in the Province in the 1980s will be highlighted. International and national experts will provide valuable insights drawn from lessons learned in Newfoundland, elsewhere in Canada and around the world.

The forum has been designed for participation by key stakeholders, including communities, industry, research institutions, industry, labour, environmental and other non-government organizations, along with all levels of government.

### **BACKGROUND**

Exploration for oil and gas resources on the north coast of BC dates back to the early 1900s. According to 1998 estimates from the Geological Survey of Canada, reserves in the Queen Charlotte Basin may exceed those of Newfoundland's Hibernia field by more than five times. However, concerns about the impact of oil and gas development on the coastal environment and resulting political pressure have prohibited further exploration of the potential for this sector of the BC economy.

In 1959 the Province of British Columbia imposed a moratorium on exploration drilling on the coastal waters between Vancouver Island and the border of Alaska and British Columbia. The moratorium was temporarily lifted in 1966 to permit the drilling of 14 exploratory wells. In 1972, both the Government of Canada and the Province of British Columbia re-established the moratorium.

In 1984, consideration was given once again to lifting the moratorium so that petroleum companies holding leases in the region could undertake exploration. Public information meetings were held throughout northern British Columbia during the fall of 1984 and winter of 1985. In April 1986 the appointed review panel submitted a report containing 92 recommendations that outlined conditions under which development could proceed. The report aimed

to help both governments negotiate a Pacific Accord (similar to one instituted in the Atlantic in 1985) which would have allowed the lifting of the moratorium. Then, in 1989, the Exxon Valdez disaster along with other spills raised public concern and persuaded the two governments to extend the moratorium indefinitely, with no mechanism for its review.

Ten years have passed since the last review. In the meantime, the British Columbia economy has weakened, particularly in coastal communities, technological improvements have taken place in the industry (exploration, drilling, extraction and transport), and significant developments on the east coast of Canada have taken place from which lessons can be learned. Employing state-of-the-art technology for exploration, drilling and environmental assessment the Hibernia Project was launched in the late 1980s, followed by the Terra Nova project also in Newfoundland and the Sable Offshore Energy Project in Nova Scotia in the 1990s. British Columbians now have an opportunity to learn from these experiences.

Delegates at conferences on ocean opportunities held in Prince Rupert in 1996 and 1998 came out in favour of lifting the moratoria on oil and gas exploration. In 1997 the Prince Rupert-based North Coast Oil and Gas Task Force was formed to encourage provincial and federal governments to move in this direction. In 1999 a resolution of BC's Coastal Community Network urged further investigation into the opportunity and the government's Northern Development Commission hired a consultant to undertake a study into the feasibility of lifting the moratorium. Meanwhile, a number of First Nations, fishing and environmental organizations have begun to organize in opposition.

The time to revisit the subject of oil and gas exploration and drilling in BC has come. This forum will provide an unbiased, fact-based venue for this debate.

**Proceedings from Workshop** edited by Patricia Gallagher, Director, Continuing Studies in Science, SFU, with assistance of Jennifer Penikett, Research Assistant, Centre for Coastal Studies, SFU, Laurie Wood, Program Assistant, Continuing Studies in Science and Craig Orr, Centre for Coastal Studies.

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**Workshop Moderator:** Robert Brown, Director, Institute of Fisheries Analysis, Simon Fraser University

**Rapporteur:** Merrill Fearon, Executive Director, Save Our Fish Foundation

## OPENING REMARKS

**John T. Pierce**

*Dean of Arts, Professor, Geography Department,, Simon Fraser University, Burnaby BC.*

British Columbia is blessed with an abundance of natural resources relative to many other regions of the world. Resource development over the last century and a half by European settlers has brought great prosperity to many communities and regions but this prosperity has frequently been both short-lived and cyclical and often at the expense of the environment. Those communities, which have been able to diversify their economic bases, to go beyond the simple extraction and export of resources, have created the ingredients of a model of economic and social development most likely to succeed. Many communities are now actively searching for new options to diversify development through tourism, value added industries, and knowledge-based activities. And of course oil and natural gas production have become yet another option.

What is true for each community is also true for the province. The BC economy is entering a very significant transition- in which the importance of physical commodities and their impact on employment and income, regionally, provincially and nationally, is being subsumed by a new information/knowledge based economy. In particular, innovation in fuel cell technology originating in BC may diminish our need for fossil fuels. There is, in other words, a pronounced dualism developing as the two sides of BC's economy compete for human and capital resources and, in many ways, compete for scarce dollars and political support. This is not just a sectoral issue where one component of an economy subsumes the other but also a very real geographical one. Most non-metropolitan communities are still heavily wedded to resource development (their comparative advantage remains in resources) and they have few prospects of being an integral part of the information economy.

Governments, of course, have played and will continue to play an important role in regulating resource industries. That regulation, and the nature and intent of that regulation, have evolved substantially. Where governments were initially preoccupied with economic imperatives- an attempt to sustain jobs and incomes- this broadened in the 1960s and 1970s to regulation to meet broader social/cultural goals. During the past 15 to 20 years, we see government regulation, at least provincially, increasingly aimed at ecological and environmental imperatives- and for good reason!

There is a legacy of mismanagement of the resource base in practically all sectors- both renewable and non-renewable. Communities have borne the brunt of this mismanagement experiencing substantial and in some cases irreversible economic and social dislocations as a result of the declining quality of the resource at hand. The oil and gas industry must recognize that there are legitimate and significant environmental concerns associated with offshore development as there are with the problems associated with the boom and bust cycles of development. Importantly, there is a growing conflict over the singular use of marine and landbased ecosystems for traditional resource extraction. Society now interprets and values resources in a far more pluralistic fashion. What I mean by this is that the 'natural economy' is increasingly valued for its non-market and non-commodity uses. Preservation of those uses is often conflicts with resource extraction. There are plenty of examples of this in mining, forestry, agriculture and fisheries. Having said this, there are also examples where multiple uses and hence values can co-exist. A number of factors/ issues need to be confronted and recognized if there is to be progress in reconciling the differences. For example, science has an important role to play in understanding the risk and uncertainty associated with competing uses. Sharing access and rights to resources beyond the traditional government/industry model is critical. And ensuring that communities will benefit over the long term through participation cannot be overemphasized.

While provincial governments have altered the intent of regulation, there has been considerable broadening in influence if not in actual decision making from environmental NGOs, community groups, First Nations representatives and stakeholders provincially, nationally and internationally. As a consequence the complexity of arriving at decisions has risen dramatically. Approval times on many resource projects have lengthened and, in numerous instances the prospects for further resource development have been eliminated. Depending upon one's perspective, these delays and refusals may represent direct benefits i.e. increase in option values or direct costs i.e.

foregone opportunities. And again I would remind you that there is a pronounced dualism spatially in the way in which these outcomes are expressed and experienced.

With the emergence of the new information based economy, the diminished economic importance of traditional resource sectors and the changing values we place on the natural economy combined with many more forms of regulation and new stakeholders including First Nations groups, we run the risk that the differences, divisions and complexities will impede action and foreclose on opportunities which are essential to the survival of many resource dependent communities. Better understanding our options (goals) and the social, economic and environmental implications of pursuing those options are at the heart of a successful society and economy. Part of that discourse must include consideration of key moral and ethical questions relating to equitable treatment of First Nations and future generations as well as the imperative of managing our environment sustainably.

This conference provides a unique opportunity to begin to explore the implications of options relating to offshore oil and gas development. Clearly we are revisiting old questions but in the light of new information, insights and exigencies. Notwithstanding the growth in the information economy, the oil and gas sector will remain important in BC particularly given the environmental advantages of switching to natural gas. Its spatial expression will be the result not just of geological and economic opportunity but public consensus that the benefits far outweigh the potential costs. Thus this conference is taking the first steps: to ensure the oil and gas industry is cognizant of environmental concerns; to learn of new technologies and procedures for oil and gas development from other jurisdictions; and lastly to educate and share information in both native and non-native communities about the pros and cons of this form of economic activity for the purposes of community economic development.

## **THE BC SITUATION: A LOOK AT THE PAST, PRESENT AND FUTURE**

### **Offshore Oil and Gas: Past and Possible Future**

**Lynne Ewing**

*Senior Policy Advisor, BC Ministry of Energy and Mines, Victoria, BC*

#### ***The Past***

Since at least 1949, offshore oil and gas has been an issue in British Columbia. The Province has always believed that the seabed of the offshore area belonged to the Province and that the benefits of any exploration should therefore belong to the Province. Concerned that the federal government would proceed unilaterally with exploration, British Columbia issued an Order-in-Council (OIC) in 1959, reserving the submerged lands to the Crown Provincial. This OIC was re-issued in 1967.

However, offshore oil and gas drilling under federal regulation proceeded regardless of provincial concerns. From 1966-68, 14 wells were drilled by Shell Canada Ltd. from a rig built in Victoria - 6 wells off the west coast of Vancouver Island and 8 wells in Hecate Strait. The results were inconclusive and drilling was halted.

In 1972, in response to concerns about tanker traffic between the Queen Charlotte Islands and the B.C. Mainland, the federal government prohibited any such traffic and in addition, indicated that no offshore exploration could proceed. It should be noted that tankers and oil barges now routinely use those waters.

As part of the 1980s National Energy Program, the federal government stepped up incentives for offshore oil and gas exploration and British Columbia feared that activity would again take place which excluded provincial involvement. In response, a third provincial OIC was issued in June, 1981, reserving the offshore lands to British Columbia. At the same time, the Province issued a press release stating that no exploration could proceed before a full environmental assessment was undertaken. As a result of the provincial initiative, Canada's first federal-provincial environmental assessment process was established under the auspices of the Federal Environmental Assessment Review Office (FEARO) and the BC Ministry of Environment. Public consultation and information meetings were held widely throughout coastal communities and with First Nations, followed by public hearings,

during the period 1984-1985. At that time Chevron Canada Ltd., which had obtained a farm-out from Shell, and Petro Canada were the proponents, although Petro Canada subsequently withdrew from the review process.

The Federal-Provincial Panel issued its report in April, 1986, indicating that offshore oil and gas could proceed with 92 conditions. Those conditions required understanding of the drilling environment, use of the best available technology, a requirement for strong, effective regulation, training, inspections and preparation for emergencies. Specific conditions included a requirement for continuing public and First Nations consultation, environmental assessments of drilling programs (not a requirement at the time), areal and seasonal constraints on seismic exploration and no drilling within 20 km of land during the initial drilling phase.

Research requirements included knowledge of currents, improved weather forecasting, seabed site surveys, bird surveys, baseline coastal inventories and sensitivity mapping. In the event of a spill, lethal and sub-lethal impacts of crude oil on salmonids and other species research was required, as well as contingency plans, tests and reviews prior to drilling. Some of this work has been done; some would be required prior to or during exploratory drilling.

In 1987, the federal and provincial governments issued a response to the panel report, accepting many of the recommendations, particularly as many already were required by regulation, and rejecting or revising others.

In 1987 negotiations between the federal and provincial governments on management of offshore oil and gas activity began. These were based on precedents set in Nova Scotia and Newfoundland and were without prejudice to ownership and jurisdiction. Two elements of the Atlantic and Nova Scotia Accords were agreed upon: that revenues should go to the Province as if on land and that reciprocal legislation would be put in place giving regulatory powers to both governments. Negotiations foundered for two reasons: 1) the federal government was pressing BC to open Land Claims and 2) BC wanted parity with Eastern province regarding development funding. Although negotiations were re-opened in 1988, these came to a halt when the province declared in a 1989 press release that there would be no drilling for five years. This was in response to public concerns about the Nestucca barge spill off Grays Harbour, Washington and the Exxon Valdez spill in Alaska.

### ***In the Interim***

Although the issue was discussed within government, no further actions were taken until 1997 when the North Coast Oil and Gas Task Force, a lobby group centred in Prince Rupert, asked government to re-examine the issue of the moratorium. Subsequently, letters of support for reconsideration of the issue from Mayors, Chambers of Commerce and other coastal community leaders were received by federal and provincial ministers. The federal government indicated that it was up to British Columbia to decide whether or not to lift the moratorium.

A further impetus came from the Geological Survey of Canada who, in 1998 issued Open File Report #3699 which indicated oil potential of 10 billion barrels and gas potential of 43 trillion cubic feet on the west coast. These are considered very high numbers from a self-styled conservative agency and suggests that the BC offshore has the potential of basins such as that in the Cook Inlet of Alaska. However, British Columbia's offshore potential will only be fully understood after modern geophysics and exploratory drilling have taken place.

In the meantime much resource survey work had been done on birds, currents and coastal resources. Some specific candidates for Marine Protected Areas had been identified. New advanced technologies were in place including 3-D seismic, directional drilling, multi-beam bathymetry, satellite communications and weather forecasting. There had been considerable additional experience in offshore oil and gas operations and regulation in Nova Scotia and Newfoundland, the North Sea, Cook Inlet, as well as fields in Australia, Africa and South America. Double hulled tankers are required on the Alaska run as a result of 1990 U.S. legislation. A BC-States Oil Spill Task Force, formed after the Nestucca and Valdez spills were better prepared to implement coordinated shore-based clean up measures, should they be required. Land Claims negotiation with B.C. First Nations were also taking place. These advances were documented in a report to the BC Information Science and Technology Agency by AGRA Earth and Environmental Limited in December 1998.

In addition, statistics regarding the input of hydrocarbons into the marine environment indicated that the offshore oil and gas industry is responsible for only 1.5 per cent, natural sources through seeps and erosions 7.7 per cent,



municipal and industrial wastes and run off 36.3 per cent. Tanker traffic, which a few years ago was responsible for some 45.2 per cent of marine hydrocarbons, has seen its contributions reduced considerably in recent years as a result of new vessels, double-hulls and other technologies.

In 1999 the Northern Development Commissioner (NDC) first initiated discussions with north coast and then Mainland residents concerning their views on opening discussions regarding the moratorium. Those reports were issued in 2000.

### ***The Future(?)***

Should government decide to open the issue of offshore oil and gas exploration, there are two major tasks to be completed: An environmental scoping document indicating what work remains to be done and First Nations and Public consultation. With this information, plus experience in the rest of Canada and any changes in the regulatory environment, a decision could be made regarding lifting the moratorium.

If government subsequently decided to proceed with lifting the moratorium, the Pacific Accord would need to be negotiated and completed, reciprocal legislation put in place, a joint federal-provincial board or committee would be appointed and a public/First Nations advisory committee established. Industry would have to be re-engaged and the existing 22 million hectares of tenures re-negotiated. Industry would be required to undertake First Nations/public consultation. An Oil and Gas/Fisheries Liaison Committee would be established and geophysical exploration and analysis would be required to determine initial drilling targets.

When initial drilling targets are identified, industry would be required to continue with Public/First Nations consultation, to do site specific environmental studies, make an application to the joint Board or Committee and undergo an environmental assessment of its drilling plan. Each new activity would be subject to Board and environmental assessment approval as well as public/First Nations consultation.

### **Peter Hannigan (sent slides, in PDF format)**

***Petroleum Geologist/Resource Analyst, Geological Survey of Canada, Calgary, AB***

Please see separate PDF for Peter Hannigan.

### **Grand Chief Edward John**

***First Nations Summit, North Vancouver, BC***

We understand from a First Nations' perspective the need for development, and recently I talked to one of the provincial cabinet ministers who told me, 'look at the difficult economic situation this province finds itself in right now'. I replied, "I know your revenues aren't that great, but look at the source of revenues that are coming into the province. A lot of oil and gas revenues are being generated – one of the more lucrative areas for revenue generation". What he was saying was we are having some problems in the area of fisheries – there is a crisis – no salmon. The salmon industry has been affected very dramatically. The forest industry is also having some major changes. We are currently attempting to prevent complete depletion of resources bases. For example we are doing are best to regenerate logged areas. We need other alternatives. We need to find other areas of employment, business opportunities, and revenue generation in the province. Here we are now – with offshore oil and gas as a huge potential.

Peter Hannigan illustrated the potential that is out there. There are three different groups of people here today: 1) promoters, 2) those who want to protect, and 3) those who want to watch. Wherever we fall in that spectrum, I want people to understand what is happening through the negotiation process in BC. What needs to be clearly understood is the importance of consultation with First Nations. Consultation is the legal constitutional requirement

– it is not something that is by the political will of government. The question of the nature of the consultation and the depth of the consultation has yet to be fully and finally determined. The fact and the realities underlying that consultation is the reason why consultation must take place, and that goes to what we as First Nations see as the rights that we have in the traditional territories of our people. I look at the map again and I don't know that there was ever a Queen Charlottes on the west coast of this continent, but I do know that there was a Haida Gwaii, and there is still a Haida Gwaii on the west coast of this continent, and the Haida people have lived on that island for countless generations.

Take a look at all of the tribes in that area under question, the Coast Salish the Kwakwiltl to the north, the Nuu-chah-nulth on the west coast of Vancouver Island, the Heiltsuk and Haisla further north, along with the Tsimshian and the Haida. All the different tribes who have a legitimate legal interest in their territories. And when the Supreme Court of Canada says that Section 35 of the Constitution recognizes aboriginal rights, that the collective interest of First Nations people and that these rights include this notion of aboriginal title as a legal interest in land over which First Nations have a collective decision-making authority, it says to me that you need to do something more than 'consult' – and then go ahead. I cannot help but go back to the statement by the minister – the forestry industry is in a crisis, the salmon industry is in a crisis – and I look to myself and I think to myself and I ask this question: When you take a look at Smiths Inlet or Rivers Inlet, some of the best salmon producing streams in the world, what do you have now? What is there? They have been totally devastated because of logging. Someone made some decisions. Someone thought that the economic situation in this province needed some boosting. Someone thought that those issues should be played off against each other. But we have to weigh all of these factors – the political, environmental, social, economic and legal implications of what is going on, when we make decisions about what should happen. In this particular case with oil and gas - and let me tell you there are negotiations taking place in this province – it goes beyond mere consultation.

First Nations are standing on the rights that they have – the legal, constitutional rights that we have as peoples in our territories. They are recognized in the Constitution – they do not just exist in some political whim of some political actors of the province or Canada. These are genuine interests that we have. The policy that they have adopted is, 'Well, if you say that you have aboriginal rights, or you say that you have aboriginal title, you have yet to go to court to prove it'. Section 35 remains an empty promise to aboriginal people, notwithstanding that it is a Constitutional provision, because they say that the onus is on First Nations people to prove that they have any rights. Section 35 says that the existing aboriginal and treaty rights, the aboriginal peoples of Canada, are hereby recognized and confirmed. It comes down to this curious situation. Aboriginal people of Canada do not exist according to government policy. They do not exist unless we go to court and prove it. I have not gone to court and proved it, so I cannot tell you that I am an aboriginal person. But I can tell you I can trace my ancestry back thousands of years, as can any aboriginal person here. So it is repugnant to us to have to prove to those governments who asserted sovereignty in our territories in BC in 1846, that 150 – 160 years later we have to prove to someone that we exist.

That is the legal side. On the political side, we have undertaken with Canada and BC to negotiate – there are at the moment, 46 tables that are negotiating. People say, that will take care of all of these issues. I firmly believe that the negotiation process is ultimately the way to resolve these legal and historical and constitutional issues. And we witnessed that with the signing of the Nisga'a agreement, and the enacting of 18 pieces of legislation by the Nisga'a Nation and government last week. Negotiation is the way to proceed. The problem that we see on our side is not with the negotiation process as a way to resolve issues. The problem we see is the governments who come to the table with a position that for us to talk about certain issues, we need to prove that we exist and that we have rights.

We are trying to find solutions in a practical way with Canada and BC. There are 46 tables; those tables are going to take time to come to some agreements. We have borrowed in excess of \$100 million collectively in this province and we have yet to reach any agreements. If the government proceeds with events such as offshore oil and gas exploration, this act flies directly in the face of what we are trying to accomplish. We talk about interim measures agreements or what can happen in the meantime. In the meantime, they say we should have agreements on providing some degree of protection to First Nations, and their communities, over areas that are important historically, culturally, or ecologically, and to provide benefits where First Nations are involved in developing agreements and providing their consent to whatever development may take place. It may be logging in a small valley or in a particular area, or some exploration of some sort, e.g. mining in the hills somewhere. I think that,

short of that, we are going to have continued confrontation between government, and ourselves as long as they continue to go ahead and wave some paper in front of us, call it consultation, and proceed.

Where I come from in the Central Interior of the province, we have this situation already. In one of the three timber supply areas, there are some serious shortages of timber. They now have had to look to the west in the Fort St. James forest district. I use this as an example of what they are doing. Between themselves they developed a plan to allocate the available timber sales in Vanderhoof and Fort St. James. Meanwhile, we are at the treaty negotiation table with Canada and BC, and they are telling us that they can't talk about this issue. We'll talk small business, maybe 2000 cubic meters, or we'll talk 10,000 cubic meters of timber, but in the meantime, 1.3 million cubic meters of timber is being allocated to the companies in Prince George over the objections of our peoples who are trying to figure out a way to find economic stability for our communities. And the governments' say that is only a planning report, and it does not mean anything. What they've done in the meantime is they have given the green light to the companies and told them to amend their five-year harvesting plans to take into account the decisions they make by themselves. The report that they developed does not have any legal standing, but the five-year development plans do. So they have done through the back door what they said they would not do through the front door.

And that is the problem that we see – as we negotiate with government as we are sitting down trying to deal with issues related to sea resources, governments are continually and on an accelerated basis alienating resources to third party interests. And those third party interests make it very clear that if their interests are affected in any way, and the governments agree with them, they are to be compensated. But if we use the word compensation, they tell us, sorry there is no compensation on the table for First Nations, period. If you want to talk about compensation, you prove that you have aboriginal rights, you prove you have aboriginal title, and you prove that your rights are being impacted, then determine whether or not there are any damages, and then we will talk compensation. That is the reality of where we are. That is why there is so much frustration and that is why there have been no quick movement to agreements on the 46 tables, notwithstanding that we have the Nisga'a agreement in place. That is where we are and as we sit here there is a crisis emerging in this area of relations between government and ourselves. It is important that we understand that. And if governments decide over the objections of our people that they are going to go ahead with oil and gas exploration and development, you are going to hear from First Nations on these issues, until such a time that those genuine legal and legitimate constitutional interests are taken seriously by government, and there are agreements with our nations at the end of the day as to if and how any of these projects will go ahead. With oil and gas exploration, it is an eye opener, for me, to understand the magnitude of the potential that is there and to understand some of the reasons why it might go ahead and how it could go ahead if it does. The environmentalists talk about the great bear forest – maybe there is a great salmon sea out there that they could talk about.

From a First Nations perspective, notwithstanding what the governments have to say about it, we understand that we are the inheritors of certain rights from our ancestors and we will stand on those rights. And what we are trying to do is find some way to reconcile the interests of our peoples with the assertion of crown sovereignty, and you will never get the governments to agree that we are in the process of reconciliation.

#### **SYNOPSIS OF DISCUSSIONS THAT FOLLOWED THE BC SITUATION, PAST, PRESENT AND FUTURE SESSION**

John Pierce offered assurance to Edward John that things do indeed change in this country – and noted that if you look back over the last 20 years there have been remarkable changes.

*What is the Pacific Accord?*

A member of the audience asked for clarification about the details of the Pacific Accord – it was explained that the Pacific Accord is a draft piece of paper that was negotiated between 1987 and 1989 between the federal and provincial governments. It has no legal basis whatsoever. It reflects a process where the two senior levels of government are moving toward an agreement on how things would be managed – but it is still in draft form and has never been completed.

*Who owns the area?*

The question was asked: Who owns the area? The response was that it is not clear – it depends on who you talk to who owns it. That is the reason why the Minister of the day said not to mind who owns it; instead, let us talk about the resource and how to manage it thus taking the tack that was taken on the Atlantic coast. Bob Hill noted that the Haida and the Tsimshian have agreed to share Hecate Straits resources and noted that these lands have never been ceded. Charlie Bellis noted that honesty on the part of the government is critical

*What were the terms for the 1986 Panel?*

A member of the audience asked a question regarding the terms of the 1986 Panel – and commented that is was their understanding that the Panel was not asked to decide whether the moratorium should be lifted. Rather, it was asked what needs to be considered before the moratorium could be lifted; or, under what conditions could the moratorium be lifted.

The presenters agreed that this was an accurate interpretation of the mandate of the Panel, but noted that the Panel was aware that they could have said that there were no terms and conditions under which this moratorium could be lifted – that was always part of the understanding.

*What types of agreements might First Nations consider should we decide to proceed?*

Chief John was asked the following question: Suppose that we decide that we should proceed with offshore oil and gas development: Would First Nations consider a specific agreement with respect to oil and gas offshore development independent of broader land claims or other resource issues? Or would First Nations only consider a broad agreement in place first before they would consider separate oil and gas agreements?

He replied that this would depend on the geographic region and the Nation adjacent to it. For example, if you are exploring in the Haida Gwaii region then obviously it would be the Haida people. He noted that in terms of the Accord it is regionalized - three regions were identified. He suggested that for explorations/ management purposes it may be appropriate to break it down into the three regions. However, if the implications are coastwide then First Nations communities coastwide must be involved in one way or another and that means probably a different forum. He explained that the reason for his answer was related to the differences that already exist along the coast. For example, at the south end of Vancouver Island there are already a number of treaties, the Douglas Treaties, that were signed pre-Confederation and certain rights are recognized in those treaties. As a result, there may be some impacts of development on these rights, for example, fishing rights - potentially there may be impacts if they are drilling in those areas where First Nations traditionally harvest the sea resources. He stressed that if you are dealing with a specific geographic, then you need to ensure that you have the agreement with the local people – that is presuming for example that the Haida people want that project to proceed. He noted that they may very well want it although he was aware that many of the Haida people have very serious concerns about it.

*Could the oil and gas reserves be less or greater than the numbers reported?*

A participant noted that the reserve estimates are based on conceptual plays and not on actual proven fields, and they wondered how much uncertainty that introduces into the estimates. They asked: Could the oil and gas reserves be much less or much greater than the numbers that were presented? Peter Hannigan replied that in this particular study they have determined that they believe it is a 100% chance. However, he noted that they are also saying that that does not necessarily mean that there is a prospect for it.

Another participant followed with the observation that regardless of what you find in the exploration it is still a conceptual play and the actual proven fields will not be known until such time as there is the general idea of lifting the moratorium and doing further exploration.

## **THE ISSUES: A REVIEW OF ENVIRONMENTAL, ECONOMIC, SOCIAL, CULTURAL AND POLITICAL/ADMINISTRATIVE CONSIDERATIONS**

**Philip Hogan**

*Councilor of the Heiltsuk First Nation, with a focus on resource issues.*

I come from the Heiltsuk Nation, and I thank the Coast Salish people for allowing me to come into their territory. It is good that we get together to talk about some of these issues – there has been a lot of talk in the media. I am glad to be here to share the perspectives of my people

The Heiltsuk are located in the town of Bella Bella on the Central Coast. The Heiltsuk people are descendants of a number of tribal groups who share the same language group. Today we call ourselves the Heiltsuk, though we were once known as the Bella Bella Indians or tribe. We have been in the central coast since the beginning of time. Our oral traditions tell us that we were set down in that place by our creator, and we have always been there.

We have had, over time, extensive relations with all of our neighbours – I see some of my neighbours in this room today. We also have a history in recent times of a lot of problems. With the coming of Europeans we got involved with fur trade and different industries like that, and things haven't gone well. We are what they call in the media these days a coastal community.

We are only one now – we used to have a number of villages, over 80 at one time. Due to smallpox and other diseases and other problems, our populations dropped dramatically from well over 10,000, down to just more than 200, in less than 200 years. Now we are coming back up, with over 2000 now as Heiltsuk members. I'm not sure if you are aware, but the demographics of First Nations in general, and the Heiltsuk in specific, are increasing at nearly double the rate for average Canadians, so we anticipate having a great deal more members living in our territory in the future. That has a lot of implications for pressure on the resources, the need for jobs, and other things like that. Like many First Nations, especially coastal ones, we have been suffering in the last 100 years – we have seen a lot of our resources depleted and removed from us through government legislation and policy. Right now, we have a very high unemployment rate, estimated at 75%. Back in the 1960s we had full employment. It used to be that anyone who wanted a job could go fishing. So I understand when people say there are problems in coastal communities – we live it every day.

One of the things that we have done since time immemorial is harvest the resources from the land. We have a long history of established places where our people go on our land, which goes by family. This is some fairly basic information we call Quaqualat, which means to go out on your land and harvest your food. That is what has sustained us for thousands of years. We go get food, preserve it, and use it in the winter to eat, trade and give away in the Potlatch system. The area is outside of Bella Bella. I have to say too that we have never surrendered title; that has been ably discussed by some of the previous speakers. I am glad to have had Edward John here to talk about some of the legal and political background. The Heiltsuk are in treaty negotiations – we have been since the 1980s. Basically we got in as soon as we were able to after the comprehensive claims process. We have always been interested in this issue. We have had trouble since the 1800s over issues of jurisdiction and ownership. Before that there really was not much of an issue. People came in to trade and their interest was not our lands - it was to trade for our resources. That started to change around the 1870s and 1880s. We worked on that problem and we presented at the 1913 Royal Commission, and during those discussions our chiefs and elders told the commission that we own our land, and that we were glad to see them there to try to right the problems that we were living under at the time. And that commission told us we are not here to talk about that, not about title, but to talk about what use you make of reserves. So that really did not address our issues. I have some quotes from the people who talked there. One of them was Bob Anderson. He told the commission that we believe we own this land, every bit of it, and he later went on to say that he believed that the government was stealing our land. And that has been our position since that time. Between 1913 and now there was a time it was illegal to discuss this issue. Now we are in treaty negotiations. In 1981 we put our claim in under comprehensive claims. In 1993 the BC Treaty Commission opened its doors for the current treaty process, and we filed our claim as well in that process.

We are not very happy with the way things are going – the federal government came and told us that treaty is not about aboriginal title – and I am not sure if that is different from what we heard in 1913. So there are these issues of jurisdiction that we have. In case you do not know, Bella Bella is located on the Central Coast in what is being called the Queen Charlotte assessment area. The territory we have from the tribal groups I mentioned goes from around Butedale down to the mouth of Rivers Inlet. We have asserted title all the way out to international waters, so it includes directly a large portion of the area in question here. We have never surrendered our title to this land. Some feel that they have a free hand to do what they want to – I think it is clear that they do not.

I want to talk a little bit about the use that we put the land to, what we call the baqualage. Some of the richest grounds that we have are on the outside – the outside is Goose Island, up to around Price down around Calvert – it is very biologically diverse in terms of marine species. We have hundreds of species of creatures that we harvest for our food and many of them come from that area. Some are quite delicate – and we have done this for many centuries. Not the same thing as non-native people – we do not do this for sport or for a challenge or to prove something to someone - it is a way of life. It has spiritual values to it – it is part of who we are. It also has an economic value – we harvest a great deal of food in terms of quantities from these places – so they are very important to us and we are quite concerned about anything that may impact them. We fear that oil and gas exploration may harm this environment. If something goes wrong out there, they will be taking food away from our people. I mentioned before – we have a very high unemployment rate – one of the things we have left is harvesting food for sustenance.

We have not done any studies on this – we know anecdotally and from common sense and living there that a large percentage of our food comes from the land – salmon, herring seaweed, different groundfish and other species, and that the environment is already under stress. Right now there is a harvest ban on abalone. It is province wide, but certainly covers our entire territory. The species is in real trouble. It was mismanaged when there was a commercial fishery and there are ongoing troubles with poaching. The point is, they are not abundant enough for us to harvest. The species is at risk, and we cannot enjoy that food that we are used to having. Other species are in trouble: Rivers Inlet sockeye. Serious trouble. We've heard some members of DFO say that they do not know if sockeye will ever come back. Our relatives are in Rivers Inlet – another nation. Our family as well. We also harvest and intercept sockeye from there. And there is not a run of sockeye anywhere on the central coast that is not depressed or in trouble – our main food species. We need this food out there for our very survival. If there is no work, we have to rely on these foods to sustain us.

There are problems in coastal communities. The economy is in great trouble, both in fisheries and forestry. Right now, Heiltsuk in forestry have slightly more than 1% of the jobs in our territory. That is not acceptable. We have a very limited participation in any economic sector derived from the resources in our territory. We see that in fisheries; we have our own cannery we built that we are trying to maintain. Another species at risk in the offshore that we are really concerned about is the oolichan, a small smelt that sustained our people for thousands of years, and that is important socially. We have a real concern that those fish are going to go extinct; they are in that same offshore area. We believe the shrimp trawl fishery has impacted them, and other factors such as urban development and logging as well. There are some species out there that are really endangered. And we cannot afford to take risks with some of these things – they are too important to us. We are very concerned about the environment. Some people call this an inland area, and I realize that they use inland and offshore from the jurisdictional fight, but if you have ever been out there in a boat in the so-called inland portion you realize it is not really inland at all. There's very violent weather at times. Even inside in the so-called protected areas in the channels you get brutal weather – hurricane force winds every year – so it really is not inshore in terms of the weather. Some of those places you only go a few miles from our village and you are facing the open Pacific.

We are quite concerned about oil and gas exploration effects. We have a couple of court cases mentioned – Delgamuukw – within the Canadian legal system that recognizes the concept of aboriginal title. For the Heiltsuk, we also have the Gladstone case that recognizes the commercial aboriginal right to harvest herring roe on kelp. Herring also come into this area, and are quite important to us economically as one of the few things that are providing any employment recently. Herring has always been there for us. Some of these things are quite susceptible to harm. If there is an oil spill it could totally destroy some of these things we rely on like the herring. We do not see that it is worth taking the risk. Our people have been involved in these discussions since the 1980s. I have been told that our elders were involved since the 1970s. There have been a number of panels to discuss this issue – almost every 10

years we do this. Like Quebec we keep asking the question until they get the answer they want. It is clear to us that if oil and gas exploration happens, we are not going to see the benefits. The benefits do not come to Bella Bella from any of these types of developments. We have a minimal share of forestry, fisheries and tourism, and I fail to see how this kind of exploration would offer any real employment to our people. The people who are asking for this thing are not from the area. They are from north and south of us, and yet the resource as usual is in our land, our waters. We have seen this over a long time – we call it colonization. Removing resources from our people and taking away our futures. And who benefits? Not us. I do not see how we can afford to allow this to happen. I do not see how this can happen before we have a treaty or some sort of resolution to aboriginal title and rights. It is not just a scientific discussion – it is a social one. We can look at the science and see what we think is out there – and yes it sounds like there is a valuable resource out there. It isn't clear who owns it to the courts – it is clear to me, clear to my people who owns it – it belongs to the Heiltsuk in our territories and to our neighbours in theirs. There is nowhere offshore that is not subject to aboriginal title discussions. This is clear to us.

To sum up, we have real concerns about environmental costs and impacts, some serious questions about if this were to go ahead, who would benefit, and the feeling is it would not be the people who live in the area, it would be people in urban centres and communities elsewhere. That would not help coastal communities – it would help other communities. The small coastal communities are the ones that are suffering. Some of the larger ones have had a lot of aid pumped into them. And finally, there is the jurisdiction and title issues that we see as unresolved – it would be unethical to give those away at the same time as trying to negotiate treaties with us – you cannot expect people to negotiate for something while you are at the same time giving away the thing that is being negotiated for. That is not good faith. And a final thought. When we talk about First Nations, people often say ‘we consulted with the First Nations’ – I think about that – people are almost saying like we consulted Indians. We are not the same – we are separate nations. We are not the same as Oweekeno, not as the Tsimshian. We are separate nations. We treat each other as such. Cannot go and talk to one or two nations and say its okay we have consulted First Nations now. You have to talk to the people who have aboriginal titles and rights.

**John Backhouse**

*Northern Development Commissioner, Prince George, BC*

<http://www.ndc.gov.bc.ca/>

This presentation will bring you up to date on the work that has been completed to date on behalf of my office and what our plans are for the near future. For those of you who are not familiar with the Office of the Northern Development Commissioner, the office addresses issues related to investment in the north. I coordinate with the activities of groups and organizations who are involved in economic development. I report to Minister Dan Miller who is the Minister of Mines and Energy and who is also responsible for Northern Development.

Following my appointment, and during my first visit to the Northwest coast, including Haida Gwaii, the subject of the moratorium on offshore oil and gas exploration was raised at virtually every meeting that I attended including a meeting with the North Coast Oil and Gas Task Force. Many of the groups and individuals that I met with wanted the government to reconsider the offshore oil and gas exploration moratorium. However, I also met with many groups who were not of the same mind – and wanted the status quo to be retained.

As part of my role as Northern Development Commissioner I am an advocate for northern economic development. I cannot presume that the only way to develop the economy of this region is through the lifting of the moratorium, as I am also charged in reporting to the Minister with having regard for the need to balance the interests of all parties in a fair and equitable manner through the understanding of the impact of any proposed recommendations. I should have learned after sixteen years on the Prince George city council, that I should not muse publicly about an issue such as this, but I did. In fact, I mentioned it to the media and immediately I had the two sides phoning me indicating, we want the moratorium lifted, or we don't want the moratorium lifted. I recognized then that I had a very sensitive, highly controversial issue on my hands. Therefore, I stepped back and spent some time talking to people about this quandary. Eventually I was introduced to John Sanderson and Frank Borowitz of the Conflict Managers Group who helped me understand that “special interest groups are becoming more powerful, disagreements are becoming more bitter and old methods no longer work”. He explained to me that wherever we look these days, we see a rising tide of drawnout unresolved disputes, including labour management disputes, environmental controversies, shareholder rights disagreements, merger conflicts, native land claims and protracted government hearings.

He spoke about 'relationship restructuring' which could be adapted to meet the challenge that I faced, the objective being to produce positive results that will last. For example, relationship restructuring programs are known to have benefited, and in some cases transformed, workplaces and relationships between unions their members and employers. The first critical step is to meet and reach agreement to embark on a relationship restructuring program. Conducting a relationship audit is the first stage – a relationship audit assesses the kind and extent of disagreements. Then through information collection, identification and classification of problems and evaluation of the data, a plan can be devised.

I recognized then that with some modification this process could be adapted to the issues that I faced in the north. As a result, the Conflict Managers Group was asked to enter into discussions with north coast residents to assess the prospects of constructing an appropriate process surrounding the review of the existing offshore oil and gas exploration moratorium. Since my office serves a wide geographic range (from the Queen Charlottes to Valemount on the Alberta border, and from Quesnel up to the Yukon), I asked them to concentrate on the specific region of the northwest coast. The contract was announced in May of last year and consultation took place during the summer of 1999. I was seeking an opinion, not a detailed analysis. 140 face-to-face interviews were held. Our task was to determine whether there was sufficient will and ability within the northern communities to go forward into a consensus-based process that would consider the potential of lifting or keeping the current moratorium.

As a result of this work with the consultants the conclusion was that the answer to that question is in the affirmative. We are satisfied that there is significant community will, interest and desire to go forward into such a process with the important qualification that people must feel they can participate fully in the crafting of the process itself including its makeup, composition and procedures to enable northerners to play an effective role in making decisions. In a phrase, they want to be directly and meaningfully involved.

At the same time, it is important to keep this matter in perspective. For example, the concerns and expectations that motivate northerners must be considered in a provincial, if not national, context. To this point, we have had a number of discussions with persons and groups in the north. In our view, a similar process should be constructed to gauge the will and interest of industry and the people in the rest of the province before gauging the will of government. The report recommended that further consultation take the form of a replication and extension of the process that forms the basis of this report; that is, private focussed discussions with key elements of industry, various levels of government, including First Nations governments, and environmental groups to enlist their respective views. In short, we conclude that it would now be timely and important to broaden the focus and scope of the discussions. Therefore, in addition to these groups, I have asked the consultants to meet with representative groups from other jurisdictions where offshore drilling has already been undertaken to assess the impacts and issues in those areas. The experience of Newfoundland and Labrador, as well as the recent developments in Nova Scotia associated with Georges Bank, are important indicators of the potential issues and opportunities that could be raised in British Columbia. The consultants will also be talking to representatives of the government of Alaska and they are talking to the people involved in North Sea exploration.

As the result of this second phase of discussions I anticipate that the consultants will be able to provide a clear indication of those who are willing to participate in the public process to consider this issue, what information and expertise they can bring to the process, and some suggestions on how that process should be constructed. It is a long process and I personally make no apologies for that. I believe that it is such an important issue that it must be handled with caution, and it must be inclusive, and we cannot allow it to be derailed. I look forward to the findings of the Conflict Managers Group and being able to make a recommendation to government sometime in July of this year.

**Rob Brown**

*Member of the Coast Mountain Group, Sierra Club of British Columbia*

When I grew up on Burnaby Mountain my pals and I thought we lived in a wilderness paradise. We could be forgiven for thinking so, for we were surrounded by cultivated and uncultivated greenery. Bears and wolves and deer were still spotted crossing local streets, and spotting an eagle was not unusual. Hunters still shot ducks over the



sprawling marshes surrounding Still Creek, Burnaby Lake, and the land now covered by the Trans Canada Highway. Anglers pulled steelhead and salmon from the Coquitlam River and from Brunett Creek. Cutthroat trout still ran in the smaller creeks, and the mountains on the North Shore were always in sharp focus on a clear day.

In truth, we were growing up at a time of urban metastasis, an era of mall sprawl and the relentless spread of formulaic neighbourhoods. We were also growing up in the midst of the oil industry. In the absence of legislation to mask or remove it, the sour smell of refineries blew into our open bedroom windows as we slept. The local groceries and meat markets were giving way to supermarket chains whose store shelves were filled with products enshrouded in eternal plastic. Meanwhile, leaden emissions from high-powered engines that ran on octane gas were spewing out of the exhausts of big heavy Fords, Chevys, Oldsmobiles and Chryslers, then settling into ditches on lawns and into the sandlots where children played.

The small pond we called a lake and loved to swim in was nestled in among the giant green oil storage tanks of the tank farm sunk into the side of Burnaby Mountain. On our way to Burrard Inlet we passed the Shellburn Refinery which, with its lights and towers, its sprawling tanks, its labyrinth of twisted pipes, its parapets and blazing chimneys, looked like a walled mysterious middle eastern city in some distant exotic caliphate to us readers of kids' books.

That trail to the inlet ran along the fence line of Shellburn down the eastern side of Capitol Hill. We would follow the path into a forest that had hardened after sixty years of second growth. There were red, rotting stumps of Doug Fir covered with Oregon grape and still bearing the spring board scars put there by the men who dropped them with long saws and double headed axes. Our descent ended at the train tracks where we emerged from the damp shade into the open seascape where the air was filled with salt and creosote. From there we made our way to the beach hoping for low tide when the strands were covered in riches like sprawling purple, orange and red starfish, bullwhips, the dark green slippery seaweed that made walking treacherous, and Hermit crabs clambering like spiders over the shallow pools carpeted in mussels.

We crunched over the crust of these beaches past the sandy spots where clams spouted, sloshing through the tidal pools probing for bait. At first we pried mussels free of their beds and fastened them to our murderous hooks. Mussels, we soon found out, worked well, as did a chunk of flesh or an eye from the fish we caught with them. After mussels we came to prefer razor clams, not because they worked any better, really, but because there was more to fasten a hook onto inside their radial shells, because bigger to kids is almost always better, and because, even though we were embryonic sportsmen, we were learning that the chase was as big a part of the event as the kill and we reveled in the tunneling. There was better bait though. We learned this from an old man, one of the squatters probably. He waved to us to come close. We looked at each other then carefully moved to within earshot. "Sea worms", the old fellow said, you need sea worms. We looked at each other, puzzled. "Where do we get them"? one of us asked. The old man came closer. We resisted the urge to run. When he was near he explained the working of worms, how they were quick; how we were to turn over the barnacled rocks crisply and dig quickly, and how were to be careful because the worms bit.

Kids are skilled predators. We soon found the worms and came to some conclusions about the size and locale of rocks that covered the lairs. We flipped the stones sending crowds of startled crab larvae rattling like thrown dice toward the tide mark in a feverish rush for refuge. Then we dug, pulling the gray, segmented salt water centipedes from the sandy mud, dodging their pincers, then dropping them into some kind of lidded container we'd scavenged en route to the fishing. When our jars crawled with worms, we carried them to the loading piers. Our favourite pier had walkways below the platform. In summer it had shade, on wet fall days, shelter. We peered down into the green prisms and watched fish that frequented the upper levels flicker through the shafts of light. There were palm sized shiners, and a radiant species we called sea bass that, amazingly, gave birth to their young live like whales do. There were other, other fish with the same shape that pulled hard on our hardware and were easily transformed into a pair of delectable filets at home.

Closer to the bottom we caught Tommy cod and greenling. On the bottom floor we hooked mottled sculpin; drab olive coloured bullheads; spiny rock cod with large, black, protuberant eyes; picassoesque flounders and sole. Also a large flat fish with sand papery skin; with black and yellow banded fins that, thinking back on it, may have been small halibut. As predicted by the old squatter, the sea worm had an irresistible allure for all of them. We hunted

crab too. The seabed swarmed with them. To trap crab we wired a bullhead or two to a bicycle wheel, attached an appropriate length of rope and hurled the whole works into the brine and watched it disappear in shower of bubbles. After leaving the wheel below for as long as we could stand it, we pulled it up as rapidly as strength permitted. On most hauls crabs spilled over the rim of the spoked wheel like broth over the lip of a soup pot.

Our fishing in Burrard Inlet lasted about eight years. Over the course of that time we were literally up to our elbows in its fore shore environment. We took it personally when a favoured bait ground turned black, as more and more spots did over the course of those few years. It was sad thing when a sea worm hot spot stopped squirting. When a place that teemed with sand fleas and crustaceans stopped smelling of sea salt; and acquired the stale, artificial smell of man made chemicals; the rainbow sheen of oil; and went as dead as a sack of cement.

I moved north. Some thirty years later I returned to our former wildlife paradise at the foot of Shellburn. I took a walk along the beach. I turned a few rocks and exposed the black sand and pools slick oil water underneath them. Absent was the rattle of crab larvae, and almost everything else save for a few hardy barnacles and a few empty mussel shells, black and blue like the oil around them. One of our old fishing platforms was still there. The decking was rotting. I peered down into the water near the pilings and saw no flickering fish. At the far end of the pier a man was crabbing. He had one undersized crab in possession. "You better watch that huge crab doesn't take your arm off", I said. "No big crabs anymore", he complained, "hardly any crabs at all. The Chinamen come and took them all".

I don't know that I've seen a richer marine ecosystem than Burrard Inlet was. It's ineffably sad to see it now, ailing and dying; it's like visiting a friend wasting away from cancer. I'm not saying that the wretched state of a large part of the Inlet is due to oil pollution alone. I don't even know if the excrement from the oil refineries and ships are the largest source of marine pollution there. Even when we were kids condoms floated around in the water like jellyfish suggesting that sewage was probably a large polluter. Still, the fate and state of Burrard Inlet can help us appreciate the anthropogenic impact on the hydrosphere and the variety and complexity of the problems flowing from it. First, we need to appreciate that the ecological riches of the sea are not evenly distributed. The continental shelves, are to the sea what littoral zones are to lakes: the edgy places where life is generated and concentrated, and the place where natural resources are abundant and most easily exploited.

As Dr. Stanislav Patin points out, *this zone and the narrow strip of land adjoining it have been the focus of activities that have, to a large extent, ensured the emergence and progress of the world's economy and, in a broader context, the origin and development of civilization itself. At present, about 80% of the Earth's population and 50% of all large cities are located in the coastal area.* Pollution is the leading factor when it comes to hardships man inflicts upon the sea, but its not the only one and it can, as Dr. Stanislav Patin points out, only be fully assessed within the framework of *all* other impacts of human activity on the hydrosphere.

*Underestimation, says Patin, of the striking complexity of anthropogenic impact on the water ecosystems and the use of a single factorial approach to analyze their state, focusing on some single aspect of human activity, generally leads to a distorted picture of the consequences of such activity. It is important to take into consideration that simultaneous impacts of several factors can cause synergetic effects. That is, the consequences can exceed the mere sum of the effects caused by each factor separately. Such situations are quite possible, for example, when radioactive, chemical and thermal impacts are combined.* (Patin, 1999)

In Burrard Inlet there is oil, there is sewage, there is a thermal plant, as well as many other industries. We need to examine the impacts on the hydrosphere in a holistic way. After doing this we have to appreciate that the effects of these activities is greater along the shelf zone and greatest in the bays and a sheltered coastal area, like Burrard Inlet.

At present, the anthropogenic disturbances of the shelf zone are found on a global scale. In many areas they have reached critical limits. *This is the prize, writes Patin, for the unjustifiably, rapid economic growth and short sighted environmental policy rather than its absence. The first obvious symptoms of anthropogenic press on the coastal zone and continental shelf appeared about 50 to 60 years ago. By now, anthropogenic impact has become so intense, diverse, and dynamic that the decision-makers at last seem to realize its danger. Offshore oil and gas production is part of this heterogeneous mosaic of human activities presently occurring in the shelf zone.* (Patin, 1999). Clearly the latter activity can't be separated from the rest of a monolithic, corporate driven industry to which it belongs, and

whose impact on the biosphere is global.

Oil spills and well blowouts, as devastating as they are, are not the most devastating spin-off of the oil and gas industry. Burrard Inlet has, as far as I can tell, never been a victim of a large oil spill, but has been and is being contaminated by the slow relentless drip of oil, oil byproducts and other pollutants. Crude oil is a shape changer built of a complex suite of chemicals that assaults from all angles and manifests itself to us all kinds of forms.

I understand that the focus of this conference is on the impacts of oil exploration and the fate of the moratorium presently in force on this coast. I understand that the byproducts of exploration, (drilling muds, drill cuttings, seismic explorations, physical impact of fisheries, vast suite of chemicals and gases released into the environment in the exploratory process) have their greatest impact on site. And, in many cases rapidly dissipate (though a significant amount of recent research is disputing widely held notions about the reach of these impacts and suggests there is still not enough research into the question). It is a grave mistake to examine any aspect of the oil industry in isolation.

Man made systems are caricatures of natural systems. We accept that everything in the natural world is interconnected in an infinitely complex fabric whose subtle weave we are just starting to appreciate. Manmade systems share that same quality of interconnectedness. The oil industry is large, unwieldy and complex, and it is all of a piece. You can no more examine hydrocarbon exploration in Hecate Strait in isolation of the oil industry and all its manifestations, any more than you can try to understand the working of the little finger without knowing anything of the neuromuscular system.

When you lift the moratorium and entertain the idea of oil exploration, you are courting and continuing to encourage the oil industry, and all the things attached to it. From the inevitable spills, to tar balls and plastic bottles that wash up on the beaches, to completing the construction of the global greenhouse. The only acceptable economic initiatives are the conservative ones that will sustain future generations, and have less impact on natural systems. Allowing oil development to proceed on our north coast will further burden the troubled fishing industry, an industry which can be restructured and retooled to operate more comfortably within natural systems.

Places like Hecate Strait and Queen Charlotte Sound, and the coast lines that define them are rarer now and will be rarer in the future as more and more of the world oceans are subject to exploitation, As a result, their tourism potential will increase. Oil platforms and the other accouterments of the oil industry are inimical to any saleable wilderness experience. Opting for the oil and gas development amounts to choosing a non renewable resource with a high negative environmental impact over one a renewable natural resource.

To shift into the exploratory mode and proceed with gas and oil development in advance of the settlement of First Nations' entitlement is morally indefensible. Implicit in our constitution is the idea that this society can no longer be blind to the needs of indigenous peoples as we exploit the land and the sea. We are obliged to see that the last "t" is crossed on the last treaty agreement before we entertain the notion of hydrocarbon exploitation on this rugged coast.

But most importantly, isn't it time we attempted to slow down the hydrocarbon express? Choosing the path of exploration and development in the turbulent seas on this coast is choosing to continue the ride; it does nothing to further cleaner, alternate forms of transport capable of taking us safely into the future.

*Roll on, thou deep and dark blue Ocean--roll!*  
exclaimed Byron.

*Ten thousand fleets sweep over thee in vain;  
Man marks the earth with ruin--his control  
Stops with the shore; upon the watery plain  
The wrecks are all they deed, nor doth remain  
A shadow of man's ravage, save his own  
When for a moment, like a drop of rain,  
He sinks into thy depths with bubbling groan,  
Without a grave, unknell'd, uncoffin'd,  
and unknown,*

*His steps are not upon thy paths,--thy fields*

*Are not spoil for him, --thou dost arise  
And shake him from thee; the vile strength he wields...*

(Childe Harold's Pilgrimage Cantos CLXXIX and CLXXX)

Byron would be shocked to see how far beyond the shore the industrial exertions of man now extend, how heavily trod upon those ocean paths have been since he set down those words in 1812. Man can and does affect the ocean, very profoundly, it appears, and from every angle, and one of the ways he affects it most are the myriad manifestations of the oil and gas industry. Dr. Patin defines the contours of the problem: *Humankind*, he writes, *already dealt with the alarming lessons from ignoring gradual and inconspicuous alternations in nature. For example, possible global climatic changes and disturbances of the ozone layer that may occur in the near future have emerged and developed as a result of the combined impacts of local sources. Each of them too weak, insignificant, and hardly noticeable to be taken into serious consideration. Combined together as time passed (only about a hundred years), these local changes are causing a global effect. Compared with the atmosphere, the World Ocean is certainly more conservative and slow to respond. It has a longer latent period before revealing non-obvious (subtle) effects. The complexity and potential tragedy of the situation lie with the fact that when the global changes in the hydrosphere do happen, it will be too late or impossible to do anything.* (p.336)

Civilization crawled out of the sea. It appears now that the fate of civilization hinges on what happens on her continental shelves. The sea is the mother of us all. Electing the exploitive course in one of the few remaining unexploited coastal areas in the World Ocean is treating her the same way we have treated her for the last century.

**Steve Smith**  
***Businessman, Owner Crest Hotel, Prince Rupert, BC***

When preparing this presentation I reflected on how I could address the social and economic effects of oil and gas development in my community of Prince Rupert in just twenty minutes. A picture is worth 1000 words. I will show you a few pictures (not included here).

This is a coastal community that is in trouble. Although we are the second city in BC to have rail access from Eastern Canada, that being the CN Rail system that goes into Prince Rupert, a better track, a lower grade than going into Vancouver and three days closer to the orient – our major industries are all suffering from the lack of use of this corridor. We have a highway system as good as most down south but it is underutilized.

This is a typical highway that most coastal communities use – most of you see this picture and say that is a cruise ship – but to most of the communities on the north coast that is our highway system. A system of transportation that we have to move goods and services to places like Bella Bella, Ocean Falls and Prince Rupert and the Queen Charlotte Islands. Many of the smaller communities don't even have a vessel of that size to bring their goods. For example, Port Simpson, twenty miles north of Prince Rupert on the mainland, has a ferry system that can take about ten cars and they only get service three times a week, a vast improvement over the service they had three years ago, when it was a passenger only ferry carrying 40 passengers and you put your refrigerator or your chesterfield on and strapped it on an open deck exposed to the weather. And that community is on the mainland of BC, not on an island. This is our wonderful coal terminal, that was built by the Alberta government, province of BC and the federal government – used to 40% capacity. This is our grain terminal next to the coal terminal – used at 60% capacity even though it is three days closer sailing time to the orient – even though ships sit in Vancouver paying demurrage for days and weeks. These services are underutilized in the north. This is the general cargo dock in Prince Rupert. It is totally underutilized, and their sales are probably down 50% in the last three years because the amount of lumber is not being shipped out of BC. Some lumber is being shipped down south through containerization.

Saddest of all is our fishing industry. An industry that developed the North Coast, gave people pride and it was family industries and all individual little businesses that succeeded in developing the small communities on the coast of BC – private businesses, each one with its own identity – employing their family and friends. Now they are decimated by the policies of the federal and provincial governments and the fact that our fish resources are depleted.

We used to see this – and we saw opportunity – now most of our groundfish are being shipped into the United States to be processed – not being processed in the local communities where it was caught. Even our tourism industry has been subjected to the economic downturn in the economy. Not the least of which was the Alaska blockade where fishermen from the Fraser River blocked the ferry in Prince Rupert because they were not getting their share of the catch for the northern licences (salmon) that they bought. It totally ruined the tourist industry for that season and the repercussions still continue.

The only thing missing from this picture are the people. And as the communities on the north coast get smaller, and less people come to visit them and less goods and services travel through, this is the biggest asset base that we have and we are losing it – the people that live in the north coast. And they are friendly people – proud of what they do and proud to share it with you. But we cannot eat and cannot exist on our culture alone. We need industry to develop and share our resources. Fishing is a seasonal industry – and this has been heavily impacted by the fact that the federal government has changed legislation regarding EI. Many of these people only work in the summer time and if they do not qualify for EI, they have no income, and no opportunities in the winter. This is not only relevant in large communities such as Prince Rupert; many of the workers that come to work in those fish plants come from the smaller villages, whether up the Nass River or smaller villages further up and down the coast. And they come to work in Prince Rupert in the summer time to focus their employment and to earn money and to return to their villages to sustain their own environment and their own way of life, in the winter.

Our First Nations people are a very important element of our communities. In Prince Rupert, 40 – 60% of our population is First Nations people. We have people from the Tsimshian, the Gitsxan, the Haida Nations, and they are very involved in our community and in the fishing industry – perhaps 70% of those involved in gillnetting and trolling are First Nations people. These are people who have developed the resources in the north, and lived off those resources and we are proud of what they have done. We are smiling faces up north – we are proud of what we do – but we do have to have opportunity. We cannot continue to send all of our resources south and try to eke out little of what is left to make a living. We have to reinvest in the north and in the coastal communities so they can get a bigger share of the resources that are being extracted. Often times we feel like we are the used bottle depot. And I hear our First Nations friends talking about what is in it for us. I am a third generation Prince Rupert person myself. My grandfather came in 1906 and built the first home out of box and crates for my grandmother. We were hoping to have a viable community, a centre like Vancouver, a port for the Orient. Those things have not happened and a lot of this is due to politics.

I show you this because I want to impress on you the mode of transportation that we rely on. That looks like a very small plane – to many of you – but that is the method of transportation that Bob would be most familiar with in Hartley Bay because when you have to travel it is the only method of getting to Hartley Bay – by fish boat or by Beaver aircraft. And for most of the coastal communities this is our way of transportation. And these things (Beaver aircraft) are continually being rebuilt. This represents a road – we are proud of it – it goes to Lax Kw'alaams, a community of 1700 people on the mainland of BC which has ferry service three times a week. You have to travel this road, about fifteen miles, which takes 45 minutes. They have a fish plant there – it has gone broke three times. Perhaps the lack of infrastructure, they cannot move goods on roadways, is part of the reason they cannot make it. And that fish plant provided employment for all of the people that worked and lived in the community. And a fleet of vessels operated out of that community because they had a fish plant that could serve them. When the basic infrastructure is not there, and when the infrastructure that is there is composed of a ferry system that operates one day or three days a week, think about how it is possible to be efficient in business. Think about how efficient the Okanagan would be if the Coquahala was only open two days a week and if the weather was bad it was closed all the time. This is the reality on the north Coast, the reality for coastal communities. Our infrastructure is getting old, much of it is tired. We don't want to be a tourism mecca where people come to visit only two months of the year and the rest of the time we have no opportunity. We need to harvest our resources. Tourism is one of them. I am involved in that industry, but it is not the be all and end all for the coast of BC. We have to harvest our trees, minerals, and oceans. In the south you worry about transportation. In the northern communities we do not even have bus service – for example in Bob's community of Hartley Bay their system is an ATV (all terrain vehicle). The roads are made of wood – a community of 700 people – two hours by boat from Prince Rupert, depending on the speed of your boat.

We do not worry about leaking condominiums, we worry about buildings that are falling down because they have no people living in them. We are reminded constantly about what happened in the years past. This is an old cannery site along the Skeena River, where many people worked and had a livelihood and now it is just a series of rotten pilings with memories. Saddest of all is our fishing fleet. Once proud, we had over 700 gillnetters and trollers operating out of the north coast in the Prince Rupert area – now we are down to about 300. Each vessel belonged to a family – it was a way of life – people came from the Nass River – fished in the summer time. They were proud of what they did. Their parents worked with them – they taught their children about the sea and what they did and how they earned a living. That is gone, partly through licensing, not only because of the fish. The government changes regulations and we are the by-product, unemployed people. We used to have 27 seine boats, and each boat had a five man crew, now we have twelve. Five times 30 vessels is 150 people, all working, making a good living, \$50 thousand per year for a crew member on a seine boat ten years ago. Now people are looking for other methods of employment, and it is not easy. Here is a cannery on the Skeena slough – the North Pacific cannery. When I was a teenager anyone could get a job here. People came from the outlying native villages, housing was there for them in the summer time, friends came from universities and worked at North Pacific – hundreds of people were employed there – on pay day, on Fridays, it was a big thing. I was in the retail business at the time and you knew when it was payday in the canneries on the Skeena because everybody was uptown spending money. The economy was booming. Today it is a tourist site, the North Pacific Cannery village, and employs twelve people. We are happy it is still there, although it is pretty hard to equate twelve tourism jobs with hundreds of cannery workers who were working overtime seven days/week.

This has filtered down to our retail community. What was once a Third Avenue in Prince Rupert, where you couldn't rent a storefront for any price because they were all full, is now full of empty stores, stores for rent, for lease. There is a story behind these stores. This store here, Fashion Footwear, was started in 1930, and the family had it until 1999. And one of the members of that family was the chairman of our school board for twelve years. Those are the kind of businesses that promote the community and contribute to the community. This is the backbone of the small communities – small stores, small businesses. Here is another – started in 1932, ended in 1999. This restaurant open for twenty years in Prince Rupert – now closed. Here is a large furniture store, 1938 family business, closed in 1999. Businesses closed because they were losing opportunity – they could no longer justify the investments they had, the staff they were carrying, or the time and effort they were putting into a community that seemed to be dying. That saddens me because I live in Prince Rupert out of choice and I see the despair on peoples faces, and the lack of opportunity, mostly because we don't have the infrastructure. We do not have the share of the natural resources harvested in our areas, that we are entitled to.

I show this photo because it represents a way of life. It is a gillnetter/troller combination boat – maybe from Hartley Bay, Oona River, Digby, Lax Kw'alaams, or Metlakatla. This boat which you could buy today for \$8,000, maybe in those days had a total of \$40, 000 invested. This boat was a way of life, a family business, as important as that shoe store or clothing store. This boat represented business for that small community. And it had a set of family values and traditions that was passed down from generation to generation, it may have started off as a rowboat in the Skeena, evolved to a gas boat and into a diesel gillnetter. But through one piece of legislation the government said we will no longer have gillnetter/troller combination vessels, and you have to specify which one it will be, and even which area you will fish in. The heart and soul of these communities was the people, who may not have been the best salmon fishermen, but they made a living. They trolled, gillnetted, set crab traps, fished shrimp in November, and hand jigged some halibut and groundfish. At the end of the day maybe they made \$60, 000 gross and after they paid their boat expenses, may have had \$30, 000 left over for a family income. This by Vancouver or Toronto standards is not a lot of money, but if you live on a small native reserve or in a small coastal community, \$30, 000 can go a long way. Most of all it gave the people pride and opportunity. And furthermore for centres like Prince Rupert people came to our areas to be serviced. Those 700 boats had to come in, get their oil changed, get fuel and groceries. Those opportunities are now gone.

(Referring to photos) Certified welding, secondary industry there to support the fish boats, is no longer there. This apartment complex – almost 100 apartments– 56% vacancy – the owner gave it back to the bank last year. We were building twenty houses/year – now we are building one or two – and private homes have dropped \$50 – 70, 000 in value. In the south you may dream of gardens, up north we just have the refuge. You want to come and visit our streams as tourists and fishermen but they are our livelihood, and we cannot make it on three months of business.

We are trying to rehabilitate streams like this to produce salmon. You see a pile of guts and fish offal, we see opportunity.

We doubled the workforce – we now have 1200 people working at this kraft mill – it doubled our city’s tax base and we now had all kinds of amenities for our people. But in a few short years the trees starting dying and the fish left and the crabs weren’t suitable to eat. And we said – we have made a mistake – because we had. We were polluting the very island we lived on. I can tell you today that we eat crab from Wainwright Basin – and the fish are coming back – and the trees are growing and from where I saw my first logging show when I was eight years old the trees are now twelve to fourteen feet high. We can repair the environment – yes we make mistakes from time to time, sometimes even in our own backyard – but we don’t do it on purpose. We can fix it and technology can give us the answers.

In closing, I want to share a slide with you – we all have a vision for the area where we live. A place that has employment, that is prosperous, has small business, and healthy industry. And yes we do have to get involved in resource extraction – we do cut trees, mine and harvest the fish and maybe we even harvest the offshore oil and gas. But at the end of the day, we have to have a community that has jobs for people and opportunity. What we see is an opportunity with north coast oil and gas – it will provide the infrastructure, the tax base, the amenities, the jobs that all the people on the north coast need and deserve. Do not tell us no, tell us how.

#### **SYNOPSIS OF DISCUSSION THAT FOLLOWED THE REVIEW OF ENVIRONMENTAL, SOCIAL, CULTURAL AND POLITICAL/ADMINISTRATIVE CONSIDERATION SESSION**

*Is there a need for jobs in the north and the central coast regions?*

There was discussion about the need for jobs in the north and on the central coast. Philip Hogan noted that the fish are not coming back and they do need jobs. But he noted that the outside area is the breadbasket for the Heiltsuk Nation and they cannot afford to have it destroyed. He expressed his opinion that most of the benefits, should oil and gas development go ahead, would not go to the people of Bella Bella – that instead he believes that they will go to investors, and corporations, or maybe to Prince Rupert. He posed the question: Why should we go hungry for someone else on our own land? And he noted that the Heiltsuk people use that area – not just on the islands and the beaches but also the ‘outside’, Goose Island Banks; they have stories and names from out there and traditions that tell them how to navigate. He expressed the importance of protecting this area and stressed that it is not right that the benefits go to corporations, and even the province, before the question of who owns it is settled. He noted that the Heiltsuk Nation knows who owns it. He stressed that the government cannot be at a table negotiating treaties and at the same time be giving the rights away for oil and gas resources. He referred to a publication about the direct effects of oil and gas exploration on the environment on the website for the Heiltsuk Nation ([www.heiltsuk.com](http://www.heiltsuk.com)).

*What is the health of the fisheries in the north?*

Steve Smith addressed a question regarding the health of the fisheries in the north. He noted that the salmon stocks of the Nass and Skeena Rivers are quite healthy and that in fact they are expecting record returns of sockeye on the Skeena River in summer 2000. He also noted that there were benefits coming to Prince Rupert from the free trade agreement; for example, Prince Rupert has the largest fish cannery in the world which employs about 2000 people work at the height of the season – significantly, at any time during the season, about between 65 and 70% of the fish being processed in the cannery comes from Southeast Alaska .

*Are fishers in Prince Rupert supportive of offshore oil and gas exploration?*

A participant referred to fishers in Sointula being opposed to offshore oil and gas drilling and said that they see it as another threat to their already threatened industry and so was surprised to hear from Steve Smith that the fishermen in Prince Rupert are looking at offshore oil and gas as an *opportunity*. Steve replied that although he couldn’t speak for all the fishers in Prince Rupert he did believe they were positive and he noted that there are numerous examples of fishing co-existing with oil and gas development throughout the world. He discussed what some fishermen see as side benefits from the industry; for example, having a stable platform in Hecate Strait would mean that a doctor

would be readily available, and weather reports and other services such as cell phones, would be more accessible. He emphasized that this has to be viewed as a whole, and part of that is an opportunity.



## THE 1990S: CHANGES IN THE OIL AND GAS INDUSTRY

**Susan Sherk**

*Senior Human Environment Consultant, AMEC Earth and Environmental, St. John's, NF*

It is a wonderful experience for us from the East Coast of Canada to come to the West Coast of Canada to hear about the issues facing you in the years ahead. Regardless of the outcomes, this is an opportunity for us to share our experiences and what we have gone through in the industry in the last twenty plus years. There are many similarities between the discussions we are having today and those held in Atlantic Canada during the 1970s and early 1980s and, I suspect, those that were held prior to the establishment of the moratorium in 1985 for offshore oil and gas exploration in British Columbia.

During the 1970s and 1980s we in Newfoundland looked to the North Sea for lessons learned just as you today are hearing some of the lessons we have learned. In fact, many of us here today from Atlantic Canada either worked or visited the North Sea prior to helping shape our oil and gas industry.

To provide you with some background information on the East Coast experience and perspective as well as to highlight the relatively slow evolution of the industry, I will describe a very brief chronological overview and thumbnail sketch of the development of our industry. We have the Hibernia and Terra Nova fields, which are the two fields now in production. There is also a development off the Scotian shelf, the Sable Offshore Energy Project. Hibernia is roughly 315 km east of St. John's.

The industry, or oil and gas reserves in the east coast have been known for quite awhile. The earliest evidence of oil and gas in Atlantic Canada goes back to the early 1800s. Fast forward to 1943, when there was drilling off Prince Edward Island. Then during the 1950s geological surveys took place off the coast of Newfoundland and determined that significant petroleum potential existed, much like what you heard about this morning for British Columbia. During the 1960s and 1970s, a flurry of exploration activity took place offshore New Brunswick, Nova Scotia, the island of Newfoundland and coastal Labrador, partially fuelled by PIP grants (federal government petroleum incentive program). This helped to hasten the first discovery well drilled by Mobil Oil off Nova Scotia in 1971. Between then and 1979 a number of gas discoveries were made off both the Nova Scotia and Labrador coasts, but in 1979 the first major oil discovery in the Canadian offshore was made and that was Hibernia P15.

Despite the significance of the Hibernia field, approximately 666 million barrels of oil, it did not come into production until eighteen years later, in December of 1997. Today we have an industry, albeit in its initial stages, that has vast potential. Offshore Newfoundland we have an estimated 8.2 billion barrels of oil, discovered and undiscovered, and 69.1 trillion cubic feet of natural gas, discovered and undiscovered. Offshore Nova Scotia an estimated eighteen trillion cubic feet of natural gas exists also discovered and undiscovered. To date twenty-three significant discoveries have been made, eighteen offshore Newfoundland, and five on the Labrador shelf. Hibernia is in production, the Terra Nova field is anticipated to be in production in early 2001, and it is anticipated that the White Rose field could be in production in 2003 if its environmental statement is accepted and approved. Offshore Nova Scotia, the Cohasset project has already been decommissioned and the Sable Offshore Energy Project has been producing since late 1999. Other projects are waiting in the wings.

For those of us in Atlantic Canada there were advantages in taking such a long time to develop the industry, in this case the eighteen years between the discovery of Hibernia to its actual production. It allowed us to listen, learn from others, particularly those in the North Sea, and try to minimize some of the problems that could occur. We did make mistakes and you are going to hear about some of the lessons and mistakes that we made today.

There are many images and ideas that exist as to what the oil and gas industry is about. Depending on your background perspectives and philosophical viewpoint, those images and ideas can be very different. In fact, when I first travelled around the province of Newfoundland and Labrador discussing the industry and its possible implications, I encountered every conceivable stereotype that you can possibly imagine. I should tell you that the secondary school teachers were the worst. Many of them had bought into the emotional rhetoric and the hype associated with the then TV show *Dallas* and were transmitting that stereotype to their students. On the other hand, fishermen were the most realistic. They wanted to know how drilling was done, and once they understood the

concept, which they did almost immediately, they then focused their attention on the issues that would affect them, as Strat Canning will talk about later today. These issues were potential oil spills, loss of catch, safety zones and compensation, among others.

Today, on the panel we have assembled some of the most knowledgeable people in the Canadian offshore oil and gas industry, each of whom will discuss changes and advancements in the industry in the last ten to fifteen years. Significant changes have occurred in the way in which the physical environment is managed. Improved technologies have resulted in new and improved forecasting methods, marine dynamics research and GIS systems. Significant changes have also occurred in offshore engineering; the gathering of seismic data is more efficient than ten years ago, thereby providing more precise information about the likely presence of hydrocarbons. This in turn allows for a better selection of correct drilling systems and well design. Another significant change that has occurred is the incorporation of environmental management strategies as part of an operator's overall management framework. Finally, although a risk of a blowout is relatively small, to ensure against ongoing damage from a blowout or spill, marine spill organizations have been set up on both the east and west coasts of Canada. Our speakers will talk on the specific areas of risk management and risk assessment and will touch on the major changes that have taken place in these areas. There is not time to cover all of the changes. Thank you.

## **Environmental Assessment**

### **The 1990s: Changes in the Oil and Gas Industry Environmental Effects Monitoring, An Overview**

**Bevin Ledrew**

*Principal, Environmental Assessment, AGRA Earth and Environmental, St. John's, NF*

#### ***Introduction***

This presentation focuses on the experience of the offshore oil and gas industry in Atlantic Canada. Most of the focus is on the areas under the management of the Canada-Newfoundland Offshore Petroleum Board, mainly because I am less familiar with the Nova Scotia experience. While the industry has had an effect onshore, with respect to construction, supply bases, and socio-economic impact, my comments focus on the offshore components and the offshore environment.

As a background, the stages of activity include exploration, development, production and closure/decommissioning. We have had experience in Atlantic Canada with all these stages except the last, as illustrated by a brief and selective overview of events:

Seismic Exploration started in the late 1960s and continues to the present.

Exploration drilling has extended from 1969 until the present, and has occurred:

- Strait of Belle Isle
- Offshore Labrador
- Grand Banks
- NE Nfld.
- Davis Strait
- Flemish Pass, Cap
- Gulf of St Lawrence
- Sable

In the order of 500 exploration (wildcat) wells have been drilled to date offshore Atlantic Canada.

Significant Discoveries have been recorded from three main regions, and a total of 69 have been identified. A limited number have moved to the stage where a development application has been submitted, and a total of three production licenses have been issued.

Projects in production or under development include:

- Cohasset-Panuke – in production
- Venture Gas – in production
- Hibernia – in production
- Terra Nova – in construction
- White Rose – application in progress

Hebron and Ben Nevis are anticipated to follow on the heels of the White Rose Project. All except Venture are oil producers.

It should be noted that there are areas where exploration activity has been absent or restricted. These include the George's Bank where a moratorium is in place, as well as areas under jurisdictional dispute in one case between France and Canada, and in the other between Nova Scotia and Newfoundland. The international dispute has been resolved, and the provincial dispute is under examination.

As a general pattern, the Labrador and Sable Island offshore areas have proven to be gas "prone", while the Jeanne D'Arc basin on the Grand Banks is oil "prone".

Offshore exploration is an expensive business, which in turn requires the participation of large companies, and the requirement to discover large fields in order to produce an economic project. Even for the large oil companies, there is a tendency to share risk through buy-in arrangements. This is reflected in the ownership structure of the major offshore producers in Atlantic Canada.

### ***Environmental Reviews***

The major development Projects have all been subjected to Environmental Impact Assessment processes, which have involved Panels with Public Hearings (Venture Gas, Panuke-Cohasset Light Oil, Hibernia, and Terra Nova). Generally lesser levels of assessment, if any have been required for exploration activity – an Initial Environmental Assessment for Offshore Labrador Exploration. One exception was the examination of exploration drilling on George's Bank. Note that for Hibernia, the onshore construction component of the Project was exempted from assessment, and in its place a monitoring committee was given authority over selected ingredients of the onshore activities.

The Panel reports resulting from the major environmental assessments for Venture Gas, Hibernia and Terra Nova all concluded that these undertakings could be conducted without a major unacceptable level of environmental impact.

### ***Environmental Interactions***

The key biophysical concerns associated with offshore developments relate to a limited number of project-environment interactions. The main difference between exploration drilling and production is the time scale. An exploration hole is completed in weeks to months, while a production operation will require the drilling of development wells, the maintenance of these, and the extraction of product over a period of years. The other principle difference is the requirement to store, transfer and transport product during the operation phase. For routine exploration drilling and production, the potential interactions include:

- Noise from various sources
- Drilling mud and cuttings discharge (containing metals, possible oil, and altering bottom habitat)
- Produced water during production (can be low salinity, hydrocarbon contaminates, and above ambient temperature)
- Wash down and stormwater from decks (residual oil)
- Sewage
- Minor, but chronic oil spills from poor handling practices

Regulations are in place with respect to permissible levels of contaminants in discharges, and recent reviews have focused on achieving standards that are technically possible.

## ***Environmental Issues***

From these various interactions, a set of issues have arisen, and these are briefly summarized as follows.

- Seismic effects from geophysical surveys were a concern with respect to possible fish mortality. Modern technology has produced “clean” seismic signals that do not have this shock effect. There can be transient influences/effects on marine mammal communications. Recent attention has focussed on concerns that groundfish respond to surveys in a manner that reduces catchability.
- Use of oil based muds has produced a concern that hydrocarbon concentrations can build up in the nearfield seabed environment. Use of synthetic oils and improved separation of mud-cuttings has dramatically reduced discharge volumes and toxicity.
- The drill cuttings can alter the composition of surface substrate, and produce a crusted material that alters the habitat characteristics in the area near the drill site.
- Conversely, some researchers have expressed concern that mud/cuttings form a “floc” which moves as a cloud like formation near the bottom, resulting in dispersion well beyond the drill site, and greater mobility of contaminants for uptake into the food chain.
- The cuttings could release metals thereby increasing natural uptake phenomena, and producing toxic responses in receptor organisms, and possible taint in commercially caught fish species.
- Produced water could create a plume of low salinity and high temperature differential along with dissolved hydrocarbons, which would reduce primary productivity, and result in avoidance response by mobile species.
- Chronic spills would create surface slicks that would produce mortalities in seabirds through contact.

This presentation will not address unplanned events, (blow-outs, tanker or pipeline spills) except to acknowledge that these are recognized in all environmental impact assessments as having the potential to create a major negative environmental impact, albeit one with a low probability of occurrence. The challenge for those in the emergency preparedness business is to reduce the probability to a number as close to zero as possible.

## ***Results to Date***

The issues identified above have been evaluated and addressed through environmental impact prediction studies (EIS), and various, ongoing research and environmental effects monitoring programs. I will attempt to summarize the results of work to date and the conclusions reached.

Most of the following comments are based on the Grand Banks experience, specifically the Jeanne d’Arc basin in which is found the major Atlantic Canada offshore oil discoveries to date.

The area of interest is about 300km offshore in 85-95m of water depths. The seabed is a moderate energy environment with substrates comprising gravel- sand materials. The water current patterns are low in intensity and indeterminate in direction.

The Hibernia production platform represents a point source for discharges that include produced water, stormwater, drill cuttings and the like. A modelling exercise was carried out to establish the fate of these discharges, i.e. their likely pattern of dispersion and deposition around the platform. The EIS predicted that an “impact zone” would develop on the seabed proximate to the platform, but would be restricted to less 1000m.

Based on the calculated concentrations of discharges, an environmental effects monitoring program was designed. A key principle required that monitoring must be based on testable hypotheses, rather than being carried out (some would say as comfort monitoring) in a manner which could not link cause and effect, and which would serve no purpose in achieving continuous improvement in environmental performance.

On the basis of this examination, a number of candidate programs were rejected, including:

- water column monitoring (high dispersion rates render samples below detection)
- Benthic species diversity (high natural variance, low/patchy densities of organisms)
- MFO induction (generic indicator of stress, but not attributable)
- Caged exposures (practical methods unavailable)

The selected sampling program addressed pathways of concern, and were designed in a manner which would provide statistical tests of the stated null hypotheses:

- Sediment quality – physical character (grain size distribution), chemistry (metals, hydrocarbons) and toxicity (chronic and lethal)
- Fishery species – taint and body burden (metals, hydrocarbons).

The development of a sampling strategy resulted in considerable challenges to come up with a practical field program that satisfied our statistical design. For sediments, a large-scale grid was established, and replicate sampling (three per station) restricted to a target 50m in radius. A suitable grab was found and modified such that it could reliably extract a substantial and undisturbed sample.

For target fish species we chose Icelandic scallops, an ideal indicator species given its sedentary status, and its filter feeding behaviour. It was an added bonus that the species is harvested commercially, hence it met all our criteria. The selected fish species was American plaice, a less suitable target given its life history.

### ***Conclusions and Trends***

The baseline sampling was conducted in advance of production, and also served to provide an assessment of the effect of exploration drilling since several wells had been completed within the grid area.

In general there was no measurable effect from exploration drilling. The only variable that was above background was for barium, an inert ingredient in drilling mud. Some false “hits “ occurred with toxicity tests, and modifications have been recommended. As well, it has been established that the ideal monitoring species (Icelandic scallops) have only one failing – they are not present in sufficient numbers within the monitoring zone. Based on recent improvements in caged exposure methods, it may be practical to introduce another filter feeder into the water column as a replacement for this species.

It is early to reach conclusions on the long-term effects of production operations at Hibernia. The results of the second year of monitoring (and the first full year of production) will become available within weeks. In general the monitoring parameters and target species appear to be suitable, however some adaptation may be required. As well, the Terra Nova monitoring program has just started, and while there are many similarities in the two, some added monitoring parameters have been incorporated in that program, reflecting differences in the two projects (FPSO versus GBS, five drill sites versus one) and the results of emerging research and public concerns.

The added monitoring parameters include:

- fish health (MFO induction, histopathology of liver and gills, hematology)
- water quality (including phytoplankton density)
- benthic species diversity

There are a number of trends in the offshore petroleum business, which will serve to further reduce environmental impacts, and to improve the understanding of environmental effects. Incorporation of quality and environmental management systems has brought a “continuous improvement “ approach to environmental performance, such that the contaminant content of permitted discharges is continuously reduced beyond the minimum required to achieve regulatory compliance. The development of synthetic based drilling muds has removed the concern with respect to oil-based muds and the consequent hydrocarbon content of discharged cuttings. The improved performance of mud-cuttings separation has also served to reduce the proportion of mud residual on the discharged cuttings.

As evidence of continuous improvement, the CNOBP recently reported on the pattern of reported spills for offshore production operations. The levels are below those found in other jurisdictions, and appear to be on a downward trend.

## Physical Environment

**Laurie Davidson**

*Senior Vice president, Environmental Operations, AGRA Earth and Environmental, Toronto, ON*

I will provide you with a brief review of some of the things that have changed in the 20 years in the physical environmental business as it affects offshore oil and gas, and then will look ahead as to where we might be headed.

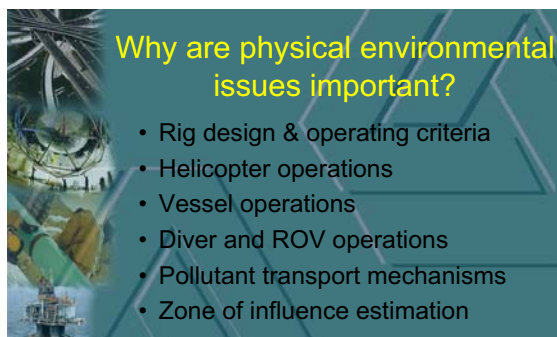
### *Perspectives*

As we talk about environmental impacts associated with oil and gas our conditioning is to think biologically about the impact of the oil and gas activity on the environment. When we talk about the physical environment we have to change that paradigm slightly. We see it from both sides – the impact of the environment on the activity, (this is a major factor) and we look at the operating environment - the physical characteristics of the operating environment. The way we are able to actually operate in the offshore is largely conditioned by features of wind and waves, currents, on the east coast ice, and so on. Coupled with that are the physical environmental contributions to the impact of the activity on the environment. These include issues associated with drill cuttings, routine discharges, accidental discharges, noise, and the big issue, large spills. I will be addressing both of these perspectives as I continue.



### *Are physical environmental issues important in a dialogue on offshore oil and gas operations?*

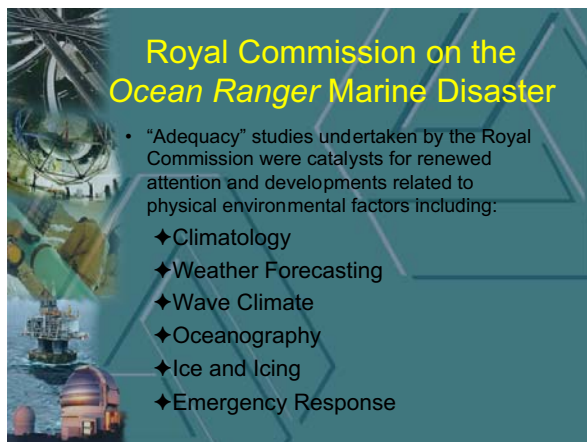
Certainly, a major influence on rig selection or rig design, is fitting the equipment to the environment to ensure safe operating conditions. Certainly helicopter operations, on a very tactical, practical, day to day basis are largely affected by the physical environment. Further, vessel operations, and diver remotely operated vehicle operations are all significantly influenced by physical conditions. It is the physical ocean processes that control pollutant transport mechanisms – how a pollutant moves through the environment to a receptor. This leads to a contribution of what we call zone of influence estimation, the geographical impact zone from a pollutant event. Again, from an operational perspective, physical environment is a major influence on the constraints in the oil spill response operation and in



the search and rescue operation.

### ***Triggers leading to change***

Before discussing some specific changes I want to talk about some triggers. Why is it that we have actually seen substantial improvements in the last twenty years? Clearly, there is a natural scientific process that goes on – learning goes on. There have been a couple of events on the east coast that have provided the momentum or impetus to this improvement process. On Feb 15, 1982, the night of the 14<sup>th</sup>, an intense under-forecast storm on the Grand Banks, combined with a series of progressive accidents coupled with human error and bad decisions, resulted in the capsizing and sinking of the Ocean Ranger and the loss of 84 lives. This is an event that I cannot even begin to describe – the emotional impact in a small town like St. John’s was enormous. There wasn’t a life that wasn’t affected and it touched everybody in town. As a result of the Ocean Ranger disaster, a Royal Commission was established. A number of the Commission’s studies dealt with adequacy issues in the oil and gas sector on the east coast in terms of many of these physical environment issues. It was like a magnifying glass to focus on what we did well, what we did poorly, and where the uncertainties were. That was the driver for the research and development that moved forward from that time.



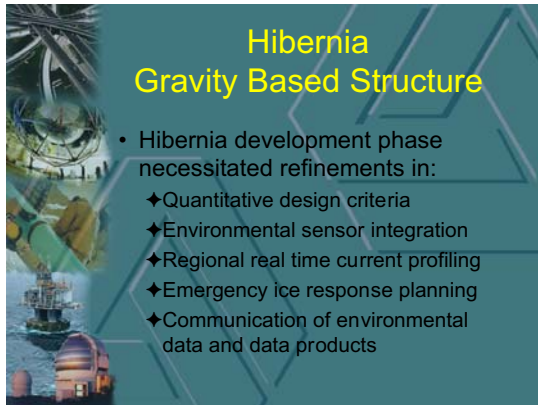
The severity of the Grand Banks environment is a natural trigger for technological advances. It is a bad place to work, no matter how you slice it. There are icebergs that come with somewhat unpredictable frequency (a very noisy signal) – the number of icebergs at the Hibernia latitude per given year fluctuate from 0 to 2500. There are small ice pieces that are hard to detect and that move with the waves carrying huge momentum and providing potential structural damage. And there is a wave climate that from a statistical basis is just about as bad as it gets. This is a natural environment that triggers a desire for improvement.

The third trigger that I would suggest to you is the momentum from the Hibernia development project. The Hibernia development phase virtually demanded improvements and refinements in a number of areas, including design criteria, and environmental sensor integration, bringing data streams together. In addition, the ability to measure currents on a regional basis for the prediction of ice behaviour brought increases or improvements in the way we think about managing the ice situation, and as well there have been huge improvements in the communication of environmental data and data products.

***On that basis and with those triggers and the natural progression of knowledge, I will pose the question: What is it that has changed?***

I could have taken a tact where I went back to the variables and talked about the individual parameters that have changed – but this would be dull. So instead I will try to deal with some generic groupings here. I would suggest to you that in over twenty years we have seen new developments in at least these five – technology or instrumentation equipment improvements; improvements in our ability to predict the behaviour of the physical environment; huge

improvements in communication and data management; improvements in process management (I use the term process management to talk about the way we do things – the way we manage human activity in a physical environment); and the category that I call awareness. Instead of trying to be comprehensive here I am going to address three issues: oceanographic and ice monitoring; weather and sea state and ice forecasting; and emergency oil spill response, and I am going to touch on examples in each of these three disciplines of where we have seen significant improvements.



**Hibernia Gravity Based Structure**

- Hibernia development phase necessitated refinements in:
  - ◆ Quantitative design criteria
  - ◆ Environmental sensor integration
  - ◆ Regional real time current profiling
  - ◆ Emergency ice response planning
  - ◆ Communication of environmental data and data products



**So What Has Changed?**

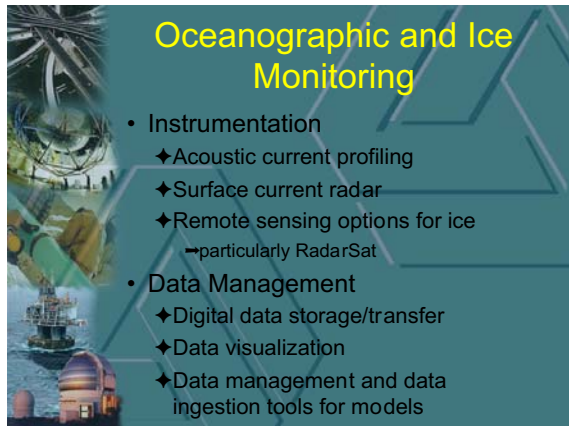
- New developments in :
  - ◆ Instrumentation/Equipment
  - ◆ Predictive Capability
  - ◆ Communication/Data Management
  - ◆ Process Management
  - ◆ Awareness/Attentiveness
- Focus on:
  - ◆ Oceanographic and Ice Monitoring
  - ◆ Weather/Sea State/Ice Forecasting
  - ◆ Emergency Oil Spill Response

### ***Oceanographic and Ice Monitoring***

In terms of oceanographic and ice monitoring there have been substantial instrumentation improvements, particularly in estimates of ways to measure currents through the development of technology that, for example, can be deployed on the beach and measure the currents at the surface of the ocean. There have also been enormous leaps in the remote sensing field, that is the sensing of the physical parameters from airborne sensors or from spacecraft sensors. Similarly, in terms of the computational power that drives this business – a very data intensive business – there have been very significant leaps in being able to store and manage and manipulate data quickly; for example, getting information out of a current meter on a rig in time to be able to use it to make practical decisions. Surprisingly, 10 years ago that was a problem - yet today it is a given. Our ability to take complicated data – currents are hard data to picture because they vary in three geographical cartesian directions and they vary in time resulting in four dimensions in variability. Improvements in data visualization technology has resulted in picture flow through the use of colour and 3D graphics. Data management and data ingestion tools – the ability to get the sensors into the models without a lot of manual intervention, have also improved remarkably; for example, with scale. We mount that instrument in a frame but that frame is sitting on the bottom - it has acoustic beams and measures horizontal currents through those acoustic beams. Thus, you can actually profile the changes in horizontal



current with a single instrument sitting on the bottom. You can also mount that instrument in the hold of a ship and as the ship is in transit it can measure the vertical profile of currents.

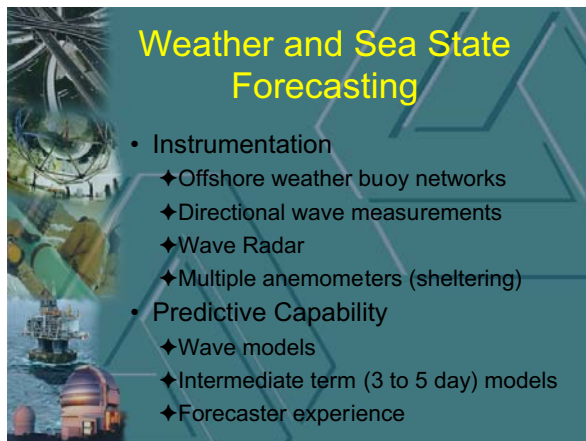


**Oceanographic and Ice Monitoring**

- Instrumentation
  - ◆ Acoustic current profiling
  - ◆ Surface current radar
  - ◆ Remote sensing options for ice
    - particularly RadarSat
- Data Management
  - ◆ Digital data storage/transfer
  - ◆ Data visualization
  - ◆ Data management and data ingestion tools for models

### *Weather and Sea State Forecasting*

There have been significant improvements in this area. For example, with the addition of offshore buoys to the data network we can have more point sources of information. The weather forecasters are insatiable – they want as much data as there is and more. We have also improved the ability to measure waves not only by their amplitude but also by the direction from which they propagate. Systems are getting better and using the radar system to measure waves around a point. There is also the new practice of mounting multiple wind measuring devices (anemometers) on a rig and being able to flip from one to another to avoid sheltering on the rigs so as to give a true wind measure to support helicopter operations coming onto the platform. Additionally, we have seen improvements in our ability to predict. Weather forecasters told me the other day that we are as good as out to 78 hours into the future now as we were 48 hours, 10 years ago. This is almost double our predictive capacity as a result of improved skill in weather forecasting. Also, we should not underestimate the fact that being there develops a human resource base so we now have proper forecasters forecasting the harsh marine conditions on the East Coast for the better part of 20 years; i.e., we have an experienced base.



**Weather and Sea State Forecasting**

- Instrumentation
  - ◆ Offshore weather buoy networks
  - ◆ Directional wave measurements
  - ◆ Wave Radar
  - ◆ Multiple anemometers (sheltering)
- Predictive Capability
  - ◆ Wave models
  - ◆ Intermediate term (3 to 5 day) models
  - ◆ Forecaster experience

### *Communication*

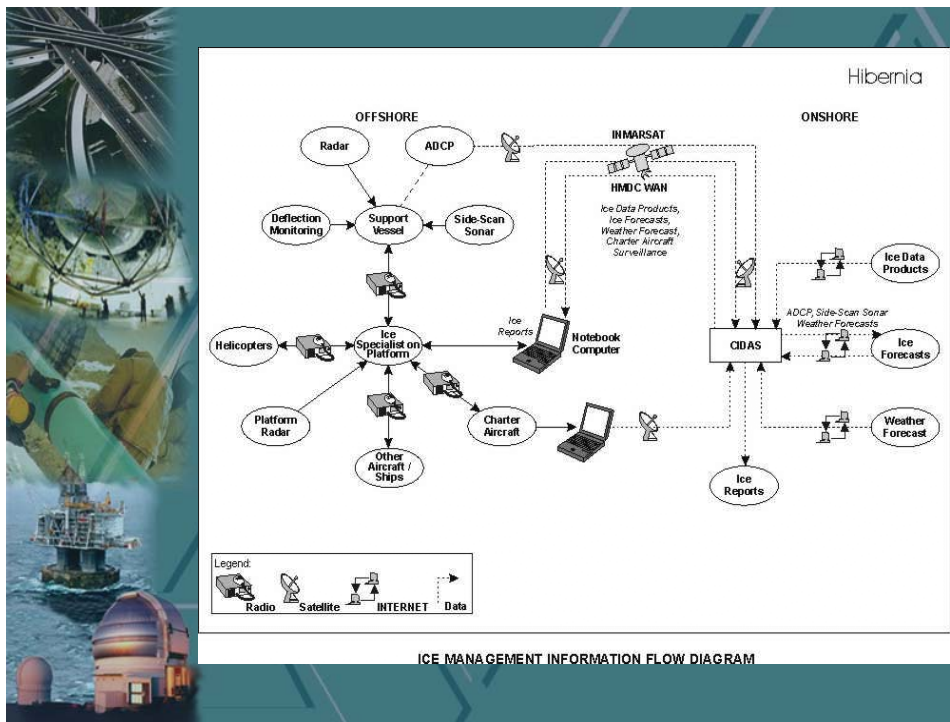
Communication is the big issue in terms of forecasting. Over the last 15 years, ship to shore communications have progressed from the static filled HF radio to what I call the virtual office. If I am sitting on the Hibernia platform I

have at my fingertips exactly the same data that I would have on the beach or in my environmental management system office – in my particular operation it is indistinguishable – the same information, the same flexibility, and the same speed of communications on the platform offshore as on the beach.

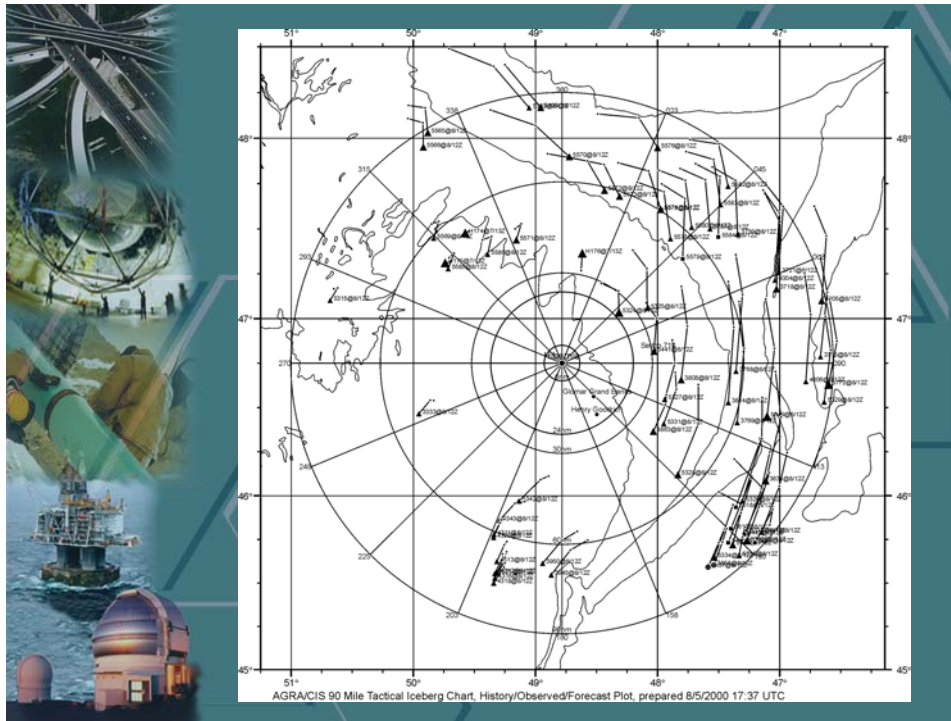
## Weather and Sea State Forecasting

- Communication/Data Management
  - ◆ Over fifteen years, “Ship to Shore” communication has progressed from static-filled HF radio to the virtual office
  - ◆ Meteorological, oceanographic, ice and iceberg data stream integration has become the norm
  - ◆ Distribution of data/data products with ease (Hibernia experience)

Meteorological oceanographic ice data integration has become the norm now and we have highly refined systems for the distribution of data and data products. In this slide, the key point is that each of these ovals is a location – we have helicopters and ships, platforms and weather office, ice office and environmental management office contractors office, Hibernia office. They are all equipped to talk to each other and receive the same data - with information coming in from current meters, airplanes looking at icebergs, and from public ice data bases in Ottawa. All of this information moves in near real time to all of those locations. That is an enormous leap from what where we were ten years ago.



It allows us to do things like this in the slide below.



This distance is 100 – 110 km and that is a picture of the ice conditions five days ago on the Grand Banks – each of the triangles is the location of an iceberg and the tail is a three day history of its motion. That kind of detail was absolutely unthinkable 15 years ago.

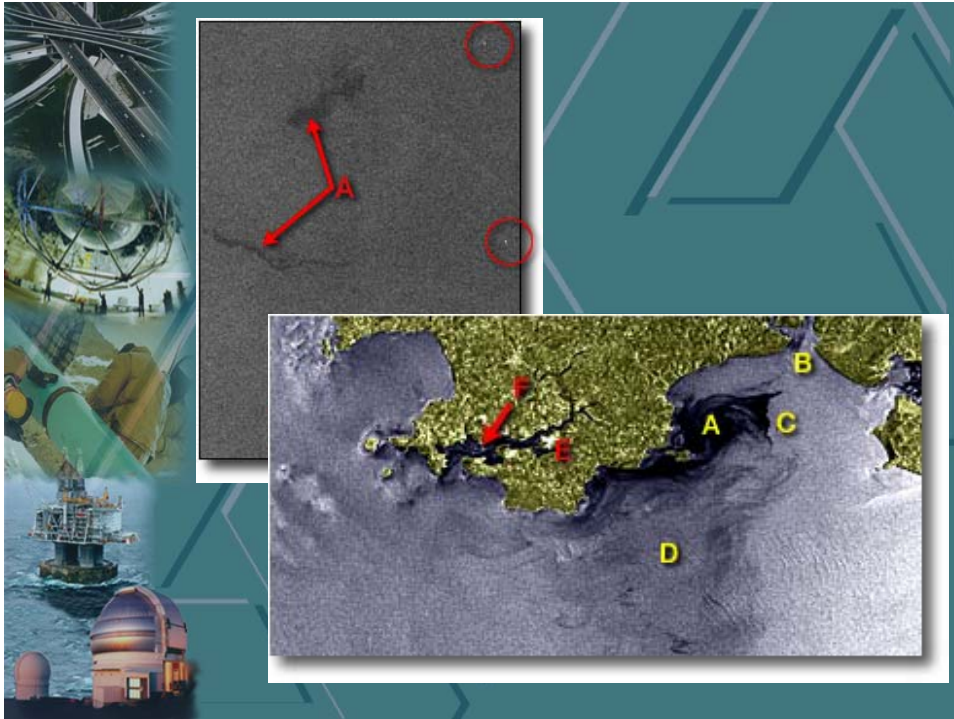
### *Emergency Oil Spill Response*

**Emergency Oil Spill Response**

- Equipment
  - ◆ Continuous improvement in containment and recovery equipment
  - ◆ Tracking buoys that really work
  - ◆ Remote sensing tools that “see” slicks and sheens from the air
  - ◆ Specialty equipment such as fire-proof booms and slick igniters
  - ◆ Innovation in storage and disposal methods and practices

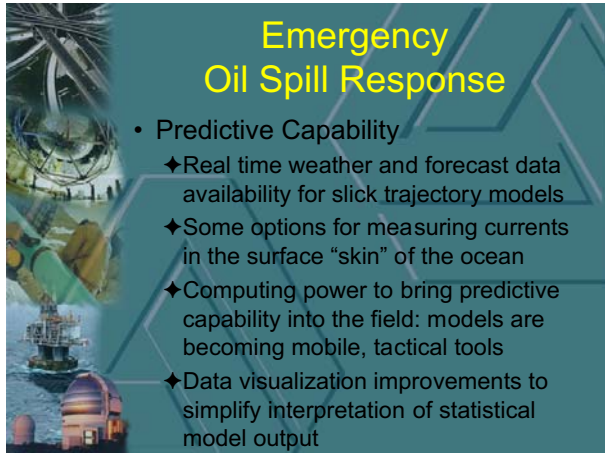
Probably the biggest issue in the public view is the oil spill response issue. How has this changed in the last ten years? We have seen improvement in containment and recovery technology and we have also seen the evolution of tracking buoys that really well work these days, as well as remote sensing tools that see slicks on the ocean surface from the air. In addition, we have specialty developments in terms of fireproof booms and slick igniters as a spill management tools, and innovations in storage and disposal methods and practices.

The slide below is a satellite image of Flemish Pass north of Hibernia; the circles are our ships and the presence of the oil sheen on the water is visible from space.



Another satellite image actually a radar satellite image, colour enhanced, shows the Sea Empress spill. You can see the oil patches clearly from the radar. This kind of product is becoming operationally available. The satellites that are put up these days have that kind of resolution and discrimination on about a four day cycle for the Canadian landscape.

There have also been significant developments in our ability to predict the behaviour of oil spills – the ability to get real time weather and updated forecast information quickly for slick trajectory models. As well there are some improved options for measuring currents close to the surface of the ocean. There have also been large changes in computing power allowing us to bring the models into the field – putting the models into the hands of the users rather than being locked in a semi-research mode which was the norm ten years ago.



**Emergency Oil Spill Response**

- Predictive Capability
  - ◆ Real time weather and forecast data availability for slick trajectory models
  - ◆ Some options for measuring currents in the surface “skin” of the ocean
  - ◆ Computing power to bring predictive capability into the field: models are becoming mobile, tactical tools
  - ◆ Data visualization improvements to simplify interpretation of statistical model output



**Emergency Oil Spill Response**

- Process Management
  - ◆ Brander-Smith Commission
  - ◆ Canada Shipping Act changes
  - ◆ Legislated OPEP's and SOPEP's
  - ◆ Response Organizations
- Awareness/Attentiveness
  - ◆ Focus on:
    - Prevention (best practices/technology)
    - Preparedness (includes training/exercises)
    - Response

Importantly, there has been a very structured evolution of the oil spill response regime in Canada within the last decade. The involvement from the Brander-Smith Commission on tanker safety led to changes in the Canada Shipping Act which specified legal requirements as to spill preparedness for ships at sea and for oil handling facilities and locations where oil is pumped onto a dock. That has led to the development of response organizations which have the state of the art equipment caches stacked around the country and which have at least on the east coast come into service as a preparedness tool and as a response tool for the oil industry. This structure again simply did not exist ten years ago.

From the awareness attentiveness perspective I would say that we have seen an evolution to a focus on prevention and preparedness where we used to worry about response.

***Where does the future lead?***

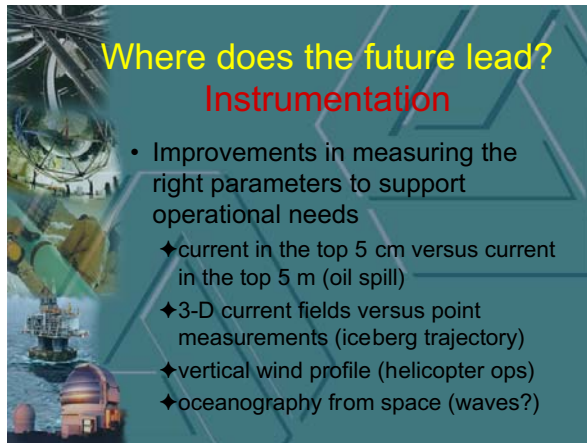
What is going to happen in the next five to ten years? Instruments are going to help us measure the right parameters to support what we need operationally. We will see significant changes in our predictive capability. For example, we are going to see the push yet further out in time for weather forecasting and we are going to see developments in the ability to predict visibility conditions around the rig for improved helicopter operations bound for the rig.





### Where does the future lead? Predictive Capability

- How far in time will we push and sea state forecasting
- Near-field visibility/foa
- 3-D time varying current
- Ice and iceberg (presence, distribution and
- Oil spill fate and behavior
- Search and rescue



### Where does the future lead? Instrumentation

- Improvements in measuring the right parameters to support operational needs
  - ◆ current in the top 5 cm versus current in the top 5 m (oil spill)
  - ◆ 3-D current fields versus point measurements (iceberg trajectory)
  - ◆ vertical wind profile (helicopter ops)
  - ◆ oceanography from space (waves?)



### Where does the future lead? Communication and Data Management

- Control of the models in the hands of the end users? (oil spill, ice behavior, search and rescue)
- Interpretable satellite imagery in near real-time to any location?
- Interpretation of real-time near-field visibility changes in the helicopter cockpit?

We are also going to see improvements in oil spill behaviour, predictions and search and rescue. For our communications and data management, we are going to see the models in the field – tactical people are going to be using the models to make operational decisions. They are going to have the technology and the know how to interpret what they get out of the models. We will see satellite imagery being used on an operational basis in the field. And finally this one is really Buck Rogers – you are going to see some kind of visibility data being available in the cockpit of the helicopter as it is bound for the platform.

In terms of process management, we are going to manage our data better and we are going to do better at building service groups that service an entire industry rather than through fragmented contracts. We are also going to see maturity in spill management and in cooperation with industry operators.



**Where does the future lead?**  
**Process Management**

- Integration of data streams and services from multiple suppliers at a single facility?
- Industry-wide service providers?
- Maturity in spill management command and control?
- Maturity in joint operator agreements?

In terms of awareness, we will see increased potential for risk management and continued movement up that spectrum towards spill prevention and preparedness for response. And finally we are going to see an explosion in public consultation which we take very seriously.



**Where does the future lead?**  
**Awareness/Attentiveness**

- Increased attention to risk assessment and risk management
- Continued movement up the spectrum toward spill prevention, from preparedness and response
- Public consultation role being taken much more seriously than was once the case

I will close with one thought – you might ask how important is this physical environment work? Is it really important to the whole picture, the whole spectrum of things, that we are talking about?

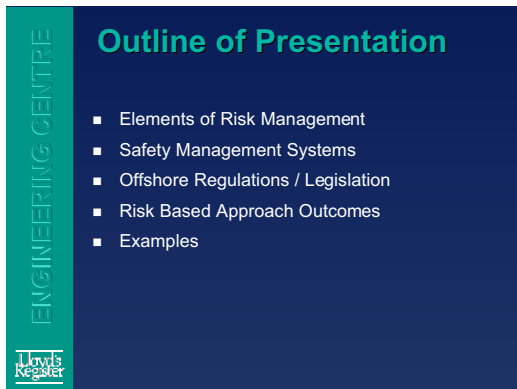


Let me go back to the Ocean Ranger – I was on the ground that morning and I watched the events unfold and experienced the absolute horror of that day. I come from a perspective where physical environment issues are very much a human issue – it is about people, about ordinary people, doing hard jobs in difficult places; it is about the guy that lives next door, he has a wife and a couple of kids and he needs to come home safe after his stint in the offshore. The work we do affects that – it is very relevant.

## **Risk Assessment in the Offshore Oil and Gas Development**

**Ben Poblete**

*Risk Management Specialist, Lloyds register Engineering Centre, Houston Texas*

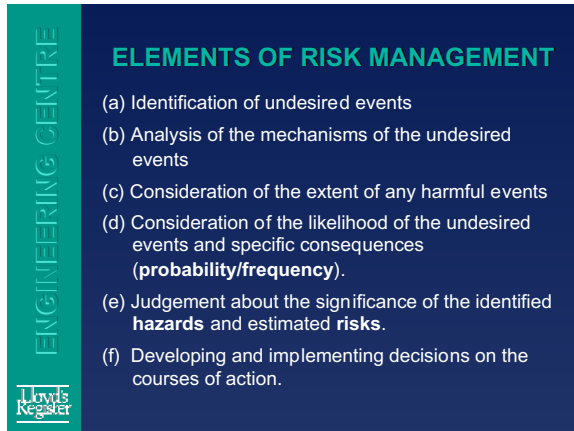


The objective of this presentation is highlight the advancement of the oil and gas, exploration and production activities in the last ten years. The major driver, with the improvement in their management systems, is to develop a more cost effective but environmentally safe solution to their operational concerns.

The presentation will first discuss the essential elements of risk management and establish a common nomenclature that will be utilized throughout the document. This will then lead on to the essential elements of an effective Safety



Management System and how it leads to a more holistic and proactive approach especially when dealing with advancements in technology. There will be a short talk on the current state of offshore regulations and how the major oil companies are imposing more stringent contractual obligations when dealing with the development and operations of their petroleum properties. Some of the outcomes from this risk based approach will be presented as well as examples of more hardware oriented advancements or developments resulting from these changes.



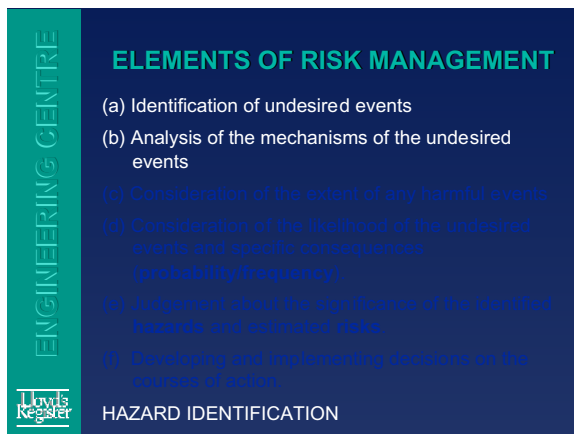
The slide features a dark blue background with a vertical teal bar on the left containing the text 'ENGINEERING CENTRE' and the 'Hovis Register' logo. The main title 'ELEMENTS OF RISK MANAGEMENT' is in teal. Below it, a list of six items (a-f) is presented in white text.

**ENGINEERING CENTRE**  
Hovis Register

**ELEMENTS OF RISK MANAGEMENT**

- (a) Identification of undesired events
- (b) Analysis of the mechanisms of the undesired events
- (c) Consideration of the extent of any harmful events
- (d) Consideration of the likelihood of the undesired events and specific consequences (**probability/frequency**).
- (e) Judgement about the significance of the identified **hazards** and estimated **risks**.
- (f) Developing and implementing decisions on the courses of action.

- The key item is the identification of the undesirable events and the analysis of the mechanism. If these items are not accurate the risk management result will be completely ineffective. The management system of a company should address the identification of undesirable events as one of their essential elements.



This slide is identical to the one above, but includes the text 'HAZARD IDENTIFICATION' at the bottom left, below the 'Hovis Register' logo.

**ENGINEERING CENTRE**  
Hovis Register

**ELEMENTS OF RISK MANAGEMENT**

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HAZARD IDENTIFICATION


The word “analysis” is when consequence and likelihood (probability/frequency) is combined in a study. It is critical to note that the analysis is only as good as the identification performed.

Consideration of the extent of any harmful events. What is going to happen once an event like this occurs. First part is the identification – get the mechanisms set up – then you consider the extent of this harmful event. You now have a consequence. The next issue, once you have the consequence, is that you have to consider the likelihood of the undesirable event. Now you have to get into things like probabilities and likelihood – once you start getting into that issue is when you start talking about risk.

ENGINEERING CENTRE

**ELEMENTS OF RISK MANAGEMENT**

(a) Identification of undesired events  
 (b) Analysis of the mechanisms of the undesired events  
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 (f) Developing and implementing decisions on the course of action.


 RISK (HAZARD) ANALYSIS

We are talking about the hazard when we talk about the identification, deal with the analysis and the extent of it. That is all part of the hazard identification portion. We now talk about risk when we start talking about probabilities and likelihoods.

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**ELEMENTS OF RISK MANAGEMENT**

(a) Identification of undesired events  
 (b) Analysis of the mechanisms of the undesired events  
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 RISK ASSESSMENT

- The word “assessment” is used when an analysis has been judged with someone with experience. The accuracy of the assessment is dependent on the experience of the assessor.

With risk analysis we are just talking about the numbers themselves – we have not put any judgement into that. The next step of the process, risk management, is where we try to get the judgement about the significance of the event. When we are doing this we are taking the hazard and now are talking about an assessment. The key point with the judgement part is that you must have experienced individuals doing this. Assessment is based on experience. You must have some kind of experience before you can take it from an analysis to an assessment. So usually when I hear someone saying that they have done a risk assessment, that means that there has been some competent individual who has taken it from the analysis on to the assessment portion. The last portion is basically once you have got all this information, and you have created your judgement, then you develop and implement decisions based on the judgements– this is the course of action. That last portion is what they call risk management. One of the things that you have to understand, when you get through this part, (the assessment part) that is the most difficult part, this is where you have to start trying to figure out what kind of solutions you must have.



**SAFETY MANAGEMENT SYSTEM (SMS)**

- Safety Policy
- Risk Assessment
- Develop Procedural Control Measures
- Implement Control Measures
- Safety Monitoring
- Reporting & Investigation
- Identify any SMS Weakness
- Performance Review of SMS
- Review Assessment & System Provision



- These are the key elements of a company Safety Management System (SMS). Similarly, as with the risk management elements, the SMS is only as good as the quality of the risk assessment performed. Inaccurate risk assessment work will result in ineffective application of the management system.



**CHARACTERISTICS OF SAFETY MANAGEMENT SYSTEM (SMS)**

- Continuous Improvement
- Incorporates Modifications in Facilities and New Technology & Procedures
- Accurate Hazard Identification is a key to the success of the system
- Involvement and consultation
- Systematic thinking & documentation

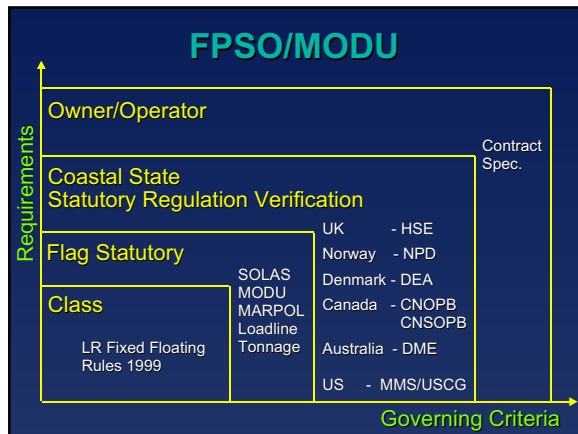


- The key aspects of a good SMS is that it can incorporate changes in technology, equipment/system and procedures.
- This type of methodology matches the type of management systems in place with most corporations.
- The method is good in demonstrating corporate due-diligence.
- A documentation system is critical for the management of the identified hazards and the actions resulting from the recommendations.

The assessment is more accurate with more involvement and consultation.

In the last ten years this has been the focus of most companies – we are now getting into more safety management systems. Why are we doing this? The characteristic is that they are taking a business perspective more than anything else – the fact that there is always continuous improvement and not standing still. What else can it do? It can incorporate modifications, take up new technology, and take advantage of it – we are not standing back and waiting for something to go wrong. We are looking forward – being proactive. As I showed you in the risk management process, identification is the most critical – if you do not do that right whatever information you get under risk management– the decision that is made by management, is totally wasted, you haven't done the first two properly. That is why it is very important that we go through this process. The other thing – a new thing – is more involvement– the success of the operation is based on everyone's involvement whether internal or external. And this is a new push.

## Offshore Regulations



- Marine system was chosen as an example
- FPSO units combine the traditional process topside facilities with marine components.
- Verification of the latter is serviced via the Class and Flag requirements
- Contract specifications usually more severe than the legislation that will be imposed on a project.



- These regulations made the whole industry evaluate their operations and performance. This emphasized the potential magnitude (direct and indirect effects) of a consequence from a major accidental event.
- This event showed vulnerability of company SMS
- Responsible for instigating a more proactive approach with a the management systems

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## Prescriptive vs Goal Setting

- Prescriptive vs Goal setting
- Fragmented vs Holistic
- All hazards vs Focus on major hazards
- Belt & braces vs Inherent safe approach

Lloyd's Register

- Goal setting legislation more in line with current business management systems practice.
- Goal setting legislation enhances focus on the identification and management of hazards
- Inherent safe approach is very proactive

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## Risk Based Approach - Outcomes

- Contracting changes (Fit for Life)
- Alliances (shared responsibilities)
- ISO 9001/14001
- Human Factors
- Interactive CADs (walkthrough - accuracy of costs and risks)
- ALARP
- Fit for Life or Purpose

Lloyd's Register


- This change in SMS meant that owners are now imposing their system on all the major project or operational contracts. This means that contractors, which usually dominate the manpower, on most oil & gas operations, will be more responsible or share the responsibility for the safe and environmentally friendly design, construction and operations of a project.
- Alliances are now utilised to share the risks and rewards of a project.
- ISO standards are now an integral part of most companies management system. This will also focus on continuous improvement.
- Human Factors is now an important issue with design and operations since the availability of safe production is dependent on the reduction in the human intervention on a system. This reduction in duration also reduces the risk to personnel on the installations. Cultural calibration is also an issue to consider as projects are now more global.
- Interactive CADs have improved visualisation of design and modifications of offshore systems. The changes in computing power has also made the technology more readily available. This system has also helped in human factors evaluations, maintenance planning, emergency procedures and remote design reviews.
- ALRP (As Low As Reasonably Practicable) is the new words used.
- Operators focusing on cradle-to-grave solutions due to experience gained from current operations. This action is in line with ISO requirements. Fit for purpose is now the minimal point of reference and contractual requirements are more in tune with the fit-for-life approach.

- Improvements in computing power and experience gained from global operations have statistically improved the accuracy of the analysis on anchors and mooring lines. This in effect have resulted in some very cost-effective but safe solutions by the operators. This is an example of better analysis due to improved or higher quality data and a more effective assessment with more experienced operators.



**Examples:**

- Anchoring (Mooring Analysis)
- Fires and Explosions
- Environmental spill reduction (platform and subsea - identification of modes of failure)
- Corrosion - integrity management
- RCM - Reliability Centred Maintenance
- ROV - diverless trees
- DP - because of better GPS/technology improvement



- The systematic approach in the identification of hazards has resulted in a better understanding of the mechanism that could result in an oil spill. Thus, this will result in a more focused and effective solution to prevent oil spills. This proactive, likelihood reducing methodology, has a more effective impact on the environmental protection strategy of an operations. Experience gained in reservoir identification (better computer power), equipment/materials selection and procedural controls are important inputs in the assessments of environmental risks.
  - Experience has shown that a majority of the loss of containment, in an oil and gas operations, is due to corrosion. This experience as well as the resultant consequences from these losses has resulted in the development of a more effective methodology of identifying and prioritising the damaged portions of a system.
  - RCM is improving the availability of an operations and thus reducing the loss of containment potential. This program is due to the improved, statistically significant data collected by industry resulting in better analysis of life-cycle performance of systems. High availability means lower potential for an accidental release.
  - Improvement in ROV technology has reduced risks to divers.
- Improvement in GPS and DP technology and computing power has drastically reduced the potential for unplanned and hazardous vessel excursions. This in turn reduces the likelihood of collision or loss of containment from a well.

## LESSONS FROM ATLANTIC CANADA AND THE NORTH SEA

### Myths and Realities About Oil-Related Development: Lessons from Atlantic Canada and the North Sea

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Oil and gas exploration has a fairly long recent history in both the North Sea and off the east coast of Canada, dating back to the 1960s. In each of these regions, it is useful to distinguish between two phases in the growth of the offshore industry: an initial or fledgling industry phase and a subsequent mature industry phase. I am using these terms in a sociological sense which is somewhat different than the sense in which the terms are used in the industry itself.

The fledgling industry phase refers to the initial period during which the *institutional context* for the new industry is being developed. This includes government policies, programs, regulatory frameworks, royalty and tax regimes; industry organization associations; labour relations regimes; education and training programs; and a myriad of other institutional practices that emerge and become consolidated during the early years of the growth of the offshore industry. Once it has become established, this institutional context for the growth of the new industry becomes stable, habitual and difficult to change. Hence, it is an extremely important phase, one which has lasting consequences throughout the subsequent mature phase which can last up to fifty or more years. From the point of view of the offshore oil and gas region under consideration, it is critical to get it right during this fledgling industry phase. Since it may be about to embark on the development of an offshore oil and gas industry, this is a crucial time for British Columbia as a province and, especially, for those communities most likely to be impacted by the development. Fortunately, BC is in an ideal position to learn from other jurisdictions.

I will argue that there is much that can be learned, and that the time period to focus on is the early, fledgling industry phase for each comparison case. That will be the main focus of this paper, although I will add some comments about the mature industry phase later.

Looking back on it, we can see that in the North Sea countries, mainly Great Britain and Norway, the fledgling industry phase was rather short. A combination of circumstances, including the world oil crisis of the 1970s and Britain's need for oil revenues to help solve its balance of payments problem, made for rapid development. The institutional context was put into place quickly, and the industry entered its mature phase early, with many fields in production by the mid-1980s. There were 13 oil fields in production off Shetland as of January 1981. Initially, the British government took an essentially *laissez-faire* approach and let market forces hold sway. This worked in the sense that it encouraged rapid development and government revenues, but there were costs on the social side in the areas of occupational health and safety, environmental protection, and regional and industrial development. Over time, the British state became more interventionist in a guarded and limited way.

Norway, a much smaller country with a population of 4.5 million, as of January 1999, compared to Britain's 59 million in 1997, already enjoyed a strong economy with low unemployment at the time oil was discovered. Hence, it took a more gradualist and interventionist approach from the beginning that Oystein Noreng refers to as the North Sea model of oil development (Noreng, 1980). Recently, Norway has allowed the industry to be more market-driven, and there is concern that some industrial development opportunities were lost through the more interventionist approach.

This is a major theme--finding the right balance between market forces and interventionist government policies that fits a particular jurisdiction--that the British Columbia government will need to address.

In Atlantic Canada, the fledgling industry phase lasted much longer. This was due mainly to the success rate of early exploration efforts being less than in the North Sea, but it was also influenced by the jurisdictional dispute between the Government of Canada and the governments of Newfoundland and Labrador and of Nova Scotia. During the 1970s and early eighties the Newfoundland government in particular was adamant about asserting its jurisdictional control over offshore resources. Newfoundland modelled its approach largely on the North Sea model, particularly that of Norway. It aspired to use offshore oil and gas as a major force in province-building (House,

1985). The federal government, however, refused to acknowledge Newfoundland's claim and federal jurisdiction was upheld by the Supreme Court. After much negotiating, a political compromise was reached with the signing of the Atlantic Accord in 1985. This sets out a joint federal/provincial approach to managing the offshore industry, with a joint Canada/Newfoundland Offshore Petroleum Board established to administer it. A similar Canada/Nova Scotia accord was reached with Nova Scotia in 1987 and a similar Canada/Nova Scotia Offshore Petroleum Board also established. In retrospect, one could argue that the slower pace of development was beneficial to Atlantic Canada—it allowed us to develop more slowly and to learn more from the North Sea experience than we would have done if things had developed more quickly.

Many of the issues related to the growth of the industry in Atlantic Canada are covered in detail in various presentations at this workshop. My intention is to provide a general overview and discussion of some of the issues that have proven to be significant, and to dispel some myths about what has proven not to be significant, in the Atlantic Canada and North Sea experience, focussing mainly on the fledgling industry phase in both cases.

### *I. The Fledgling Industry Phase*

There was a fair degree of social scientific interest in the early, fledgling industry phase of offshore oil and gas development in both the North Sea countries and eastern Canada. (For the North Sea see, in particular, Mackay and Mackay, 1975, Moore, 1982, Byron, 1986, and Noreng, 1980; and, for eastern Canada, House, 1985, 1986 and the various papers published as part of the Institute of Social and Economic Research's oil and gas initiative.) My intention here is not to review that literature, but rather to make some broad generalizations based on my own involvement at the time and on more recent reflections based on the current situation.

Having focussed on the onshore Canadian oil and gas industry during the early 1970s, I first visited Scotland and Norway during the summer of 1975. I remember renting a car and driving up the very rural road through Shetland to the site of the proposed Sullom Voe oil terminal. There was virtually nothing there at the time, just two small villages, Brae and Voe. It was as remote and rural as any place we can think about in coastal Newfoundland and Labrador, Nova Scotia and British Columbia. When I next visited Sullom Voe, in 1982, it was completely transformed into a huge industrial complex. Thousands of tons of crude oil a day were being piped ashore from the North Sea oil wells, stored in huge tanks, and then shipped out by massive tankers from Sullom Voe. Shetland's main town, Lerwick, had become a centre for offshore service and supply base support to the offshore oil rigs and platforms; and the main airport, Sumburgh, had been transformed into a beehive of helicopter activity ferrying people and materials back and forth to the rigs. The Shetland Island Council was striving mightily to keep things under control. This was just in Shetland. On a smaller scale, a similar tale was unfolding in the neighbouring island of Orkney. On a much larger scale, the city of Aberdeen was becoming the operations centre for the British North Sea. Other towns affected on the mainland of the north of Scotland were Peterhead, which had been a major fishing port, and Inverness, the administrative and service capital of the Scottish highlands. Due to the fast pace of the development, several small communities were also being affected as fabrication yards for massive steel and concrete production platforms swung into operation.

A similar tale can be told about Norway, but on a smaller scale due to the Norwegian government's adopting a slower pace of development. Stavanger became the centre of oil operations, with both offshore supply and service activities and platform construction taking place there.

Looking back on it, we can see that the eastern Canadian growth of the offshore industry occurred later and at a reduced and slower pace. The Sable Island gas field off Nova Scotia and the Hibernia oil field off Newfoundland are the only two large fields currently in the production phase. By far the largest industrial activity has been the construction of the concrete, gravity-based production platform for Hibernia, which was started in late 1990 and completed in 1997. At peak, in January 1998, it employed close to 5000 people. Currently, there are about 2500-2600 people employed in Newfoundland directly working in the oil and gas industry.

In each of the regions under review--Scotland, Norway, Nova Scotia and Newfoundland and Labrador--there was a great deal of soul-searching and anxiety about the advent of the offshore oil and gas industry, just as there is now in British Columbia. Looking back on it, it is possible to distinguish between myth and reality in terms of these concerns. My purpose in the rest of this paper is to examine some themes that reflect such concerns. Many of these, and others, will be elaborated on over the course of this workshop.



## *Myths*

**1. Unfounded Fears.** In each of the oil-affected areas of the North Sea and eastern Canada, local people initially expressed many fears about the impacts the new industry might have on the local culture and life-style, and the social problems that it might bring to their region. Much of this fear stems from the oil industry's being, from the local perspective, so powerful and monolithic. It seems like an alien force that is about to impinge on and, possibly, change forever a (somewhat romanticized) traditional culture and way of life. In the event, most of these fears have proved to be groundless. In the only systematic piece of research into urban effects, Helge Godo of the Rogaland Research Institute compared Stavanger to two comparable Norwegian cities that had not been impacted by oil. While he did find that alcohol consumption increased more rapidly in Stavanger during the period of rapid oil-related growth, he found that crime rates, divorce rates and several other indicators actually showed a lower rate for Stavanger than for Bergen and Kristiansand (House 1985: 188).

In the cities impacted by oil--Aberdeen, Stavanger, Halifax and St. John's--the industry has, if anything, brought a welcome diversity, cosmopolitanism, and new dynamism to an urban lifestyle. Both Aberdeen and Stavanger have managed to control oil-related property development in such a way that it has enhanced the restoration and refurbishment of the downtown core. While oil appeared to be a threat to the character of old St. John's initially, the slow pace of the development has given us time to learn from Aberdeen and Stavanger and there has been a shift in perspective. Oil employees and their spouses themselves have been charmed by the "oldest city in North America" and many commercial buildings and houses in the downtown core have been improved as a result (Combden and Nurse, 2000). Halifax had already made a strong commitment to refurbishing its waterfront and downtown before the advent of oil, and the limited scale of development in Nova Scotia so far has been such that there have been no discernible ill effects.

Rural areas have been more vulnerable. In Scotland, the early rush for development did have some negative social impacts in Peterhead, the Lochcarron area (site of a large platform construction yard at Kishorn), Orkney, and Shetland. From a negligible base, crime rates rose dramatically for a short while. In Shetland, the number of crimes reported to police rose from 430 in 1971 to 2,170 by 1979, during the construction phase of the Sullom Voe terminal (House 1985: 217). The sheriff of Orkney and Shetland said to me (as we shared a bottle of highland malt whisky at his house in the wee small hours): "In 1970 I had nothing to do, but now I have to work a full day like everybody else!" Fortunately, with the ending of the construction phase, the crime rate declined again to 532 reported crimes by 1983.

The Newfoundland case shows that it *is* indeed possible to learn from others' experiences. The construction site at Bull Arm, where the Hibernia platform was constructed, was carefully designed to provide a self-contained level of comfort and amenities for the workforce such that there was very little contact with, and thereby very little negative impact on, the surrounding communities. Ironically, the main complaint from the communities was that there was too little impact. Oil did not produce either the level of employment for local people, the stimulus to local businesses, or the general level of excitement that people had hoped for (Shrimpton, 1999). This brings us to our next consideration.

**2. Unrealistic Expectations.** If big oil has proved not to be the ogre of social and cultural degradation, nor has it proved to be the talisman of instant prosperity for all. While oil has meant some wealth and some prosperity for some people, towns and smaller communities, most people and most places have been unaffected in any direct way. As Ian McNicoll has clearly demonstrated for rural parts of Scotland, both the multiplier and spread effects of oil-related development in rural areas are low (McNicoll, 1986).

While there is no doubt that, overall, the advent of oil has produced many opportunities for local business people in the urban impacted areas, it has been a mixed blessing in many ways. In St. John's, the Hibernia discovery ignited an early conflagration in housing prices which was quickly doused, many people having lost a lot of money in the process. Oil has been a difficult business for local firms to break into. *Timing* is of the essence. Too large investments too early in the process can lead to financial difficulties and bankruptcies. Some of Newfoundland's biggest business names suffered severe losses during the early 1980s. During the nineties, especially during the construction phase of Hibernia, firms have done better (Shrimpton, 1996). Part of the maturing process has been the new realization within the local business community that, while oil does mean opportunity, it also means adopting

new business practices for success in a highly competitive marketplace (Combden and Nurse, 2000). Unrealistic expectations of easy, instant affluence invariably mean disillusionment and business failure.

**3. Environmental Destruction.** Another common myth, one that may now be prevalent in British Columbia, is that oil and gas exploration and development will inevitably lead to massive environmental destruction and degradation. This is an extremely important and highly sensitive issue, one that will be examined much more thoroughly throughout this workshop by people with much more expertise than I. In suggesting that environmental destruction is a myth, I am not suggesting that there are no environmental problems related to the advent of offshore exploration and development to a region. In Shetland, for example, there were some early oil spills near Sullom Voe, and the dead birds that washed up on nearby beaches created a great deal of negative publicity nationally. On the whole, however, it is fair to observe that, to date at least, the amount of documented environmental destruction due to oil and gas exploration and development has not been nearly as great as was feared. Strict government regulation and what appears to be a genuine new regard for environmental sensitivities within the industry itself, have proved to be important. Public perception tends to confuse oil spills from tankers, which can happen in any coastal region, with oil pollution from offshore rigs and platforms. While the spectre of massive environmental damage from the offshore industry has proved to be mythical to date, this should in no way be taken as an excuse for complacency. Fortunately, this is unlikely to happen in British Columbia. There is no cause for complacency. It is something that you should be very concerned about. In my opinion, if you are going to get involved in petroleum exploration and development, it should be with the intention that this is going to be the best jurisdiction in the world at dealing with environmental issues related to this industry.

### ***Realities***

I want now to turn my attention to some of the main realities, in terms of what has actually happened in the North Atlantic to date. One thing can be said for sure: change is going to be inevitable, there is going to be change if you proceed with the development of an offshore oil and gas industry. There are going to be benefits, but there are also going to be some problems. Some of these are preventable or at least controllable with sound planning and good management, and this is what you need to be thinking about from the beginning.

**1. The Alexander Kielland, the Ocean Ranger and the Piper Alpha.** In 1980, 123 people were killed when the Alexander Kielland production platform collapsed and sank in the Norwegian sector of the North Sea. On February 15, 1982, all 84 men aboard the Ocean Ranger drilling rig offshore Newfoundland were lost. On July 6, 1988, the Piper Alpha production platform exploded and 167 people were killed. Each of these deaths has had lasting negative impacts on the wives, children, mothers, fathers and other relatives and friends of the victims (House, 1987).

Without a doubt, the killing and maiming of hundreds, perhaps thousands, of people through industrial accidents is the single most negative impact of oil and gas development in the North Sea and off the east coast of Canada to date. For British Columbia, this should be a first priority, right up there with the environment. Regrettably, this has not been the case in either of our comparison cases (Carson, 1982). Furthermore, and this is the most damaging of accusations, it is *still* not the case. As a recent report shows, regulatory confusion and both governments' and industry's greed to get the oil and the money flowing, have meant that occupational health and safety have not been given the priority they deserve (Hart, 2000). The risk of serious industrial accidents offshore is a constant and requires the inculcation of an attitude of zero tolerance by industry and regulatory agencies. This is an issue for which a potential new oil and gas-producing region, such as British Columbia, should aspire to become a world leader from the outset.

**2. Family Impacts.** Having a husband/father or wife/mother working away from home for anywhere from two to four weeks at a time can have negative impacts on family life. This so-called "intermittent spouse syndrome" typifies work patterns in the offshore oil and gas industry. Research has shown that this pattern increases anxiety levels for many women and their children while the husband/father is in transit and working offshore, and it creates adjustment difficulties for both the women who have to alternate between being single head of the household and supportive spouse in alternating cycles, and the men who have to adjust back and forth between life on the rig and life at home (Storey et. al., 1986).

There are ways in which supportive companies and regulatory agencies can mitigate the negative effects of the offshore work regimen. While the typical pattern off the east coast is now three weeks on, three weeks off, a two-week on, three-week off pattern would clearly be preferable for family stability (and it would also increase the number of jobs created offshore). Family visits to the offshore work site, if not real then at least virtual, would also be helpful. Above all, making provision for offshore workers to communicate regularly with family members would reduce the sense of separateness and isolation.

Onshore activities related to offshore oil and gas development can also have negative impacts on families, particularly during boom and bust situations. The community of Alesness in the Moray Firth region of Scotland, for example, experienced a population increase from 1,500 in 1970 to 7,500 in 1980. The construction of new housing and recreational facilities failed to keep pace with the rate of population growth. Incoming housewives from the south lacked the social network support they had enjoyed at home. Husbands worked long hours, taking advantage of high pay for overtime, and were too tired to provide much support at home. The social work office at Alesness quickly found itself overextended. Similar problems occurred during the construction phase at Sullom Voe, where social work referrals jumped from 289 in 1975 to 1,121 in 1979 (House, 1985: 219).

The North Sea experience shows that controlling the *pace* of development makes sense for social reasons as well as economic ones. Although no systematic research has been done, it seems that the impacts in Newfoundland and Nova Scotia have been less severe. Sound planning and a controlled rate of development would be needed if British Columbia were to avoid such negative family impacts should oil and gas exploration and production proceed there.

**3. Social Exclusion, Inequality and Regional Development.** While oil-related growth has undoubtedly brought new wealth and employment to some individuals and some communities, its impact has tended to be very uneven and unequal. Many people and many communities are simply left out of the new prosperity. In rural regions, where both the multiplier and spread effects are low (McNicoll, 1986), oil activity tends to take place in a kind of enclave economy, with the locals largely on the outside looking in. While multiplier and spin-off benefits are greater in urban oil-impacted centres, only a small proportion of the population benefit directly.

In the long term, it is the *indirect* effects of oil and gas development which are most important for most people and communities. Where local authorities are able to invest oil revenues in progressive efforts at economic diversification and improving social amenities, as in Shetland, benefits have been spread more equitably than where this has not been possible. If a local jurisdiction is able to negotiate its own source of cash flow from the oil industry, it can emulate Shetland which has been able to invest the proceeds in the fishing industry, economic diversification and improved social amenities for its senior citizens.

At the provincial level, oil-induced growth in Gross Provincial Product statistics can give a misleading impression of affluence. According to recent estimates in the *Globe and Mail's* Report on Business, Newfoundland and Labrador is forecasted to lead the country in GDP growth in the year 2000. In employment growth, however, it ranks eighth and, overall, on a composite measure using a number of indicators, it is also in eighth place of the ten provinces, while Nova Scotia ranks ninth (2000, B1).

I would argue that, to date, oil and gas development has not been well integrated into the economy as a whole in Atlantic Canada. From the wider perspective, the question needs to be asked: who benefits in a macro-sense? Who benefits, for example, from Hibernia production? It seems ironic that, in its latest Ambassador newsletter for promoting the province, the same government that has taken a hard-line stance against bulk water exports and the export of unprocessed nickel from Voisey's Bay, states proudly that: "Statistics Canada reports that production of Hibernia crude oil has increased by 47 percent since 1998. Of the 36.4 million barrels of crude produced by Hibernia in 1999, 33.6 million barrels were exported to the US (Industry, Trade and Technology, 2000:2). It is undoubtedly good news indeed for the United States and the American multinationals that dominate the Hibernia Management Development Corporation that 92.3 per cent of Hibernia crude is being shipped directly to the US for refining and further processing. But is this in the best interests of Newfoundland and Labrador? Perhaps it is, but, more likely, it is not. There *have* been many local benefits from the Hibernia development which may not have occurred at all if the province had taken a hard-line stance. One of the great problems of dealing with the oil industry is that it is almost impossible for the educated layperson or academic researcher to get access to the information that would be required to make an informed decision.

Interestingly, it was not with oil, but with natural gas, that this issue is now coming to a head in Newfoundland. A local lobby group, led by the rambunctious Mayor of St. John's, Andy Wells, is challenging Husky Oil's plan to develop the White Rose field on the same model as Hibernia and Terra Nova--that is, to exploit only the oil at this time and export it directly out of the province, while leaving the gas within the reservoir. In Nova Scotia, disputes between local communities and the oil industry over benefits from natural gas have recently become a hot topic as well.

What does all of this mean for a potential new offshore oil province such as British Columbia? In my opinion, there are three key questions that need to be addressed up front:

- (1) How is the Government of British Columbia, on behalf of its citizens, going to ensure that it has the best possible information on which to base its decisions about petroleum exploration and production?
- (2) What is its vision and its plan for the growth and development of this new industry within the context of the British Columbia economy as a whole?
- (3) How are small communities adjacent to the offshore oil and gas activities going to be involved so as to maximize benefits and minimize costs from oil-related development?

With respect to the third of these questions, it is noteworthy that, in Newfoundland and Labrador, the focus has been almost solely on provincial benefits, with much less attention paid to regional benefits within the province. Within Nova Scotia, the landing of the Sable Island pipeline in Guiseborough county without much attention having been given in advance to local impacts, is a current example of this issue of sub-provincial regional impacts (Ralph Gorby will provide more information on this tomorrow from an enlightened industry perspective.)

In principle at least, the oil industry, government agencies and community organizations in British Columbia are ideally placed to learn from the east coast experience and build concerns and planning for regional benefits into the development of the industry from the outset.

**4. Benefits.** The presenters who follow me in the next session will provide some detailed information on various economic and social benefits that have accrued from offshore oil and gas development, and ways in which potential negative impacts have been mitigated. These benefits are real and important. I will deal with them in only a summary and introductory way.

The most obvious and tangible benefits are economic: personal income, government revenues, jobs, new business opportunities. There have also been important and fairly tangible spin-off benefits in terms of increased research and development capability, improved education and training facilities and programs, and a general upgrading in the capabilities of the local business community and local workers.

Less obviously, but equally important, there have been less tangible benefits as well. General amenities, from housing stock to specialty shops, have been upgraded. On the whole, and contrary to what many had feared, there have been positive cultural impacts as well. The marketplace has expanded for Newfoundland artists, musicians, crafts people and actors. As has been found for Shetland (Wills, 1991), newcomers to the region have proved to be more interested in learning about and learning from the local culture than in destroying it.

Perhaps the most important intangible benefit, as illustrated in the joke about what the wall street financier says to the Newfoundlander ("Yes, sir!"), has been an increased confidence among Newfoundlanders in their own abilities and their own accomplishments. The Hibernia production platform symbolizes this. A major feat of engineering and technical design, this massive structure was fabricated in Newfoundland primarily by Newfoundlanders. Furthermore, Newfoundlanders and Newfoundland firms are now competing successfully in the oil industry internationally. They are confidently part of the much touted global economy. In the words of a local businessmen who has been involved in several oil-related ventures for many years: "We are no longer seen as stunned newfs." (Combden and Nurse, 2000: 14).

## ***II. The Mature Industry Phase***

The long federal/provincial dispute over offshore jurisdiction and the negotiations that led up to the signing of the Atlantic Accord are described in Steve Millan's presentation at this conference, and the organization and activities

of the Canada/Newfoundland Offshore Petroleum Board in John Fitzgerald's. Nova Scotia has its own agreement and its own Canada/Nova Scotia Offshore Petroleum Board. For the purposes of this paper, the signing of these accords and establishment of these boards mark the transition point between the fledgling phase and the mature phase of the industry in eastern Canada.

In reviewing the recent history of the industry since 1985, nothing much has changed in terms of the institutional context in which it operates. The general parameters which were laid down by the mid-1980s have set the context for the specific developments which have occurred since. Subsequent to the Atlantic and Nova Scotia Accords, the most important documents for understanding the growth of the industry have been the specific environmental impact assessments and development plans for the major offshore fields which are now either in production or about to go into production: Sable Island, Hibernia, Terra Nova, Deep Panuke and Whiterose. Some of the features of these and their implications for social and economic development are discussed in the sessions on social and economic effects at this conference (see papers by Shrimpton, Canning and Locke). It is not my intention here to cover this same ground. Rather, I would like to outline three themes that have come to dominate discussions about oil and gas development since 1985, globally, nationally and locally.

**1. Interventionist versus Market-Driven.** Throughout the first century of its existence, the international petroleum industry was allowed to develop without much government intervention (with some notable exceptions, such as the break up of the Standard Oil Trust in the US and, in Canada, the establishment of the Ottawa Valley line to encourage the growth of the oil industry in western Canada). This changed dramatically, however, during the 1970s with the emergence to power of the Organization of Petroleum Exporting Countries. South American, Middle Eastern and North African oil producers became much more interventionist in order to capture more of the benefits of oil exploitation for themselves, not only through increased royalties and taxes but also through insisting on capturing more of the backward and forward linkages than had been the case up until then. In the North Sea, the Norwegian government adopted an interventionist approach from the beginning. In Canada, the Government of Newfoundland and Labrador took the lead in adopting such an approach in an effort at province-building; and this was quickly countered by the federal government's National Energy Policy (NEP). In retrospect, the Atlantic Accord can be seen not only as a compromise between the federal and provincial governments, but also as a blueprint for a joint approach to managing offshore development which was intended to have been fairly interventionist.

Since the mid-1980s, however, the pendulum has been swinging back towards a more market-driven approach to petroleum development. World oil prices fell during the early 1980s and the big oil-producing countries came to realize that they still depended on the major oil companies for their expertise, technology and access to markets. The 1980s also saw the rise of neo-conservatism in western countries, epitomized in the pronouncements of Margaret Thatcher in Britain and Ronald Regan in the US. In this ideological vein, Brian Mulroney's conservative government dismantled many of the provisions of the National Energy Policy in Canada. In some ways, both the Atlantic and Nova Scotia Accords and the Hibernia development agreement can be seen as last vestiges of the NEP approach.

In this context, it is not surprising that, in its *implementation*, the Atlantic Accord has been less interventionist than its formal wording might suggest. During its early years, the CNOPB was headed by Albertan oilmen who were unlikely (were chosen to be unlikely?) to be interventionist; and, subsequently, by career public servants who have been less "radical" than the Young Turks who forged Newfoundland's petroleum policies during the late 1970s.

Hence, as discussed above, the *production* of oil from the Newfoundland offshore has been essentially market-driven as determined by the multinational corporations that control the developments. In an essentially *laissez-faire* approach, the CNOPB and both orders of government have left it to the companies to determine how the fields should be developed and where the oil should go. In the case of Hibernia, in which there was considerable public investment, Newfoundland enjoyed backward linkage benefits through the construction of the offshore platform at Bull Arm. But this has not been the case for Terra Nova, nor is it planned for White Rose. Other than the requirement that the oil be first landed in Newfoundland for transshipment, there are no forward linkage benefits for the province from oil production. The implicit philosophical assumption is that the market should be allowed to determine what type of production system should be used, where it should be built, and where the oil should go. By expediting development, local benefits would accrue in the form of royalties and taxes, employment and industrial spin-off benefits.

Recently, in both Nova Scotia and Newfoundland, there has been some citizen-led reaction against this market-driven approach over the issue of natural gas. In Newfoundland, the FOGO (Friends of Gas Offshore) coalition is leading the charge for a new, more interventionist approach. (It may be more than coincidental that the main spokesman for FOGO used to own a night club called the FOGO-A-GO-GO! Fogo is the name of a fishing community on the north east coast of Newfoundland.) Whether or not the pendulum is swinging back again in the interventionist direction in the east coast offshore remains to be seen.

In my opinion, for a new offshore region such as, potentially, British Columbia, the issue of market-driven versus interventionist approach should *not* be determined on ideological grounds. It is a pragmatic matter, of what makes most sense to a particular jurisdiction at a particular point in its development. And the decision should not be made only on economic or business grounds. It is equally important to consider issues related to environmental stewardship, cultural values and social vitality. It is not a matter of either market-driven or interventionist, but rather of what judicious mix of the two is most appropriate for a particular jurisdiction at a particular point in its development. Implicitly at least, even people within the oil industry itself are coming to realize that market forces cannot be allowed to hold sway in an unmitigated way.

**2. Environmental Stewardship.** By the 1970s and early 1980s the environmental movement was beginning to influence government policies, and, as a reaction, most large oil companies had established small environmental departments. Environmental issues, however, were seen as more of a nuisance factor than anything else, and environmentalists within the companies were viewed as the low people on the totem pole. This has changed quite dramatically. Most CEOs now pay attention to environmental concerns, if for no other reason than that they recognize that the long-term viability of their industry depends on their taking such concerns seriously. And at least some environmentalists have achieved a new respectability within the industry itself (Tsui et. al., 1998). Both the federal and provincial governments require extensive and intensive environmental impact assessments for all offshore developments. All of the major offshore projects off Canada's east coast have been subject to extensive environmental review. One former Mobil employee once described the Hibernia EIS as the most thorough environmental impact assessment ever conducted in the history of the world. This may or may not be true, but it makes the point.

This is not to suggest, however, that the current environmental impact assessment process, in which the big oil companies themselves contract out the work and control much of the information, is the ideal model. Personally, I would prefer to see communities being empowered to conduct their own environmental assessments so that they could become the experts. But the current system is certainly an improvement on the past. This issue is, of course, central to this whole workshop and to the issue of whether or not the moratorium should be lifted on exploration off coastal BC.

**3. Social and Human Issues.** In the past, with few exceptions, the international petroleum industry gave little thought to and was insensitive to the impacts of its exploration and production activities on the people and communities that were impacted. This is no longer the case. Pressures from communities and governments, and a more enlightened understanding within the industry itself have changed the approach fundamentally. Oil companies now take an incorporative rather than an exploitative approach to the peoples and communities in new frontier regions (House, 1980). From the point of view of coastal communities and First Nations peoples, this creates opportunities to negotiate deals with the oil industry that can ensure significant local benefits. The danger is no longer so much rape as it is seduction. Local people, including First Nations people, need to become knowledgeable about the industry so that they can negotiate on equal terms from a position of strength. Remember that the best time, perhaps the only time, to negotiate from strength is at the beginning of a new offshore play. Once the industry becomes set in its course, it is difficult to make it change direction.

This new sensitivity to human issues also applies to occupational health and safety. The industry is well aware of the adverse publicity it derives from disasters such as the Ocean Ranger, and there are people working within the industry who care about safety and health and take pride in achieving excellent safety records. This is not cause for complacency. There are still lots of red necks in the oil industry, and the aphorism "time is money" still rules the bottom line. And the oil industry in North America is still adamantly anti-union, especially in the offshore workplace, despite the contribution that enlightened unions could make to health and safety practices. The government of a new petroleum exploration and production region should give high priority to putting in place a

strict and comprehensive regime for offshore health and safety from the beginning, and should ensure that it has the resources in place to manage the regime effectively through unannounced inspections and severe penalties for infractions. While the threat of these must be ever-present, the need for them should be obviated by working with the industry to put into place the best occupational and health practices possible.

### **Conclusion**

My aim in this paper has been to provide a broad overview of some of the key issues related to social and economic development and impact issues associated with offshore oil and gas activity, drawing on the experience of the North Sea and east coast Canada so far, and to examine some of the related policy and administration issues. These will be dealt with in more detail over the course of the next two days.

If offshore oil and gas exploration and production proceeds off the coast of British Columbia, and if there are significant finds of hydrocarbons, the effects will be profound. Many effects will be positive. Some will inevitably be negative. Sound planning, policy making and effective management and administration, at both the provincial and community level, can contribute immensely to maximizing benefits and minimizing costs. It is important to take an active rather than passive approach to petroleum-related development; and it is crucially important for local people and leaders to become as knowledgeable as they can about the issues. It is very difficult to get at the information if you are not actually involved in the industry yourself. The whole question of information, information access and control, is something you have to think very hard about right from the beginning. People in the oil industry know that knowledge is power; local people have to know that as well. Hopefully, this workshop will be an important first step in this direction.

I would like to conclude by paraphrasing from an inspirational speech given by Mr Ian Clarke, who had served as the chief executive of the Shetland Islands Council when he was negotiating with the oil industry and the British government in the early 1970s. At a conference organized by Memorial University's Extension Service called "Oil and Gas: Are We Ready?", Mr Clarke insisted that local people should not become overawed by either the size or the global reach of the multinational oil companies. "Remember," he said, "that you and you alone are the experts in your own community and you alone must determine what it is you want out of this development." I think it is really important that you do not assume that you can't have influence. If you assume you can't have influence, then you won't have any. You have to start out on the assumption that you *can* influence the way that this new industry is going to develop in your region.

I believe that *if* you in British Columbia decide to lift the moratorium and proceed with offshore exploration and, potentially, production, there is a wonderful opportunity for this region to set a new standard for the world in how to develop the offshore wisely and effectively. Your guiding principle should be somewhat as follows: "In British Columbia we will either develop the most progressive offshore oil and gas exploration and production regime in the world, or else we will not develop the industry at all."

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## DISCUSSION OF QUESTIONS RELATED TO SOCIAL, CULTURAL AND ECONOMIC IMPACTS

### Socio-Economic Impacts of Offshore Oil and Gas Activity

**Mark Shrimpton**

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#### *Introduction*

The conference organisers asked the presenters in this session to answer three questions about the socio-economic impacts of oil and gas activity:

- Do benefits accrue to communities?
- Do benefits outweigh costs?
- What measures minimize risks and negative impacts?

I do not like the first two questions because they suggest a fixed and automatic relationship. However, based on my experience in such places as Newfoundland, Saint-Pierre et Miquelon, the Faroe Islands and the Falkland Islands, and on my reading about the effects of this and other industry elsewhere, I can certainly state that substantial benefits **can** accrue to communities and that the benefits **can** greatly outweigh the costs. However, this depends on the circumstances and, critically, the effectiveness of management initiatives.

In respect of the last question, I will discuss not only measures to minimize risks and negative effects, but also those designed to maximize the opportunities and positive ones. Especially in rural and peripheral regions, the prospective arrival of the oil industry is commonly seen as threatening community well-being and benefitting only a limited number people and companies, while generating boom and bust effects, damage to traditional industries, inflation, social disruption, environmental problems, etc.. As a consequence, governments and others are often primarily reactive, trying to stop or limit negative social, economic and environmental effects while hoping to receive some economic benefits. In this presentation I will argue for more proactive and strategic approaches that recognize and seek to optimize the wide range of socio-economic effects, both reducing or eliminating those that are negative and creating and enhancing positive ones<sup>1</sup>. In doing this, and in line with the conference as a whole, I will draw mainly on the experience in Newfoundland and Labrador.

#### *The Newfoundland Context*

Newfoundland's approaches to offshore oil activity are largely shaped by the poor state of its economy throughout twentieth century. This has led to economic development and employment creation being the dominant public policy issues since the beginning of the twentieth century. However, this was not initially reflected in approaches to offshore oil activity, which saw the first exploratory wells drilled in 1966. However, in 1977 the Minister of Mines and Energy (and later Premier) Brian Peckford introduced a revised provincial *Act Respecting Petroleum and*

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<sup>1</sup>It is important to note, and give consideration in any assessment, that what are benefits for some (e.g. increased rental income) may be costs for others (e.g. increased rent payments).



*Natural Gas.* Strongly influenced by Norwegian approaches, this highly-interventionist regime sought to maximise provincial benefits in the areas of revenues, ownership, business opportunities, employment opportunities, training, research and development, production and the rate and manner of development. (Shrimpton, 1998)

This approach influenced both the federal government's National Energy Policy, which was introduced in 1981, and the 1985 federal-provincial Atlantic Accord, which settled the dispute as to jurisdiction over the Newfoundland offshore. The Accord established joint management of the industry (by the Canada-Newfoundland Offshore Petroleum Board (C-NOPB)), a joint project review process, a mechanism to control the pace of development, and fiscal arrangements similar to those applying to onshore oil and gas. It also established a \$300-million Offshore Development Fund to help Newfoundland prepare for participation in the new industry, and Canada-Newfoundland benefits provisions to give local companies and people a full and fair opportunity to work in it. The latter included a requirement that the project proponents file a Canada-Newfoundland Benefits Plan. The Atlantic Accord has provided the framework for the regulation of oil industry activity in Newfoundland since 1985.

### ***Exploration Activity***

Offshore oil activity is commonly considered in terms of its three main phases: exploration, development and production. The rest of this presentation mostly discusses the benefits resulting from development and operations, based on studies of the socio-economic effects of the construction and operation of Hibernia, Newfoundland's first offshore oil production project. However, it is also important to briefly review the effects of exploration activity, which largely involves seismic surveys and the drilling of exploratory and delineation wells.

The potential benefits from exploration are relatively small but can be significant for some companies and individuals. The equipment and companies involved in exploration are very specialized and mobile, and the scale of activity is very variable. As a result, the opportunities for local participation are limited, because it is often difficult to justify the investments companies need to make, and the training individuals require, if they are to become involved. Newfoundland did seek to maximize involvement and met with some success; for example, of the 1631 people working in offshore oil exploration in 1981, 57% were Newfoundlanders. However, the pace of exploration slumped in the mid-1980s and then ceased altogether for more than a decade, and most of these people lost their jobs. Furthermore, the dangers of exploration work are exemplified by the death of 84 workers, mostly Newfoundlanders, when the semi-submersible Ocean Ranger sank on the Grand Banks in February 1982.

The variability of exploration activity also effects onshore opportunities, and a number of companies which made major investments so as to participate in exploration folded when activity slumped. However, other companies greatly benefited through expansions in their existing core business. This included, for example, travel agents, customs brokers, environmental consultants, hotels, restaurants, stevedores and ships-chandlers. Almost all of this activity and associated benefits were and are in St. John's, the main centre for administrative and support (including the marine base and helicopter) services for exploration.

### ***Hibernia Construction Benefits***

Construction of the Hibernia production platform commenced in 1990 and was completed in 1997. The Hibernia project was not commercial at the time it was started, given oil price forecasts, but proceeded anyway thanks to considerable government support. This included federal commitments to pay 25% of costs (to a maximum of \$1.04 billions) and provide loan guarantees for 40% construction costs (to a maximum of \$1.66 billions), and some provincial tax concessions. In exchange for these, the proponents (led by Mobil Oil) committed to deliver business and employment benefits to Canada and, in particular, Newfoundland. As such, Hibernia was a regional economic development project aimed at both providing short-term employment and kick-starting an offshore oil industry. (Shrimpton, 1998)

Specifically, under the Hibernia development agreement, Canada was to receive:

- I. 55% to 60% of \$5.2 billion pre-production expenditures
- II. 65% of \$10 billion operating expenditures
- III. 13,000 person/years construction employment (70% of total)
- IV. 20,000 person/years of operations employment

Newfoundland Benefits were to include:

- I. Construction of the massive concrete and steel gravity base structure (GBS)
- II. The fabrication of the well-head 'mega-module' and other components
- III. 50% of GBS design engineering
- IV. 10,000 person-years (50%) of construction, and most of operations, employment
- V. Some taxes and royalties

The GBS, well-head module and various other components were built at a green-field construction site at Bull Arm, Trinity Bay, about 120 km west of St. John's. Other modules were built in Italy and South Korea, and the whole structure brought together and assembled at Bull Arm. A significant part of the project management and design work was undertaken in Newfoundland.

An analysis of the social and economic effects of the project (Community Resource Services, 1996) found that it exceeded, and in some cases greatly exceeded, all the development agreement benefits commitments. In terms of employment and training, for example, it resulted in:

- I. Over 50 million person-hours of employment, approximately 60% by Newfoundlanders and 15% by other Canadians
- II. At peak 6800 people worked on the project, 6100 of them in Newfoundland
- III. 1.85 million person-hours of design engineering in Newfoundland, in part as a result of a specific technology transfer agreement between the proponent and the provincial government
- IV. About 2500 union workers received training

Project expenditures totalled about \$5 billion, of which 45% were in Newfoundland, and 27% elsewhere in Canada. Within Newfoundland, many of the benefits were near Bull Arm and in the St. John's area and on the Burin Peninsula. However, most of the construction workers alternated between work at the Bull Arm site, where they stayed in its 3500-bed work-camp, and periods in their home communities, helping to disperse the benefits across the province. In particular:

- II. About 7% of the employment went to people living, and \$34 million expenditures to companies located, within 50 km of Bull Arm
- III. There was a major employment concentration (c 800 jobs, mostly in design and management) in St. John's, and 75% of purchase orders went to St. John's companies
- IV. There was a minor employment concentration on the Burin Peninsula, as a result of fabrication work at the Marystown Shipyard

These benefits were not, of course, evenly distributed within communities. In particular, the fact that the great majority of positions on the Bull Arm site were unionized was a source of considerable resentment in some quarters. Furthermore, and to some degree relatedly, only about 4% of the construction labour force were women, notwithstanding a number of initiatives designed to ensure women had good access to construction employment (see Grzetic, Shrimpton and Hart, 1996).

### ***Hibernia Production Benefits***

The Hibernia construction phase only lasted eight years, and the degree to which it will deliver longer term economic benefits will depend on the transferability of the construction, fabrication and engineering capabilities it developed to other projects and activities. There are some positive signs in that, for example, the Bull Arm site has been used for fabrication and assembly work for Newfoundland's second oilfield development project, Terra Nova. However, this is using a very different production technology, a Floating Production Storage and Offloading (FPSO) vessel, that does not involve the concrete-related construction capabilities needed for Hibernia. Production from the White Rose field, currently in the regulatory approvals process, would also use an FPSO. However, many other skills and capabilities have been put to use elsewhere, and some argue that another GBS may be built at some stage.

In any case, the greater economic prospects were always going to be related to the longer-term, if smaller-scale, production activity. Hibernia production started in November 1997 and a study of the social and economic effects of the first full year of production (Community Resource Services, 1999), 1988, found that the following major direct economic effects:

- Total expenditures: \$299 million, \$191 million (64%) in Newfoundland
- Wages, salaries and benefits worth \$68.8 million were one of the largest expenditures. In addition to partners and main contractors, 189 Newfoundland companies issued purchase orders worth \$8.5 million
- 705 employees, of whom 583 (83%) Newfoundlanders

When these direct effects were input to the provincial government's Newfoundland and Labrador Econometric Model, it provided the following estimates of the total effects of Hibernia production on the economy:

- Newfoundland's GDP \$626 million higher
- Direct, indirect and induced effects 5.7% of total GDP
- Personal income \$168 million (1.7%) higher
- Consumer spending \$124 million (1.7%) higher
- Total employment 3100 greater
- Unemployment rate 17.9%, as against 18.4%
- Population 5000 higher

These benefits were not evenly distributed across the province. In particular:

- Most activity was in St. John's, but there were some suppliers off the Avalon Peninsula
- Most employees were in St. John's, but offshore workers did come from 78 communities across the province
- Employment at the Whiffen Head terminal, Placentia Bay, which transships oil from shuttle tankers to second-leg tankers
- Shuttle tanker crew mostly live on the Burin Peninsula
- Secondary spending (e.g. tourism)
- Government spending (taxes, revenues, reduced expenditures)
- However, women comprised less than 5% of the offshore labour force

The business and employment opportunities associated with production are not solely in highly-skilled and technical fields. For example, considerable benefits have accrued to companies and individuals involved in construction, hospitality, retailing, business services, education and tourism.

Furthermore, these direct and spin-off effects will last for the life of the field. This is currently estimated to be at least twenty years, although this will likely be exceeded as new technologies increase oil recovery or as new reservoirs are found in the vicinity of the platform. Furthermore, other such benefits will follow as new fields are developed and come into production. As has already been noted, the Terra Nova oilfield is under development and will enter production in 2001, and the White Rose project has recently entered the approvals process which, if successful, would likely lead to production in 2004. Concept development work is also proceeding on the Hebron-Ben Nevis oilfield, and various other projects (including the development of gas reserves) are under longer-term consideration.

### ***Economic Diversification***

The offshore oil industry has added a relatively new sector in the provincial economy. However, this new activity has also diversified the economy in other ways. In particular, it has been highly beneficial for companies that, assisted by the Canada-Newfoundland benefits regulations, have been successful in bidding for work in this very demanding global industry. It has provided them with new equipment and capabilities, improved their business practices, and increased their credibility and ambition (see Community Resource Services, 1999).

As a result, such Newfoundland companies as Stratos Mobile Networks, Milestone Communications, Community Resource Services Ltd., Cougar Helicopters Inc., Hi-Point Industries, Lawlor and Associates, Robinson Blackmore

Printing and Publishing, SCC Environmental and C.J. Cahill and Co. Ltd. are increasingly competitive locally, nationally and internationally, in both the oil industry and other sectors. For example:

- **Stratos Mobile Networks.** This company was established to provide communications between the Hibernia construction site and offices in St. John's. It subsequently won contracts to provide onshore-offshore communications to the Hibernia and Terra Nova platforms, and has become highly successful in the provision of remote industrial site communications for offshore oil, onshore pipeline, defence and coastguard activity. It has its main corporate office in St. John's, which is also the location of its operations centre, oil and gas unit and Inmarsat hub (Stratos is the world's third largest supplier of Inmarsat service), with over 150 employees.
- **Milestone Communications.** Not all activity involves high-end engineering or exotic technologies. For example, Milestone Communications was created to produce Hibernia company newsletter and other corporate materials, and undertook subsequent work for Petro-Canada. It has also diversified into work for other sectors, including information technology, tourism and economic development. It was recently successful in bidding for a \$250,000 contract from Chevron Corporation, California, to produce global corporate information pack
- **Community Resource Services Ltd.** My own company successfully bid on early Hibernia environmental impact assessment work and has subsequently undertaken numerous socio-economic scoping and impact studies and developed local benefit plans. Through this, we have expanded into the more general study and monitoring of socio-economic effects. While much of this work has been related to the oil industry in Newfoundland, we have expanded to projects in other industries, and to international work. Our clients for international work have included, for example, the US Minerals Management Service, the UN International Labour Office, the Australian Mines and Metals Association, BHP Minerals, the Icelandic National Power Company, Hydro-Aluminium and the Governments of the Faroe Islands and Falkland Islands

These and other such companies have clearly not only built on, but also diversified from, their local oil industry experience. As such, they are only to a limited degree dependent on the success of the local and international oil industry, and hence oil prices. Thus, the offshore oil industry has broadened Newfoundland's economic base and made the province less dependent on the success of one or two sectors.

### *Effects Optimization*

Clearly, then, benefits can accrue to communities as a result of oil and gas exploration, development and production activity. Newfoundland has received many economic and social benefits, although they have not been evenly distributed, and they were sometimes not as great as had been promised by politicians or expected by the public. Furthermore, there have been cases where the benefits have not been as large as they could have been given more effective management.

In this context, it is interesting that the dominant oil industry issue in Newfoundland in the last few years has not been whether the benefits outweigh the costs, but whether the benefits are as large as they could or should be. There is some concern about the potential for oil pollution, and safety is re-emerging as an issue, but there is little or no concern about the industry's other environmental, social or economic effects. This is clearly relevant in answering the last of the three questions posed by the conference organizers: 'what measures minimize risks and negative impacts?'

There have certainly been a wide range of such concerns in the past. Indeed, the C-NOPB Development Application Guidelines (C-NOPB, 1988), developed in the late-1980s, provide a good overview of the types of concern that were widespread in the wake of the Hibernia discovery. These included rapid population growth, house price inflation, homelessness, income inequalities, crime, substance abuse, and damage to the fishery and traditional lifestyles.

These concerns, have all proven to be exaggerated or unjustified, either in and of themselves or because they have been successfully addressed through management initiatives. As one example of successful management, concerns about the potential effects of the Bull Arm construction site on adjacent rural communities were very effectively addressed through the use of a high-quality work-camp, union labour, and an effective system for monitoring and managing community effects (see Storey, Shrimpton and Grattan, 1996). Ironically, the most significant negative consequences of the oil industry have not resulted from any real effects, but result from misplaced speculative

activity in St. John's immediately after the Hibernia discovery in late 1979. This resulted in temporary house price inflation and unjustified changes to zoning to permit the construction of new subdivisions and office towers.

The generally low level of concern about the effects of the oil industry is demonstrated by the Terra Nova and White Rose project approvals processes. The public consultations and hearings attracted briefs and presentations concerned with maximizing local economic benefits but, given the experience of the Hibernia project, virtually none on other economic and social issues. The Terra Nova panel concluded that there were no significant socio-economic concerns, beyond the need to continue to seek to maximize local benefits (C-NOPB, 1997).

### ***Conclusion***

In conclusion, considerable benefits, far outweighing the costs, can accrue to communities as a result of oil and gas activity. However, this requires the use of measures to both minimize the risks and potential negative impacts, and to make the most of the potential benefits.

These must include a balanced and strategic assessment of the effects of the project or the industry as a whole, taking into account the range of optimization measures available and their likely effectiveness. Such an assessment must be imaginative in exploring the ways in which the oil industry can be harnessed to local goals and aspirations. As such, the starting point for all this must be the local context and local priorities.

In Newfoundland, concerns about the existing economic conditions, and the effects it was having on individuals, families, and communities, were paramount. The assessment of the merits of having oil and gas activity sought to balance the economic and social benefits that could accrue, given the available optimization measures, with other risks and concerns. The conclusion was, and the great majority of Newfoundlanders believe, that the industry's benefits far outweigh its costs. However, the context and priorities in British Columbia and elsewhere are different, as may the potential management mechanisms and the conclusion.

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## **Atlantic, Fisheries Impacts**

### **The Evolution of Policy and Practice for Managing Interactions Between Fisheries and Offshore Petroleum Activities in Canada's East Coast Region, 1980 - 2000**

#### **Strat Canning**

***Canning and Pitt Associates Inc., St. John's, NF***

#### ***Introduction***

Although exploration for offshore petroleum resources in the marine environment off Canada's East Coast began in the early 1960s, it was not until the discovery of the Hibernia oilfield in 1979 that attention focused on the potential

implications of petroleum development on the region's established fisheries. The Hibernia field was situated almost 200 miles from shore near some of the richest fishing zones on the Grand Banks. Though the fisheries resources in this region had been seriously depleted in the previous two decades, in 1977 Canada's declaration of a 200 mile limit offered the promise for a major improvement in the resource base and raised expectations that the fishing industry was about to enter a decade of significant growth and prosperity.

The Hibernia field occupied a very small portion of the Grand Banks, however the potential effects of a large oil spill on fisheries resources and fishing industry operations in a much larger zone raised a great deal of concern and doubt about the possibilities of a peaceful co-existence between "fish and oil". In addition to the potential physical damage resulting from a major oil spill, many of the larger offshore fishing companies were also worried that offshore oil development would undermine the socio-economic structure of the industry. These concerns were based on the widespread view within government agencies and the fisheries industry that the fisheries played a central role in Newfoundland's economic and social structure, its political fabric and its way of life.

And so, in the late 1970s and early 1980s, numerous delegations to the North Sea, and many local conferences and seminars were raising such questions as: Are we ready for oil? Will we be able to resolve the conflicts between fish and oil? Can the traditional fisheries stand up to the power and threat of oil?

As a consequence of these contacts with Scotland and Norway, the general public and the fishing industry in Newfoundland were aware that uncontrolled offshore petroleum activities had had significant negative impacts on the North Sea fisheries; these included, for example, physical conflicts such as debris-related damage to fishing gear, as well as loss of access to fishing grounds.<sup>2</sup>

Considering the North Sea experience, many people were sceptical about the possibility for a "peaceful co-existence" between inshore and offshore fishing activities and offshore petroleum development.

All of these factors focussed attention on the potential negative consequences of offshore oil activities on the East Coast fisheries, and the need to avoid the mistakes of the North Sea in order to minimize any negative consequences on our fisheries activities.

### ***The Regulatory Environment***

In the early 1980s, during the preparation of the Hibernia Environmental Impact Statement, these concerns about potential effects of offshore development on the fisheries – and the desire to learn from the North Sea experience – dictated a demand that the fisheries required careful protection from expanding petroleum activities and hence special consideration in any impact assessment studies. These views had a significant influence on initial baseline studies conducted for the Hibernia Project (as well as on the general marine-related environmental research which the petroleum industry adopted for subsequent EIS studies in the next decade). In many respects, these concerns helped to establish the parameters – as they pertained to fish and oil – of the legislative/regulatory environment which evolved over the next decade.<sup>3</sup>

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2. In addition to *de jure* loss of access, due to the establishment of mandatory safety zones around oil and gas installations, as early as 1978 the Scottish fishing industry had argued that offshore oil development activities had created a *de facto* loss of access to established fishing grounds, because fishing vessels had "voluntarily" been avoiding sea-bed areas littered with debris as well as those occupied by pipelines. Such areas, the industry argued, had been "sterilized" and lost to fishermen and, as a consequence, had resulted in lower catches and hence lower incomes. Fishing industry research had concluded that, by 1986, a total of 308 square miles of the UK Continental Shelf had been "lost" to offshore oil and gas activities, and had translated into an annual loss (for the 1986 fishery) of between 275,000 pounds and 3.0 million pounds. These research data were used to argue a case for loss of access compensation for Scottish fishers, along the lines which had already been agreed in the Norwegian legislation. (See Aberdeen University. "Loss of Access to Fishing Grounds from Offshore Oil and Gas Activity." Prepared for the Scottish Fishermen's Federation. Aberdeen, Scotland, 1978; and also the follow-up study, MacKay Consultants. "Loss of Access to Fishing Grounds from Offshore Oil and Gas Activity." Prepared for the Scottish Fishermen's Federation and the National Federation of Fishermen's Organizations. Inverness, Scotland. 1987.)

3. Since some British Columbia readers may not be familiar with the Canadian offshore regulatory (marine and environmental) context, a brief summary of the regulatory and legislative environment on Canada's East Coast is presented in Appendix 1.

As such, during the Hibernia environmental review process, the baseline research devoted a great deal of effort to documenting established fishing activities, and analyzing potential economic and physical interactions between the fisheries and offshore petroleum development activities.<sup>4</sup>

Subsequently, in 1985, the Hibernia Panel Hearings focussed on potential fisheries and oil related issues and problems such as

- the loss of access to fishing grounds
- the physical and economic effects of sea-bed debris
- the loss of skilled fisheries workers to an expanding oil sector
- competition for industrial services and marine infrastructure
- the negative consequences on fishing activities and fisheries resources from oil spills, and
- the requirement for fisheries compensation programs

However, although the Hibernia Environmental Impact Statement and the Panel Report<sup>5</sup> dealt in some depth with fisheries issues, the Canada Newfoundland Offshore Petroleum Board (CNOBP) Decision Report<sup>6</sup> did not attach any specific fisheries-related 'conditions' to the proponent's development application.<sup>7</sup>

Instead, considering potential issues such as the incidence of sea-bed debris, loss of access compensation and the need for information exchange, the Board encouraged the two industries to work out their own arrangements within the marine environment.<sup>8</sup>

The CNOBP did not impose any stringent, mandatory requirements concerning the best way to manage fisheries and petroleum interactions. Nor did it offer any specific guidelines as to what it considered appropriate measures and mechanisms to deal with specific items, such as loss of access compensation. In addition to loss of access compensation, the Panel suggested the need for compensation for attributable gear and vessel damage (due to the incidence of sea-bed debris, for example) and noted that, given the link between fish harvesting and processing, intervenors from the fishing industry had also raised the question of compensation for 'induced damages', such as those which onshore fish processing firms might experience in the event of an oil spill.

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4. NORDCO Ltd. "Fisheries Utilization in Eastern and Southern Newfoundland: An Assessment of the Impact of the Hibernia Development in the Period 1980-1990". Report Prepared for Mobil Oil Canada. St. John's, NF. 1981.

5. The relevant documents are: Hibernia Development Project Environmental Impact Statement, Volume IV - Socio-Economic Assessment, submitted to the Hibernia Environmental Assessment Panel in May 1985; and Hibernia Development Project, Report of the Hibernia Environmental Assessment Panel, December 1985.

6. Canada-Newfoundland Offshore Petroleum Board. Decision 86.01, St. John's, Newfoundland, June, 1986.

7. After considering all of the pertinent data, along with numerous presentations from industry participants, the Report of the Environmental Assessment Panel concluded that many of the worst/negative effects of petroleum activities experienced in the North Sea, e.g. the incidence of sea-bed debris, could be avoided or minimized with appropriate industry regulations, good housekeeping procedures and preventative measures and monitoring programs, etc. And, although the fishing industry had expressed its concern to the Hibernia Panel about such issues as the migration of skilled labour to an expanding oil sector, or the potential for increased competition for marine services, these were not seen as fundamental problems (as subsequent events have clearly demonstrated).

8. The proponents of the Hibernia Project acknowledged that loss of access to fishing grounds could occur due to exclusion of fishing activities in an offshore exclusion zone, as well as during the construction of the GBS in an inshore location. Though research for the EIS had concluded that offshore fishing activities would not be significantly affected by a loss of access to the mandatory safety zone, Mobil acknowledged "that some fishing activity might be excluded due to construction of the GBS" at the inshore location. The Panel Report stated "that inshore fishermen [have] maintained that it would be very difficult or impossible to relocate, as alternate locations are not generally available" and, moreover, that the fishing industry claimed "prior right" to any fishing grounds that might be occupied by GBS construction activities (though, at the time of the EIS Hearings, the preferred location for the GBS site had not been decided by the proponent) and had challenged Mobil to present "meaningful mechanisms", i.e. a compensation scheme for loss of access to grounds, to deal with this situation.

In addition to loss of access compensation, the Panel suggested the need for compensation for attributable gear and vessel damage (due to the incidence of sea-bed debris, for example) and noted that, given the link between fish harvesting and processing, intervenors from the fishing industry had also raised the question of compensation for 'induced damages', such as those which onshore fish processing firms might experience in the event of an oil spill.

However, despite the concerns which the fishing industry (as well as some DFO managers) had expressed to the Panel, in its formal response to the Panel Report the CNOPB did not attach any formal conditions pertaining to fisheries compensation to the Hibernia Development Plan. Though its mandate included ensuring proponent's financial responsibility for attributable damage and promoting and monitoring compensation policies for non-attributable damages, the CNOPB stated that, in its view, "the best compensation program for damages to fisheries interests resulting from offshore petroleum activities would be one which is developed by the parties involved and which includes a procedure for the settlement of disputes between them". However, although the CNOPB's report adopted a rather *laissez faire* approach to the resolution of fish and oil interactions, the Board's Decision Report embodied an implicit "carrot and stick" philosophy. Thus, in urging and encouraging both industries to work out appropriate arrangements, e.g. for an appropriate compensation program, the Decision Report noted that, if the two industries found that they were unable to agree on an appropriate compensation approach "the Board is prepared to arrange for such expert advice as may be necessary to achieve these purposes and, in the absence of agreement between the two parties, to use its authority to impose the establishment of such a program".<sup>9</sup>

As events transpired, the Hibernia Project was delayed until the end of the decade (in late 1989). Nevertheless, these 1980s perspectives set the parameters of subsequent discussions between the two industries during the post-1990 period when the policy and general principles articulated in the Hibernia EIS, the Panel Report - and by the CNOPB - were translated into more concrete, operational fisheries environmental protection plans and the fisheries compensation programs established by the petroleum industry.

### ***Fisheries and Petroleum Consultations and Negotiations Since 1990***

In 1990, the start of construction work for Hibernia's Gravity Based Structure (at Bull Arm in Trinity Bay) offered the first "real-world" opportunity to develop practical, operational plans to deal with concrete, day-to-day, fisheries and oil issues, based on the principles and regulatory guidelines articulated several years earlier.

Though all parties were aware of North Sea fish and oil problems and lessons, they also knew that conditions in the East Coast offshore environment were significantly different from those in Scotland and Norway. Consequently - in order to address the unique circumstances of both industries in this region - the petroleum industry recognized it was necessary to develop some creative - "Made in Atlantic Canada" - solutions.

Though the 1980s legislative and regulatory milieu had laid out the basic requirements of the "what" that was needed, there was very little in the way of practical, Canadian experience to guide the two industries in their efforts to work out an appropriate course of action, and mutually acceptable mechanisms to resolve concrete problems.<sup>10</sup> In short, there was no standard textbook or manual to which either party could refer: we knew the "what", but we did not know the "how".

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9. CNOPB Decision 86.01, p. 87.

10. In 1991, the two Offshore Petroleum Boards (the CNOPB and the C-NSOPB) had jointly published a short handbook summarizing their policy on compensation for attributable damage and the general regulatory and administrative roles which both Boards exercised with respect to compensation payments. (See CNOPB - Canada-Newfoundland Offshore Petroleum Board - and C-NSOPB - Canada-Nova Scotia Offshore Petroleum Board *Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity*. September, 1991.) Although this handbook outlined the preferred procedure eligible claimants were expected to follow when making a claim for any damage caused by an offshore operator, it did not describe in any detail the basis for calculating and paying compensation payments to any affected fishers. The Petroleum Boards were established in 1986 and, prior to 1991, it was agreed that fisheries-related compensation matters would be dealt with via existing mechanisms: e.g. the 1984 Canadian Petroleum Association's (CPA) "Fishermen's Compensation Policy for Unattributable Damage" (dealing with debris-related damage incidents), as well as Transport Canada's Ship Source Oil Pollution Fund (which covered damages related to "mystery spills"). However both of these programs were designed to address *nonattributable* damage incidents, that is claims from fishers where the responsible party could not be identified. In effect, this CNOPB/C-NSOPB handbook was seen as an interim measure which would apply until governments or, more appropriately, the two industries themselves established a more comprehensive policy (and concrete, operational programs) for *attributable* damages.



The approach which the CNOBP – in its wisdom – had recommended – and the absence of detailed prescriptions – left a fair amount of scope for both industries to consider – voluntarily – a workable and pragmatic regime that was both sensible, and also one that made sense to both industries.

However the process was also helped along by some 'visionary' thinking within the oil industry.

In the early 1980s, the Canadian petroleum industry had taken initiatives to establish some of the parameters and the general framework of an appropriate working relationship with the fishing industry. The CPA's Environmental Code of Practice, and the compensation policy (for unattributable gear and vessel damage) which the Association's Offshore Operator's Division articulated in 1984, provided a foundation for building new approaches and procedures.<sup>11</sup>

So, although the Hibernia Project was delayed until 1989, by 1990 the stage was set for both industries to begin developing appropriate structures and procedures to manage fisheries and petroleum interactions, on both an industry-to-industry basis, as well as on a site-specific level.

As noted above, the initial opportunity to develop a working relationship was at the micro level: at Bull Arm Trinity Bay, where Hibernia's GBS construction activities commenced in the late fall of 1989. This project offered a challenging and unique milieu in which to translate some of the principles - which had been articulated by the CPA and the Hibernia Panel, and the approach to problem resolution which the CNOBP's Decision report had suggested - into practical, operational plans to deal with a variety of potential fisheries and oil interactions' issues and problems including: the potential loss of access to fishing grounds, fisheries compensation and the need for concrete mechanisms to manage the day-to-day working relationships between fisheries and oil activities in an inshore marine environment.<sup>12</sup>

As such, efforts to develop basic principles and appropriate mechanisms and procedures between the two industries had no "manual" or "textbook" to which they could refer and very little in the way of legal/legislative precedent. In short, both sides more or less had to "start from scratch" and to become familiar with the unique features and parameters, and the "operating environment" of their respective industries. This was eventually achieved through a relatively straightforward process – involving extensive consultations and discussion, information exchange and negotiation - over about a fourteen month period.

However, as simple as that may now appear, deliberations between the two industries had to work out general principles, practical mechanisms, protocols etc. to address a very broad range of topics and issues, and to translate these into concrete programs capable of dealing with the day-to-day interactions between the two industries in a site-specific situation, namely the five fishing communities in the vicinity of Bull Arm.

For example, in the initial stage of the Hibernia GBS fisheries liaison process whose task was to design a compensation program, both industries had to begin the process by addressing some very basic topics such as general compensation principles, appropriate compensation methodologies, definitions of "impacts", access to and the appropriate use of income data sources, operational protocols for mutual avoidance and safety, vessel traffic management procedures, and many others.

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11. The CPA compensation program was the main component of an overall policy developed jointly by the two industries in the form of a Memorandum of Understanding (MOU) signed by representatives of both industries in November 1984. As such, it was the first "joint industry" agreement between the two industries. The MOU stated that the compensation policy was "supplemental" to, and thus did not replace any rights already available in existing legislation (viz. Section 19.2 of the *Canada Oil and Gas Act*) which addressed the issue of *attributable* damage compensation. The 1984 joint agreement acknowledged that other compensation issues remained to be discussed at a later date. Thus the MOU noted: ... "matters of mutual concern will continue to be investigated. Primary among such matters ....is the question of 'loss of access' and 'second level compensation'."

12. It is essential to understand that these regulatory prescriptions/recommendations were very broad in scope; as such, they did not offer fisheries participants, petroleum industry managers and their consultants any specific guidance regarding how they might or should be translated into concrete programs and/or operational plans. Despite the lessons and experience of the North Sea, it was evident that industry conditions and circumstances were significantly different in this region, and in any case, apart from having worked out the problem of gear and vessel damage compensation, in the North Sea both industries had made little progress (if any) on other key issues, such as loss of access compensation.

For its part, the oil industry had to become familiar with the operational environment, structural characteristics and socio-economic realities of “traditional” inshore fishing activities, and the establish what it felt was a fair, reasonable and pragmatic fisheries compensation program which encompassed and accommodated where possible, these “unique” factors and conditions. In the end, both sides were able to agree on a comprehensive loss of access compensation program that worked to the mutual satisfaction and benefit of both industries over seven-year life of the GBS project.

Because it was founded on a set of broad, mutually-developed compensation principles, a genuine commitment to a formal consultative procedure, as well as on a solid base of information about the fisheries and the realities of the petroleum industry, the Hibernia fisheries compensation program was able to adapt and respond to the changing circumstances of both the fisheries and the GBS Project (for example the 1991 shutdown of the GBS Project and the 1992 closure of the northern cod fishery) over the period 1990-1997 during which time the GBS was constructed.

Since 1990 – building on the Hibernia experience and also the development plans for other East Coast oil and gas projects – both industries have made significant progress towards creating the foundation for a peaceful co-existence within the marine environment.

This working relationship has succeeded, in part, because it has been based on several key parameters, including

- V. a pragmatic understanding of the very different operating environments of both industries
- VI. a commitment to genuine consultations and a consensual approach to problem solving
- VII. an awareness of the mutual benefits to be gained through co-operation
- VIII. and an equal – though sometimes begrudging – respect for the very different way in which both industries attempt to exploit and manage the marine environment.

There are still several basic issues to be addressed and resolved. However, when one considers that both industries have been working together for less than a decade, the record of what has been accomplished on the East Coast so far is quite impressive.

For example, these accomplishments include:

- VI. agreement on the basic guiding principles of their relationship
- VII. the embodiment of these principles within several joint industry agreements
- VIII. agreement on basic economic and legal parameters – including operational procedures and appeal mechanisms – for both attributable and non-attributable fisheries compensation – for gear and vessel damage.
- IX. a well-established process of industry-to-industry liaison, information exchange and communications
- V. a wide range of contingency planning approaches and mechanisms for managing day-to-day fish and oil interactions such as those involving:
  - 1. vessel traffic management
  - 2. fishing activities in mandatory safety zones
  - 3. marine communications protocols and procedures
  - 4. fisheries observation of petroleum activities, and
  - 5. specific plans, and various mitigative measures, to address matters such as temporary interference to fishing operations by project construction activities.
- procedures and venues for involving the fishing industry in project implementation plans and environmental monitoring programs, and

- in the past year or so, agreement-in-principle on procedures to deal with potential impacts beyond 500 metre safety zones.

In the last few years, through the experience gained through such projects as Hibernia and the Sable Offshore project, both industries have continued to develop a better understanding, and an awareness of the stake each industry has in the management of the marine environment.

Fisheries and petroleum Liaison Committees are now standard practice. And there is a genuine commitment to the involvement of fisheries participants in all stages of project development – during exploration, the EIS process, site development and in Environmental Effects Monitoring (EEM) programs.

All of the projects in Atlantic Canada have established voluntary programs for fisheries loss or damage compensation, and all of these programs were developed through close co-operation and consultation with the fishing industry.

By mid-1998 three Programs had been established or were near to being operationalized: the Pan-Canadian (formerly LASMO) program; the Hibernia program (for the offshore production installation); and a similar program for the Sable Offshore Energy project. And, within the past two years, the Canadian Association of Petroleum Producers (CAPP, formerly the CPA) has revised and updated its 1984 nonattributable fisheries compensation program. In addition, several short-term programs have been established for seismic surveys during the last few years.<sup>13</sup>

During the past two or three years (1997-1999) both industries have been 'down in the trenches', scrutinizing and interpreting the legislative and regulatory framework in which they have to operate. Both sides have found it necessary to examine and discuss relatively complex issues – and several ethical questions – pertaining to the sustainable use and appropriate management of the marine environment.

Through this process they have, advanced – and enhanced – our thinking about such important topics as the shared use of seabed resources, loss of access, direct and indirect (i.e. induced) impacts and the principles of compensation, among others. (It is instructive to remember that – less than a decade ago – many of these terms were simply legal constructs, or abstract notions. However – as a direct outcome of two industries working together – we now have a better idea of their practical meaning and definition, and of what is required – as well as reasonable – when translating such concepts into concrete mechanisms to deal with real-world problems and conflicts.)

Given time, both industries will continue to advance our thinking, and develop concrete mechanisms to address and resolve such issues as

- cumulative effects
- the issue of discharges beyond 500 metre safety zones, and their potential impacts on fishing grounds, e.g potential loss of access,
- and other long term issues such as stock impairment

Apart from these observations, there are other general conclusions which might be noted about efforts to resolve fish and oil negative interactions in the East Coast region.

- Many of the impacts that were predicted or anticipated in the early 1980s have not occurred. For example the loss of skilled workers, debris problems or competition for onshore services have not proven to be significant problems.

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13. In general, these programs are also consistent with the principles and procedures articulated in the 1984 CAPP/CPA policy, though they have been modified to reflect the operator's development plans and fisheries industry conditions. A plan for the Terra Nova project is expected to be similar, as well. This will bring a strong measure of consistency and coherence to individual operator attributable damage plans in Canada's East Coast area.

- Great strides have been made in developing appropriate procedures and mechanisms to address loss of access problems and compensation for financial loss.
- The East Coast has moved well ahead of other, older frontiers – e.g. the North Sea – in terms of finding and applying new solutions to 'old problems' - for example the loss of access issue.
- Though Canada's regulatory milieu has undoubtedly played a key role in fostering and encouraging working relationships between fish and oil, the two industries have managed to agree on the basic principles - and the concrete details of their relationship – on their own, without any significant intervention from government agencies.<sup>14</sup>

The 'voluntary' nature of the approach taken by the petroleum industry must also be noted. Though oil companies are legally obligated to work out satisfactory agreements with the fishing industry, in most areas the regulatory environment has offered both industries the scope to formulate mutually acceptable arrangements and specific mechanisms to deal with matters such as loss of access issues, or gear and vessel damage compensation policy.

1. In the East Coast region, the oil industry has adopted a relatively liberal, non-legalistic perspective as the best way to build the "how" of its relationship with fisheries industry participants.
2. The oil industry might just as easily have adopted 'a fit for purpose' attitude, or what we in Newfoundland might call a "that'll do scheme". Instead, so far at least, it has generally sought to go beyond the minimum requirements.
3. Last, it may be noted that petroleum companies could have chosen to develop solutions 'in-house', and then tried to sell them to the fishing industry: instead they have adopted a consultative approach as the most appropriate way to develop impact management policies. In this respect, they have a better track record than many government resource management agencies.

### *Lessons from the East Coast*

In summary, what might be said about the lessons of fish and oil in the East Coast frontier? Here are some personal observations (not arranged in any particular order of importance):

1. Continuity of personnel. This has been a key ingredient.

In any (ongoing) fish and oil discussions, it is essential for an oil company to have a 'corporate memory'. This is important for any oil company, but even more so for the fishing industry whose members have a great deal of (healthy) scepticism for "people in suits". In the East Coast environment, this continuity has been the key ingredient in building bridges, trust and goodwill between the two industries, and in developing appropriate, fair – and workable – impact management programs;

2. Another lesson is that it takes time to build a working relationship between fish and oil. The consultation process cannot be rushed: it takes many, many meetings for each side to make its points. And, at times, the process has to allow both sides to 'blow off steam', to walk away from the table, and then to come back after a 'cooling down' period.

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14. It is useful to compare the approaches to the management of fish and oil interactions which have evolved in Canada's East Coast offshore area to those established in Norway and the UK. Norway has adopted a highly legalistic (through formal legislation) and administratively complex approach; in the UK, although an industry-to-industry approach has been used, government has created a more *laissez faire* legislative/regulatory milieu for the management/resolution of fish and oil issues. In Canada's East Coast region there is a more balanced regulatory/legislated milieu within which both industries have been encouraged to co-operate and work out their affairs on via industry to industry agreements, or on a site-specific/project-local community basis.

3. Both industries have also learned that a successful, workable fish and oil relationship must be founded on mutually-agreed principles. These can only be arrived at through a genuine consultative process, and a commitment to problem-resolution.
4. Experience has also shown that site-specific situations offer the best milieu in which to identify, address and resolve concrete issues, and to develop specific, practical, mechanisms for managing fish and oil interactions. Hibernia's GBS project offered an ideal opportunity to work out basic principles and operational mechanisms to address concerns about loss of access. It is very difficult to work out solutions in the abstract, e.g. during the EIS stage of a project.
5. With respect to the issue of compensation, many lessons have been learned; but the basic guiding principle is that compensation should always be considered as a "mitigation of last resort". (Discussions between the two industries have always attempted to focus on the principle that appropriate means of mitigating anticipated or actual impacts should be implemented first, and that financial mitigation should only be employed to correct any residual economic loss after other means of mitigation have been utilized, or determined to be unfeasible.)
6. Another lesson is that governments/regulators have an appropriate role in facilitating the process in which two stakeholders are trying to work out their relationship in the marine environment. A single-window approach – such as the one which the CNOBP established to foster and oversee discussions between the two industries – offers a better chance for both industries to work out their relationship.<sup>15</sup>

So far, the CNOBP has not found it necessary to "impose" a solution on the two industries, as it stated it was willing to do in Decision Report 86.01. For example, around the Hibernia fisheries liaison table, the CNOBP has very much taken an impartial observer role, acting as a benevolent referee or a silent mediator, with the expectation that both industries will - in time - achieve a consensus on their own. This is an appropriate and proper role for government to play in such a voluntary process. Though the CNOBP does not see it simply as a voluntary requirement for offshore operators to work out an agreement with the fishing industry: it accepts that the details of these arrangements are "voluntary" in that they need to be worked out as a mutual agreement between the two industries, without undue government intervention.

### ***Concluding Remarks***

During the past decade and a half, a great deal of time and energy has been devoted to developing practical, operational and mutually beneficial relationships between the traditional fisheries and the petroleum industries. To date, the 'East Coast experience' clearly demonstrates that it is possible for both the petroleum and fisheries industries to co-exist in relative harmony: however, experience has also shown that such a relationship does not happen 'naturally'. Successful outcomes require several key 'ingredients': time and consultation; patience – and stamina; a commitment to the process; the right combination of vision, sound principles, ingenuity and hard thinking; and a 'hell of a lot' of meetings and negotiations (which – at times – may often seem more like strategic arms limitation talks than conventional labour management discussions).

Although they have very different corporate cultures, exploitation strategies and economic power, during the past decade the fisheries and petroleum industries have been building a foundation for "peaceful co-existence" in the marine environment of Canada's East Coast. Though the North Sea experience offered a starting point, the guiding principles, operating procedures and consultative mechanisms which have been articulated here have been tailored to meet the social, economic, regulatory and physical environment of this region.

Working within this unique environment, both industries have succeeded in establishing a pragmatic and cooperative working relationship. In the process, they have developed and applied concrete mechanisms to address real world situations such as loss of access to fishing grounds and petroleum-related damage incidents. Though

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15. Government has to set the parameters, the basic rules of the game, and the 'performance criteria': but it must be willing to let the process unfold without bringing its own agenda to the table. (Indeed, it may be suggested that government should not be directly involved since, in a sense, having granted both parties the "privilege" to exploit the resources of the marine environment, it has effectively created a conflict of interest for itself.

Canada's legislative and regulatory system has no doubt played a role in fostering these relations between "fish and oil", the petroleum industry has gone beyond the regulatory minimum to establish close working partnerships, often on a voluntary basis.

Building on the CPA policy of the early 1980s, the regulatory milieu established by government agencies and the experience of the Hibernia GBS project, over the past decade the two industries have continued to build a relationship as equal stakeholders in the East Coast offshore during planning for other offshore petroleum projects in Newfoundland and Nova Scotia.

The relationship which both parties have evolved is one based on a pragmatic understanding of the common interests they share as marine resource users, a commitment to genuine consultations, the development of a consensual approach to problem solving, an awareness of the benefits to be gained through co-operation and a mutual appreciation of the different way both industries are expected to exploit and manage the resources of the marine environment.

Drawing on the experience already gained and the relationship they have evolved, the two industries have established a framework and process to continue discussing, and eventually resolving, new issues as they arise. Already, other jurisdictions, regions and industries are looking to the Newfoundland and Nova Scotia experiences for new ways of building mutually beneficial working relationships in the marine environment.

In this respect, it may be concluded that fisheries and petroleum issues offer a unique and fascinating arena for understanding a wide range of socio-economic, legal, environmental – and ethical – issues pertaining to the appropriate use and management of the marine environment. The process of addressing and resolving these pragmatic day-to-day realities and problems offers many opportunities for advancing our thinking about such concepts as co-management, sustainable development or 'third party' effects.

This has to do with the unique interface (within the marine environment) between these two very different stakeholder groups: one (the fisheries), which has been granted the 'privilege' of harvesting common property resources; and the other (the petroleum industry) which has been granted "proprietary" (or quasi-property) rights to a specific part of the sea-bed. There are still many aspects of this peculiar relationship to be worked out - especially as the concept of quasi-property rights in the fishing industry continues to be defined.

As for the future working relationship of these two industries, nothing is certain: though they have a common stake in using the resources of the marine environment, they also have some competing and conflicting interests. As such, new issues and problems will no doubt be encountered. And so, future petroleum projects will undoubtedly require different plans or mechanisms to address and resolve a variety of site-specific interactions.

However, in the East Coast, both industries now have the basic principles, the forum and some of the mechanisms, if not all the answers, to continue the process of identifying, discussing and resolving any new problems, as they arise. There are several issues that remain to be addressed and resolved. These include:

1. the potential issue of stock impairment, in particular who should be compensated if petroleum operations result in actual economic loss:
2. the matter of long-term cumulative effects - specifically how any such impacts are, or can be, measured, and whether any related economic effects warrant direct compensation to fisheries participants, and
3. the emerging problem of the potential operational, economic, and biophysical, impacts of seismic survey activities.

But – considering the East Coast experience – neither side has yet chosen to 'walk away from the table'. And so far, the process the two industries have established has never broken down. And that, it may be suggested, is a record that few other industries have achieved, anywhere in Canada.

#### ***Appendix 1. Overview of the Regulatory and Legislative Environment on the East Coast of Canada***

### ***Accord Areas.***

Nova Scotia and Newfoundland and Labrador offshore production and exploration areas are co-managed by the federal Minister of Natural Resources and the Ministers responsible for the Newfoundland Department of Mines and Energy, and the Nova Scotia Department of Natural Resources.

Although the resources are constitutionally owned by Canada, a joint federal-provincial administrative regime for managing rights and for regulating oil and gas activities was established by the federal *Canada-Newfoundland Atlantic Accord Implementation Act* and the *Canada-Nova Scotia Petroleum Resources Accord Implementation Act* in the late 1980s, and in complementary provincial legislation.

### ***The Accord Acts***

Which are identical in most respects – incorporate and assimilate other relevant federal petroleum legislation, such as the *Canada Oil and Gas Operations Act* and the *Canada Petroleum Resources Act*, establish technical regulations for oil and gas drilling and production, and deal with safety and environmental regulation. They also establish the Canada–Newfoundland Offshore Petroleum Board (CNOPB) and the Canada-Nova Scotia Offshore Petroleum Board (C-NSOPB) to manage oil and gas activities on behalf of the responsible Ministers.

The CNOPB and C-NSOPB are independent Boards (their staff are neither federal nor provincial civil servants), although certain decisions of these Boards, referred to in the Accord Acts as "fundamental decisions", are subject to review by both federal and provincial ministers. The ministers advise on these decisions and on Board management, such as budgets and appointments.

The primary mandate of these Boards is to regulate all petroleum activities and manage petroleum resources within the Newfoundland and Nova Scotia offshore areas. Their principle responsibilities include protection of the environment, management of offshore petroleum resources to ensure maximum economic recovery, and issuing licences required to carry out petroleum exploration and development activities.

Under the *Accord Acts*, compensation may be claimed for any "actual loss or damage" caused by spills, discharges, or debris, and even if such emissions are authorized by regulation.

The following are sections from the *Canada-Nova Scotia Accord Act* relevant to authorized discharges. (The *Canada-Newfoundland Accord Act* contains the same text.)

### ***Spills and Debris:***

#### Definition of "spill"

165. (1) In sections 166 to 170, "spill" means a discharge, emission or escape of petroleum, other than one that is authorized pursuant to the regulations or any other federal law or that constitutes a discharge from a ship to which Part XV or XVI of the *Canada Shipping Act* applies.

#### Definition of "debris"

(2) In sections 167 and 170, "debris" means any installation or structure that was put in place in the course of any work or activity required to be authorized under paragraph 142(1)(b) and that has been abandoned without such authorization as may be required by or pursuant to this Part, or any material that has broken away or been jettisoned or displaced in the course of any such work or activity.

#### Definition of "actual loss or damage"

(3) In section 167, "actual loss or damage" includes loss of income, including future income, and, with respect to any aboriginal peoples of Canada, includes loss of hunting, fishing and gathering opportunities.

#### Recovery of loss, damage, costs or expenses

167. (1) Where any discharge, emission or escape of petroleum that is authorized by regulation, or any spill, occurs in any portion of the offshore area,

(a) the person who is required to obtain an authorization under paragraph 142(1)(b) in respect of the work or activity from which the spill or authorized discharge, emission or escape of petroleum emanated is liable, without proof of fault or negligence, up to any prescribed limit of liability, for

(i) all actual loss or damage incurred by any person as a result of the spill or the authorized discharge, emission or escape of petroleum, and

(ii) the costs and expenses reasonably incurred by the Board or Her Majesty in right of Canada or the Province or any other person in taking any action or measure in relation to the spill or the authorized discharge, emission or escape of petroleum; and

(b) all persons to whose fault or negligence the spill or the authorized discharge, emission or escape of petroleum is attributable or who are by law responsible for others to whose fault or negligence the spill or the authorized discharge, emission or escape of petroleum is attributable are jointly and severally liable, to the extent determined according to the degree of the fault or negligence proved against them, for all actual loss or damage incurred by any person as a result of the spill or the authorized discharge, emission or escape of petroleum.

The Boards may require that successful claims be paid out of the funds available under the operator's "letter of credit, guarantee or indemnity bond or other form of financial responsibility provided."

The Acts also provide for the establishment of a Review Committee consisting of members appointed by each government, representatives of the petroleum industry and representatives of the fisheries industry to review and monitor any claims and payments.

The Boards are also charged with promoting and monitoring compensation policies for fishers respecting damages of a non-attributable nature.

### ***Canada Shipping Act.***

Claims for ship-source oil spills may be made under the *Canada Shipping Act*, either by suing the owner of the vessel or claiming through the Ship-source Oil Pollution Fund (Section 702 and following) for "loss or damage or incurred costs or expenses ... in respect of actual or anticipated oil pollution damage ... for the loss, damage, costs or expenses" (710). This includes claims for loss of income by (712)

(a) an individual who derives income from

(i) fishing,

(ii) the production, breeding, holding or rearing of fish, or

(iii) the culture or harvesting of marine plants,

(b) the owner of a fishing vessel who derives income from the rental of fishing vessels to holders of commercial fishing licences issued in Canada,

(c) an individual who derives income from the handling of fish on shore in Canada directly after the landing thereof from fishing vessels,

(d) a person who fishes or hunts for food or animal skins for his own consumption or use,

(e) a person who rents or charters boats in Canada for sport fishing, or

(f) a worker in a fish plant in Canada, excluding, except in the case of a family-type co-operative operation having a total annual throughput of under 1,400 tonnes or an annual average number of employees of under 50, a person engaged exclusively in supervisory or managerial functions,

has suffered a loss or will suffer a future loss of income, or of a source of food or animal skins in the case of a person described in paragraph (d), resulting from a discharge of oil from a ship and not recoverable otherwise under this Part or any other law, he may, subject to subsection (4), within three years after the time when the discharge of the oil occurred or first occurred, as the case may be, or could reasonably be expected to have become



known to him, and within six years after the occurrence that caused the discharge, file a claim with the Administrator for such loss or future loss.

### ***Environmental Assessment Process.***

Under the terms of the 1992 *Canadian Environmental Assessment Act*, before it is approved, a major project which may have environmental impacts, such as a petroleum development, must undertake an environmental assessment of the effects it might cause, and the project may be subject to assessment by a public review panel as well.

The environmental assessment must consider any changes in socio-economic conditions, and propose appropriate mitigations for adverse effects; within the Act, this may include compensation.

Under the conditions of project approval, regulators may also require the petroleum operator to prepare appropriate plans for compensating the fishing industry for any damages which might result from the development of petroleum resources.

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## **Atlantic, Economics Impacts**

### **Newfoundland's Oil and Gas Industry Newfoundland's Experience – Lessons for BC**

**Wade Locke**

*Department of Economics, Memorial University of Newfoundland, St. John's, NF*

Presentation, Report/Paper summary to come.

## **SYNOPSIS OF DISCUSSION RELATED TO THE ATLANTIC SOCIAL, CULTURAL AND ECONOMIC IMPACTS SESSION**

*What about the economic cost of what we might lose? Has anyone done a full cost accounting?*

The panel could see no reason why this could not be considered. But they noted that it is difficult to evaluate costs accruing ten years into the future. In the meantime, though, the key is to develop a compensation mechanism for habitat loss and to determine who gets paid compensation; for example, with the fishery resource, it is owned by the people of Canada, and there are also First Nation interests.

*How were the concerns about fishery resources handled in Atlantic Canada?*

The effects on fisheries depend on local considerations such as species (sedentary or mobile, etc.), life cycle and type of gear. On Georges Bank a moratorium was put in place because there were nursery grounds for the fish. The Sydney Basin development on Cape Breton Island was cancelled because it is a fishing area with a lot of fixed gear and there was concern about seismic operations, although there were also concerns about offshore oil and gas in general. Generally, groundfish do not take bait after seismic activity. The fishery around Hibernia was formerly American plaice, but these stocks crashed long before the oil and gas development.

*Is there anything happening about safer tanker transport? And what about earthquakes?*

Ben Poblete noted that in the Gulf of Mexico they are considering mandating that only double hull vessels would be allowed to transport oil. And in the South China Sea the concrete platforms are designed with earthquakes in mind.

*What is the longevity of the projects in Atlantic Canada?*

The estimates are eighteen years for Hibernia and fifteen years for Terra Nova based on current resource estimates.

## **Sable Offshore Project**

**Ralph Gorby**

*Community Liaison Manager, Sable Offshore Energy Project, Halifax, NS*

The following is a summary, the full presentation will be available shortly. The Sable Offshore area is ecologically sensitive; meticulous attention is paid to safety. Onshore are the small coastal communities of Guysborough County; there is a gas plant and a liquids processing facility for propane and butane. The benefits include employment, business services, infrastructure improvements... (*\*a series of very useful lists appeared on the overheads*). The lessons include the necessity of effective public consultation and having strong links with local municipal and business leaders, as well as effective union/management relations, and monitoring and sharing progress. It's been established that fishers and the Sable Offshore Energy Project are legitimate users of the seabed. Liaison Committees with fisheries and aquaculture provide a forum for communication. The Energy Project sponsoring of offshore observers and services such as environmental

monitoring, weather information, and communications helps create trust and understanding. There can be socio-economic benefits, but this requires commitment, clear goals, reasonable expectations, vigilance in monitoring, and good communication.

Please see Powerpoint Presentation from Ralph Gorby.

## **BC Tourism**

### **Coastal and Marine Tourism in British Columbia: Implications of Oil and Gas Development for the Tourism Industry**

**Alison Gill**

*Professor, Department of Geography and Centre for Tourism Policy and Research, Simon Fraser University, Burnaby, BC*

In British Columbia tourism revenues grow annually, reaching \$9.2 billion in 1999, with a total of 22.3 million visitors and directly employing 113,000, including self-employed, workers (<http://www.sbtbc.gov.bc/programs/tourism.html>). Ecotourism represents a key component of provincial economic revitalization and diversification and is a significant and rapidly growing component of the overall tourism product with 1997 revenues of \$892 million and employing 13,000 people. The specific contribution of coastal and marine tourism to the tourism economy is uncertain. The problem of identifying this sub-sector is not confined to Canada. As Miller and Auyong (1998) report, a discussion paper published in 1998 in the United Nations "International Year of the Ocean" finds little information on US marine and coastal tourism. The report notes that "there is no systematic collection of data and information on the magnitude, nature, and economic and social impacts of tourism and recreation in the nation's [USA] coastal zone. This is, in part, responsible for a general under-appreciation of this set of activities and the failure to devote adequate planning and management attention to the relevant issues that are raised for coastal tourism and recreation" (cited in Miller and Auyong, 1998:12). Given that in general terms, the United States is far ahead of Canada on issues regarding coastal zone management, it seems likely that the importance of such activities is even less appreciated in Canada. Nonetheless there is evidence of growing academic debate (Miller and Auyong 1991; Miller 1993; Wong 1993; Lockhart and Drakakis-Smith 1997 and the organization of three world congresses on Coastal and Marine Tourism (CMT 1990; 1996; 1999) held during the 1990s (two in Hawaii and one in Vancouver) also attest to the emergent awareness. Similarly, the establishment of Oceans Blue Foundation here in Vancouver, a non-profit organization that seeks to promote environmentally sensitive and sustainable coastal tourism, highlights an increasing sensitivity to issues surrounding tourism in coastal environments.

The objective of this paper is to examine the nature of coastal and marine tourism in British Columbia and consider what impact the potential development of the oil and gas industry might have on both the tourism industry and the implications of this for coastal communities. As there is virtually no research on this subject, my conclusions are purely speculative and intended to highlight the importance of tourism to the BC economy and more specifically the coastal areas in order to position tourism within the overall debate on integrated coastal management and planning. I will first present an overview of the coastal and marine tourism in BC including a discussion of the range of coastal and marine tourism resources and associated development and planning issues. I will then focus on the more subjective topic of destination on the image of tourism in coastal British Columbia and then conclude by considering the potential economic and social implications for tourism development in coastal communities should oil and gas resources be developed.

#### ***Coastal and marine tourism in British Columbia***

##### *Definition*

A study in 1991 funded by the Canada -British Columbia Tourism Industry Subsidiary Agreement (TIDSA), entitled "Marine Tourism in British Columbia: Opportunity Analysis", although now outdated, presents a comprehensive view of what constitutes marine tourism and presents an economic impact assessment. The "marine tourism industry" is defined as including "not only commercial operators, but facilities and events or attractions that are managed by either groups or government agencies ranging from local to federal levels. Commercial operators include marinas, charter operators and fishing lodges and resorts offering a range of activities, power and sail cruising, sport fishing,

kayaking, scuba diving, whalewatching and wildlife viewing" (Industry Science and Technology Canada 1991). (They do not include the cruise ship industry). I believe it important to talk about coastal and marine tourism rather than just marine tourism as coastal communities and the lives of their residents are integrally bound to the nature and use of adjacent marine areas. The marine and coastal tourism industry is thus a diverse one as is the spatial distribution of various activities that are dependent on resource availability and quality as well as accessibility. Since the study was conducted there has been significant growth in many coastal tourism resources such as sport-fishing lodges and various ecotourism activities such as ocean kayaking and wildlife viewing, especially scuba diving and whale watching.

While not included in the study, the cruise ship industry has over the last decade grown at a rate of about 10% per annum (CCG Consulting Group Ltd. 2000). Direct expenditures by the cruise industry in BC were \$281.9 million in 1999 with a total annual impact of cruises ship activities on BCs economy of \$507.4 million, and 5243 jobs in BC alone (CCG Consulting Group, 2000). There is no real sense of the geographic location of where these expenditures are made but as 19 of 22 cruise ships to Alaska originate in Vancouver the impact is most felt in Vancouver. The growth of the so called "pocket cruise" (or smaller cruise vessels) has also been stimulated by an increasing market demand for "ecotourism-type products". A common thread of all marine tourism activities is a coastal experience in a scenic coastal setting. Although sportfishing lodges and charters rely more heavily on US markets, the market for many of the activities is Canadian. However, it seems likely that the non-Canadian market may be growing as a result of increased international attention on such BC coastal areas as Clayoquot Sound and the natural and cultural resources of Gwaii Hanaas National Park in the Queen Charlotte Islands. The cruise ship industry by contrast is highly dependent on US markets.

***Tourism Development and Planning***

With the decline of resource based industries in British Columbia, coastal communities have been especially hard hit and have struggled for survival. Various community economic development strategies are being employed that for many communities include some form of tourism development as a means of economic diversification. With a growing demand for cultural ecotourism products, First Nations communities are important actors in such development. While some communities such as Alert Bay, off the north Coast of Vancouver Island, have come some way in developing their tourism opportunities by combining cultural attractions with wildlife viewing (especially whale watching), other communities, for example Bella Coola, are still at a embryonic stage.

Until 1995 when the Tourism Act was passed, the BC Ministry of Tourism lacked a legislative mandate to engage in resource management and land use planning processes (White, 1999). With the passing of the Act, tourism gained a 'seat at the table' with other stakeholders in land use planning. However, efforts to inventory tourism resources have been conducted since the early 1990s with the introduction of the Coastal Tourism Resource Inventory Program, a GIS-based mapping program that provided the basis for identifying the resources that are important to the tourism experience being sought. For example the following resources are seen as representing good capability for an exclusive fishing lodge experience (Table 1).

Table 1 Example of good capability for an exclusive sport fishing lodge

| ESSENTIAL RESOURCES<br>(necessary for product to exist)  | QUALIFYING RESOURCES<br>(define product's level of quality)   |
|--|---|
| <ul style="list-style-type: none"> <li>• larger fish within travelling distance from lodge</li> </ul>    | <ul style="list-style-type: none"> <li>• scenic setting</li> </ul>  |
| <ul style="list-style-type: none"> <li>• sheltered water for float plane use and boat moorage</li> </ul> | <ul style="list-style-type: none"> <li>• other nearby activities to enjoy besides fishing (e.g. beach, trails)</li> </ul> |
| <ul style="list-style-type: none"> <li>• remoteness (greater the 1 km away from road access)</li> </ul>  | <ul style="list-style-type: none"> <li>•wildlife to view</li> <li>• heritage resources</li> </ul>                         |

These types of information have been placed in layers to provide a map-based GIS inventory. Having an inventory is essential – you cannot plan unless you know what you have. So for tourism this was a big step forward. This mapping is not completed yet and it is an ongoing project. The other difficulty that is faced is the institutional complexity of coastal resources upon which tourism is dependent. The word “dependent” is critical. Tourism, in terms of resource use, has a very high level of dependency on decisions made in other resource sectors.

Parks represent one of the only designations in which tourism interests are highly valued but considerable tourism activity takes place outside of designated park areas. On the British Columbia Tourism website visitors are invited to “come experience one of the wildest and most spectacular coastlines on earth”. One of the parks in the area that would potentially be affected by oil and gas development is the Broughton Archipelago Marine Provincial Park, at the south end of Queen Charlotte Strait. Also, newly announced are the new Marine Protected Areas – there are currently four pilot projects, three of those are in the Georgia Strait and the Gulf Islands area, only one is further north off the Queen Charlotte Islands the Bowie Seamount area. The latter would not be affected by oil and gas development. Marine Protected Areas are new designations under the Oceans Act that are going to be jointly managed with federal and provincial assistance. I anticipate that as these pilot projects get developed there may indeed be more of them that are designated. Their intent is of course, ecological conservation.

British Columbia markets itself as “Super, Natural British Columbia” “A world where wilderness reigns, where cityscapes melt into mountain ranges, where sea and sky hold hands”. The image of super, natural and wilderness is the one that has been established in the market place for some time and is a drawing feature for many people who come to Canada, particularly from the US. A definition of “image” is an amalgam of impressions, beliefs, ideas, expectations and feelings towards an area. It has been demonstrated over and over again that these are very important determinants of tourism buying behaviour. There are two types of images – induced images which are marketing or promotional images, and organic images - the images people build up of a place from other sources such as the media. It is these images that are hard to control. Events, for example, oil spills or other environmental damage have a negative effect on images, especially if they conflict with the induced image that is being used by the tourism industry.

### ***Implications of oil and gas development for the tourism industry***

Finally, some thoughts on the implications of oil and gas development to the tourism industry. A lot of this is pure speculation but I have broken it down into 4 elements – these relate to the environment; community development; tourist image and tourist/recreational conflict. The environment is very important as it is what attracts people to BC’s coast and it is what BC has established in terms of its marketing image. The threats to the environment go beyond the danger of oil spills and there are other issues of environmental quality. For example, aesthetic degradation is a concern. It seems possible that tourists and recreationists on the marine highway as cruise ship passengers, pleasure boaters or fishers, will probably be within visual sight of oil or gas operations. Environmental quality, may also be a concern especially in the construction phase but also in the production phase. A serious pollution events, for example, an oil spill, of course would have very serious effects environmentally although it is interesting to note the length of time that such disasters affect tourists’ images. There have been a number of studies that show how soon tourists will go back to earthquake areas, or places where there have been outbreaks of terrorists attacks – and it is relatively short – tourists seem to have short memories. They don’t hold this against you forever, although people still do remember the Exxon Valdez and they do think about that perhaps to some extent, but it is not irrevocable.

Wilderness has specific definitions in the US – large tracts of untouched area with no roads. But for most people, wilderness is a mental construct. For many tourists, most of whom are now urban dwellers in the developed world, wilderness doesn’t really have to be that far or that wild for us to consider it wilderness. At the same time, the idea of industrial intrusion is certainly very contradictory to the notion of wilderness and one could debate philosophically why we need wilderness. It certainly is an important element of how we are marketing British Columbia

Finally, I want to comment on the potential impact that oil and gas development may have on coastal communities. It has been a hard-fought battle to get coastal communities to embrace tourism. It is not something that people who are used to the resource economy take to and convert to very easily and it has taken a lot of hard work, a lot of

consultation, public meetings, etc to get people to say “yes, maybe tourism isn’t just all ‘Mc’ jobs, dishing out hamburgers, and so forth – maybe there is an opportunity for entrepreneurship and maybe making a decent living out of tourism”. A niggling concern that I have - and that is all it is – concerns expectations. We have heard about how the expectations of oil and gas development tend to detract people from other things, believing that there are high paying jobs coming in. I am a bit concerned that people will abandon tourism in the expectations of faster money, faster economic development. An important issue we have heard for coastal communities is that diversification is the key. We have heard from Wade Locke that the oil and gas industry on the East coast is only part of that economy. It is not the golden egg. It is important to keep in people’s minds the ideas of diversification and keeping tourism up there as one of the players. And then again, something that we have heard quite a lot about, is the overall need in whatever is done in oil and gas development to engage in best practices. There is considerable experience now developed on the East Coast and elsewhere about how we can make oil and gas development safer, and less environmentally, ecologically risky. I personally do not think we are looking at “either/ or” in terms of tourism and oil and gas development. There are ways and means by which tourism and oil and gas development can work together, but it is going to need very careful thinking and it is going to need the tourism representative at the table in the debates and discussions about resource use.

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### **BC North Cultural/Economic**

#### **Robert Hill**

***President, Tsimshian Tribal Council, Prince Rupert, BC***

I have received in my upbringing, the best of both worlds. I grew up with Steve Smith in the northern community of Prince Rupert, but I also started out in my life, not knowing English but being very fluent in my language, the simaliuth language of the Tsimshian.

In coming down here, I had mentioned some of these issues to our delegation. The travelling partner sitting next to me was reading the Calgary Herald. It said that a consortium of western oil companies has found a vast petroleum reserve in the Northern Caspian Sea off the coast of Khazistan that may well be the largest discovery anywhere in the world. It was talking about the potential of that discovery being anywhere from 8 to more than 50 billion barrels of oil. And believe it or not, the communities in that area are now struggling and deciding who is going to build the best oil pipeline, or how they are going to harvest the extraction of the resources. And as an afterthought in that same article they mentioned that part of the fields in Russia have been exploited, in Tengis by an international consortium led by an American oil company. This is what we are looking at with our potential in the Queen Charlotte region.

Before I came down here I spoke with some of my advisors and the hereditary chiefs of the lands that we are mentioning, about how the potential of oil exploration could impact our communities.

What I did, was ask them, as far as our lands are concerned, what do I tell them at this meeting. We are in the treaty process; we are in the fourth stage, the stage prior to the agreement in principle stage where you have a framework design to tell the governments of Canada and British Columbia what you are going to have on the table for discussions. And of course that involves the substrate as well as minerals and oils. The hereditary chiefs told me – let them know who we are and where we are located and let them know how we have survived all of these years since contact. But most of all tell them some of your observations on what we have experienced from the extraction of all the resources within our lands. Let them know how they have completely devastated the fishing industry, how

we have rehabilitated our streams long before they came over. Tell them about how those streams were completely devoid of salmon, that we planted baskets, any containment that we could in a river that we know that salmon would come back to. The salmon will bury in the sand in the substrate of that stream in the pebbles so we know that salmon is going to lay eggs in those baskets. That we removed those baskets after the salmon have laid their eggs and put them into barren streams so as to ensure the survivability of streams. Let them know that you have done that. Also let them know that you are put here to protect those very resources that may be impacted by the exploration of oil and gas on your lands.

And I say this under great advisement, that during the discussions of the framework agreement in the fourth stage, we told both governments, Canada and BC that we do not object to any economic development within our traditional territory, as long as we play a large part in the development of that economy. And that all the benefits need to accrue to those communities that are represented. Every year I am expected to report to the hereditary chiefs and the nation. We go through a ceremony, a ceremony we hold dear to us. We call it the talking stick – during that ceremony the hereditary chiefs stand around in a group, and they place the responsibility on me that I have to inform them of the state of the nation. And I have to do that, every year, unlike the governments that go through four years of tenure and do nothing in the first three and only in the last year during the election year do they do something about the resources. Prior to coming down here, I was speaking with the MLA of my district, and he said Bob, there are two environmentalist organizations that have met with six of the giant forest companies in this province. They are in the throes of imposing a moratorium in the different coastal zones in the province of BC. He requested that we should get together to do a joint press release. I got hold of my communities and talked to the negotiators at the table and I asked, what should be the response? We are negotiating with governments right now and the very things we are negotiating are the lands that we hope to have some reasonable control in regarding the say of how they are developed. They advised me to use that one issue, and call the MLA back and let him know that we will caucus amongst ourselves and we will go back and tell the government of BC that this is the only way we are going to do it. The advised that we should use this as a leverage so that the government can start talking about interim measures, about treaty related measures. That same government may have the power to lift the moratoria off the oil and gas exploration in the lands that we are talking about, in the oceans that we are talking about. And that is important – their message to the MLA was, what have you got for us? My message to you is – to friends that I travelled down with, and I am part of that community – what have you got for us as First Nations people? That is a very important point.

I need to tell you about the communities that I represent – Metlakatla, Lax Kw'alaams, Kitkatla, Hartley Bay, and Kitasoo. More importantly, we have another community in the Alaska side, termed Metlakatla, Alaska. I represent seven communities and the eighth one is Metalkatla Alaska. When Steve told you about the blockade of the Alaskan ferry cutting down on the number of tourists coming into Rupert, that is the truth. Another part of our claim to fame is to do with the Exxon Valdez accident where the skipper hit a rock. That skipper used to be the skipper of the Malaspina that hit Digby island – going into Prince Rupert harbour – that ferry went high and dry, an the excuse was that they were changing watches – but there was nobody on the wheel.

Our other claim to fame was the freighter that went high and dry in Prince Rupert harbour. It took two and a half weeks to come off the rocks, because of the amount of tides that we experience in the North coast – an average of 21 feet between high and low. No matter how many regulations you institute in regard to the exploration of oil, and no matter how many safety nets that you provide, our history through humanity has taught us that there will be accidents. There will be impacts on the environment, and on resource extractions of other species.

The Tsimshian nation is described in this manner – clearly the traditional territory of the Tsimshian although they represent seven communities – comprises a third of the coast of British Columbia as we know it to the Alaskan border. More importantly, it encompasses a third of the watershed of the Skeena River and by a gentleman's agreement, the Haida Nations have the Hecate Straits. You may not think that is too significant, but it is significant in the mere fact of its size and it is also significant in the fact that in our history we won those lands. We had the aboriginal right to harvest in those areas. We certainly did not go to war with the government of BC or of Canada, but we did go to war with our neighbouring nations and we won those territories. As much as each of the individual nations that we live beside won their territory. And our history has taught us that – in order to have peace amongst the First Nations of British Columbia we had to have our own treaties. We did that in 1990. All First Nations in northern British Columbia got together and decided to sign a treaty amongst themselves. It is not the business of government – we said that we would continue to share the resources within our respective territories and that we



would adopt the appropriate protocol in regard to entering each other's territories. This was the Northwest Tribal Treaty. Since then there are various other Nations within the signatories (there were ten of them) of the Northwest Tribal Treaty that have signed other treaties with their neighbouring nations. The Kitasoo and the Heiltsuk and the Haisla people. The importance of communities in coastal Tsimshian territory is very dear to us, because we are a maritime people. With regard to the fisheries, there are very little returns of oolichans coming back to the Skeena and the Nass and to the areas around Douglas Channel – the Kemano and the Kitimat rivers, simply because there is a huge by-catch in other licence categories such as the shrimp trawl. It has been proven through the statistics of the management of DFO that in 1997 there were 87 tons of oolichans as a bycatch on the shrimp trawl and what is it used for – bait.

The other message that I need to tell you is that the history of resource extraction in the traditional territory of the Tsimshian is very dismal. There have been no benefits accrued to the communities of the Tsimshian nation –there may have been minimal benefits going into the city of Prince Rupert. Simply put, I agree with most of the presenters here that this is something that needs to be reviewed in depth and it needs to be looked at to the degree that all the stakeholders and the potential people that it could impact need to come to the table. That is a huge undertaking. Regardless of what we do, those resources are pretty well gone. We have a problem with salmon – but what are we doing about it – we are going on to another resource and we are going to clean it out and sit back and say, what happened. Let's not look too much at what we have in our back pockets or the potential of what we can put in our back pockets but look at how it can affect the successive generations to come.

I agree that we need to discuss this a lot further than just with a mere forum with the people within this circle. We need to reach out to the assembly of First Nations and the Summit Process and Grand Chief Ed John – it is going to be one of the most important decisions that could be made on this coast. Lastly, the other important component is this – we have heard a bit about tourism in BC and my nation has undertaken an active role in developing tourism on our coast. There are options that we haven't looked at yet. For example, just across the border is our eighth community of Metlakatla Alaska. I remember going into Ketchikan, and watching the sheer number of people that come there for three months of the year. We need to have a look at that potential. In this area, a place called Moore Island, off Princess Royal, where that bear park is going to be (the Spirit Park for the White Kermode) – is the group of islands is where my great –grandmother was born. I can remember her telling me stories about why we moved to Moore Islands in the summer time – simply out of respect for the Haida Nation. In those days there were raids conducted by all First Nations throughout BC – so they moved there for protection while their men moved into Alaska to do hunting. We are building a long house there – on Moore Island – out in the middle of nowhere. It will probably benefit the kayakers as they move along the coast of BC. We also have an archaeological site at Pike Island, just off Digby Island. The Metlakatla community is going to be putting up a long house there for the purposes of a museum and perhaps for a person to live there, and give guided tours. We will build one in Princess Royal, and we have built one in Douglas Channel – the outer perimeter of our boundaries.

We are getting geared up for that kind of thing and we are also getting geared up for ecotourism. For example we have displaced vessels – gillnetters and seiners that can no longer fish because the companies forced us into surrendering those licenses. We are very innovative. It is issues like this that I think we need to look at rather than going into a competitive world like the Caspian Sea.

Again I enjoyed telling you about our traditional territory. I know that things are very tough now in the community of Prince Rupert but I want to emphasize that we still have some resources that are left – territories that are absolutely beautiful in nature and we want to keep it that way.

(~~ Insert Bob Hill scanned maps)

## **SYNOPSIS OF DISCUSSION FOLLOWING TOURISM, CULTURAL AND ECONOMIC IMPACT SESSION**

The comment was made that in Alaska the oil and gas industry and the tourist industry exists side by side. Alison Gill noted that it is hard to generalize because the tourism industry is based on niche markets and the cruise ship passengers are different from kayakers.

## **DISCUSSION OF QUESTIONS RELATED TO ENVIRONMENTAL IMPACTS AND MANAGEMENT**

**Paul Scott**

*Pacific Region, Canadian Environmental Assessment, Vancouver, BC*

Paul Scott provided a summary of the following paper

**FEDERAL ENVIRONMENTAL ASSESSMENT AND  
WEST COAST OFFSHORE OIL AND GAS DEVELOPMENT**

**Notes for a Presentation to Exploring the Future of Offshore Oil and Gas  
Development in B.C.**

**Simon Fraser University - May 18, 2000**

**Paul Scott, Canadian Environmental Assessment Agency, Vancouver**

Introduction

In the early 1980's, consideration was given by the federal and provincial governments to a lifting of their respective moratoriums on offshore exploration. In 1983, a Memorandum of Agreement was signed between the governments of Canada and B.C. that established the basis for a joint review of renewed offshore oil and gas exploration should the moratoriums be lifted. Under the Agreement, the two Ministers of the Environment established an independent environmental assessment panel to conduct a public review of the potential environmental impacts associated with any renewed offshore exploration program. The offshore area subject to the panel review was the coastal waters from northern Vancouver Island to the B.C./Alaska border.

Panel Review Process

A five member independent panel was appointed in June, 1984. The panel's terms of reference asked it "to examine the environmental and directly related socio-economic effects of offshore petroleum exploration, and to present recommendations on the terms and conditions under which offshore petroleum exploration could proceed in a safe and environmentally responsible manner". It is worth noting that in interpreting its terms of reference, the panel defined exploration to include seismic surveying, exploratory drilling and the delineation drilling that would occur to establish favorable conditions for the development and production programs to be proposed. The panel did not include in its review a consideration of impacts associated with production scenarios.

At the beginning of the review, both Petro Canada and Chevron were involved and information prepared by these companies served as a starting point for the review. The panel's Terms of Reference named both Chevron and Petro Canada as proponents. During the course of the review, Petro Canada decided to withdraw citing other priorities. For the remainder of the review, Chevron served as the only project proponent.

During the early stages of its review, in late 1984, the panel held public information meetings in 15 north coast area communities as well as Vancouver and Victoria. These meetings introduced the panel to area residents and other interested stakeholders and

helped to panel to understand the issues of concern and to finalize the information requirements for the review. In December, 1984, the panel released a document outlining the additional information it needed from government and industry in order to complete its review. Following the preparation by Chevron and federal and provincial governments of the additional information requested and once the panel was satisfied that it had sufficient information to complete its review, it held a series of public hearings, both technical and non-technical, in most of the same communities in which the information meetings had been held. These hearings were held in the fall of 1985. At the end of its review, the panel produced a report (dated April, 1986) to the federal and provincial governments summarizing the results of the review, including its conclusions and recommendations.. The panel report included a total of 92 recommendations.

The two governments responded to the panel report and the panel recommendations in June, 1987. In this response, the governments accepted most of the panel recommendations subject to a number of conditions.

#### Panel Conclusions and Recommendations

The panel concluded that terms and conditions could be put in place that would allow the moratoriums to be lifted. Other important conclusions and recommendations included:

- Exploratory drilling should not take place within an exclusion zone of 20 km from any point of land to minimize potential impacts on sensitive nearshore areas from routine operations or from an oil well blowout.
- Exploratory drilling outside of a specified 20 km exclusion zone should initially be confined to the months of June to October at least until further operating experience is obtained and weather forecasting improved.
- A two year airgun seismic survey program could proceed providing certain terms and conditions were met. The panel concluded that further seismic programs should not be permitted until monitoring results from the initial program were analyzed to better determine the effects of airguns on fish eggs, larvae and juvenile fish.
- Additional information leading to a better understanding of the environment of the exploration area and the potential impacts of the exploration program should be gathered and provided to the regulatory authorities prior to the commencement of the drilling. Some of the panel's other recommendations provided details on what additional information was needed.
- The major source of socio-economic impact is likely to arise from the limited ability of residents of the areas, including First Nation people, to participate in decisions relating to the management of the area's resources.
- An effective ongoing environmental management structure should be put in place that would be capable of managing decisions relating to the environmental and socio-economic considerations of offshore exploration and of possible development and production as it may evolve.



- An effective compensation program that applies to all losses and damages resulting from an oil blowout or from routine operations should be established before the start of any offshore drilling.

Some other important considerations that arose during the panel review include:

- Land claims and, at the time of the panel review, the lack of any meaningful progress on land claims, were brought forward during the review by the First Nation people in the area.
- There was, and presumably still exists, some question about the jurisdiction over the West Coast offshore area. Is it federal or provincial? The panel review was carried out “without prejudice to resource ownership and jurisdiction, to any future agreement which may be reached on sharing of revenues from offshore oil and gas activity”.
- Numerous issues were raised in connection with the environmental acceptability of the risks associated with offshore exploration and, in particular, the risks associated with the possibility of a major oil blowout.
- Panel concerns and recommendations relating to seismic exploration were based on the understanding that most seismic survey work would be done using airguns. There was, at that time, limited knowledge about the impacts of airguns on fish eggs, larvae and juveniles and about the distribution of these organisms in the review area. Has this knowledge increased in the intervening years? There were also concerns expressed about the impacts of airguns on whale migration. The panel recommended against the use of explosives for seismic surveys.
- Concerns were expressed about the potential impact of adverse weather conditions on the exploration programs and uncertainty was expressed about the accuracy of forecasts of adverse weather conditions.
- The panel believed that means should be found to ensure that area residents have an effective role in decisions relating to the management of offshore exploration and its possible effects.
- The panel recommended that offshore operators establish a preferential hiring policy for employing local residents assuming equivalent skills and the operators ensure that contractors follow the same policy.
- The panel made a number of recommendations relating to blowout prevention and control and how to deal with a blowout situation should one occur.
- The panel made recommendations on areas of research and investigation that should be carried out to increase knowledge about issues such as impacts of oil on birds and fish.

#### Follow-up to Panel Report and Recommendations

In June, 1987, the governments of Canada and B.C. together issued a formal response to the panel’s report and recommendations. The governments accepted the intent of most of

the panel's recommendations. In fact, the governments accepted the intent of 80 of the panel's 92 recommendations. For 46 of these accepted recommendations, the timing and the manner of implementing the objectives were not detailed. Nine of the recommendations were rejected (none were critical recommendations) and no response was possible for 3 recommendations because the topics were then under policy review.

Although the panel report and recommendations along with the government response to the report seemed to open the door to having the moratoriums lifted, no further action with regard to the moratoriums was taken. This appeared to be due, at least in part, to lack of active interest by the oil and gas industry in renewing exploration activities off the west coast. It is really only in the last few years that interest, driven largely by north coast communities, in lifting the moratoriums has again been kindled.

#### Future Federal Environmental Assessment Requirements

The basis for the federal involvement in the 1980's panel review was the *Environmental Assessment and Review Process*. This non-legislated federal environmental assessment process was replaced in 1995 with the new *Canadian Environmental Assessment Act*(CEAA).

Under CEAA, whenever a federal authority has a specified decision-making responsibility in connection with a project, it takes on an obligation to ensure that an environmental assessment is carried out that meets the requirements of the Act. There are four areas of federal decision-making that trigger assessments under CEAA:

1. federal proponent;
2. federal funding;
3. federal lands; or
4. federal regulatory authority.

The most likely triggers for any new federal environmental assessment of renewed plans for offshore exploration and/or development would be in connection with federal regulatory authorities. A few areas of regulatory decision-making that would likely trigger a new CEAA review are National Energy Board authorizations under the *Canada Oil and Gas Operations Act*, authorizations under Section 32 and/or Section 35(2) of the *Fisheries Act*, and permits under the *Navigable Waters Protection Act*.

Once a CEAA trigger was confirmed in connection with an identified offshore project, then the responsible authority(ies) would have to ensure that an environmental assessment was completed that met the requirements of the Act. It is too early to speculate on the nature of such an assessment. However, two factors should be kept in mind:

1. any new CEAA assessment of offshore exploration activities would be obligated to take into consideration the results of the previous panel review; and

2. if a review under the B.C. *Environmental Assessment Act* were also required, the Canada-B.C. Agreement for Environmental Assessment Cooperation would ensure that the two levels of government would work together on a single assessment process.



**The Status of Environmental Assessment Review of Westcoast Offshore Hydrocarbon Exploration: what is (and isn't) needed to warrant the lifting of the moratorium on Westcoast offshore hydrocarbon explorations.**

**Jon Sexter**

*Sector Environmental Resources Consultants, Victoria, BC*

My contention is that the stage is set for the lifting of the moratorium. That particular assertion is based on a number of premises, several overriding and several intrinsic. The primary premise is that there will be and has to be the entering in good faith of tripartite negotiations between Canada British Columbia and the Haida Nation, Canada British Columbia and the Tsimshian Nation, and Canada British Columbia and the Heltsuik Nation, with reconciliation of resource sharing and resource revenues and benefits from this particular resource. That can go on concurrently with a variety of things and I will go as far as to say that that should go on separately and apart from the existing treaty negotiation process.

With that said there is another premise. I was surprised that no one yesterday mentioned this, and that is that somewhere out there, there is an industrial proponent that wishes to make a play here. We have to make that assumption, because without a proponent there are not going to be projects of exploration of various forms and perhaps even production one day. In addition, I would emphasize the fact that even though the geological presentation yesterday emphasized the whole coast, based on our Panel's findings some fifteen years ago, every time I think about offshore exploration on the west coast, it starts and stops north of Vancouver Island. I would not think of it happening in Johnstone Straits, Georgia Strait or off the West Coast of Vancouver Island. The geological evidence is where I assume that the proponents will focus.

Through the work of LUCO (Lands Use Coordination Office) a CD-ROM will be soon be issued by the province of British Columbia - it is a coastal resource and oil spill response atlas which is both iterative and very interactive. The first one is for Vancouver Island. Because its focus is coastal resource management it is also very useful for oil spill response and planning. The data is already in place for a similar atlas for Haida Gwaii, there is an ongoing program collecting data for the Central Coast, and the process is about to get underway on the North coast. LUCO's overall program of coastal resource mapping is one thing the Panel called for and it is indeed well underway.

The point about the focus of the Panel being not *whether to* per se is in fact correct, but implicit in everything the Panel said and did was if there was reason, in their collective and respective opinions to recommend not going ahead with the lifting of the moratorium either on social grounds (and they did a great deal of things social from the communities) or on technical grounds, they would have said so. In fact, they filed their recommendations and it has been sitting, following the government's review of it, for a good number of years.

The intrinsic premises that I talked about are as follows. These are the premises of my assertion that the stage is set. The stage is set and in fact is waiting for mechanisms and implementation; for the appropriate things to make it happen right, from a social point of view, economic point of view and environmental point of view. The premises are that the Panel in fact, fifteen years ago, thoroughly and responsibly covered the range of applicable issues.

The second thing is that the technology and the will are present to assure the implementation of the recommendations and safeguards.

And notwithstanding the pressures on the resource that we talked about yesterday, we all know that the ecosystem in general is basically out there and requires the same safeguards, with appropriate technological advances, as were there were fifteen years ago. What I am basically saying is that we don't need to go and visit the *what to* again. The *what to* is on the stage – it is the *how to* that we need - the *how to* do it right.

***The Panel's Recommendations***

Of the 89 recommendations from the Panel this is how they break down from the implementation point of view. Four pertain to general environmental assessment processes. Twenty-five need to be implemented during offshore

exploration. Nine are things that have to be investigated and or mechanisms and structures that have to be put into place before seismic exploration. Thirty-five are things that need to be undertaken or produced prior to exploratory drilling. Eleven items deal with compensation, and among those that were not formally accepted are the compensation recommendations, and five items are related to a coordinating committee and management authority to oversee this.

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***The Panels Recommendations***

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- 4 pertain to general environmental assessment processes;
  - 25 are operational / procedural conditions to be required and implemented during offshore exploration;
  - 9 are items to be undertaken or produced and in place prior to the commencement of seismic exploration;
  - 35 are items to be undertaken or produced prior to the commencement of exploratory drilling;
  - 11 items deal with compensation for damages and loss to environmental resources as a result of offshore exploration activity; and
  - 5 items relate to a coordinating committee and management authority to oversee Westcoast offshore petroleum exploration.
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The Panel was very adamant that a focussed authority needed to be established, because other agencies have their own agendas, their own priorities, their own budgets and things of this sort.

The key recommended items that are required prior to commencing with seismic exploration are listed below. Bear in mind, however, that the wording is fifteen years old and reflect the times and processes that were on hand (these were the days before treaty process and before truly focussed community consultations). For example, the recommendation (#8) to ensure participation by the regional public can be interpreted in any way appropriate to today. The same is true with the recommendation (#9) nine to ensure aboriginal people involvement. Recommendation #20 for the production of fisheries booklets, to my knowledge still has to happen. For the recommendation #23 for improved knowledge of current movements, many programs are completed and include all sorts of advances. Things like funding of community monitoring – that is monitoring of the effects on both community and its own area resources have yet to be put into place as is the case for the recommendation (#46) for a local supplier policy.

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***Key Recommendations***

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- #8 ensure participation by the regional public: *current information programs to be expanded and formalized*
  - #9 ensure aboriginal people involvement : *as for 8 above*
  - #20 produce fisheries booklets: *to be developed*
  - #23 improved knowledge of current movements : *this and related hydrographic and oceanographic programs are completed (reference: websites of Dr Bill Crawford of CHS-DFO)*
  - #21 seismic operators meet with fishing industry :*to be arranged*
  - #41 funding of community monitoring: *to be arranged*
  - #42 public information and education programs: *as for 8 and 9*
  - #46 local supplier policy: *to be developed*
  - #57 improve information on native food fishery: *programs underway*
- 

For the four items needed to be put into place before exploratory drilling my colleagues at Canadian Wildlife Services advise me that the requisite bird surveys have been undertaken on the mid and north coasts. The data gaps regarding modelling of fisheries, and regarding currents and oceanography, and sensitive mapping for the areas of the coast we are talking about are underway.

- #33 Bird Disturbance Guidelines : required bird surveys have been undertaken on the mid and north coast by CWS.
- #53 Reduce Data Gaps re Modeling of Fisheries Impacts : required research in this area has been undertaken and is ongoing
- #59 Sensitivity Mapping – General: programs in the subject areas are well advanced
- #60 Sensitivity Mapping - Food Fishery and Resource Harvesting: programs in the subject areas are underway

## ***Legislation***

With regard to the acknowledged applicable legislation I will only refer to some of the key points. My examination of the situation, both as a student and practitioner of the system, suggests that the Canadian Environmental Assessment Act is not necessarily applicable to seismic exploration. It is certainly applicable to exploratory drilling – via the permits, if not other things, that are required for structures. This is not a direct federally sponsored activity. The primary trigger lies in the specific permits that are required from federal agencies to authorize an aspect of an activity and depending on where it is and what permits the federal government does or does not allow there may be no trigger for the Environmental Assessment Act for seismic exploration. Having said that, my contention is that even if there are no formal broad environmental process requirements, I use the term ‘environmental assessment’ as the planning tool that proponents use to do the environmental planning for their project and through that they acquire their regulatory permits. What Paul Scott does in his office is the review of that – and his environmental assessment (it used to be called a review process) reviews what a proponent these days should be and probably is doing. It is a subtlety but we don’t want the public, or yourselves, to be caught up by the fact that unless there is a process there won’t be any environmental assessment. There will all sorts of environmental assessment, both in the sense of the things that any proponent who emerges knows he has to do, because the Panel has basically laid out a number of conditions, or because he knows that if he goes out and scores in any part of the world he has to do these things, and these things will be overseen by whatever the body is and through the mechanisms that I am advocating be established.

## ***What is NOT needed?***

In my view, you do not need another Panel hearing on the *whether to*. There is a taking of the pulse going on now. There are going to be focussed consultations – the northern commissioner is examining what I call the pulse on northern residents’ views on offshore oil ( <http://www.ndc.gov.bc.ca/> ). To proceed, it is my view that public consultations in a formal sense are not needed in the *whether to* issue – the stage is set. Further, an Environmental Assessment Review Panel on seismic exploration is not needed. When you are thinking about these things, the question you should ask is: What additional information will this add or shed light on to the situation? If someone could convince me that there is additional information at these levels, I could be convinced there is a need for such a review panel. At this point I am not. Also, I do not think you need protracted hearings on *how to*; instead you need focussed consultations on *how to* - those are very different constructs in my mind.

In summary, in my mind, given the premises I described at the very outset, there are four things that need to be done, to give the two cabinets of the senior governments a comfort factor to enable them to lift the moratorium. Those in appropriate positions need to show that the mid-1980s Panel satisfactorily addressed the barriers and safeguards and conditions/issues; show that there are mechanisms to implement these properly and put them into place; show that these steps are going into place or are in place to proceed with the Panel’s recommendations; take the public pulse with regard to acceptability (and it is my understanding that Mr. Backhouse efforts are doing that); and undertake focussed public consultations on the *how to* level in relation to a declared intention to lift the moratorium.

## **Environmental Impacts, Assessment and Management**

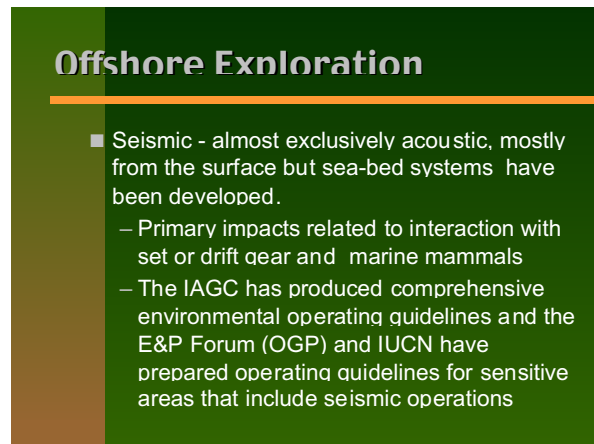
### **Wishart Robson**

***Canadian Occidental Petroleum Ltd., International Manager, Environment, Health and Safety, Calgary, AB***

Canadian Occidental does not hold any offshore exploration leases or acreage in Canada. The reason I was invited to give this presentation is for the experience that I have had working with a number of people in this room in activities on the west coast, the Arctic and most recently when I was with Petro Canada looking at the Terra Nova project and going through the environmental assessment process and the panel review. I will be talking about some of the changes that have taken place in the industry over the last ten years in the development process, in the technological sense, and in the process and management sense. I will present my views on the environmental assessment process and some of the challenges that a proponent, the company, has. As Jon Sector mentioned there

wouldn't be reviews unless there were proponents. I will finish up with observations, primarily based on some of the work I do overseas, on the role of oil and gas development as it pertains to environmental justice and ethics and equity.

### *Offshore Exploration*



**Offshore Exploration**

- Seismic - almost exclusively acoustic, mostly from the surface but sea-bed systems have been developed.
  - Primary impacts related to interaction with set or drift gear and marine mammals
  - The IAGC has produced comprehensive environmental operating guidelines and the E&P Forum (OGP) and IUCN have prepared operating guidelines for sensitive areas that include seismic operations

For those of you who are not familiar with the world of offshore exploration, seismic exploration is the process for trying to determine the location of the reservoirs that you might want to drill into to see if they contain hydrocarbons. That used to be done through the use of explosives, which was very destructive especially in terms of fisheries and marine mammals but that was a long time ago and as you heard yesterday from Bevin Ledrew, they have progressed to newer technology, with much cleaner signals that do not have those sorts of impacts, although there still are concerns about marine mammals and perhaps some species, or particular lifecycles, of fish. Strat Canning yesterday talked about some of the physical interactions between seismic exploration and the fishery particularly with respect to set gear, whether it is nets or traps. We work hard with the fishing industry wherever we are, whether in Canada or overseas, to make sure that those impacts are minimized through communication or through timing.

In the last ten years there has been a lot of work done by the industry, and by the industry's contractors, as well as by a number of international environmental groups to come up with operating guidelines that will effectively improve the way we do our business and minimize the impacts that we might have. The International Association of Geophysical Contractors (IAGC) has produced an excellent set of operating guidelines that is meant to minimize those impacts and interactions with other marine users. The E and P Forum of the Office of Global Programs (OGP), an organization of oil companies based in the United Kingdom, and the International Union for the Conservation of Nature (IUCN), a world wide conservation organization based in Geneva, have come up with operating guidelines for particularly sensitive environments, including mangroves and coral reefs, in the marine setting. The communication of those practices and those guidelines are referenced now in our contracts and the operators, the seismic contractors, are required to meet these terms as a requirement of our contract and they are audited on this during the course of our work, particularly where we have identified that there are some sensitivities.

## Exploration Impacts

### Exploration Impacts

- Exploratory drilling - generally single well operations; impacts dictated by mud program, water depth and currents and particle size and environmental character.
  - Programs must be approved (DPA) by regulator on a well by well basis (ADW)
  - success rate averages 1 in 10; well bores seldom used for production operations
  - surprises are possible

Exploratory drilling is generally done with single wells and the wells are drilled at quite a large spacing – if you have a large prospect and you have identified a couple of targets you could be looking at tens of miles or more between the exploratory well locations. The impacts might be dictated by the mud program. Mud in this case, the drilling mud that we use, is to lubricate the bed and also to get the cuttings from the bottom of the well to the surface so that you can continue to drill in the paths of some of those muds. The muds contain things like diesel fluid that would lubricate the bed. Going back over the past 20 or 30 years since the time that diesel was used, we are now talking about two and three different technological generations of product.

The impacts from exploratory drilling are dictated by the kind of mud program and chemicals you use as well as the water depth. The greater the water depth, generally the less the impact is on the seabed. Impacts are also determined by currents, that is, how strong the currents are, with respect to the distribution of the cuttings that might come from that well, as well as particle size of the cuttings, and the environmental character of the area.

### Exploration Impacts

- Development drilling - several wells drilled in close proximity possibly from a single location. Generally leads to production operations. Timelines vary from project to project and country to country.
  - There may be an accumulation of cuttings, flaring associated with production testing, fewer surprises while drilling, but in oil producing zones more frequently

In most countries, using the terms from the east coast of Canada, the operator must submit the program that he has when he has successfully bid on a piece of land and acquires it. This program describes what he intends to do in the whole block during that exploratory phase (DPA). They also have to submit requests for approval (ADW) on a well by well basis. And both those applications have to contain some level of environmental information about the site and what the proponent intends to do to minimize the impacts. For your information, the success rate for exploration wells worldwide, ones that might uncover hydrocarbons, and that doesn't necessarily mean commercial hydrocarbons, might be one in ten. The well borers for those exploration wells are seldom used for production. The exploration wells are generally abandoned and if a discovery has been made they go on to drill a well that will be used in the production operation. Surprises are possible because you are drilling into formations and reservoirs that

you don't know. Therefore, when the drilling is done on exploratory wells it is done a little differently that it is when it is done in a development sense – you are not drilling to make time and reduce costs that way – you are drilling to ensure that the well integrity is maintained throughout the whole program

If you have been lucky enough, one in ten or one in fifteen, or one in twenty, you may get into development drilling, which is determined in part by what it is that you have found, both to the extent of volume and area, as well as quality of oil and quantity of oil. That could be several wells drilled in close proximity - sometimes if you are interested in minimizing the footprint of the impact, you might drill a number of wells in one location and pad. This generally leads to production operations. However, the timelines between the exploration activity, development drilling and production can be years. For example, on the east coast of Canada, it was between eighteen and twenty years (we heard yesterday) between the discovery and the commercial production of the hydrocarbon. And in the north, in the Arctic, where there have been commercial quantities found, it is going to be even longer than that because of the issues around where that gas can be marketed. So in a development drilling sense, the impacts could be associated with an accumulation of cuttings or flaring associated with testing the fluid to determine what the flow rates will be. There could be definitely fewer surprises than well drilling because you have identified what you are drilling through. When you are in the producing zone, therefore there is an incremental risk of having some form of problem that might result in the release of hydrocarbons.

### *Development Drilling*



**Exploration Impacts**

- Development drilling
  - new mud systems have been developed that balance well safety and integrity with reduced potential for environmental impact
  - Annular injection of cuttings has been tested and tried in the field
  - Shore-based cuttings cleaning systems have been developed and are being marketed by service companies

With respect to development drilling, there are now ways to minimize the number of wells that are drilled, including, coming off at different locations through directional drilling, or through other processes where you only have to have one central well bored and you take off and drill multiple laterals off that. All of these are in attempt to try to reduce the number of well heads you might have to have on the seafloor and also the number of holes that you have to drill to the surface. I mentioned earlier that there have been new drilling mud systems developed because of the concerns about the older types of drilling muds used which included diesel, or low toxicity mineral oils. They have now developed some synthetic muds, five or six different types, and they are all designed to meet the safety and well integrity issues as well as to reduce their environmental impact. It is possible that in larger fields where you have a lot of drilling going on you can drill a special well and you can inject the cuttings from other wells into that well bore - this is called annular injection. This type of injection has been tested and tried but is not widely used because there are still a number of technical issues to be dealt with. Further, as Bevin Ledrew mentioned yesterday, there are now shore-based cleaning systems that have been developed whereby cuttings can be transported to shore and the cuttings can be cleaned of whatever hydrocarbons are in them either in the formation or the drilling mud and then the cuttings can either be used in a land farm or they can be used in some other process. Again this would probably be tied to a very large program with lots of wells in a certain area.

### *Production impacts*

The physical process of separating oil and gas really hasn't changed that much over the years. However, gas conservation regulations and a new generation of generators and other drivers with low air emission qualities have certainly improved the air quality.

## Production Impacts

- Production operations - the physical process of producing gas or oil has changed little; however gas conservation regulations and new generation generators and compressors have reduced emissions to the air. Produced water is generally treated sequentially in the process to meet disposal requirements. There have been improvements in separation technology.

Produced water, water produced with the oil and then separated from it before you ship the oil off to market, is generally treated sequentially in the process now to the extent that we have new separation technology and we can produce water that has a lower content of oil that we were able to do ten years ago. The issue of produced water was certainly one of the more topical issues on the hearings on Terra Nova, as it is in most places where there are those sorts of forums to discuss the development of oil and gas. During the courses of the Terra Nova hearings, there was a lot of discussion about produced water and the question came up about taking the produced water that you generate and re-injecting it into the formation – because a lot of the formations don't naturally flow to the surface so you need to put water down there (you may need to put gas down there) to lift the oil to drive it out of the reservoir into the well bore and take it up to the surface for production. In the case of Terra Nova, for example, they were going to be doing some water flooding, and the question arose as to why you can't take that produced water and put it into the reservoir.

## Production Impacts

- Produced water can be re-injected but not generally for enhanced recovery. To date the cost/benefit of injection leads to treatment and disposal.
  - NORM may be present (older fields) and can not be treated.
- The trend to Floating Production will reduce impacts associated with the abandonment of fixed platforms.

There are a number of reasons for this. They mostly have to do with the quality of the water that you get to put down there, even after you have treated it, and the possibility that it might cause a problem in the reservoir, particularly if you have bacteria in it and the bacteria start to grow in the reservoir and produce hydrogen sulphide. This could sour your formation pretty quickly. Therefore, there are a lot of concerns about why and how we would do this, and generally today, in almost all the producing areas of the world, the produced water is still treated to some level set by the regulators, generally 20–40 ppm and then discharged overboard. In the Gulf of Mexico they have found in some of the older portions that have been in production for 40– 50 years, something called naturally occurring radioactive material (NORM) – it is a natural product generated in the reservoir and it is my understanding that it cannot be treated.

The trend to Floating Production gets away from some of those issues, but it also has some of its own problems that I will describe below. The other aspect, sometimes not an aspect which oil companies become directly involved in, is the case of transportation. In the case of pipelines, the pipelines from production operations to shore-based storage facilities, there have been a number of issues associated with their construction, their operation and their decommissioning. Floating Production and storage onsite eliminates some of the concerns, but in this case it has its own concerns associated with both the storage and transfer operations. During the preparation work that we did for the Terra Nova hearings we did quite an extensive review from about fifteen years of experience with these systems in the North Sea and elsewhere, and it turned out that they actually have a very good record of safety. We could only find two incidents where the loading lines had parted between the tanker that was producing and the tanker that was offloading in hundreds of thousands of operations. At the time that the Hibernia platform was built, they went through the environmental assessment process, and they did look at Floating Production. However, at that time, in the early 1980s, technology was not sufficiently advanced to do the things that we are doing today. Twenty years, even ten years, have brought significant changes.

## Transportation Impacts

- Pipelines from production operations to shore-based terminals have been the standard with attendant issues for construction, operation and abandonment.
- Storage on-site eliminates those concerns but has its own risks associated with transfer operations under a range of conditions.

### *The Precautionary Principle*

One of the issues that came up in the context of the Terra Nova environmental assessment review and that has also come up since the matter of oil and gas development on the west coast is Principle 16 from the Earth Summit in Rio, the Precautionary Principle. It says that “where there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost effective measures to prevent environmental degradation”. This is an interesting principle to look at in the context of offshore oil and gas development anywhere in the world, but certainly in Canada, because it talks about ‘serious’, which is a difficult term to define, and about ‘cost effective’ and the question is for both of these terms, who determines what that is.

Clearly, industry is going to have a serious voice in what ‘cost effective’ means with respect to the money that we are going to spend, and we would hope that we have a say in determining the ‘serious’ component as well. This is one of the principle premises that a lot of the intervenors in the Terra Nova hearings came in with, both the NGOs and the regulators, both the federal fisheries and environment departments. When you think about the Precautionary Principle and put it in the context of risk-based decision making (which is what we do in the industry all the time; for example, you heard Ben Poblete talk about it yesterday), it doesn’t just extend to safety, it extends to environment and to people.

## The Precautionary Principle

- Principle 16 from the Rio Declaration of on Environment and Development states:
  - “ Where there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost effective measures to prevent environmental degradation”



We do have some information that we can bring to try and answer some of those questions. What is cost effective? and What is serious? I think that everybody accepts that if it is determined to be irreversible, that is just not going to be an issue for debate.

With offshore oil and gas, there are analogue producing basins, with more than twenty years of data, and there are offshore producing basins with more than forty years of offshore production. The data over the last twenty years is much better than the data that was collected in the first twenty years of some of those fields. We now have analogue producing basins in the North Sea, the Gulf of Mexico, southeast Asia, and Australia. We can refer to these and try and do analogues on where we think we are going to be operating, and identify what the issues would be based on what the experience has been elsewhere. The interesting thing when you are following this process though, is that when you look at the older data, you are looking at data that was derived, or impacts that may have been derived, from operations that were materially different from those that are operating today. If you are looking at an operation that was started 30 years ago, you are probably looking at something that might have had diesel fuel as the additive for lubrication and you might be looking at chemicals used then that are no longer in use today. This makes it very difficult to do some of that extrapolation.

## Impact Assessment

- The Precautionary Principle and Risk-Based decision making
  - There are analogue producing basins with more than 20 years of data
  - Improved Operating practices/products
  - Monitoring programs are better designed
  - The impacts of new technology/practices may not always be obvious

The newer fields like Hibernia and some of the fields in the North Sea with newer monitoring are starting to provide data that allows us to really look at whether we have to be concerned about the Precautionary Principle, and just what 'full scientific certainty' means. There are improved operating practices and products and monitoring programs are better designed. But we also have to be concerned or should be aware at least, that the impacts of new technology are always not what we think they are going to be. Earlier I mentioned synthetic muds being developed in the North Sea - there was a lot of hope that they would resolve some of the outstanding issues between the industry and the regulators and other interested parties. However, it turns out that some of the synthetics are not as good as others, and in cold water they are not delivering the benefits that we had hoped for.

### *Routine operations*

## Impacts

- Routine Operations
  - significant changes in Regulatory requirements, Operator standards, Contractor standards and Industry/NGO standards for unique or sensitive environments
- Accidents
  - High profile accidents have a low frequency but, continue to challenge the industry, undermining the credibility of all Operators

For routine operations, to summarize it, there have been significant changes in the regulatory requirements and in the role of the regulator. As an operator I can say that I would much rather work in an environment with a really informed effective regulator – it makes my life a lot easier. It also makes it easier within the company and it makes it easier within the context of the communities you operate in, if they know and trust that the regulatory system is effective. Operator standards have changed, in part, because corporate standards are changing in all respects, whether it is in social or environmental issues. Contractors have improved their performance. There is a better relationship in some respect between industry and NGOs when it comes to the cooperative efforts I mentioned earlier. And after saying all that, I have to admit that our industry has been plagued by some high profile, low frequency, accidents, that continue to call into question the ability of industry to be an effective operator, particularly in the challenging frontier of the offshore area.

### Issues

#### Issues

- Do we have the right (best) process for offshore Oil and Gas impact assessment?
  - Who - Proponent/Industry or Resource Owner?
  - When - Before lease sale or after discovery?
  - By Region, By Project, By Issue?
  - What is the project?
  - Cumulative Impacts

Probably one of the most significant incidents that has taken place since offshore oil and gas development was considered in British Columbia, was the loss of the Piper Alpha platform in the North Sea four years ago. That was an unfortunate set of circumstances that resulted in the death of 167 people (220 or 230 people were on the platform). That led to, among the things that Ben Poblete discussed yesterday, the Cullin Report, the development of the safety case concept, and the principle of reducing the risk to as low as is reasonably practical. Those are all things that came out of the Cullin report – they are very technical in most respects. That is why we have people like Ben Poblete at Lloyd's Register to provide us with guidance on these issues.

But it is a very personal issue as well – Piper was operated by a company that used to be our parent company, Occidental Petroleum – and there were a number of people in our company who actually worked in the Piper operations based out of Aberdeen. This may just be a big faceless industry to a lot of people but to us it is an industry of people. And we do care. It is an event like this that drives us to improve our performance as companies and as individuals. We do operate in rough areas and do some things that people don't agree with but we do care about our people and we care about the environment and we do want to do a good job in producing the energy that people demand from us day in and day out.

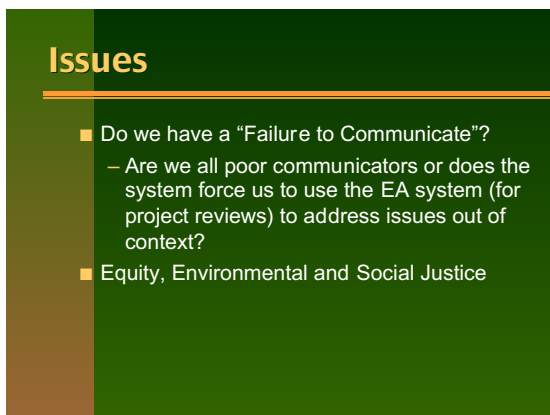
Do we have the right or the best process in Canada for offshore oil and gas impact assessment? Before I talk about *who*, I will talk about *when*. If the company wants to explore offshore the process is: the government puts up lands for bid and you bid a certain amount of work. It could be a seismic program, or it could be a seismic program and drilling operation of one or two wells. That costs a certain amount of money – it might be \$40 million, it might be \$90 million. Each of these wells is expensive; \$20 to \$40 or \$50 million per well drilled offshore in Canada. Then after you make a discovery you drill a few more wells and after that you have to determine whether or not you have a commercial discovery, and whether or not you can produce it or whether or not you need new technology such as in deep water. By this time you have probably spent 300-400 million dollars and you still don't have the environmental assessment to develop the deal. In addition, there are other jurisdictions where those issues about are we going to allow oil and gas in this particular area are sorted out before the lands are leased. And then it becomes

more of a site specific concern about how is that operator going to develop that particular aspect to minimize the concerns around safety and environment and social impact. So for example, with Terra Nova we have spent \$375 million and still have to go through the approval process to build the project.

Who should do that? Should a company do the environmental impact assessment and then have to defend it to the public, and to the resource agencies, most of whom have the information we have to take to develop it, or should the resource owners and their other agencies, sister and brother agencies in government, be the ones that do that at the early stages before the industry leases that land - so that we can go in and know that that has been looked after and we do what we do best, which is to find and produce oil and gas? Should we do it by region, by project, by issues? For example, when the environmental process was being done for Terra Nova, the one for Sable was going on at the same time. Concurrently, we talked about whether we should be using oil-based drilling muds, about what we should do with produced water, and a lot of the questions were about whether or not we should be having oil and gas development in these areas. That means that Mobil and their team and Petro Canada and their team were doing the same things and having to address the same issues. To my mind each issue should have been dealt with separately, not in the context of one project that has to defend all these issues.

Other issues that come up are: What is the project, what are the boundaries? For example, the issue of transportation at Terra Nova - Is the tanker at Terra Nova different from the tanker that comes from the North Sea filled with crude going into Montreal or Quebec City? It turns out that they probably are – but once it gets into the shipping lane are they any different?

Another issue is that of cumulative impacts. As an operator we know what is there – we can talk about that - but we don't know what's coming in the future. To most of the proponents that seems to be something the government should be addressing rather than the individual company.



### ***Lessons learned from Frontier operations***

I have come to the conclusion that a lot of the conflict or difference of opinion that I as an operator have with community organizations and other stakeholders is because we frequently get put in a position of defending an action that the resource owner has made. You can think about the oil and gas company in many respects, and as a contractor to the government. We contract with them or they contract with us to produce oil that we are going to get paid a certain amount for and after we recover our costs. We do not like being put in a position where we have to be at odds with the NGOs and the communities because we think we do a good job of trying to communicate with them – but often we are put in the position of having to address issues that are beyond our ability to provide answers for and it is a very frustrating experience.

### ***Equity and environment and social justice***

I would like to provide a little different perspective on environmental justice – mostly drawn from the work that I do overseas. There are a lot of third world countries that look at the developing world and they are critical of the fact that we have oil and gas resources here, but we want to go and develop them there because then we do not have deal

with the risks here. They say “you want to come and explore our oil and gas so you do not have to do it in your backyard”. I have to say that we operate in difficult environments all over the world. It is difficult here, with lots of different values, and native title issues, and other concerns, but these are also true for a lot of the countries that I currently operate in. It is no different operating in Indonesia and Nigeria in that respect than it is operating in Canada on the west coast.

Finally, I will leave you with the thought that everybody has something in their backyard that they like – here are some of the places that I have been that fit that category. These are special places that demand and require special attention from the operators that produce oil and gas. Here in Alaska, the MacKenzie Delta, and the Arctic (Innuvik and Tuktiaktuk) all with oil and gas operations – there is no production but production from analogue operations. Here is Sable Island and a very special operating area just off the Gully, Newfoundland’s fledgling oil and gas industry, primarily on the Grand Banks but also off Labrador, the West coast of Greenland, and where there is no production yet but exploration, in the highest Arctic. This is Yemen – an extremely difficult region. What are the environmental issues there? Groundwater – this is the most valuable resource in this area - if you contaminate that you will have more impact on people’s lives than you can imagine. On the west coast of Africa – two million barrels/day are produced, most of it offshore. Here is Botswana, and the middle of a game farm in the Amazon, and this is Colombia with its very sensitive freshwater swamps but again oil and gas production/operations are going on there. Then there are the mangroves in SE Asia, and a large coral reef. The offshore oil and gas industry is in all of these areas and they operate with special operating guidelines in each area. They are different from each other – all have special challenges – but they are all unique to the people that use them and live there day to day.

## **SYNOPSIS OF DISCUSSIONS FOLLOWING THE ENVIRONMENTAL IMPACTS AND MANAGEMENT SESSION**

### *What about oil spills?*

A participant asked what percentage of oil for offshore operations could be expected to be recovered if there was a spill. The panellists replied that you would be doing well to recover twenty percent and if you had adverse conditions, five percent would be a success – that is, for the oil remaining after it evaporates.

A participant asked if there has ever been a case with a large spill – where it has been successfully contained. The presenters responded that mostly what you are talking about with large spills are tanker spills and it is these large instantaneous releases that cause problems. They noted that if they are not instantaneous releases, rather slower release, then the success rate would be much higher. They noted however, that each spill has its own specific challenges.

One participant noted that incidents of minor spills has increased in the United Kingdom and noted that the presenters did not show slides of suffocating seals and birds. She would like to have heard from the people of the countries affected by oil spills.

Susan Sherk made the point that the largest oil discharges have to do with bilge discharge of oily water and noted that this is a very serious problem all over Atlantic Canada. It is not related at all to the oil industry and it is not related to tankers that are carrying the oil, but it is a serious problem worldwide. She stressed that when we talk about ‘oil spills’ we should be clear about the source of the spill.

### *Is there a process for violations?*

The question about the process for violations was posed. The panelists noted that companies operate under licence to government and that the government has legislation that allows for certain penalties against operators. In Canada, for example, under the Fisheries Act, operators are required to post a bond. It is possible that your licence could be lifted if you had a spill or that you might only be able to operate, subject to specific conditions.

### *What changes have been brought in with the new act?*

Charlie Bellis complimented the federal government for bringing in the process of environmental assessment and noted that, unlike some countries, Canada is lucky to have such a process in place. However, he questioned whether since the new Act has come out if the proponents were more liable to be involved or could they walk away from the table like Petro Canada did. He noted that he sees this as a potential weakness in the system. Paul Scott answered that under the new Act the proponents cannot walk away. He also noted that under the new Act there may not have been an assessment like the one they had fifteen years ago because it was not considered a specific project. It was a plan to assess the moratorium and a review of the environmental implications of potentially lifting it, without actually having a particular project. Therefore, under the new Act, it is unlikely that you could have a Panel such as the one they had fifteen years ago and now you may have to wait until there is a particular proponent that wants to build or operate a particular well before you can put such a process into place. However, this is not to say that today there would not be a government review of lifting the moratorium; rather that there would probably not be such a review under the current Act and instead it would probably have to be done under some other authority. He noted that once you get into a review of a project the only way the proponent could withdraw is to abandon the project – and they wouldn't be allowed to proceed with any activity if they didn't participate in the assessment. He noted also that they are now at the point where they are starting to recover the cost for the review from the proponents as well thereby not only requiring them to participate but also to contribute some of the cost.

*What are the requirements to consult with neighbouring nations?*

Bob Hill noted that there was a lot of emphasis on the consultation process and asked: What are the requirements globally to consult with neighbouring nations? He used the example of the US and the use of the Hecate Strait and Dixon Entrance and the AB line and the military activity that is carried out there by the US government. He also referred to the standards of the federal government regarding operating in this region and noted that the standards of the First Nations in this area exceed those of the government of Canada. He asked: What standards do you have to follow?

The panel responded that activity in British Columbia waters would clearly have a potential impact on Alaska and that that would be a consideration so that Alaskan interests would be invited and encouraged to take part in the federal and provincial environmental assessment.

*Whose standards would be used?*

Referring to Georges Bank and Cook Inlet Bob Hill wondered how the US interest, the AB line and the boundary, would be considered in terms of the environmental assessment process – whose standards would be used for the environmental assessment, but beyond that how would the resources be shared between the two countries?

*Should a different question be asked?*

Another point raised was: If it was understood that the Panel could have said *no*, why was that not in the terms of reference which clearly read “under what conditions should the moratorium be lifted”? The participant made the statement that the question regarding whether the moratorium should be lifted has never been asked and noted that it has to be asked and addressed by all the people involved.

*What about Marine Protected Areas?*

A question was raised about compensation for exploration/development in Marine Protected Areas. The response was that the process/negotiations would take into account what is nearby and what rights in the legal sense are being encroached upon and this would be expected to be sorted out before the MPAs are established. The three or four MPAs currently being proposed for British Columbia do not interfere directly with leasehold areas involved with oil and gas reserves or with other specific subsea minerals.

*Has a proponent come forth?*

A question was raised about whether or not a proponent has come forth regarding development of offshore oil and gas in British Columbia.. The response from the panel was at this point there is no identified proponent for offshore oil and gas on the west coast; however, there clearly is interest on the part of north coast communities, and a variety

of British Columbians, in this particular resource development opportunity. There is also a lot of interest in what the implications are with going ahead with the development and *if* it is going to go ahead how it should be done properly. Up until this point petroleum companies have been keeping away from the west coast because there is a moratorium in place. And it appears that it is not in their interest economically and timewise to play on the west coast until they have some indication that the moratorium will be lifted. The supposition is that if that happens, then perhaps a proponent will be interested – and perhaps the markets and conditions in the petroleum industry in the world are such that they will not be interested. It was pointed out that despite being invited to attend, there is no identified proponent participating in this meeting.

**Peter Taylor**  
*Scientist, Environment Australia*

I am on a short assignment from the Australian government with the Canadian government with the Department of Fisheries and Oceans. This is a good opportunity to provide a very short update on what we are doing with our Marine Protected Area program in Australia. In the course of this we do have significant interactions with the Australia oil and gas industry. I will briefly summarize the work that we are doing and some of the stories I have to tell about some of our experiences.

For those of you who are not familiar with some of the issues that we need to deal with, the white line on this map indicates our marine jurisdiction. Unlike some other countries, our state or provincial governments have responsibility for the waters legislatively out to about 3 nautical miles and the federal government has responsibility for waters beyond that out to the limit of our EEZ. We are also signatories to the Law of the Sea Convention. We have made claim to 42% of Antarctica as well, and through to MacDonal Island and Macquarie Island, Norfolk Island, Christmas Island, and Ashmore Reef. So it is quite a large marine responsibility.  
(<http://www.environment.gov.au/marine/mpa/commonwealth/cthmpa.html> (see map))

What I will try to do is give you some sense of the policy context that the Australian federal government is working on in relation to Marine Protected Areas and also about what we mean by multiple use. And I will describe what our broad policy position is in relation to our interactions with the oil and gas industry and some of the experiences.

With regard to the policy context that we operate in, the federal government launched a federal Oceans Policy at the end of 1998. This provides us with an overall umbrella and a mandate to be able to work very closely with all sectors that have responsibilities in the marine environment. And the overall (simplified) aim of the Oceans Policy is to ensure that the different sectors that work in the marine environment are able to work in a more integrated way so that one industry doesn't negatively impact on others.

I am slightly embarrassed to tell you how much money is involved in funding when you consider the expenditure on ocean related activities in this part of the world. But in the budget, we have been given for the next 3 years funding (federal government – cross agency responsibility) for a range of marine environment protection initiatives. These initiatives get 21% of the funding; 14% goes to the development of commonwealth or federal MPAs and there is the administrative cost for an Oceans office that we have and the advisory processes and so forth. For the implementation, we have divided the country up into six regional provincial scale type marine regions. For the next three years we will be concentrating on the SE region to establish integrative regional plans which will also encompass MPAs. I will have to say that the Oceans policy and the national representative system of Marine Protected Areas are significant top down driven policy mandates, as being directed by the federal government with the support of the state governments. We have a national representative system for Marine Protected Areas that has taken several years to bring to agreement with each of the states. Each of the state governments has their own region a specific base for establishing Marine Protected Areas within their jurisdictional waters out to three nautical miles. We have national agreement about what a national representative system for Marine Protected Areas is, and the state legislation for the established MPAs tends to differ according to the needs and desires for each of the states. You have much more conservative approaches in some states and more liberal approaches in other states.

At the commonwealth level, we have just recently designated three sections under the new program: the waters around Macquarie Island Marine Park, have sixteen million hectares of which six million hectares is a 'no take' component; some extinct volcanoes south of Tasmania, a fairly small reserve there; and in the Great Australian Bight in 1998, about two million hectares.

We are currently working on three more – a small island in the Indian Ocean, Cartier Island, the waters around Lord Howe Island in the Pacific, Heard Island and MacDonal Island just slightly north of Antarctica. This map shows (<http://www.environment.gov.au/marine/mpa/commonwealth/cthmpa.html>) where we have our federal marine protected areas. Ashmore Reef, and hopefully shortly Cartier Island, a focal point for illegal immigration that comes from Indonesia and Middle East, a small reserve called Mermaid, and then Ningaloo which is over 200 km long, and the Great Australian Bight and the Sea Mounts off Tasmania, and Macquarie Island, Lord Howe Island, and of course a separate authority which deals with the Great Barrier Reef Marine Park Authority which encompasses a very substantial part of the Queensland coastline. That is under a separate Act and is administered by a federal agency with the state government of Queensland.

When it came to embracing the notion of multiple use and when I first came along and was asked to set up this program I had a look and saw that the federal department really had no strategic relationship with groups outside government and it was a problem. In the marine environment to make a meaningful Marine Protected Area you need to take a really large ecosystem based approach. We decided that it was really important that in order to do that you are better off having strategic alliances with industry groups and the marine users. If you did not do that you were immediately inviting conflict. And your chances of getting large or meaningful ecosystem based MPAs would be virtually impossible. So we worked very hard to come up with a set of principles for the maintenance of ecosystem integrity which is our primary objective under Commonwealth law, wealth generation and resource use, equity across industry and a participatory framework to ensure that those affected are engaged in the process.

I should mention too that Australia is a member of the IUCN (International Union for the Conservation of Nature). Under our new very powerful environment legislation that comes into effect in July of this year, the Environment Protection Biodiversity Conservation Act, we have embraced the IUCN categories for management. There are six categories: absolute no take (1), multiple use (6) and range of categories in between. This is the international standard that is recognized throughout most of the countries that have a robust Marine Protected Area network.

I have to say that when we first started engaging industry – once we made the decision to get out and actually work with stakeholders- the first thing that happened was that I was described in the media (when we were trying to negotiate with the fishing industry a two million hectare ecosystem based MPA) as a work-shy ecowarrior.

It was really important that we came face to face with the reality of decision-making particularly with regional communities that were going downhill badly economically. What we really needed to face was – well if we are going to establish a Marine Protected Areas regime, it needs to be relevant, and we need to have substantial buy-in in order for the communities that are affected by these decisions to actually own and feel that this is important for them. That meant a system of compromises, on both sides – trade-offs, deals, negotiations in order to get something that had genuine integrity from an ecosystem biodiversity conservation perspective but at the same time minimized any conflict and any loss of livelihood.

When it comes to the oil and gas industry – 60% of Australian petroleum needs comes from the waters off Australia – we realized that the oil and gas industry is a very significant industry – it is probably our most wealthy marine industry. We thought the best thing to do would be to walk right into Australia's Petroleum Industry Association and form some sort of strategic alliance to ensure that we had the basis for communicating with the oil and gas industry. That resulted in us developing a substantial agreement between the Australian Petroleum Production/Exploration Association (the PEC Association) and Environment Australia, or our department. That has led to some outstanding examples about what you can achieve through cooperation – we have had dollars contributed to marine conservation from industry, we have had staff secondments both ways, and we are also working on a voluntary conservation agreement in the Northwest shelf of Australia, now our hottest area of commercial oil and gas activity.

Here are a couple of examples – the Great Australian Bight that I mentioned earlier, if you can picture it, is in the very southern part of Australia, a very important whale migration area and calving area for the southern right whale, at the head of the Bight, and the sedimentology of the Great Australian Bight is very significant. There have never

been any river or water systems flowing out into the Bight and so the sedimentology in a global sense is unique. We took a representative sample, that the oil and gas industry is particularly interested in doing some work on. We decided that we shouldn't shift that somewhere else – rather we would embrace it and should there be an argument for the oil and gas industry to be drilling, rather exploring, in the park we have provided for a pathway or a process for that to be examined in our management. It is also enshrined within our Act that there is equity with any industry groups – it depends on our objectives. In this particular case, it has been very controversial. We have not won any friends in the conservation movement in Australia because they believe that we should lock out the oil and gas industry, full stop. However in this case, the oil and gas industry, should they pose an argument to be drilling inside or near the park, will have to go through extremely rigorous environmental impact assessments and processes and the companies may decide it may not be worth going through that process. It is possibly unlikely indeed that there would ever be any activity inside the area but it is not 100% absolutely ruled out – I would be interested to see if it happens, but at least there is a process for industry to go through.

This one example does not involve oil and gas but I will show it as a demonstration of the processes that we need to go through in order to trade off and get innovative outcomes. The Sea Mounts, extinct volcanoes, virtually wiped out by the fishing industry except for a group of them that were quarantined some time ago – that has been declared a Marine Protected Area. In the process of designing and negotiating with fisheries we found that this is 2000 meters of water, that there was occasionally some bluefin tuna caught in the top 500 meters of the water. Quite frankly our chances of getting this as an MPA were zero unless we had some way of being able to work with the fishing industry on this. At the end of the day, we used the IUCN categories from the seabed to within 500 meters of the surface (about 1500 meters of water) encompassing all of the Sea Mounts in a category of absolute 'no take' – and the fishing industry were prepared to work with us on that. The top 500 meters is a category 6 under the IUCN and some fishing is allowed.

To finish, the conservation agreement that we are negotiating with the oil and gas industry has been a very exciting project, and very innovative. If we can get an agreement, that is not necessarily an MPA, with the oil and gas industry, it means that we have enormous capacity to be able to influence the industry over conservation related activities including whale/cetacean monitoring. This is a very exciting project

The lessons we have learned from all this is the value of 'buy-in' including the contributions to conservation; it is also the sense that marine conservation is everyone's responsibility, it is not just the role of government. As a consequence of the 'buy-in' and the multiple use you will eventually be guaranteed of getting larger more ecosystem-based MPAs. With regards to the relationship between science and politics - decisions are made through politics rather than pure science. It is a tricky game meeting the needs of the electorate and the minister and at the same time making sure that we get something that makes sense.

Among the challenges we face for the future include: moving beyond personalities – there are personalities in different industries that make things happen and we need to institutionalize these positive initiatives beyond the personalities; maintaining political interest – we have a minister who is very committed to MPAs and drives the agenda very strongly. What happens when he goes? Fortunately we still have a strong policy mandate; and managing cultural change inside organizations is a very difficult thing to do.

## **A brief overview of global change and energy**

**Robie MacDonald**

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Climate change has occurred for eons and will continue to do so. Recent human activities have the potential to alter climate but it is not yet clear what influence they might have. Whatever the changes are, they are not likely to be manifest as a rosy, warmer future for all humans. It is clear that climate change will be delivered differently to different regions – drought in some places, more rain in others, warmer in some places and cooler in others. There will be winners and there will be losers. A major reason why we are not yet able to construct accurate predictions of, for example, the impact of CO<sub>2</sub> increase in the atmosphere is that we do not understand all of the pathways involved in climate. Models are helping us to understand how climate might be changed and long-term proxy records from ice and sediments are helping us to view the present in terms of a highly variable past.



Two factors contribute to human encroachment on climate 1) Population explosion where humans have gone from less than a million in the distant past to 6 billion at the end of the 20<sup>th</sup> century and 2) Increase use of energy by each of us so that present requirements are about 100 times what they were during the stone age. One clear, unequivocal result of human activities is the increase of greenhouse gases (GHG) in the atmosphere (CO<sub>2</sub>, CH<sub>4</sub>, CFCs). Physical behaviour of these gases, which is well known, tends to reduce heat loss from the earth to space and so leads to warming.

Data from ice cores going back as much as 400,000 years show that climate has changed by extraordinary amounts in the past – four ice ages have occurred during which atmospheric temperatures have swung by more than ten centigrade degrees and humans have lived on earth throughout this period. The last ice age ended about 10,000 to 15,000 years ago and has been followed by one of the most stable periods during the past half-million years as far as atmospheric temperature is concerned. Indeed, some climatologists are asking why we have not started to enter the next ice age! These long-term records strongly suggest that gases like CO<sub>2</sub> and CH<sub>4</sub> are implicated in global change either as initiators or as amplifiers. No matter how GHGs operate in the climate system, human activities have enhanced their atmospheric concentrations beyond any recorded in glacial ice from the past 400,000 years. Other observations are that the past several years and even the past 50 years have been warmer than previously: the oceans and atmosphere contain more heat (are warmer), glaciers have retreated in many places, ice has thinned in the Arctic and sea level has been rising. These various phenomena are very likely related to one another but we do not yet know for sure how much they are due to human activities or whether they are simply part of a long-term cycle in global temperatures. One of the difficulties in assessing our impacts on climate is that the climate system is complex and contains a number of poorly understood feedback components including clouds and the organic carbon cycle. For this latter, the amounts of carbon stored in reservoirs (atmosphere, ocean, sediments) and the rates of transfer between reservoirs are large and variable making the estimate of human impacts on the cycle difficult to measure. Nevertheless, a recent report on climate change (Houghton et al., 1995) concluded that the balance of evidence suggests that enhanced warming due to human activities is probably occurring and that we are just emerging from the noisy climate background.

Historical trends of GHGs together with projected use of fossil fuels suggest that our activities will impact climate in detectable ways over the next two decades. Models and hypotheses suggest that some of those changes might occur much faster than we previously believed possible. In particular, evidence from Greenland ice cores suggests that climate in that region has changed within times measured in decades and that the change may be caused by alteration of global ocean circulation (shutting down the ocean conveyor belt). Therefore, it is not so much a gradual warming of the globe that climate scientists worry about; rather, it is the unexpected feedbacks on atmospheric and oceanic circulation and changes in the hydrological cycle than can lead to catastrophic change in short time periods.

In the Kyoto Agreement, Canada contracted to reduce its CO<sub>2</sub> emissions such that by 2008-2012 our emissions would be six percent less than the estimated emission in 1990. So far we are not progressing very well. In 2000, our emissions in Canada were perhaps fifteen to twenty percent *higher* than in 1990 and are projected to be as much as 30-40% *higher* 2020 (in BC our total GHG emissions climbed from about 50\*10<sup>6</sup> tonnes/yr to over 60\*10<sup>6</sup> tonnes/yr). Even were we to live up to the Kyoto Agreement (along with all the other parties who signed on) the activity of reducing our emissions will only buy us time – perhaps a decade. This is because the effect of GHGs on climate depends predominantly on the cumulative release during the phase in which gases are accumulating in the atmosphere.

Would the decision to produce or not produce oil from the Queen Charlotte Sound and Hecate Strait regions have any effect on climate? Not really. The important control of human impact on climate is set by the global demand from increasing population hungry for increasing energy, and in this equation our coastal reserves are minuscule. If we are to effect change, it has to be done in the way we use energy as opposed to how we extract it. For example switching to alternate energy sources (solar, wind, tidal), using hydrogen or natural gas (CH<sub>4</sub>) instead of liquid fuel oils or coal which produce larger amounts of CO<sub>2</sub>, or using less energy especially in personal transportation would be far more effective ways of reducing our “climate forcing”. Finally, oil has an irreplaceable value as a starting material in the chemical industry. Delay in oil production, therefore, might preserve oil for this purpose while alternatives are developed for combustion uses (heating, transport).

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## **Oil and Gas Issues in Alaska: Lessons Learned about Long-term Toxicity Following the Exxon Valdez Oil Spill**

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### **Abstract**

The *Exxon Valdez* oil spill, which occurred in March 1989, was and still is the largest oil spill to occur in U.S. waters. Although not the largest spill in world history, the extensive documentation of birds and mammals deaths in the first year, coupled with evidence of damage to fish and fish habitat makes it one of the most-studied spills in history. The detection of significant pockets of residual oil in several sensitive habitats a decade later, coupled with evidence of long-term damage has altered public perceptions about the dangers of oil contamination in the nearshore environment. Although our knowledge of spill effects has increased significantly in the ensuing decade since the spill, exactly what the impact of these subtle and delayed impacts may be on the ecosystem remains unknown. This spill has changed our view of the damages resulting from an oil spill, causing us more concern for the long-term persistence and long-term damages.

### **Need for oil**

Supporting year-round economic activity is a struggle in northern environments, and the petroleum industry adds much-needed jobs and tax dollars to an otherwise shaky state economy. Royalties and taxes from oil production are the primary support for the state of Alaska government, and much of the infrastructure of the state is derived directly or indirectly from these funds. But, energy development it is not without social and environmental costs. Oil and coal have been produced in Alaska for nearly 100 years, significantly accelerating with the discoveries of reserves in Cook Inlet and, a few years later, of even larger reserves in Prudhoe Bay. Social changes, both positive and negative, began with the initial exploration; whereas, most environmental risks occurred later with production and transport. Alaska has produced about 20% of the U.S. domestic oil production since the 1970s, from several fields in the Cook Inlet and Prudhoe Bay regions. Over the past 30 years, there have been numerous small spills, including a continuing chronic discharge of oil-contaminated treated ballast water (a price one pays for exporting oil), and one very large oil spill in 1989. Fisheries, tourism, and oil production are the mainstays of the Alaska economy, industries that maintaining an uneasy co-existence in regions where they occur together.

### ***Brief history of the spill***

The spill occurred on Good Friday, 1989, when the *Exxon Valdez* deviated from its normal course to avoid an iceberg, but failed to return to course. It was a human error. About 43 million liters of Alaska Northslope crude oil was released, about 20% of the cargo (Spies et al. 1996). Winds were initially calm, but timely reaction to the spill was hindered by the remoteness of Alaska, residual winter conditions, and the availability of equipment. Equally daunting was the 200 million liters still on board, which needed to be removed to prevent an even worse spill. After 3 days, freezing 70 knot northerly winds stopped all activities and spread the oil beyond the immediate vicinity of the ruptured vessel. Preventing spread of the spill was no longer an option. Fisheries were suspended for the spring and summer in the spill-affected areas. Exxon would spend two summers and about \$2 billion dollars cleaning the oil from several hundreds of kilometers of beaches, inside and outside Prince William Sound. Coincident with initial cleanup activities, both sides, state/federal governments and Exxon, began litigation-sensitive (secret) damage assessment activities. In 1991, a settlement of about \$1 billion was reached between Exxon and the state and federal governments for criminal negligence and for the damages to the natural resources. Civil damages to Natives and fishers in the spill area went to trial several years later to pursue civil damage proceedings against Exxon, resulting in a judgement against Exxon for \$5 billion--a judgement that is still under appeal 11 years after the spill.

### ***Exxon Valdez oil spill- Unique, most studied***

Before the spill, Prince William Sound was a pristine environment, with few people (less than 10,000 in two villages and three communities). The largest of these communities, Port Valdez, was the southern terminus of the 800-mile Alaska oil pipeline, and the marine terminal was where tankers like *Exxon Valdez* took on the crude oil loads. Fishing was the primary commercial employer of the region, centred in Cordova. Cordova was often ranked as one of the top 10 U.S. ports in value of commercial catch landed. Subsistence harvest, particularly fishing, was a dominant way of life for the two Native villages in the Sound. Lacking any industry, Prince William Sound had one of the most ecologically sound and chemically clean environments in the world. Baseline measurements for chemicals confirmed the cleanliness of the Sound before the spill (Karinen et al. 1993), and biological baselines had tracked populations of several commercial species before the spill.

Subsequently, the *Exxon Valdez* oil spill became the most-studied spill in history. Approximately \$100 million was spent between 1989 and 1991 to determine the immediate impacts of the spill; the results of which were the basis for the settlement. These studies ranged from counting carcasses of birds and mammals to determining the contamination loads in intertidal and subtidal sediments. Since the settlement, approximately \$100 million has been spent assessing the long-term persistence of oil and the long-term effects of this residual oil. These studies have ranged from species-specific studies to ecosystem studies. No other spill has been studied so intensely, particularly its long-term consequences. From the *Exxon Valdez* oil spill, many lessons were learned. In particular, 1) there are immediate effects to fish and habitat, even if not always visible 2) oil is persistent in some nearshore habitats 3) oil is far more toxic than previously believed 4) oil and gas development in certain species/habitat combinations can have serious consequences, and 5) a precautionary approach needs to be adopted toward the interaction of fisheries and oil development.

### ***Lessons learned- immediate impacts***

As in most spills, human errors seem to eventually happen. Oil and water do not mix, and once oil is spilled, it is very difficult to clean up. Shorelines are often heavily impacted. Birds and mammals are always hit hard in the beginning of a spill. Damage to fish has seldom been documented following a spill, but with the *Exxon Valdez*, damages to pink salmon and herring have been documented. The immediate effects of the spill have been covered in two symposium proceedings. The Exxon contractors published their first reports in the ASTM proceeding; the *Exxon Valdez* Trustee researchers published their first reports in the American Fisheries Society. The *Exxon Valdez* experience makes clear the need for prevention.

While immediate effects of a spill can be obvious for many species and habitats, particularly the surface species, the significance and magnitude of these effects can always be debated. Table 1 demonstrates the range in deaths from the spill that were estimated for four species, and can serve as our model to demonstrate the debates surrounding spill damage. The impacts to birds and otters were based on the collection of thousands of carcasses, with

expansion to estimate the uncollected carcasses. The number of dead adult birds and otters cannot be disputed, and was hard data showing a direct impact on a population. The immediate impacts are seldom disputed with the surface animals- the visual evidence is usually strong. The length of time to full recovery is often disputed and depends in part on the health and recovery of the ecosystem, making it a complex task to calculate given the many factors that are seldom fully understood. Given that there were not a series of oil spills in Prince William Sound prior to the Exxon Valdez spill, predicting recoveries was not based on a series of previous observations. Therefore, estimating times to recovery was not based on a reality-based model but had to be extrapolated experimentally. This led to debate over government estimates of recovery times.

In contrast, subsurface species are more difficult to see and study, and their impacts to these species are less understood. The case for damage to fish populations is certainly not supported by the hard visual evidence of carcasses like with the birds and mammals. Estimation of damages are more open to controversy, beginning with the estimates of initial damage. In a fish population, high mortality rates in eggs and larvae are expected, and it is very difficult to tease out the mortalities caused by a spill event from the mortalities caused by natural processes. Adult carcasses of pink salmon or herring were not found or collected, but egg or juvenile life-stage impacts were detected found by the Trustee researchers, and estimates of damage were made from these observations. The numbers estimated can be staggering- Brown et al. (1996) estimates 13 billion herring larvae did not survive the early stages of the spill. Exxon disputes the damage to these life stages, saying they were no more significant than natural deaths, and that populations were not affected.

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**Table 1.** Deaths of birds, otters, pink salmon, and herring as estimated by EVOS Trustee researchers.

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| Species     | Estimated Mortalities | Reference           |
|-------------|-----------------------|---------------------|
| Otters      | 2,800                 | Garrott et al. 1993 |
| Birds       | 250,000               | Piatt and Ford 1996 |
| Pink salmon | 1,900,000             | Geiger et al. 1996  |
| Herring     | 12,980,000,000        | Brown et al. 1996   |

***Lessons learned- oil persists for a long time***

About 40% of the spilled oil was beached within Prince William Sound, driven by a high-energy storm shortly after the spill. Subsequently, the oil settled into the interstices of beach gravel. In some locations, this process resulted in deposits of oil that were more than two metres deep (Weidmer and Fink 1996). About two percent of the original spilled mass remained in the beaches by fall 1992 (Wolfe et al. 1994), despite considerable cleanup efforts (\$2 billion worth) and the physical forces of three winters. After more than ten years, oil can still be found in the intertidal reaches of some salmon streams, and on cobble beaches armored with large boulders, and underlying mussel beds on soft sediments.

*Persistence of oil in pink salmon spawning habitat:* Pink salmon spawn in the intertidal reaches of streams in Prince William Sound, and like other intertidal zones, streams were impacted by the beached oil. This habitat is important to pink salmon: 75% of the spawning occurs within the intertidal reaches of streams within Prince William Sound. At first, the freshwater outflow of streams was presumed by many to give adequate protection from direct oiling of the stream beds (and for the most part, it did), and it was hoped that the indirect oiling of spawning gravel from the streams sides would not be significant. To avoid harming the critical spawning habitat, cleaning of the stream deltas was left to natural processes. Studies in the mid 1990s continued to show persistence of oil in the spawning habitat and studies measuring elevated salmon embryo mortalities provided information that the decision not to clean may have been in error.

In 1989, sampling of more than 170 stream deltas revealed broad-scale contamination of the intertidal stream banks (Murphy et al. 1999), but there was little direct visual evidence of oil in these stream beds. However, in streams

flowing through contaminated sediment for two years after the spill, elevated enzymes indicative of oil exposure were evident in the incubating larvae (Weidmer and Fink 1996). In 1995, there were still measurable levels of oil in stream bank sediments of 12 oiled streams (Murphy et al. 1999). In 1999, evidence for continued leaching of polynuclear aromatic hydrocarbons (PAH) from oil into stream water was collected by our laboratory using oil-collection devices placed in salmon redds, indicating continued exposure of salmon eggs and risk. In hindsight, these findings were not surprising given that these habitats were never cleaned after the spill.

*Persistence of oil in armored beaches:* Other habitats in Prince William Sound also retained significant reservoirs of oil in sediments, such as the armored beaches of Latouche and Evans Islands. Armored beaches are in a high energy environment, and consist of large cobble overlain with boulders; these beaches were pounded in 1989 with storm waves and oil, driving the oil well into and below the surface. These beaches were cleaned extensively in 1989 and 1990, but subsurface oil could not be removed. In 1997, these beaches were re-cleaned. Initially, efforts to clean the exposed sections of the beach appeared successful, but winter storms re-arranged the boulders on the beach, revealing a large number of newly exposed oil patches in 1998 (Brodersen et al. 1999). Exposed oil on the surface often had a very thick weathered consistency, while the exposed oil immediately underneath was fluid and mobile, and thus readily re-solubilized.

*Persistence of oil in mussel beds on soft sediments:* The highest concentrations of oil in beach sediments after cleaning have been found in soft sediments underlying mussel beds in Prince William Sound (Babcock et al. 1996, 1998). In contrast to the high energy environments of armored beaches, some mussel beds rest on soft sediment low gradient beaches, often within sheltered bays. Many of these habitats were not cleaned in 1989 or 1990, because the habitats were judged to be sensitive and would have been destroyed by cleaning. In these protected habitats, nature has often been less effective at natural cleaning and restoration. In the late 1990s, these habitats have been suspected as possible sources of hydrocarbon exposure to higher vertebrates, such as harlequin ducks and juvenile sea otters. Some of these species use mussel beds for foraging at different seasons and stages of their life cycle. The retention of hydrocarbons in sediments underlying mussel beds coupled with the potential for long-term exposure should result in a close re-examination of the non-cleaning decision in future spills.

*Composition of weathered oil:* The process of weathering removes the lighter aromatic hydrocarbons at a faster rate than the heavier compounds. The remaining oil has a higher proportion of 3-4 ring aromatic hydrocarbons (PAH), compounds which are more toxic (to aquatic organisms) than the smaller aromatic hydrocarbons. While the volume of oil may be reduced with weathering, the toxicity on a volume basis actually increases. These reservoirs of toxic oil can remain untouched in sediments for years until disturbed (Brodersen et al. 1999, Murphy et al. 1999, Babcock et al. 1996, 1998; Carls et al. in press;).

### ***Lessons Learned: oil can be toxic over a long time period***

In addition to initial deaths attributable directly to oil effects, a number of marine vertebrate species continued to be affected for many years after the spill, including sea otters, harlequin ducks, herring and pink salmon.

*Long-term damage in sea otters and sea ducks:* The age distribution of sea otters whose carcasses were recovered between 1976 and 1998 indicates a persistent effect of the spill on the survival of otters alive in 1989 (Monson et al. 2000). In addition, sea otters born in contaminated areas after the spill also had greater mortality than expected. It is thought that these otters continued to be exposed to oil residues and that their pups were affected by both direct and maternal exposure to oil (Monson et al. 2000). In harlequin ducks, winter survival 6-8 years after the spill was lower in the oiled part of Prince William Sound than in un-oiled parts of the sound (Esler et al. 2000), but no direct effect of the spill was identified. In another study, induction of P450 1A enzymes in harlequin and Barrow's goldeneye sea ducks was found from 1996-1998 in the oiled areas of Prince William Sound, and the authors concluded that remaining oil was still constraining full recovery for these two species (Trust et al. 2000). Both species show evidence of continued oil exposure, and both have feeding strategies that are tied to the nearshore, where pockets of oil still remain. The linkage is suspected but not yet proven.

*Field evidence of long term damage in pink salmon:* There were measurable increases in the number of dead eggs in intertidal portions of pink salmon streams in oiled areas of Prince William Sound for four years after the *Exxon Valdez* oil spill (Bue et al. 1996, 1998). Many presumed that these intertidal spawning areas were protected from oiling effects, since there was no visual evidence of direct oiling. Long-term damage to eggs is believable when the

evidence of persistence of oil alongside the stream is combined with the emerging evidence that oil is especially toxic to eggs in the stream gravels. Exxon contractors have disputed these elevated egg mortalities, but the statistical power of the Bue et al. studies far exceeds the power in the tests conducted by the Exxon contractors (more streams, more transects, more eggs examined, more years examined). Long-term damage such as this from an oil spill have rarely been documented.

*Laboratory evidence of part per billion (ppb) toxicity to pink salmon embryos:* Since 1993, a series of long term-low level exposures has been conducted with pink salmon embryos, with effects measured in the 1-20 ppb range. In these studies, artificially weathered oil was deposited as thin films on gravel substrate. Seawater was passed through the rock just as it would if the oil were beached, exposing fish eggs to the resulting solutions. The exposures were long (up to 8 months), and some juveniles were tagged and released to the wild environment to test their fitness after exposure (these experiments were possible because salmon return to their natal streams to spawn). In embryos and larvae, there were obvious abnormalities and impacts on survival by the end of the exposure (Marty et al. 1997, Heintz et al. 1999). Most surprising, however, were the delayed impacts on growth and on numbers of returning adults (Heintz et al. 1996); adults returned about sixteen months after the exposures ended and were evaluated for growth and survival. Because these effects accrue across life stages, exposure of eggs to these low levels (20 ppb) eventually killed half the fish before they could reproduce. Adverse effects appeared at total PAH concentrations near 1 ppB, indicating that the practice of setting water quality standards at 1% of the acute toxicity levels is not sufficiently conservative.

The response of herring eggs and larvae to the type of oil solutions used in the pink salmon experiments was similar to pink salmon response, though the picture is not as complete. Field observations in 1989 indicated significant failure of larvae in the oiled areas of Prince William Sound (Brown et al. 1996). Laboratory tests with herring embryos and larvae also indicated their extreme sensitivity (Carls et al. 1999). Herring eggs exposed to solutions as low as 0.4 ppB of PAH in seawater for as few as four or as many as sixteen days exhibited a variety of adverse effects (Carls et al. 1999). Effects included increased mortality and abnormalities, and reductions in swimming ability, incubation time, and length at hatch. Several of these effects suggest structural and genetic impacts from oil rather than simple toxicity. Herring do not home to Natal areas like pink salmon, hence the evidence of long term exposure and damage is less clear after the first one-to-two years of the spill. Herring populations crashed in 1993, due to disease that cannot be tied directly to the oil spill, although many suspect there is a linkage. Troubling, there was also a crash in pink salmon in Prince William Sound in the same year, and no other region in the state had a herring crash in standing biomass or a crash in pink salmon.

How can such low concentrations be toxic in the long-term? Once released from sediment, the toxic fractions are taken up by the lipid-rich eggs. Eggs, which develop slowly, incorporate these compounds into their tissues, and these compounds may alter how the fish larvae develop. Thus, low-level oil poisoning is insidious because most of the effects are delayed, and each different symptom is hard to detect, but the cumulative effect may be substantial. Ominously, most of the toxicity associated with this mode of action appears to be associated with the larger and more environmentally persistent oil fractions (Carls et al. 1999; Heintz et al. 1999). In addition, ultraviolet light can increase PAH toxicity by several orders of magnitude, and is most effective on the large persistent PAH (Pelletier et al. 1997). Genetic damage that is passed on to successive generations is currently under study.

### ***Implications of Oil Pollution for Fish Natal and Rearing Habitats***

The threat is not just from acutely toxic concentrations that result in immediate fish kills, but also in the more subtle effects of low-level oil pollution to sensitive life stages. Incubating embryos are very sensitive to long-term exposure to PAH because they may sequester toxic hydrocarbons from low or intermittent exposures into lipid stores for long periods, and because developing embryos are highly susceptible to the toxic effects of pollutants (Marty et al. 1997; Carls et al. 1999; Heintz et al. 1999). PAH in weathered oil can be persistent, biologically available for a long time, and very toxic to sensitive life stages. The result is that fewer juvenile fish survive, so that recruitment from the early life stages is reduced, and adult populations are not replaced at sustainable levels. Eventually, adult populations may gradually decline to extinction.

Streams and estuaries play host to the vulnerable early developmental life stages of many fish species and are also the recipients of the bulk of chronic hydrocarbon discharges. Herring spawn their eggs in areas of reduced salinities, salmon use both stream and estuary for much of their first year of life, and the embryos-larvae-juveniles of many

marine species use the estuaries for nursery grounds. The very qualities of these natal and rearing habitats that provide protection from predators also make both the habitat and, by extension, the species vulnerable to pollution. The soft sediments of salmon streams and many nearshore estuaries can harbor oil for extended periods with slow release.

Fish natal and rearing habitats are clearly vulnerable to oil poisoning from chronic discharges under the current regulatory framework, because regulations are based on *acute toxicity models* which, seldom account for long term low level toxicity to vulnerable life stages or for habitat differences in retaining contaminants. Water- quality standards are often based on acute toxicity results for more-tolerant life stages, which may seriously underestimate cumulative adverse effects, even when presumably conservative safety factors of 1% are applied. These water-quality standards need to be revised to protect these habitats. This is a daunting task. In the United States, the equivalent of an Exxon Valdez oil spill is produced every year by each 50 million people as urban runoff (Eganhouse et al. 1981, Hoffman et al. 1983). No single event is notable, and mass fish kills with floating carcasses are rare. Instead, there is continued habitat contamination, erosion of populations and, when coupled over time with other events such as hard winters, other habitat loss, increases in predators or fishing, decreases in food availability at a critical life stage, etc. Such chronic pollution may eventually result in extinction of the population. Species with life history strategies that rely on streams or estuaries for reproduction are most vulnerable.

Prince William Sound is recovering from the EVOS, and although oil can still be found in selected habitats 11 years after the spill, less oil is bioavailable each year. The spill is now more analogous to chronic low level pollution from the remaining pockets of oil. In contrast, most urban environments have a complex mixture of pollutants that add to the stress of other physical habitat perturbations. Unless protection of water quality and physical habitats is secured, many natal and rearing habitats of fish near urban areas will continue to degrade and will lose their ability to support sensitive life stages.

#### ***A precautionary approach to risk assessment should be adopted***

A precautionary approach to oil and gas development and the attendant risks to marine organisms seems advisable in the face of mounting evidence that oil is far more pernicious in the nearshore environment than previously believed, and that early life stages of fish are very vulnerable to toxic pollutants. We are no longer surprised at embryo sensitivities when humans are exposed (e.g. fetal alcohol syndrome; thalidomide); we should not be surprised that low level environmental pollutants can have devastating effects on fish embryos and their subsequent poor recruitment into the adult population. While the oil companies, like big Tobacco, continue to remind the public that very little can be rigorously proven, the public is becoming increasingly aware that oil and gas development can have a major impact on fish and wildlife habitat. Up until now, it has been the government's responsibility to prove the potential for harm before greater regulatory controls would be placed on oil development and transport. In the light of the results of the Exxon Valdez oil spill, the public is requiring more caution from its regulators. Drug manufacturers are required to prove that a given drug has a very low risk before it can be sold, but in environmental regulation the burden of proving risk rests with the government. Like ripples from a pebble in a pond, each of the effects of oil on fish reproduction is cumulative. Oil development and transportation will continue to be needed and valued, but each aspect needs to be viewed in terms of risk to developing embryos and sensitive habitat, rather than the acute toxicity models relevant to more tolerant life stages.

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## SYNOPSIS OF DISCUSSION FOLLOWING THE ENVIRONMENTAL IMPACTS AND MANAGEMENT SESSION:

*Is anyone tracking pink salmon through the food chain?*

A lot of work is being done on pink salmon and the results suggest that they are really important to the ecosystem in terms of the carcass nutrients and how they move up the food chain. A further question was raised that regarding whether any of those studies have been initiated in Prince William Sound, and tracking those nutrients, PAHs and other contaminants associated with oil up the food chain.

The response was that the studies to date have been with sockeye taking PCB's – with a lake that does not have an anadromous run and the PCBs have come from the ocean. Where they had another lake immediately adjacent to it that did not have an anadromous fish run, the PCB's were not present.

*Is there legislation on how oil tankers are constructed and maintained?*

We have been hearing a lot about the rules and regulations – now we have been hearing about oil spills. I live on Strait of Georgia and see oil tankers going back and forth. Is there legislation in place or can it be in place to dictate how the tankers are constructed so they are safe enough to go around the world, and how they are maintained, and how long they can be in service before they are scrapped.



Jeep Rice replied from the US perspective. The Oil Spill Pollution Act came in a year after the Exxon Valdez – and it says that you will change to double hulls or the equivalent, for example, within about twenty years. We are looking at that going down the road. Robie MacDonald noted that in terms of a comment made earlier about hydrocarbons coming into the Strait of Georgia system, about 50% or more of them are coming from run off from land. He noted also that combustion of PAHs around Vancouver are showing up in the sediments thus continually adding to the load of the land run off.

*Can we affect what passes by our coast?*

Jeep Rice noted that for the USA the transport vessels have to be USA registered vessels and so there is some level of control. He noted the biggest polluters in Alaska right now are the international flag tourist boats – they occasionally run on the rocks, spill oil, dumping their trash, have poor quality smoke emissions. In the south there is a shared traffic corridor through Juan de Fuca and Puget Sound so regulations have to fit both the USA and Canada.

*How are the indigenous people of that area doing after that spill?*

Jeep Rice noted that they are not doing very well – there are two villages and one did not get directly impacted from the oil spill, the other closest ones were pretty hard hit. He mentioned that this is also the area that was hardest hit by the 1964 earthquake that uplifted in exactly the same area as the oil spill. So even if a beach is certified as clean they still will not use it. For us, it would be like saying this sewer outlet here is certified to be clean - and the biggest and juiciest clams and oysters are 100 feet away and they still are not going to eat it. That is what has happened to the village – so their whole subsistence lifestyle has not only been interrupted, it has actually been stopped and they now go some pretty significant distances to do their foraging.

*Moot question- how did Alaska let the Exxon Valdez spill happen?*

With the Exxon Valdez accident having such an impact on our decision making now on the North coast of British Columbia, with the due diligence that we would hope to have been in place in Alaska, how did the state and federal government allow a vessel to leave the terminal with an impaired skipper, no pilot, no vessel escorts hitting an unmarked reef.

Jeep Rice responded that the reef well marked – on all maps, but not on the beacon. He noted that they are going to “shut the barn door after the horse got out”. One of the problems that Alaska has is that the oil industry drives the economy- not by a small margin but a huge margin. He noted that the watch dog agencies, have basically been gutted over the last ten years and it is the private interest groups, the independent groups that are the watchdogs now.

## **DISCUSSION OF QUESTIONS REGARDING THE (GLOBAL) NEED FOR OIL AND GAS DEVELOPMENT- CONSIDERING THE FUTURE?**

**John Clague**

*Faculty of Science, Simon Fraser University, Burnaby, BC*

*Comments to set the stage.*

Let us look at where we are headed in a global sense. Global oil consumption has increased about 10% in the last ten years. The projections are that this increase will continue if not accelerate in the future -- we presently consume globally about 75 to 80 million barrels of oil a year and consumption could increase by 50% or more within 20 years. In short, we are on a trajectory of increased reliance on oil. One thing to bear in mind in this context is that much of the oil that we use in the future will come from the Middle East. At present, about 40% of global oil is derived from that region and that percentage probably will increase in the future. We are in the rather dangerous situation of being reliant on an area of the world that is politically unstable. Yet we show no indication that we are ready to wean ourselves from our addiction to oil. Similar trends are likely in natural gas consumption; in fact we see an increase in consumption of gas relative to oil in the future. Finally, look at Canadian oil production -- this production will plateau in coming years; in fact, it may already have plateaued. In the United States, peak oil production occurred about 1970 and has declined ever since. There is debate as to when oil production will peak in a global sense. Some people claim that we are very close to a peak production, whereas others argue that it is some time down the road yet, perhaps 20 years or more. Whenever this occurs, as it inevitably will, we may be faced with increasing demand and a diminishing supply. If we think that \$30-a-barrel oil is expensive we may be in for a shock in the future -- \$30-a-barrel oil may be considered cheap a decade from now.

**Michael Whiticar**

*Earth and Oceans Sciences, University of Victoria, Victoria, BC*

Please see PDF presentation from Michael Whiticar.

### **Exploring the Future of Offshore Oil and Gas Development in B.C. The Role for Natural Gas**

**Richard Williams**

*Manager, Environment, Health and Safety and Sustainable Development, WestCoast Energy, Vancouver, BC*

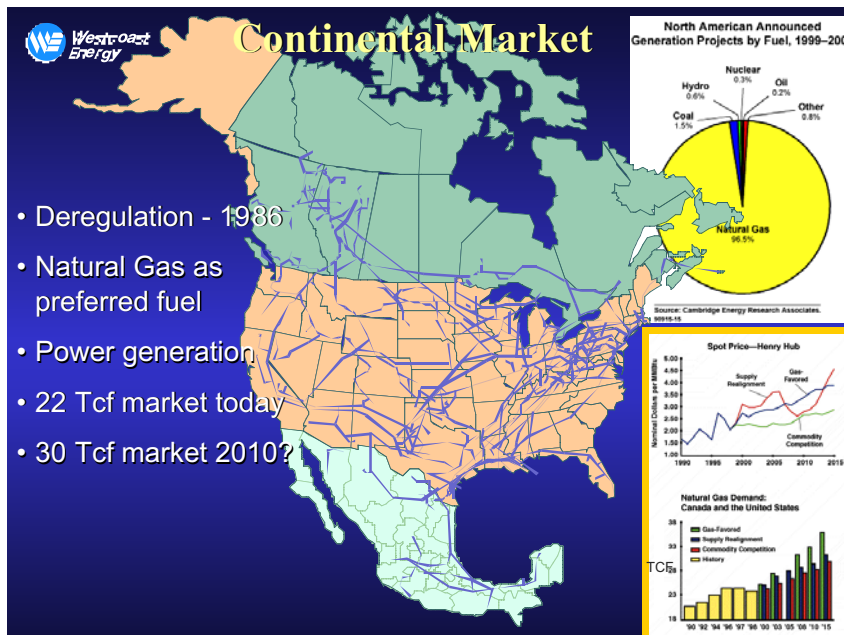
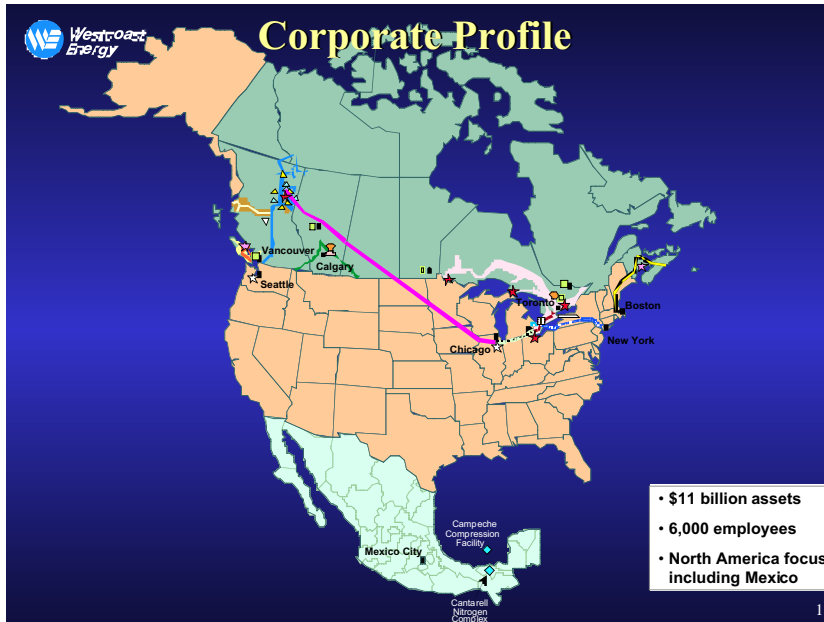
#### ***Introduction***

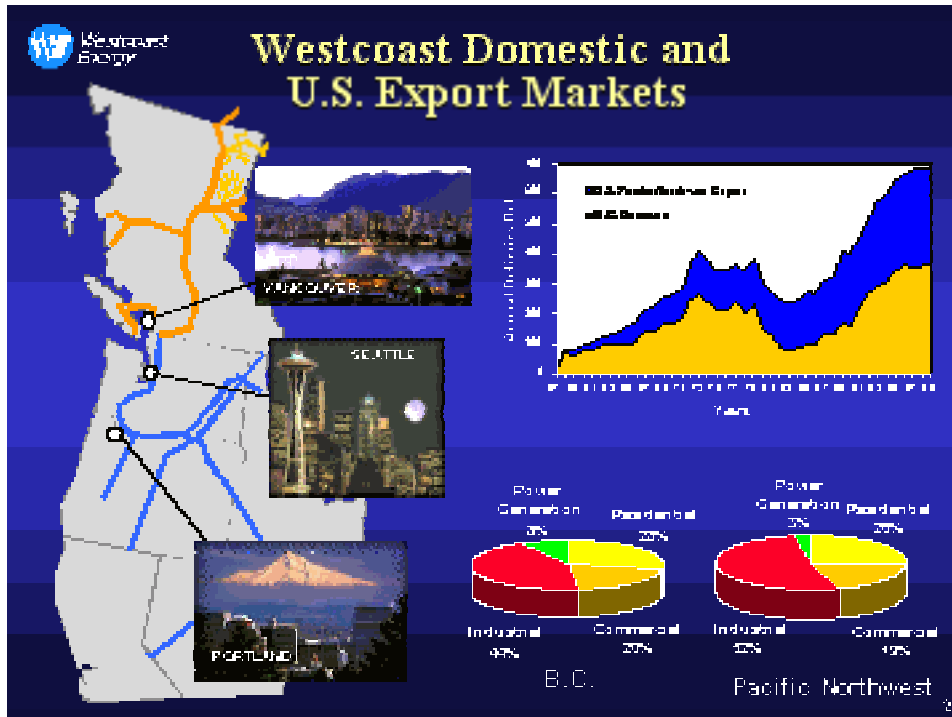
The decision of whether to develop the oil and natural gas resources present offshore in the region of the Queen Charlotte Islands of British Columbia will be made against a backdrop of significant issues relating to future energy supplies and the environmental effects associated with energy use. My presentation is intended to examine some of those issues from the perspective of the natural gas industry. After introducing Westcoast Energy and the natural gas industry, I will examine the following:

- Natural gas demand and how that demand is changing;
- Environmental drivers affecting natural gas demand, particularly concerns for local air quality and greenhouse gas emissions;
- Natural gas supply and the options for the future;

Beginning with the development of a single natural gas transmission pipeline in 1957, Westcoast Energy has grown to become B.C.'s largest company and a leading energy services provider in North America. In British Columbia the Company operates natural gas gathering, processing and transmission facilities that move more than 1.8 billion cubic feet of natural gas per day to markets in the Lower Mainland of B.C. and the U.S. Pacific Northwest. Westcoast also operates the Pacific Northern Gas pipeline in northwestern B.C. as well as the transmission and distribution pipelines of Centra Gas B.C. on the Sunshine Coast and Vancouver Island.

In the years since 1957, the Company has also acquired the Union Gas distribution network serving more than one million customers in southwestern Ontario and developed pipelines, electrical power plants and energy services businesses across Canada, into the U.S. and in Indonesia, China and Mexico.





### ***Natural Gas***

Natural gas is the foundation of our business and we believe that it offers part of the solution to climate change and concerns for local air quality. Natural gas is the least carbon intensive fossil fuel and on a full lifecycle basis (i.e. from wellhead to burner tip) is estimated to contribute at least 20% fewer greenhouse gas emissions than oil and on a combustion basis at least 50% less than coal. In relation to other fossil fuels, natural gas also results in lower emissions of sulphur, volatile organic compounds and particulate matter, supporting efforts to improve local air quality.

Within North America, natural gas is a Continental commodity. It is transported primarily through a network of pipelines that link the natural gas producing basins in U.S. and Canada with markets in both countries. While natural gas can be shipped as liquefied natural gas (LNG) in specialized ocean-going tankers, LNG has generally been more expensive than we in North America have been prepared to pay. [In contrast, oil is a global commodity - you can put it in a tanker and transport it anywhere in the world easily - so the price tends to be the same anywhere in the world.]

The development of natural gas as a continental commodity began in 1986 with the deregulation of the prices and the transportation network. Deregulation has allowed the use of natural gas to expand rapidly as competition kept prices low relative to other fuels and allowed the industry to develop transportation infrastructure linking Canada and the U.S.

### ***Natural Gas Demand***

While the initial role of natural gas was primarily to meet heating needs, in recent years it has emerged as the preferred fuel for new power generation facilities because of the relatively low capital cost of gas-fired facilities and because of the environmental attributes of natural gas. Increasingly deregulated energy markets are too uncertain to easily allow development of large, very costly coal fired base-load power plants particularly in the face of growing environmental concerns for the emissions of such units. As a result there has been an explosion in the number of smaller, gas-fired combined cycle and co-generation power facilities constructed and proposed. I probably can't over emphasize the role of power generation in the demand for natural gas – it is the most important new role for natural gas.

While power generation is the most important new role for natural gas, fuel cells could become an important reason for using natural gas in the future. While fuel cells would ideally operate using hydrogen fuel, it is likely the initial source of hydrogen would be natural gas. The Pembina Institute and the David Suzuki Foundation in their report - "Climate-Friendly Hydrogen Fuel" identified hydrogen produced from natural gas reformed in large efficient plants as the most desirable source when considering life cycle emissions of greenhouse gases.

North America currently consumes approximately 22 trillion cubic feet of natural gas per annum and this need is estimated to be growing to as much as 30 trillion cubic feet by 2010. Cambridge Energy Research Associates (CERA) has characterized the 30 trillion cubic feet scenario as a plausible rather than probable scenario for a variety of reasons. However, anticipated growth in demand for natural gas for industrial, commercial, residential and power generation use will still be enormous over the next ten years. Ultimately, the demand for natural gas will rest on how North American governments move to address air quality and global climate change concerns, the rate at which "clean coal technology" develops to address the air emissions concerns and the price of natural gas (which will determine the degree of incentive for alternative technology development).

Customers that rely upon natural gas produced in British Columbia, primarily in Southwestern B.C. and the U.S. Pacific Northwest have contributed to the same pattern of steady growth in natural gas use since the early 1980's. With growing population and a decrease in the amount of electrical power available from hydro facilities due to increased fisheries concerns in the Columbia Basin, this growth shows all signs of continuing.

#### ***Environmental Attributes***

Concerns for local air quality is the environmental driver most strongly influencing increased use of natural gas. In Canada, the regions of greatest concern are the Windsor to Montreal corridor and the Fraser Valley, although, other areas of concern exist. In the U.S. the northeast states are particularly affected both by local and regional emissions as well as a result of long range transport of emissions from coal fired power generation in the Midwest states. The emissions causing most concern are NO<sub>x</sub>, SO<sub>x</sub>, particulate matter and mercury. Natural gas combustion results in NO<sub>x</sub> emissions but at reduced levels from other fossil fuels. As sulphur is easily removed from natural gas at processing plants in the producing regions, some SO<sub>x</sub> emissions occur in remote airsheds. However, there are no SO<sub>x</sub> emissions in stressed urban airsheds. Natural gas has virtually no particulates in the area in which it is burned – although, SO<sub>x</sub> and NO<sub>x</sub> emissions can contribute to particulate levels in local airsheds in the producing areas. Mercury emissions are a very small concern relative to coal and oil.

**Local Air Quality**

- Ozone and particulates in the Fraser Valley and Windsor-Montreal Corridor
- U.S. Clean Air Act
  - Key to U.S. gas and electricity markets
  - Acid Rain Program Phase II for SO2 emissions:
    - affecting 2500 facilities.
  - NOx Program - reducing emissions limits, more facilities captured
  - Moving to address Particulates and Mercury

| Year | Annual SO2 Emissions (Millions of Tons) |
|------|---|
| 1980 | 91.9                                    |
| 1985 | 90.7                                    |
| 1990 | 90                                      |
| 1995 | 5.3                                     |

In 1995, the U.S. reacted particularly strongly to the issues of SOx and NOx with the development of the Clean Air Act Acid Rain Program under that act. The requirements of the Act has directly resulted in fuel switching to natural gas at some existing plants and all new power generation proposals being based on natural gas. Since 1995 there has been a measurable reduction in power plant emissions and beginning in January 2000, with expansion of the Act to address approximately five times more sources, this trend should continue. Both the U.S. and Canada are currently working to design regulatory programs to address fine particulate matter and mercury.

Concerns for global climate change and the need to address greenhouse gas emissions is an emerging factor influencing demand for natural gas. Natural gas is the least carbon intensive fossil fuel and its use results in fewer greenhouse gas emissions than other fossil fuels. The smaller, distributed nature of gas-fired power generation when compared to large coal fired plants allows for higher energy efficiency and reducing electrical transmission line losses.

On this basis, the natural gas industry has articulated what they call a resource stack. By far and away the best option is don't burn the fuel – energy conservation. If you need to use energy, renewables would be the most environmentally desirable sources once they become available. Oil and coal fall to the bottom of the stack based upon greenhouse gas emissions. In the middle we have identified natural gas and articulated that as part of the solution to climate change in the transition to less carbon intensive economy.

**Global Climate Change**

CONSERVATION  
RENEWABLES  
NATURAL GAS  
OIL  
COAL

SOLUTION

Internal combustion engine led to the oil business

The past

The transition is messy

The future

The fuel cell may lead to the hydrogen economy

Better satisfying customer needs

Product Performance

Time

| Carbon:Hydrogen | Coal | Oil | Gas | Hydrogen |
|-----------------|------|-----|-----|----------|
|                 | 1:1  | 1:2 | 1:4 | 0:1      |

Underlying Decarbonisation

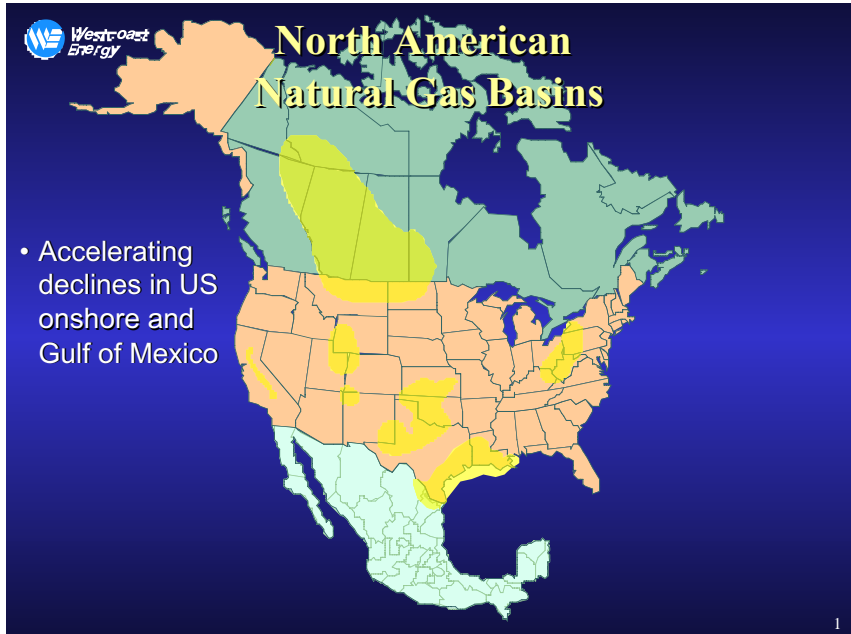
**NATURAL GAS. CLEARLY PART OF THE SOLUTION TO CLIMATE CHANGE.**

**Natural Gas is Part of the Solution to Global Climate Change**

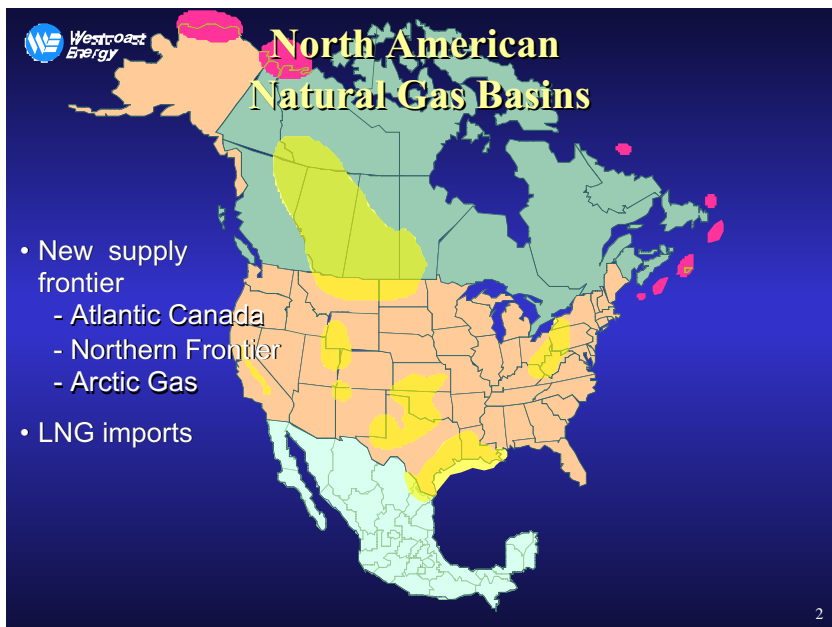
Shell has developed a useful diagram which illustrates the long-term shift to a hydrogen based economy. It doesn't speak to the speed at which change will occur but in the big ball that represents the here and now, Shell correctly suggests the transition will be messy. We anticipate that natural gas is going to play a significant role in that transition.

### *Natural Gas Supply*

Having identified the need for natural gas, there is the question of where it is coming from now and will come from in the future. In the traditional supply areas in the US onshore basins, the Gulf of Mexico and the Western Canadian Sedimentary Basin, there has been an increased rate of decline (the rate at which production from active fields reduces with time) in recent years. This is in part related to low natural gas prices a few years back, leading to reduced investment in exploration and development. But in part it is also related to the maturing of these basins. That is particularly so in the US basins and in the more developed portions of the Western Sedimentary Basin, e.g. southern Alberta.

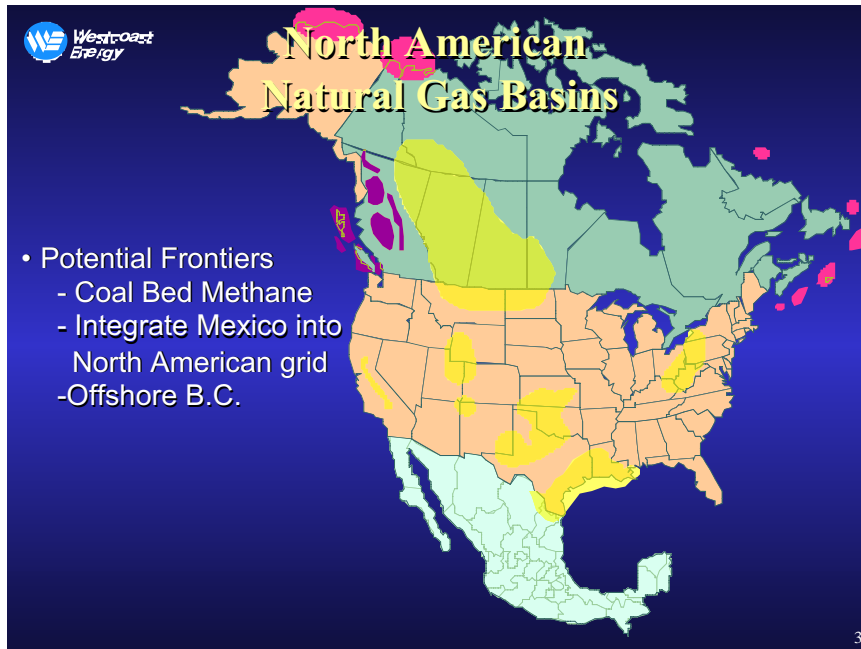


Increasingly energy producers are looking to the frontier regions to meet future needs for natural gas. In Nova Scotia area, gas from Sable Island is now coming on shore, with lots of potential in other areas of the Atlantic Coast. In the Arctic, there is the MacKenzie Delta and the Alaskan north slope. In the MacKenzie Delta there has been successful drilling, but it hasn't been feasible to put infrastructure in place to bring that natural gas to customers in the rest of North America. On Alaska's North Slope, BP is injecting something like 6.5 billion cubic feet of gas a day that is produced in association with oil and re-injected back in the reservoirs to enhance production of oil simply because they have nowhere to take the gas. Atlantic gas is supplying customers now while natural gas from the Arctic it is probably five to ten years from being available to meet energy needs. Finally, with increased prices for natural gas in the past year, imports of liquefied natural gas may also become a factor.





Looking at the more distant horizon, beyond five or even ten years, are a number of energy supply frontiers, including natural gas basins in British Columbia such as the offshore Queen Charlotte Islands region. In this time frame options such as coalbed methane and integration of Mexico into the North American natural gas pipeline grid.



## **Summary**

Natural gas produced in offshore B.C. could make an important contribution to meeting the significant growth in demand anticipated for natural gas in North America in the coming decades. Based upon existing patterns of transmission and distribution, offshore B.C. gas would primarily meet energy needs in the western portion of North America and in particular British Columbia's Lower Mainland and the U.S. Pacific Northwest. In these areas, the greatest new demand for natural gas is expected to be from a rapidly growing number of natural gas fired combined cycle and co-generation electrical power generating facilities. In future, as fuel cells are introduced it is also anticipated that natural gas could provide the most environmentally sound base fuel until commercial sources of emissions-free hydrogen are developed.

In this way, natural gas taken from offshore British Columbia could play an important role as a transition fuel, meeting needs for heating, electrical power and in the future, transportation. As the world moves to improve local air quality and address climate change, in combination with energy conservation natural gas will help to bridge our current energy needs with the non-carbon emitting sources of energy that will become viable in the future. Currently the U.S. Clean Air Act working to address concerns for air quality in the northeast states and to a lesser degree Canada's own efforts to address air quality in the Windsor to Montreal corridor that are acting as the environmental driver for the development and use of natural gas. In future, the Kyoto Protocol or other international constraint on greenhouse gas emissions will add to this pressure.

That is not to say that the development of natural gas is without impacts. In the past, the industry has wrestled with issues such as sulphur emissions in the producing regions or access to wilderness and wildlife habitat created by pipeline rights-of-way. Offshore development in British Columbia would bring a new set of challenges, albeit many of which have been successfully addressed in other parts of the world. The decision to develop offshore natural gas resources will not be one of accepting environmental compromise. Rather it will come down to a weighing of alternative environmental benefits and challenges in an attempt to find the best balance.

## **Offshore oil development in Queen Charlotte Sound and Hecate Strait: effects and concerns.**

**Robie MacDonald**

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Continental shelves are the most important regions of the world ocean from the perspective of marine ecosystems and sustainable harvest of resources by humans. On the other hand, these regions are also the most vulnerable to change and to impacts due to human activities (transport, disposal, inputs from rivers and coasts and so on). Therefore, non-sustainable activities such as oil development and mineral extraction should be entered into with a great deal of care to prevent irreversible harm and to preserve as a legacy the sustainable activities (e.g., fishing, aquaculture, tourism). Offshore oil activities have physical, chemical and biological impacts. These have been well reviewed in numerous books and technical papers and are therefore relatively well known. Here we present a brief perspective of the potential chemical impacts of offshore oil exploration to Queen Charlotte Sound and Hecate Strait (QCS-HS). Such impacts derive from two fundamentally different sources: 1) Day to day, chronic releases of materials including cuttings, muds, deck washings, domestic wastes, small oil spills, and products of combustion (from flaring or incineration) and, 2) Acute releases of oil from blowouts, spills from tankers, storage facilities and underwater pipelines. The impact, containment and mitigation of these two kinds of releases differ dramatically.

In anticipating the effects of any contaminant, the identification of the environmental pathways is crucial to understanding how the contaminant is likely to impinge on living resources. The correct assessment of pathways will anticipate "surprises" and help to prepare for them. Hydrocarbons, because they are hydrophobic, tend to favour surfaces and it is here that they do their greatest harm. Initially, spilled oil will spread on the surface of the sea where it causes well-known mortality to birds and marine mammals such as sea otters (see also Rice, this session). Later, the non-volatile, insoluble portions of the oil become attached to solid surfaces and end up on beaches and in marine sediments where they continue to harm animals in those habitats. Estuaries, which are hatcheries and nurseries for many marine organisms, are probably the most sensitive habitats that could be impacted by oil. As the oil weathers, much of it evaporates, dissolves or is metabolized by microbes. The residue of less

degradable oil components tends to contain the three- to five-ring aromatic hydrocarbons which may continue to cause harm for much longer periods particularly in fine sediments on beaches, in the intertidal and in sub-marine sediments. The effects of this “PAH-rich” residue are usually much less visible because it causes disruption of development pathways (endocrine disruption, cancers, lesions) rather than direct mortality, but such effects can last for longer periods measured in decades. Although hydrocarbons bio-accumulate, they also degrade and do not tend to bio-magnify so that low chronic concentrations of hydrocarbons do not tend to put top predators at high risk.

Chronic releases of contaminants from offshore activities can generally be controlled and mitigated through good housekeeping and through careful treatment of wastes. In particular, past experience has shown that oil-based muds – especially those containing diesel oil – have caused some of the more obvious impacts and such drilling-fluid components can and should be avoided. Fortunately, replacements for oil-based muds are available, although they might entail greater expense. Of the chronic releases, produced water poses the greatest concern simply due to the volumes which range from 15,000 – 500,000 m<sup>3</sup>/day depending on location. Produced waters, which contain residual hydrocarbons, metals and, at times, radionuclides, are one of the main sources of oil pollution for offshore production. Clearly, the treatment of these waters and the monitoring of their composition will be central to the reduction of chronic chemical impacts from any offshore activity.

Acute or catastrophic oil spills are perhaps the best known and most feared aspects of offshore oil exploration, production and transport. Here it is important to note that each region has its own sensitivity to such spills simply due to the ecosystem (biological resources, estuaries, migratory pathways) and the physical environment (e.g., waves, winds, currents, icebergs). In the case of the impact of potential oil spills in QCS/HS, the experience at Hibernia off Canada’s Atlantic coast provides little guidance. Models evaluating hypothetical oilspills using historical climatology (winds) at Hibernia suggest that spilled oil will seldom, if ever, reach the shore. For QCS-HS, particularly in winter, prevailing winds and storm systems will undoubtedly transport spilled oil onto shores. For assessment and monitoring, the region clearly lacks baseline geochemical data. Before any offshore oil activity is initiated, studies of the natural geochemistry of hydrocarbons and metals should be carried out. There are two reasons for conducting such studies before proceeding with further oil exploration or development – one is to provide the necessary knowledge of pathways to assist predictions of impacts and the other is to identify the sources and pathways of hydrocarbons from natural or other sources prior to any inputs from local offshore oil exploration. In particular, natural oil seeps have already been found during early exploration and there is likely to be discernible impact of human activities from marine transport (tar balls), from shipping or boating (bilge water, deck washing, oil leaks), from long-range atmospheric transport and potentially from aluminum smelting at Kitimat. In addition to these sources of hydrocarbon, there are also natural sources predominantly from biological processes both on land and in the sea.

Following recommendations by the West Coast Offshore Exploration Environmental Assessment in 1986, DFO has conducted a number of studies of physical processes in the region which will be helpful in the operation and design of offshore facilities and also in modeling the transport of spilled oil. Ocean water properties and currents all have been studied during a seven-year field program completed in 1995, and studies of winds and waves begun near 1990 are continuing. Subsequent to these studies, numerical modeling has been carried out and data, interpretations and references are available at the Institute of Ocean Sciences Web Site. These studies provide background information to enable predictions of oil motion should a catastrophic spill occur, and to assist in any decision on the future of the Moratorium.

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### **Moderator's Comments, John Clague**

I want to reiterate a point that was made there –the last 10,000 years of climate has been pretty unique - it has been several hundred thousand years since we have had a period like the last 10,000. So we do live in an extraordinary period of time right now –it is pretty atypical for the last several hundred thousand years.

### **Importance of International Energy Markets for BC Offshore Oil and Natural Gas Development**

**Robert McRae**

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First, some preliminary comments. We need to have some knowledge about the Canadian context before we can discuss the world context. See National Energy Board (1999). We are considering the possible oil and gas development off the British Columbia coast. Oil and gas are mentioned together as if they are a joint product. But they are very different commodities and we really ought to treat them separately. Oil development is very different from natural gas development. Any oil discovered from offshore development can definitely be used in Canada. Currently, conventional crude oil is on the decline in Canada so any new discoveries could be used domestically. But there is an adequate *world* supply of oil being produced. See Energy Information Administration (1999) and the International Energy Agency (1998c). There is an efficient world market for oil so if we did not find any oil offshore we could buy oil from the world market place. In other words, we do not need to develop the offshore crude oil in order to meet domestic needs. Natural gas is a different issue – it is a more localized market connected by overland pipelines, and occasionally shipped overseas as liquefied natural gas (LNG). If gas were discovered offshore BC then it could tie into the Canadian natural gas pipeline system and be utilized. But at present there is an adequate supply of natural gas in Canada, especially in Alberta and British Columbia.

Another general comment is that governments do not find oil and gas – it is the private industry that does. What the government needs to do first of all, in this case, is to decide whether or not they want development. To make such a decision, the government is essentially undertaking a benefit cost analysis and deciding whether the benefits outweigh the costs of development. If the government does decide to allow development then it must establish the regulatory environment and the fiscal environment prior to opening up the area for private industry. It is the private industry that is going to do the actual development. Basically the government can control when an area is to be open for development but then it must wait for discoveries by the private sector.

Now I will focus on the world scene, mostly on Latin America and briefly on Asia. In Latin America I am going to analyze transportation issues as they relate to the oil market. In fact, much of the growth in oil requirements within

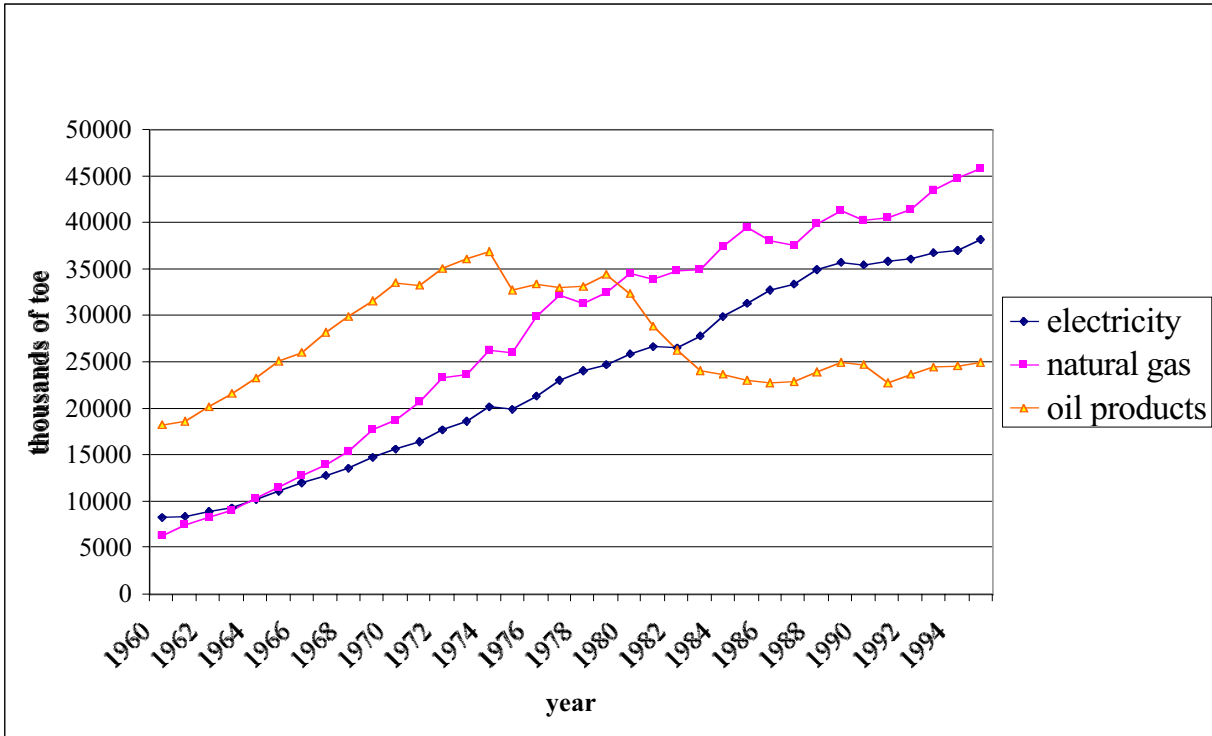


Figure 1. Total Non-Transportation Fuel Consumption, Canada

a developed country such as Canada and within developing countries such as those in Latin America and Asia is expected to be related to transport. See Dahl (1986), Dahl and Sterner (1991), Dunkerley and Hoch (1987), and McRae (1994, 1998, 1999). For instance, in Canada we have substituted other energy fuels for oil in the residential market, the industrial market, and the power generation market but not in the transport market (see Figure 1). The consumption of oil in Canada declined after the first oil price shock of 1972/73 and then was relatively flat until the next price shock of 1979/80 after which it declined until about 1986 and since then it has been relatively flat. This decline in oil consumption is very different from what is observed in developing countries of Asia and Latin America where growth in oil requirements is usually positive.

I want to demonstrate how an economist would approach the problem of analyzing how much oil is being used in the transportation sector in a region of the world, such as Latin America (see McRae (1999)). First, I need to obtain as much relevant data as possible – and that is very difficult. The sources for data include such diverse agencies as Asia-Pacific Energy Research Centre (1998b), Asian Development Bank (1994), International Energy Agency, Summers and Heston (1988), and the United Nations. I have to get data on the consumption of oil products, including gasoline and diesel oil, as well as some data for infrastructure such as the length (kilometres) of roads, the number of vehicles (cars, buses and trucks), and the efficiency of the vehicles. Some of the information that I would really like to get is unobtainable, such as the efficiency data. I can however get data on the number of vehicles (automobiles, trucks and buses) as well as the length of roads. In addition to infrastructure data, we also need some economic data for income levels and prices of the product which I have been able to obtain. I am going to focus on a number of countries in the region, such as Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela in South America; and Costa Rica, El Salvador, Guatemala, Honduras, Mexico and Panama in Central America.

I will estimate the behaviour for the following models using a technique of pooling cross-sectional data of different countries with time series data.

$$(1) \ln D_{fuel} = \alpha_0 D_1 + \dots + \alpha_n D_n + \beta_1 \ln \frac{GDP}{N_{pop}} + \beta_2 \ln P_{fuel} + \beta_3 \ln Congestion$$

$$(2) \ln D_{fuel} = \alpha_0 D_1 + \dots + \alpha_n D_n + \sum_{i=0}^s \beta_i \ln \frac{GDP}{N_{pop}_{-i}} + \sum_{j=0}^r \delta_j \ln P_{fuel}_{-j} + \gamma \ln Congestion$$

This estimated behaviour can show us about development patterns. Many of these countries are at an early stage of development, and we want to see where future oil consumption is going. If we have a cross section of countries at different stages of development then it is really easy to imagine that, for example, oil consumption per capita in Peru will be similar to Columbia at some later date when the level of real GDP per capita in Peru has increased to the level of that in Colombia. This cross sectional approach uses real data to show how countries are reacting at different stages of development.

Figure 2 shows pooled data for most of the countries of Central and South America with car ownership per capita plotted against real GDP per capita. It indicates that as real GDP per capita increases more cars are owned per capita. For comparison, the number of cars per capita in Canada is around 500 per thousand people. In South America the data show 140 vehicles per thousand at the high end. So if Latin American economies are going to look like Canada some day, they are going to own more cars. Figure 3 shows the same sort of information for trucks and buses. Again, there is clearly a scattering of data but there is an upward trend. I have done the same sort of analysis for Asia with the same conclusion.

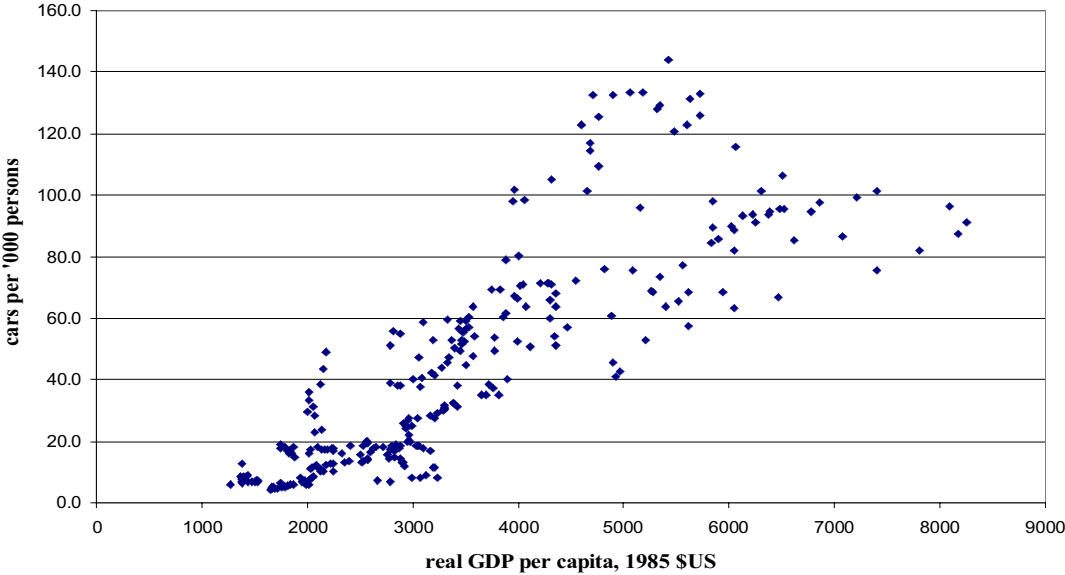


Figure 2. Car Ownership per Capita in South and Central America, 1975-92.

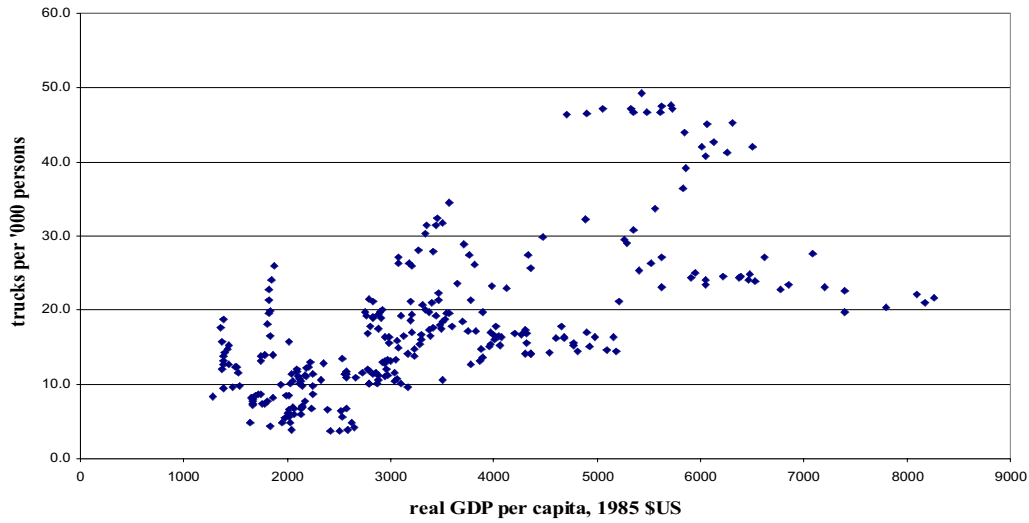


Figure 3. Truck and Bus Ownership per Capita in South and Central America, 1975-92.

Anyone who has been to a major city like Bogota or Bangkok, will recognize that road congestion is a big issue for transportation. Congestion is calculated as the number of vehicles (buses, trucks and automobiles) per kilometer of road. I thought it would be interesting to see how road congestion is related to income levels (see Figure 4).

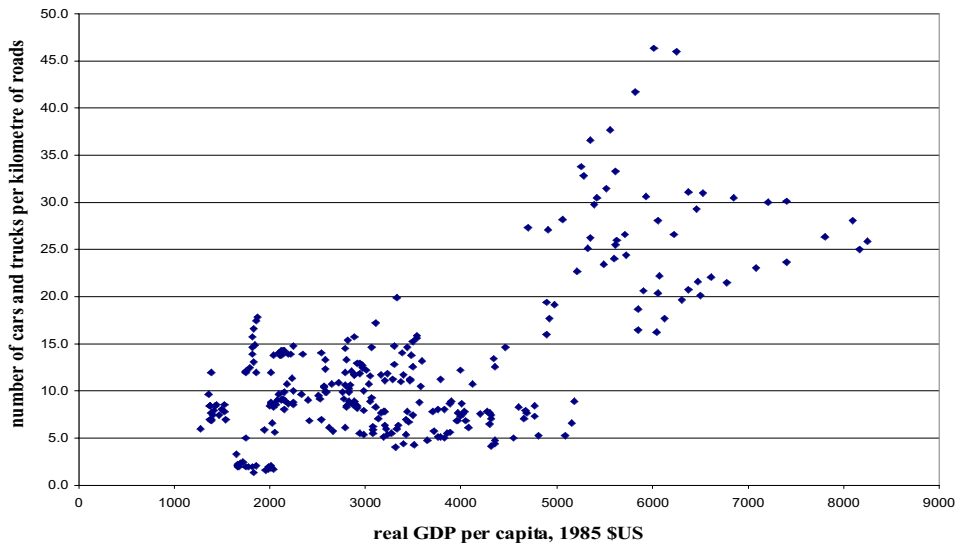


Figure 4. Road Congestion in South and Central America, 1975-92.

It appears that congestion does increase somewhat as the economy becomes wealthier. Figure 5 shows what happens to the percentage of diesel being used in road transport as countries become richer. It turns out that in poor countries diesel-based public transport is the most common method of transportation. Therefore, poor countries consume a larger proportion of diesel to meet their transportation needs. Hence, a downward trend in Figure 5.

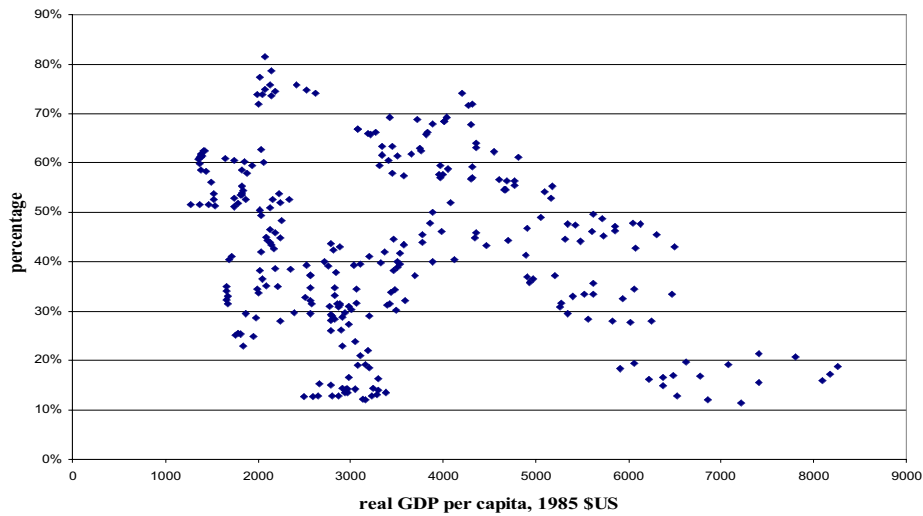


Figure 5. Share of Diesel in Road Transport in South and Central America, 1975-92.

Another factor that would affect the analysis of the amount of diesel and gasoline being used in transportation is the energy efficiency of the vehicle. Figure 6 contains a proxy for efficiency, namely, the number of liters per day per vehicle for automobiles and Figure 7 contains the same information for diesel vehicles. The data are relatively flat although they do rise a bit. Why is efficiency important? You can actually have an increase in the number of vehicles but have a decline in fuel consumption if the efficiency factor improves significantly. However, that is not the case here. Clearly consumption of gasoline and diesel is going to increase in these Latin American developing countries.

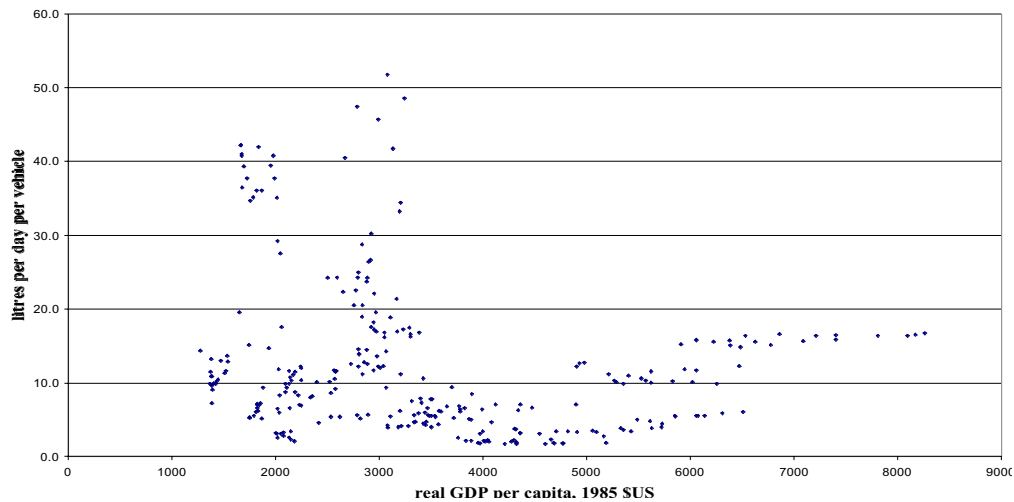


Figure 6. Demand for Gasoline per Vehicle in South and Central America, 1975-92.



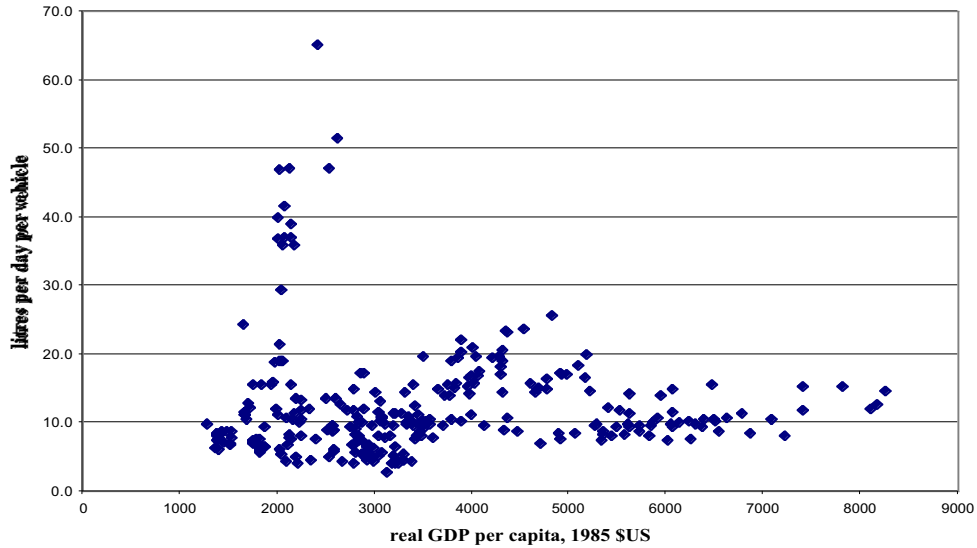


Figure 7. Demand for Diesel per Vehicle in South and Central America, 1975-92.

Economists develop models: such as those shown in equations (1) and (2). We hypothesize that the demand for transport fuel by consumers is dependent upon real GDP per capita, the price of fuel and congestion. The alternative model, the distributed lag model (equation (2)), is similar but allows people to take awhile to respond. For instance, if the price of gasoline goes up and you have a sport utility vehicle (SUV) then the next time you buy a vehicle it probably will not be an SUV. It will be a smaller vehicle but it is going to take some time to fully adjust to the higher fuel prices.

A summary of the econometric results – the so-called price and income elasticities of fuel demand shown in Table 1, indicate that income is important in determining how much fuel is being used. In terms of technical jargon, the coefficient for real GDP per capita is highly statistically significant and in this case the long-run elasticity of gasoline demand with respect to price is about 0.6. It means that a 1% increase in GDP per capita implies about a 0.6% increase in the consumption of gasoline. Real GDP per capita is the main driving factor in the consumption of transportation fuels. As income increases so does the consumption of gasoline and of diesel oil. These countries are trying to become richer – trying to become more like developed countries – and consequently they desire to own more vehicles and that means more consumption of fuel.

Table 1  
Long-Run (and Short-Run) Elasticities for Distributed Lag Model (Equation (2)) in Latin America

|               | Gasoline            |                   | Diesel Oil          |                     |
|---------------|---------------------|-------------------|---------------------|---------------------|
|               | Real GDP per Capita | Price of Gasoline | Real GDP per Capita | Price of Diesel Oil |
| Latin America | 0.60 (0.40)         | -0.15 (-0.06)     | 0.47 (0.31)         | -0.08 (-0.03)       |
| Low-income    | 0.32                | -0.12 (-0.08)     | 0.94                | -0.15 (-0.08)       |
| Middle-income | 0.69 (0.46)         | -0.20 (-0.07)     | 0.49 (0.33)         | -0.05 (-0.03)       |

Notes:

- Low-income countries includes Bolivia, Paraguay, El Salvador, and Honduras;

- middle-income countries includes Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay, Venezuela, Costa Rica, Guatemala, Mexico and Panama; and
- Latin American countries includes all of the above except Canada, and USA.

Source:

- McRae (1999)

Now let us briefly examine developments in the Asia-Pacific region. See McRae (2001). Here we examine the non-transportation sector. In Asia we treat China and Japan separately because they are such big economies and very different from the other economies of the region. Unlike Canada where oil consumption has declined since the mid 1970s, oil consumption in developing countries of Asia has continued to increase. Which fuel has the largest consumption share in Asia? It is coal – a domestic fuel which is relatively cheap but dirty, and oil is a close second. Natural gas, the preferred fuel choice in North America, has the smallest share because the supply (transportation) infrastructure isn't in place. See Figure 8.

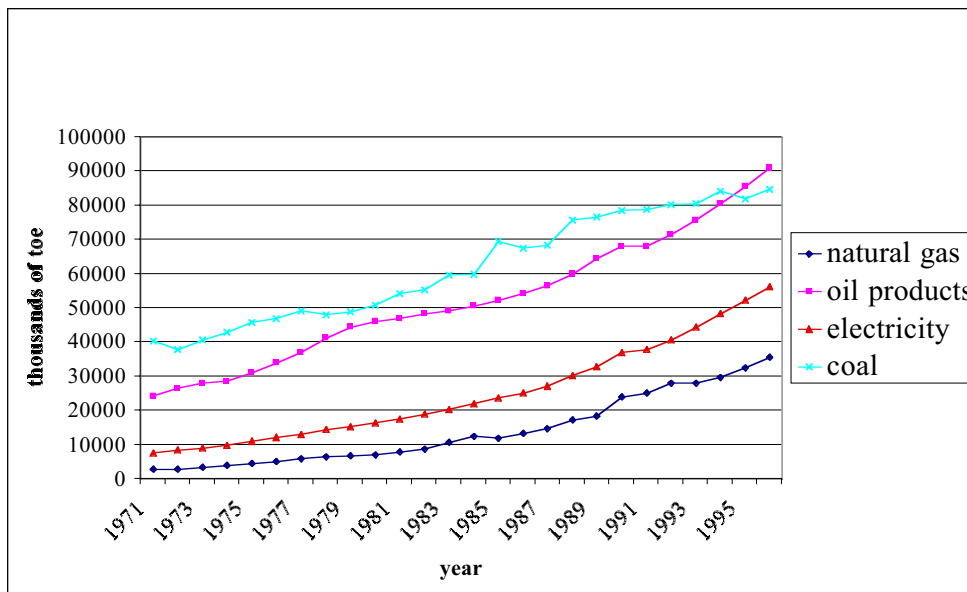


Figure 8. Total Non-Transport Fuel Consumption, Asia (excluding China and Japan).

What about China? China is a remarkable country in that almost 75% of its energy needs (everything from heating a home to running the railway system) are met by coal. Coal is domestically available and relatively cheap. See Figure 9. In the non-transportation sector of Japan, the other main economy in the Asian region, it is oil that dominates their economy, not coal or natural gas. Natural gas has to be imported as LNG and is expensive. It is mainly used for power generation. Although oil is the dominant fuel in Japan, coal is still important. See Figure 10.

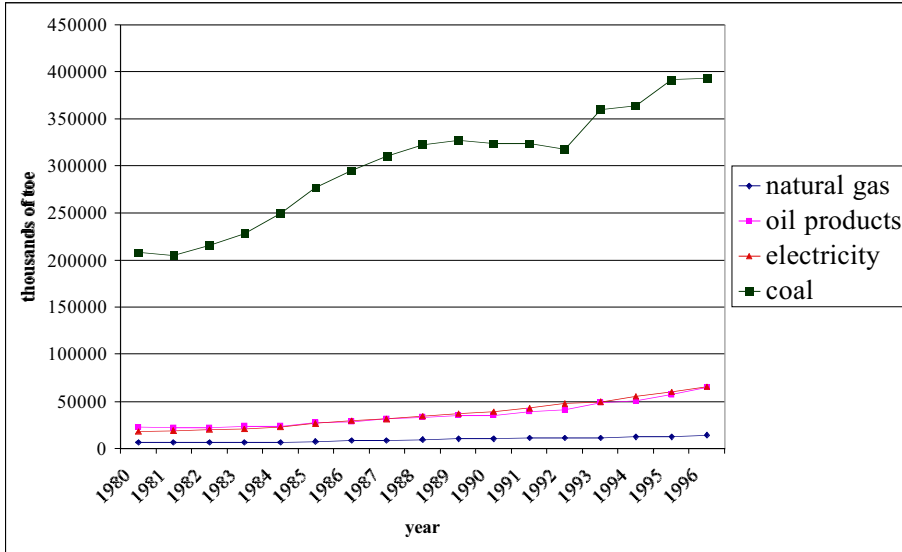


Figure 9. Total Non-Transport Fuel Consumption, China.

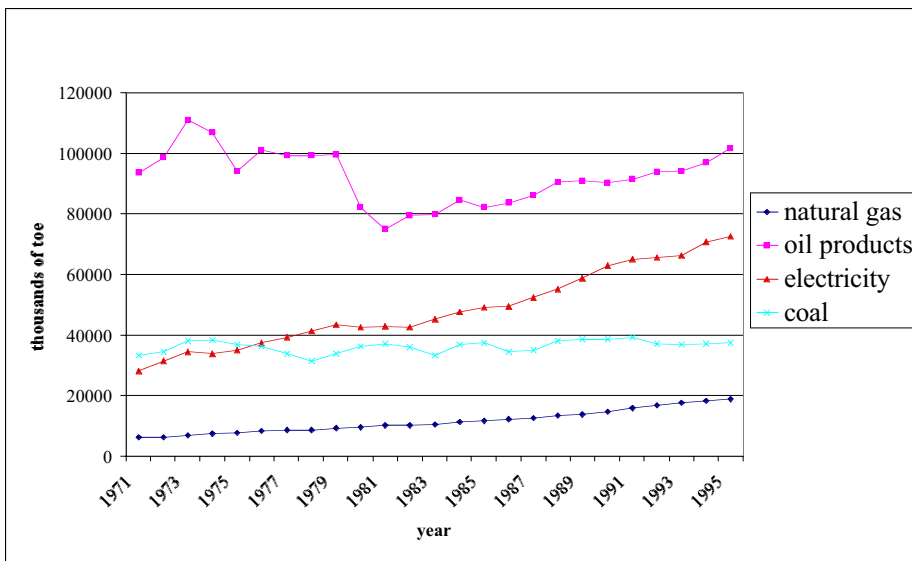


Figure 10. Total Non-Transportation Fuel Consumption, Japan.

What can we glean from our quick tour through Asia? Asian economies, especially developing economies, are at different stages in their economic development. As was the case for the demand for transportation fuels, Asian consumption of energy is tied to economic growth. It has been suggested that Asia may dominate the next century in terms of economic growth. The population levels in Asia are also important especially when we estimate models that contain energy consumption in per capita form. For instance, only one in five persons in China has an electric fan to keep cool in the summer and the power use of a typical *rural* residential dwelling is only about 1/100<sup>th</sup> of the typical usage in Canada. As Asian consumers become richer what do they want? They want TVs, fridges, fans, cars, air conditioning and other energy-using appliances and as they acquire them that means energy use is going to increase dramatically.

What does increased energy consumption do for carbon emissions? Tables 2 and 3 shows 1990 carbon emissions data for selective countries within Asia in absolute level and in per capita level. Canada has the second highest level of CO<sub>2</sub> emissions in the world, right behind the USA. The richer countries within the Asian economy have fairly high per capita production of CO<sub>2</sub> emissions –as does China because of all the coal they consume.

Table 2  
CO<sub>2</sub> Emissions and Other Data in Asia, 1990

| Country     | CO <sub>2</sub> Emissions<br>(millions tonnes) | Population<br>(millions) | Real GDP/Capita<br>(1985 \$US) | CO <sub>2</sub> per Capita<br>(tonnes/person) |
|-------------|--|--------------------------|--------------------------------|---|
| Bangladesh  | 14.3   | 108.3                    | 1390                           | 0.13  |
| China       | 2362.0   | 1,133.7                  | 1324                           | 2.08  |
| Hong Kong   | 36.6   | 5.7                      | 14,849                         | 6.42  |
| India       | 599.8  | 849.5                    | 1264                           | 0.71  |
| Indonesia   | 155.2  | 178.2                    | 1974                           | 0.87  |
| Japan       | 1061.8   | 123.5                    | 14,331                         | 8.60  |
| South Korea | 233.7  | 42.9                     | 6673                           | 5.45  |
| Malaysia    | 60.2   | 17.8                     | 5124                           | 3.39  |
| Pakistan    | 62.7   | 112.4                    | 1394                           | 0.56  |
| Philippines | 40.7   | 61.5                     | 1763                           | 0.66  |
| Singapore   | 34.8   | 2.7                      | 11,710                         | 12.85   |
| Sri Lanka   | 3.9  | 17.0                     | 2096                           | 0.23  |
| Taiwan      | 115.1  | 20.4                     | 8063                           | 5.65  |
| Thailand    | 89.8   | 56.3                     | 3580                           | 1.60  |
| Canada      | 428.7  | 26.5                     | 17,173                         | 16.16   |

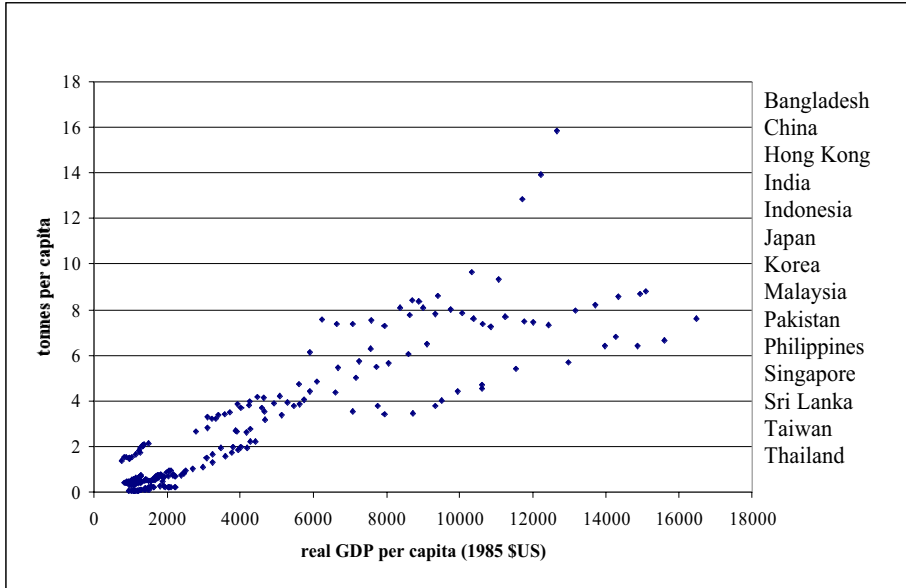
Source: *International Energy Agency (1998a) and PWT 5.6; see McRae (2001).*

Table 3  
Growth Rates of CO<sub>2</sub> Emissions and Other Economic Data For Some Asian Countries, 1990-96 (percent)

| Variable                   | China | India | Indonesia | South Korea | Japan |
|----------------------------|-------|-------|-----------|-------------|-------|
| CO <sub>2</sub> Emissions  | 33.0  | 43.9  | 53.2      | 75.0        | 10.9  |
| Total Primary Energy       | 28.1  | 25.1  | 34.0      | 76.7        | 16.3  |
| Real GDP (PPP)             | 96.4  | 37.8  | 56.6      | 53.6        | 11.6  |
| Population                 | 7.1   | 11.3  | 10.6      | 6.2         | 1.9   |
| CO <sub>2</sub> /Energy    | 3.6   | 15.0  | 14.6      | -1.2        | -4.5  |
| CO <sub>2</sub> per capita | 24.5  | 28.2  | 39.1      | 64.8        | 9.0   |

Source: *International Energy Agency (1998); see McRae (2001).*

As one produces more oil and gas, more carbon emissions are produced. I have been able to explain the amount of carbon emission in Asian countries using economic data that are tied to energy use. One can actually use economic criteria, especially real GDP per capita, to explain carbon emissions per capita because they are so closely tied to energy consumption. See Figure 11. How important are energy prices to controlling CO<sub>2</sub> emissions? It appears as if it is not as important as I think it should be. Table 4 contains elasticities of CO<sub>2</sub> emissions per capita with respect to real GDP per capita and real fuel prices. As an economist, I think that the most efficient method of reducing carbon emissions is to use the price system, even though some governments have said that they will not use carbon taxes.



**Figure 11:** CO2 Emissions per Capita in Asia, 1977-92.

**Table 4**  
Price and GDP Elasticities for CO<sub>2</sub> Emissions per Capita Within Asia-Pacific Region

| Demand Elasticity with Respect to: | All Countries | Low-Income   | Middle-Income | High-Income  |
|------------------------------------|---------------|--------------|---------------|--------------|
| <i>Real GDP per Capita</i>         | <b>0.86</b>   | <b>0.94</b>  | <b>0.90</b>   | <b>0.73</b>  |
| <i>Real Fuel Oil Price</i>         | <b>-0.02</b>  | <b>-0.03</b> | <b>-0.01</b>  | <b>-0.04</b> |

*Notes:*

Low-income countries refers to Bangladesh, India, Indonesia, Pakistan, Philippines, and Sri Lanka; Middle-income countries refers to Korea, Malaysia, Taiwan, and Thailand; and High-income countries refers to Hong Kong and Japan.

*Source:*

- McRae (2001).

In summary, it is expected that in the future there will be excess demand for energy products (oil and natural gas) in all sectors of the economy. We have examined transportation requirements in Latin America and non-transportation needs in Asia. Therefore, any discoveries made offshore BC will likely have a market either within Canada or within Latin America or Asia.

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### **Lavina White**

#### ***Participant and member of the Haida Nation***

I want to speak for my grand-daughter. The assault on Native people, their land and resources, has to come to an end if we are to continue living on Mother Earth. Our environment was intact; it has taken only ninety years for it to be destroyed. There are alternatives to oil and gas development; there are no alternatives to food. I never once heard about indigenous people doing well from oil and gas. I am asking for your help today to stop the oil and gas development in our sea.

## **DISCUSSION OF QUESTIONS REGARDING THE POLITICS, PLANNING AND ADMINISTRATION OF OIL AND GAS DEVELOPMENT**

### **Doug House**

*Professor, Sociology, Memorial University of Newfoundland, St. John's, NF*

We have heard a lot of different points of view during these most stimulating two days, and also all sorts of important information being provided for people from different points of view.

In our final panel we have four participants, two from the east coast and two from the west coast of Canada. The panel is going to focus first of all on the way in which oil and gas administration evolved and was put into place on the east coast, primarily in Newfoundland and Labrador where things proceeded a little ahead of Nova Scotia, and became something of a model for the Nova Scotia approach. And from what I understand it has already been to some degree used for a model for what *might* be put into place in terms of a Pacific Accord.

### **Steve Milan**

*President, Canadian Imperial Venture Corp., first director Newfoundland petroleum directorate, St. John's, NF*

As a geologist by training and having worked in 26 different countries, I tend to have a scientific approach to what I do – I try to approach things in such a way that I apply the scientific principles of defining the tasks, and focusing and arriving at some sort of pragmatic and reasonable decision. I also tend to believe in action rather than words – for me often the actions are far more eloquent in describing where your mind is than the words you might say. Here I will describe some of what happened – not necessarily what should have happened – a matter of facts. It is always important to consider the facts - often what we believe to be true is not and what we believe is not true is true.

### ***A hierarchy of steps***

There is a kind of hierarchy in how you address this issue. First, you start at a high level and ask the questions: What are you trying to achieve with all of this? What are your policies? (Policies is just another word for politics). This is not a bottom up process but rather one in which at the beginning you have to decide on your journey. You cannot just stumble on to it in a haphazard fashion. Although I am based on the east coast of Canada, I have also worked in an advisory capacity in several other jurisdictions, some very big, some very small, in other parts of Canada and in other countries. My advice was not always the same. The process was the same, but my advice was not the same. For example, at one point I was advising the British Virgin Islands, a very small country, and my advice there was to stay away from oil and gas development, because I felt that they had far more to lose than to gain. I provided quite different advice to what we ended up acting on in Newfoundland and that advice was quite different to what I provided in Guatemala and again in Pakistan. The point is that the answer doesn't always have to be the same – but hopefully the answer fits the facts.

### ***Public Policy***

The initial steps therefore are matters of public policy where you really define in a public sense, what the issues are and what you are trying to achieve. This requires very strong leadership and this type of approach has to be supported by the capacity to analyze – you have to be able to take apart the problem and see if there is a solution. Not every problem has a solution, but you do have to be analytical. It is a constant feedback loop where you look at the problem, analyze it, come back at it again and again and then either you give up or you solve it. That kind of analytical capability is absolutely critical. And what is also critical is that you do not focus down too early but rather that you take a broad multi-disciplinary/multi-factoral approach to what you are dealing with, because it is not simple. There are a whole host of different aspects to be integrated into the picture at the end of the day.

The art in all of this is to take these various inputs and emerge with a set of policy objectives that are reasonably acceptable to a broad cross-section of people and also saleable to the oil industry. This is a factor in this workshop that is surprisingly missing. As it was pointed out by one of the previous speakers, unless we really do things quite differently here, it is the oil industry at the end of the day that is going to be your agent to help you achieve your

objectives. My advice with regard to the next step is to engage the oil industry, as soon as possible. You may be surprised by what you find.

As was pointed out I was involved with Petro Canada. In fact, with our permits on the Dixon Entrance we did, in fact have a very successful program with the Haida Nation in helping to research some of their history and to restore some of their sacred places. When we looked at the moratorium in 1984, we recommended to leave it where it was. In fact, you may just find that there is no great rush of people wanting to develop oil and gas there. And wouldn't it be ironic if we had gone through all of this effort to give a party, and nobody comes? At least that should be established. I can tell you from hard experience, that if the resources are not that attractive, then you will have to give them away in order to interest somebody. There is a relationship between how attractive it is and how hard you can bargain. And this is very clear. That is actually what you need to do.

### *The operational perspective*

John Fitzgerald will be speaking next and will address how this is put into an operational sense. When we started off in the early 1970s we had a team of four. We had very strong political leadership, which we in fact have had all throughout, although there were several different ministers, and even two different stripes of governments. On our team was a young lawyer, myself as an industry person, and an economist, a very analytical economist, who could arrive at a common language, take many different aspects and bring them together so that we could make decent decisions. We also had a secret weapon at the time – we built one of the first cash flow models. It had to run on a big mainframe at the time, and we could only run it at night, but we were ahead of the federal government and were ahead of the oil industry and although we were very small we could act more quickly than they could and we could keep them off balance. In this way we were able to engage the oil industry very successfully and we were also able to engage the federal government who were telling us that we did not own the resource. They claimed that we did not have any rights to it – does this sound familiar – to these properties which Newfoundland argued had been brought into Canada when they joined Canada. We were also told that even if you owned it, you cannot control it because you are not bright enough. We had to kill that argument by demonstrating that we could indeed control it. And in the end we found that what we thought initially was a weakness, that is that we were small, turned out to be our best advantage. As long as we were smart. This required a lot of dedication and a lot of time. This does not happen quickly – and it takes negotiation, negotiation, negotiation.

### *Administration perspectives*

Once you set your policies, the rest really is plumbing. A lot of this has been already done by somebody else, somewhere else, at some point or other. There are only so many techniques that you can use – in terms of arriving at a set of regulations which will give life to your objectives. The function has to follow the form. What about the type of administrative structure? Exactly the same - very pragmatic. What is it you want to do? What is your philosophy? Is it very interventionist, or is it laissez-faire? These are the decisions that are being made, and have to be made, as you go along. There is no right answer - only the answer that suits and acknowledges the realities of the situation. For us, we were small, and we could not deal with a very complex situation. But so long as we were hitting the high spots, we were happy.

So you start with a policy and at that time the administration is quite thin. When you have got something, then the policy needs refreshing from time to time, but this is not such an issue. The administration however, is an issue. The question is: Can you administer it so that you can achieve your objectives? We had a small team, mostly internally in the department, but we also had access to consultants, as we went through the steps. In addition, we built a lot of bridges to the other departments in government and we communicated, communicated and communicated with all of the publics. All of the people who we should have been talking to, we talked to. We even published and ran courses so that we had a least a common language to talk about. It was a very interesting time.

I left this about 1979 and then returned when the discovery well was found in Hibernia. Then we had something tangible. That is when I came back and designed the Newfoundland Petroleum Directorate. This was not an original thought, in that the Norwegians had a Petroleum Directorate. The idea here was to put together a task team that would be focused on this issue – just this one. We realized that this went beyond oil and gas and included things such as human resources, social, cultural, legal, and most importantly the financial elements. I did not try to build a team with all these people because we could not afford it – but what we did both within government and



within my group was to have representatives of each of these elements and in addition we had very good relationships with the departments in government. This went along quite nicely until we really overstepped our mark with the federal government and we took them to court – and we lost. Those were the dark days. With that one, the history lesson is over. And now I will pass to John Fitzgerald who will pick up the story.

#### **Moderator's Comment, Doug House**

Speaking as one of the organizers, we did make efforts to have more involvement of the industry in this session and for their own reasons they declined our invitation to some significant degree. I certainly agree that it would be a good thing to have them involved. A friend of mine, that used to work with me, said, when we closed down our Commission, well that is fine – you ran your section of the relay race and now you pass the baton on to the next person. Steve is passing the baton on to John today. In another sense this happened earlier as well.

### **Regarding the Politics, Planning and Administration of Oil and Gas Development in Newfoundland**

#### **John Fitzgerald**

*Former Chair, Canada-Newfoundland Offshore Petroleum Board, St. John's, NF*

#### ***Background***

In 1985, the governments of Canada and of Newfoundland signed a political agreement that ended a long-standing, and sometimes bitter, conflict between the parties regarding the ownership of and jurisdiction over the oil and gas resources in the Newfoundland Offshore Area. These questions, or elements of them, had been the subject of references to the Supreme Court of Canada by the federal government and to the Appeals Division of the Supreme Court of Newfoundland by the provincial government in 1982. While both courts had ruled in favor of the federal government on the legal question, a very strong sentiment continued to exist in the Province that Newfoundland should, in equity, be able to control and benefit from the exploitation of these resources as if they were located on land because it had brought them with it into Confederation. The provincial government continued to assert this position and, after the federal government changed in 1984, was able to reach an agreement, called the Atlantic Accord, with the new Progressive Conservative government providing for joint management of these resources and for the Province to be the principal beneficiary of their development. The Accord was signed in 1985, and “mirror legislation” (the Canada-Newfoundland Atlantic Accord Implementation Act and the Canada-Newfoundland Atlantic Implementation (Newfoundland) Act) giving it legal effect was enacted in the Parliament of Canada and the Newfoundland House of Assembly. Both statutes were proclaimed in April 1987. The Accord Acts also provide that the Province can establish the royalties applying to offshore resources and establish the Canada-Newfoundland Offshore Petroleum Board as the joint management agency that administers the resources on behalf of both governments. The Board actually began operations in January 1986- more than a year before the Accord legislation came into effect.

The Board's mandate covers all aspects of the resource management process except the setting of royalties. It includes administration of the land tenure system, resource assessments, the custody and dissemination of geological and geophysical data, the approval of development and benefits plans, the safety of operations, environmental protection and resource conservation to ensure the resources are exploited without waste.

The Board is comprised of seven members. The federal and provincial governments each appoint three, and both appoint the Chairman jointly. The two governments may also designate a member(s) to be Vice-Chairman. The executive officers of the Board serve in a full time capacity. The Board has a staff of geologists, geophysicists, engineers, environmental protection officers, legal officers, data management specialists and support professionals to enable it to discharge its varied mandate. It also relies on formal Memoranda of Understanding with departments and agencies of both governments for access to relevant expertise without duplicating staff or services.

The Accord Acts provide that, the two governments share the cost of the Board's operations equally. For the first ten years of its existence, governments provided all of these funds without any attempt at cost recovery. More recently, part of the Board's operating cost is being recovered from industry, with the two governments sharing the balance.

The Board operates under comprehensive statutory authority and, for the most part, its decisions are final. The Accord legislation defines a few decisions as “fundamental”. Such decisions include the terms under which exploration rights are issued and the approval of development plans. These decisions of the Board require the approval of the federal and provincial “Energy” Ministers in order to become effective. The provincial Minister may disapprove the proposed mode of development (choice of production system) but that disapproval may be overturned by the federal Minister if that action delays achievement of domestic security of supply. Ministers may decline to approve a fundamental decision of the Board, but they cannot substitute a decision of their own in its place. In addition, if they want to disapprove of the Board’s decision, they must do so within thirty days or it will come into effect.

The Ministers may also jointly issue directives to the Board on a few matters. These include fundamental decisions; the conduct of public hearings; Canada- Newfoundland benefits plans; the exercise of certain orders of the Board (e.g., the suspension of operations); and the conduct of studies and provision of advice to Ministers respecting policy issues. A significant feature of such directives is that they must be given jointly, and they must be published in the Canada Gazette (i.e., both orders of government must agree on a matter before a directive can be given and there can be no secret directives). The subtle, but powerful message inherent in this provision is that the Board is intended to be the independent arbitrator of these issues but it is also expected to be sensitive to the concerns of all parties potentially affected by its decisions and to make those decisions in a way that enables those concerns to be articulated and takes them into account. The statutory provision for joint directives recognizes that there may be differences of interest among the Board and the federal and provincial governments on an issue from time to time. However, the Board will be subject to Ministerial direction only in a limited number of important public policy areas, and then only if its position differs from the position of both governments.

### ***Organization***

The Board’s staff of about forty persons is organized into seven departments; Legal and Land Administration, Exploration, Reservoir Engineering, Operations and Safety, Environmental Affairs, Industrial Benefits and Administrative Support. The names of the departments suggest their respective responsibilities and the types of professionals that staff them. A more complete description of these departments and their activities is provided on the Board’s website at [www.cnopb.nfnct.com](http://www.cnopb.nfnct.com).

The Board’s duty is to administer the legislation, i.e., the Accord Acts and the twelve sets of regulations made under them. The legislation is very comprehensive in scope and it reflects the decision of governments that the Board should be the lead agency (a single window) for dealing with the petroleum industry in offshore oil and gas matters. This does not mean that the Board is the sole authority in the offshore area. Other departments, e.g., Fisheries and Oceans and Transport Canada, also have statutory duties that affect offshore oil and gas activities. The legislation aims to ensure:

- There is an orderly and open process under which companies can acquire the right to explore in the offshore area;
- Information acquired in the exploration process is properly analyzed and provided to governments, and in due course, to the public through the Board;
- Offshore activities are carried out safely and in an environmentally responsible manner using properly trained personnel and equipment that is “fit for purpose”;
- Oil and gas resources are produced using good oilfield practice so as to maximize recovery and avoid waste, and
- Works and activities authorized by the Board are carried out in conformity with a Canada- Newfoundland Benefits Plan that honours the requirements of the Accord Acts.

Insofar as the latter point is concerned, it is important to note that the Board has no mandate to promote the development of offshore resources or to advocate any particular style of production system. In Newfoundland’s case, provincial government representatives and members of the public have filled these roles.

### ***Relations with Governments, Industry and the Public***

With a mandate as broad as it has, one might expect that the Board would be in conflict with either the industry, government(s) or advocacy groups a great deal of the time. While there have been differences of view from time to time, there have been remarkably few serious issues. This speaks well for the clarity of the legislation generally and the professional way in which the Board's staff does its work. The Board's operating style is to research issues thoroughly, to value, respect and take seriously into account the advice provided by the professionals in those government departments with whom the Board consults under its Memoranda of Understanding, to regard all expressions of concern as serious matters to bring reasoned positions to discussions with operators and to state the reasons for its decisions. The Board also publishes formal Decision Reports respecting its decisions on matters such as development applications and has said publicly that all development applications will be subject to a public review process for the near future.

The public reviews of the Hibernia and Terra Nova development applications have afforded the opportunity for broad scale public participation in the process. There was also a great deal of public debate about offshore development generally before the Hibernia development plan was submitted. These processes served to highlight the issues of greatest concern in the public mind. These were worker safety, environmental protection, and economic benefits – generally described as jobs for individuals and participation in the supply of goods and services by local and other Canadian businesses. These continue to be the areas of public concern and therefore the areas where vigilance and reassurance is necessary.

The question of worker safety will always be prominent in the public mind in Newfoundland because of a general awareness of the unforgiving nature of the North Atlantic and more particularly because of the loss of the Ocean Ranger drilling rig with all hands in 1982. The regulatory requirements that now exist for an independent review of the design of installations, for formal safety management systems, for the documented training of personnel for their tasks, coupled with the safety inspections and audits done by the Board before authorizing activities and during their conduct provides a very rigorous level of scrutiny in this area. Nevertheless, there are assertions from time to time that the safety regime is flawed because the Board has other responsibilities that could conflict with its safety role. While this is not true in reality, it does require the Board to repeat its explanation of the system publicly whenever such assertions are made.

The Board is also a member of the International Regulators Forum, through which it has access to information on safety in offshore petroleum activities in Australia, Canada, Norway, Netherlands, UK and USA.

Because of the traditional importance of the fishery to the Newfoundland economy, the well-publicized shipping accidents involving oil tankers and concerns expressed at hearings into development applications about chronic discharges from drilling and production installations, there is a quiet but pervasive concern about environmental protection during oil and gas activities in the Newfoundland offshore area. The existing regulations require operators to use the best available proven technology to treat wastewater before discharging it overboard and to have an approved spill response plan. Development projects are also required to implement approved Environmental Effects Monitoring plans, the results of which are submitted to the Board and are available to the public, to verify the predictions made in the impact assessments that are part of development applications and to provide a warning should those predictions prove to be in error. In addition, the Board, along with other regulatory authorities in Canada, is moving to restrict further the discharges that it authorizes and to require the reinjection of produced fluids and drill cuttings where this is practicable. The challenge in this area is to maintain an awareness of emerging technologies and to assess their appropriateness so as to be able to persuade operators to adopt them. The Board's emphasis is to continuously improve environmental safety by requiring reductions in chronic discharges whenever practicable and to avoid spills, be they large or small.

Not surprisingly in a Province with very high unemployment levels, the benefits area is the source of most complaints. This is partially because there is an imperfect understanding of the Board's role, and partially because some of those who do understand its role are unwilling to accept it. The Accord Acts require that a benefits plan provide a full and fair opportunity for Newfoundland and other Canadian businesses to participate in the provision of the goods and services required in offshore oil and gas activities and for enterprises based in the Province to receive first consideration when they are competitive in terms of price, quality and delivery. A similar provision requires that residents of the Province receive first consideration for the employment and training opportunities arising from offshore activities. Difficulties have arisen both when companies have failed to prequalify to be on the bidders list and when their bids have been unsuccessful. The Board's role is to ensure that an acceptable process is

in place to provide qualified companies an opportunity to bid and that the process for evaluating bids is fair. Invariably, those who have complained have wanted the Board to ensure a particular outcome favorable to them or their client group.

A related complaint comes from those who believe the Board should insist that all developments use a gravity base platform because they would have to be built in the Province and therefore produce higher employment levels during construction of the facilities. As observed earlier, the Board does not have the authority to insist on a particular style of development. It must deal with the application before it. It may decline to approve the application but can only do so on grounds that are within its jurisdiction. The provincial Energy Minister may decline to approve a development plan approved by the Board on the ground that the mode of development is unacceptable. In either case, a proponent would have to consider whether it wished to proceed, and if so, how it would meet the stated objection.

Finally, there have been complaints from unsuccessful job applicants who have completed training programs, sometimes at significant personal cost and sometimes with public support, in the hope of securing positions in one of the offshore projects. The Board's role is to ensure that operators and their contractors have a system that sets objective standards and fairly considers local residents for any employment opportunities that arise. It cannot be an advocate for the employment of a particular individual but some unsuccessful candidates find this reality difficult to accept.

### ***Summary***

The Board will soon complete fifteen years of operation. It has established effective working relationships with those departments and agencies upon which it relies for advice and it has a working relationship with offshore regulatory agencies with similar responsibilities internationally. It has earned the respect of those it regulates and the confidence of governments for the professional manner in which it discharges its duties. The legislation under which it operates has proven to be robust in meeting the technical requirements of offshore resource management. Only in the areas of industrial and employment benefits is there a persistent problem that arises from the Board's inability to satisfy the expectations of some members of the public who have a misunderstanding about the Board's role.

### **David McGuigan**

***Prince Rupert, North Coast Oil and Gas Task Force, Prince Rupert, BC***

Mr. McGuigan provided a summary of the following paper

### **Economic Prosperity and Jobs for the Pacific Northwest Through Greater Diversification in the British Columbia Economy**

***Prepared by: The North Coast Oil and Gas Task Force (NCO&GTF)***

## **Quick Facts**

### ***Offshore Oil and Gas on the British Columbia Coast***

#### **Estimated Reserves**

9.8 billion barrels of oil (ten times the estimated reserves of Hibernia)  
25.9 trillion cubic feet of natural gas

\* Geological Survey of Canada

#### **Value of Reserves**

\$295 billion in oil (gross revenues over time)  
\$5.2 billion in gas (gross revenues over time)  
Provincial royalties could surpass \$45 billion

#### **The Benefits**

- Employment (thousands of jobs)
- Feedstock for further development of industries like Direct Reduced Iron (DRI) production, Natural Gas Liquids (NGL) extraction and terminal facilities, Liquefied Natural Gas (LNG) production and terminal facilities, Methyl Tertiary Butyl Ether (MTBE) fuel additive production, Liquefied Petroleum Gas (LPG) terminal and export facilities, Petrochemical terminal and export facilities, and much more.
- Federal and Provincial royalty revenues as well as general tax revenues from economic activity.

#### **Current Moratoria**

- Federal government moratoria on tanker oil tanker traffic on the BC Coast through Dixon entrance, Hecate Strait, and Queen Charlotte Sound. (1972)
- Subsequent federal Order-In-Council indefinitely prohibited exploration and drilling in the area.
- Provincial Government moratorium on exploration and drilling in Johnstone Strait and the Straits of Georgia and Juan de Fuca. (1981)

*A joint federal-provincial inquiry in mid 1980's set out a number of conditions under which exploration in BC could proceed. Today, all moratoria remain in place.*

#### **The Support**

- Locally elected governments of Prince Rupert, Port Edward, Terrace, Kitimat, Port Clements, and Stewart representing nearly 70,000 people.
- BC Chamber of Commerce representing 100 communities province-wide and 23,000 businesses.
- BC Business Council
- Miscellaneous community and business groups from across the province.

***Today the oil and gas industry prospers on the East Coast of Canada and in the Northeast of British Columbia. Why not on Canada's Westcoast?***

## ISSUE

In 1972, the federal government imposed a moratorium on the westcoast to prevent crude oil tankers from traveling through Dixon entrance, Hecate Strait, and Queen Charlotte Sound due to concerns over potential environmental impacts of such traffic. A subsequent federal Order-In-Council indefinitely prohibited any drilling and exploration in the area. In 1981, the Province of British Columbia implemented provincial legislation imposing an indefinite moratorium on offshore exploration in Johnstone Strait and the Strait of Georgia and Juan de Fuca. A full federal/provincial inquiry completed in the mid-1980's set out a number of conditions under which exploration in B.C. could proceed. Today, all of these moratoria remain in effect and inhibit any exploration or development of the offshore oil and gas reserves on the British Columbia coast preventing the development of the industry. Meanwhile, the East Coast of Canada is experiencing the strongest economic growth in the nation through the development of the Hibernia and Sable Island projects.

## BACKGROUND

### *The North Coast Oil and Gas Task Force*

The North Coast Oil and Gas Task Force is a group of concerned individuals from the Prince Rupert area who came together in the Spring of 1997 to seek a solution to the current economic turmoil facing British Columbia's coastal communities. The downturns being experienced in the forestry and commercial fishing industries have had a dramatic negative impact on the region and it is apparent that a fundamental restructuring and shift in these industries will be required before a turnaround will be realized. In the meantime, a solution is apparent that will not only provide immediate economic activity but foster greater diversification and opportunity for further economic development in the future, ensuring greater vigor and prosperity for the local, regional, and provincial economies.

The North Coast Oil and Gas Task Force (NCOAGTF) was set up to investigate the potential for oil and gas exploration on the northcoast of British Columbia with the primary objective of building a case for the lifting of the current moratoria on such activities. Activities have focused on assembling information on the industry to build such a case; environmental reviews and advances, studies on the northcoast area, industry developments, industry perceptions of the area, and successful case studies on development activities elsewhere in the world (eg. The Hibernia and Sable Island projects). This information has been used to build awareness of the potential benefit to the region and province and assemble support for the lifting of the moratoria on exploration activities on the West Coast of Canada.

The group is comprised of the following:

|                  |                 |
|------------------|-----------------|
| David McGuigan   | Bill Belsey     |
| Shane Deinstandt | Allan Sheppard  |
| Victor Prystay   | Doug Mackereth  |
| Steve Smith      | Shaun Stevenson |

The primary objective of the North Coast Oil and Gas Task Force is to have both the provincial and federal moratoria on exploration and development of these resources removed, ensuring economic prosperity for the communities of the northcoast and British Columbia as a whole.

### ***History***

Exploration on the north coast of British Columbia dates back to 1913 and proceeded through 1971 (see history attached).

In 1972, the federal government imposed a moratorium on the west coast to prevent crude oil tankers from traveling through Dixon entrance, Hecate Strait, and Queen Charlotte Sound due to concerns over potential environmental impacts of such traffic. A subsequent federal Order-In-Council indefinitely prohibited any further drilling and exploration in the area. In 1981, the Province of British Columbia, concerned the federal moratorium may be lifted, put in place provincial legislation imposing an indefinite moratorium on offshore exploration in Johnstone Strait and the Strait of Georgia and Juan de Fuca. A full federal/provincial inquiry completed in the mid-1980's set out a number of conditions under which exploration in B.C. could proceed. In 1989, as a result of the Exxon Valdez spill in Alaska and others, the Minister of Environment, Land, and Parks reinforced the federal moratorium and announced there would be no offshore drilling for a minimum of 5 years and effectively closed down all offshore exploration related activity. Today, all of these moratoria remain in effect and inhibit any private sector involvement in sea floor exploration off of the British Columbia coast preventing the development of the offshore oil and gas industry. Meanwhile, the East Coast of Canada is experiencing the strongest economic growth in the nation through the development of the Hibernia and Sable Island projects.

### ***The Resource Potential***

The Geological Survey of Canada released a report in the summer of 1998 titled *Petroleum Resource Potential of Sedimentary Basins on the Pacific Margin of Canada*. The report outlined the preliminary estimates of reserves of oil and gas resources on the British Columbia coast. The report sighted the Queen Charlotte Basin could hold an estimated **9.8 billion barrels of oil and 25.9 trillion cubic feet of gas**. To put this in perspective, the reserves are estimated to be nearly 10 times the size of the Hibernia development, one of the key initiatives contributing to the economic recovery and growth being realized on Canada's east coast.

### ***The Economic Potential***

The present socio-economic situation in many British Columbia coastal communities is not dissimilar to the previous situations encountered elsewhere in Canada and the rest of the world. Canada's East Coast has undergone a major economic transition as traditional sources of employment were impacted through the declines in traditional industries. The development of the Hibernia project has fueled dramatic growth in employment and income in the region and solidly positioned the region as the leader in economic growth in Canada.

Scottish, Norwegian, and Shetland communities all experienced similar economic conditions prior to the development of the North Sea oil. They were facing a decline in traditional sources of employment and were looking for opportunities to shift employment and training towards a higher technological content. To a great extent, this has occurred. Subsequent to the oil and gas development phase, the economies of these communities are much more diversified, with higher skill levels fostered by the growth in new technology-based companies.

The north coast communities of British Columbia are experiencing the highest level of unemployment and dependence on Social Services in British Columbia. Some communities are experiencing unemployment levels in excess of 80%. With the outlook for the forestry and

commercial fishing sectors bleak, it is apparent that new industries must be developed to foster economic growth and provide greater diversity in the economies of the region.

The oil and gas sector provides substantial resource revenues to the provincial and federal governments (e.g., royalties and tenure sales) totalling between \$300 and \$400 million per year, as well as revenue from taxes of general application (e.g. property, social services and motor fuel) which average \$100 million per year. Oil and natural gas revenues represent approximately 2% of provincial government revenues.

### ***The Future***

The proximity of British Columbia's north coast to North American and Pacific Rim markets make development of this resource attractive. Not only would the resource provide direct benefit, the proximity of abundant supplies of oil and natural gas will provide the feedstock to foster the development of world class industrial projects such as:

- ✓ Direct Reduced Iron (DRI) production;
- ✓ Natural Gas Liquids (NGL) extraction and terminal facilities;
- ✓ Liquefied Natural Gas (LNG) production and terminal facilities;
- ✓ Methyl Tertiary Butyl Ether (MTBE) fuel additive production;
- ✓ Liquefied Petroleum Gas (LPG) terminal and export facilities;
- ✓ Petrochemical terminal and export facilities;
- ✓ Enhances oil recovery from mature fields; and
- ✓ Gas fired electrical generation and cogeneration facilities.

### ***The Environment***

Certainly, the environment is of the utmost concern when developing a resource, especially in a region dependent on the health of the marine environment in both the commercial fishing and tourism industries.

Advancements in exploration, drilling, and extraction technology have minimized the risk of incident to virtually illegible levels. The advancements seen over past decade have been necessitated by an increasing concern for the environment globally and have resulted in investment the development of technologies, which will minimize the risk of oil and gas extraction. It has been said that the advancements that have been realized in the environmental technologies in the oil and gas industries over the past decade can be compared to the advancements in the automobile industry since the Model A.

Furthermore, Canada has some of the most stringent environmental protection legislation and regulations in the world, both federal and provincial, ensuring the responsible exploration and development of the industry.

Today, ten times more petroleum products enter our oceans through natural seepage and run-off than from oil and gas exploration and development.

The development of the offshore oil and gas industry on the British Columbia Coast will not happen at the expense of the environment and the industries dependent on its health; namely commercial fishing and tourism. Rather, its development will take place in concert with these industries to ensure greater diversification and prosperity for provincial economy in the future.



### Offshore Oil and Gas Exploration on the British Columbia Coast

- 1913 1<sup>st</sup> onshore well drilled on Graham Island (8 wells drilled on Graham Island 1949 – 1971)
- 1958 Richfield Oil drills 6 onshore wildcats on NE tip of Queen Charlotte Islands.
- 1965-69 Shell Canada undertakes offshore exploration - 8 wells drilled
- 1971 Chevron undertakes marine seismic surveys
- 1972 Federal Government impose moratorium to prevent crude oil tankers from travelling through Dixon Entrance. Hecate Strait and Queen Charlotte Sound enroute from Valdez. Subsequent order-in-council indefinitely prohibits (further) drilling in these waters.
- 1978 Geological Survey of Canada estimates recoverable petroleum resources of 150 millions barrels oil and 6 trillion cu. Ft. gas.
- 1981 Province of British Columbia places indefinite moratorium on offshore exploration in Johnstone Strait and Straits of Georgia and Juan de Fuca.
- 1982 Memorandum of Agreement between Government of Canada and Province of BC established – basis for review of potential environmental and socio-economic effects of offshore exploration.
- 1983 Five member West Coast Offshore Exploration Environmental Assessment Panel (terms of reference: **present recommendations** under which **offshore exploration** in waters north of Vancouver Island **could proceed**) appointed.
- 1986 Panel recommends 92 terms and conditions to be applied to **permit exploration**.
- 1991 Institute of Sedimentary and Petroleum Geology quotes results from Frontier Geoscience studies comparing geology of Queen Charlotte Island to Cook Inlet “generally positive – higher – view” (of petroleum potential)
- 1992 Spark Oceans committee (an initiative of the Science Council of BC) reports **much more drilling is required** to assess hydrocarbon potential “ – area has technical potential for significant reserves... magnitude of the North Sea of Alaska Slope dimension”.
- 1995 Geological Survey of Canada reports “Queen Charlotte basin – has significant petroleum potential – abundant reservoir strata – numerous oil and gas shows – estimate of total recoverable resources – **2.6 billion barrels oil, 20 trillion cu. Ft. gas**”
- 1996 COFRI Conference held in Prince Rupert. Delegates urge further investigation of offshore oil and gas exploration and a process to move towards lifting the moratoria.
- 1998 **Geological Survey of Canada** reports “The current assessment indicates a substantially greater petroleum resource potential for the area”. **Potential reserves estimated at 9.8 billion barrels of oil and 25.9 trillion cu. Ft. of gas.**
- 1999 **Poll of Northern BC residents** by Sanglang Consultants for the Northern Development Commissioner reveals **overwhelming support** for the lifting of the moratorium.
- 2000 **Survey of 1500 BC Households by the University of Northern BC** finds 74% of northerners and 67% of southerners believed there would be oil and gas wells off the BC coast in the next 5 years.

### ***The Support***

The North Coast Oil and Gas Task Force (NCOAGTF) has been busy assembling information on the industry and making presentations to government and community groups over the past three years and has seen an overwhelming positive response. The NCOAGTF has the written support of the locally elected governments of Prince Rupert, Port Edward, Terrace, Kitimat, Port Clements, and Stewart, as well as many stakeholder groups throughout the region representing nearly **70,000 people**. In addition, the removal of the moratoria has been supported by the BC Chamber of Commerce representing over **100 communities and 23,000 businesses** throughout British Columbia. The Business Council of British Columbia has also shown its support.

### ***Where Do We Go From Here?***

The primary roadblocks to exploratory and knowledge gathering activities and discussion of any further options are the **federal and provincial moratoria**, imposed 1972 & 1981 and **still in effect!** These have a general impact in inhibiting the strategic exploration of our continental shelf and its resources.

The jurisdictional issues between federal, provincial and native governments concerning ownership of the sea floor and associated resources must also be resolved. Environmental guidelines and an umbrella regulatory authority to oversee and manage mineral or hydrocarbon development, the formation of a Canada Pacific Offshore Petroleum Board, can and should be put in place.

The strategic evaluation of offshore oil, gas, and mineral resources by British Columbia and Canada requires:

- Lifting of the existing moratoria on exploration.
- The exploration of our continental shelf area, and mapping and documentation of the offshore environment and its resources.
- The resolution of jurisdictional issues related to the sea floor, jurisdiction in environmental impact assessment, and the native land claims.
- The implementation of integrated and sustainable environmental management plans for the Western Canadian Exclusive Economic Zone that recognize the needs of exploratory and development activities.

We know that today it is economically feasible to safely extract gas and minerals from our oceans. The fundamental issue is the need to lift the current moratoria and address the associated environmental issues. These issues need to be addressed now within a comprehensive framework that will ensure the responsible development of our marine resources.

The economic opportunities for the northwest and the Province are substantial and the future sustainability of northern communities depend on such economic diversity. All we have to do is look at what has take place on East Coast of Canada. Why not Oil and Gas on the West Coast?

For more information contact: David McGuigan, Chair  
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**Charlie Bellis**

*Haida First Nation, member of 1986 Federal-Provincial Environmental Assessment Panel, Masset, BC*

You always learn something – I was very pleased to hear our speakers talking about their land claim in Newfoundland. We should learn a lesson from that.

Jon Sector and I were on the Panel together. Being a commercial fisherman all my life I find it ironic that the federal government has now taken away our fishing – the fish are gone. And in the forty years of my commercial fishing and running up and down the BC coast (I was telling my Newfoundland counterpart that in BC we have 15,000 miles of coastline) using the same boat and doing the same thing, I have been doing since I bought the boat 40 years ago, I would now have to have six licences. Mr Smith from Prince Rupert made a very good presentation – the only thing wrong with his speech is that he wasn't aboriginal – but I can see that the government is treating the whites like Indians so now they know how it feels.

Paul Scott was the federal man on the Panel. I learned from going to England on the Panel that the English people didn't have a public process like we have. And so I have to thank both the federal and provincial governments for having a process. In BC we visited some fifteen towns and villages and we heard all the elders on the coast and I had a feeling that that was good. I really think that the public process that we had was very encouraging and I would hope that it continues on. What we heard in all the villages was their concern about our salmon. We have about a billion salmon fry migrate up the coast in the spring of the year and that is what we heard the most – their concern about our salmon stocks and fisheries. I want to bring that to your attention. We heard that from every village on the west coast of Vancouver Island, all along the Central Coast, to Port Simpson, the last village on the coast on our side. Those concerns really are still there. In the 15 years since the panel put out its report, there hasn't really been that much done about it. A lot of work has to be done to fill in the data gaps and to give people confidence in the process and how it works.

Certainly going over to the North Sea and looking at the Union oilfields, for me coming from a small town, was an eyeopener. We went out to the Union field, and landed on the platform – they have a 300 mile pipeline into Aberdeen. It was amazing the structure that was involved. We also went to the Shetland Islands, and the old doctor in charge of the social things on the island told us that the oil industry had disrupted their culture somewhat.

**Robert Hill, Tsimshian Tribal Council**

Charlie raised an issue that is very near and dear to all first nations in British Columbia – governments and as well any potential resource extraction out of our territory –always comes with an element of lobbying – people who can convince you and people who can tell you that these are the benefits that you are going to have. We seem to have (as First Nations) lost a lot of faith in our government. The only reason that the province of BC entered the treaty commission was the promise of interim measures, later a new term – treaty related measures. While we were at the table discussing or trying to negotiate the treat process with those very same governments (and that is what Charlie raised with regard to his no prejudice to BC land claims) the whole idea of interim measures came to the idea of interim protection measures. That, at the end of the day, while we were discussing our treaty we would have the resources left here.

Ed John touched on it a little bit when he described the way our society is creating third party interests here to extract those resources at such a rate that by the time we have done our treaty there may not be anything left. And it is almost a deliberate act by governments to allow that to happen – we have seen it in forestry, in fisheries, ourselves being regulated entirely out of the industry whereby at the end of the day, the only thing First Nations have left in the Prince Rupert area is the aboriginal area rights described in the constitution of Canada, Section 35.1. The aboriginal rights to harvest fish for food, for all other aquatic species for food. That is really what is at risk for us – that protection. Our fear is that that aboriginal right be diminished if in fact the moratorium is lifted to the degree that we have developers coming in once again to completely devastate the environment. That is why we have said right from the beginning, there is a need to consult the First Nations, by virtue of the fact that we are indigenous and that we were here before the Europeans came – we have a wonderful history right in the area that you are talking

about extracting the oil from – I can tell you stories about some of those unmarked rocks that we have in the middle of Hecate Straits – the ones that are marked on the charts but don't have a beacon on them. I am talking about North Danger Rocks – where you have a specific population of sealions – we have our legends and the Kitkatlas is adapted to that legend. Where on the pathway across to the Queen Charlotte Islands when we are travelling there to harvest some of the resources that the Haidas have, where that portion of the water comes up to the shallows of approximately six to eighteen fathoms. These are very shallow waters that we are talking about building structures in that are going to be extracting the resources from the bottom of the ocean. Not to mention the richness of the crustaceans that inhabit those waters – the crab and the different aquatic species that we have learned to survive on. They have been extracted to the degree that they are no longer there. Maybe that is what we have to do to allow the exploration of oil to go ahead. Certainly one thing that I was armed with before I came down here, is that if there is any notion of lifting this moratorium you will have to meet with those communities that might be involved – the Hartley Bays, the Haida, the Kitkatlas, the Lax Kw'alaams group, the Heiltsuk group, the Kitasoo. Every piece of rock in that vicinity is something that we made long before you came here. My great-grandmother is a direct descendant of the Haida Nation. We have stories of the connections that we have by virtue of the fact that we had to travel across this great water called Hecate Straits. And I think that is important – that any exploration of oil in that area – you would have to learn about those stories and understand why we are the way we are – why we are attached to the land and the environment and the aquatic species that we live on. So thank you Charlie for being on that panel – you carry our banner – it is a tough position to be in. One thing we have learned in this whole process is that in order to learn about the way we are going to work with each other sometimes we have to go to the other side and not just remain indifferent to each other.

#### **SYNOPSIS OF QUESTIONS FOLLOWING THE POLITICS, PLANNING AND ADMINISTRATION OF OIL AND GAS DEVELOPMENT SESSION:**

*Shouldn't we also be concerned about the fish?*

A participant noted that we should be concerned with the fish as well as the fishery – it is a subtle point but it is important to keep in mind when you are talking about the health of the marine environment. This is not meant out of disrespect to the 300 commercial salmon licence holders left in BC now. David McGuigan noted that his concern is also about the fish – a resource that brought the communities along over the years and that it is one of their key parameters of concern.

*Why did one NGO group sign a letter requesting the moratorium be lifted?*

The question was raised about the David Suzuki Foundation signing on to a letter requesting that the moratorium be lifted, particularly since they signed on as a member of the Alliance for the Preservation of the Oil and Gas Moratorium. David McGuigan quoted from a CBC radio interview with a representative of the David Suzuki Foundation (also up on the internet):

“she is not absolutely opposed to the ideal of oil and gas exploration....and she says she will support a lifting of the moratorium if both levels of government adhere to the conditions set out by the oil companies themselves. The oil industry told the government not to lift the moratorium unless the following three conditions were observed: protect sensitive areas, address First Nations concerns, and apply a recognized regulatory regime”

*What was the question posed?*

A participant noted that it was their understanding of the process that John Backhouse initiated that it was to ask the question about whether or not there is community interest in looking at this any more – that is, in looking at discussing the issue of lifting the moratorium. She noted that it was her understanding they are not asking “Should the moratorium be lifted? But rather “Are you interested in discussing the lifting of the moratorium?”

David McGuigan responded that the question was to look at it and to determine whether we should consider lifting the moratorium. He noted that the second report will be out in June or July, 2000, and that from the interview of 140 individuals and groups and impact groups answer of YES was indicated. He suggested that participants may want to go to the website for the Northern Development to get the details.

***Statement by Lavina White, Haida Nation***

Lavina White noted that there was one thing that really should concern everyone and that is that the indigenous people of this province do not have a good relationship with either level of government – at this moment. She stressed that there is no getting away from it – you have to deal with the First Nations people.

## **CLOSING REMARKS**

### **Doug House**

*Professor, Sociology, Memorial University of Newfoundland, St John's, NF*

I am speaking from a personal view – reflecting on the last two days – from the point of view of one of the people who was involved in organizing the conference.

I can't help but reflect back to one year ago when I visited here and attended the Coastal Communities Network annual conference and the issue of oil and gas development came up. After the conference was over I went to dinner with colleagues who said we should organize a conference to look at these issues in as dispassionate and objective and scientific way as possible – as a way of allowing people to think about these issues and to get factual information about the issues. Unlike most of us the conference was being organized.

### ***The Purpose of the Workshop***

It is useful to remind ourselves about what we set out to do. The purpose of our workshop, as John Pierce stated at the beginning, was to provide a factual basis, to the extent that we could, for considering whether or not to lift the moratorium, without taking a position as a group here today; and also if so, how best to develop the oil and gas industry, if we are going to develop it, in this province. In addition, I think it is true to say that we hoped that we would have a civilized open, respectful and congenial debate about these issues.

### ***Have we been successful?***

The second question I would ask is: Have we been successful? I think that we have been; a lot of people are better informed. For example, I heard an oil man say “I really was interested to learn all about the First Nations people on the coast here” and I heard somebody who was in fisheries say “I didn't know all of this about the oil industry before and it has been really interesting and helpful for me”.

So in the sense that we have got a lot of information out there for people to learn about and reflect on, I would say this has been successful. I also think it has been successful in terms of the manner in which all of us have conducted ourselves over the last few days. We have made new friends, and we have developed new respect, and a lot of us 'white' people have developed a new respect for First Nations people and the eloquent way in which they express their feelings and ideas about development in the region.

### ***What we have learned?***

We have learned a lot. We know there is significant oil and gas potential out there. We know there is a difference between oil and gas. We know a lot about the ways in which on the east coast of Canada we have attempted to deal with issues such as, How do you deal with the interaction between oil and gas and fisheries and other resources? There has been a lot of learning going on. Probably there was not enough in terms of community perspective - in terms of people who have been impacted by the industry presenting – and that would be a nice thing to do if we were going to have a follow up meeting.

There is, of course, no consensus at this point about lifting the moratorium and we did not expect that there would be. I think though, to the credit of everyone here, that it has been a respectful discussion from both points of view about this. There has been quite a lot of consensus about in Bob Hill's words “It is going to be one of the most important decisions to be made on this coast” and I think that is really true. I also think there has been a lot of consensus that if there is development, then we need to go about it in a very particular and very careful way. There needs to be some kind of Pacific Accord and there needs to be federal, provincial and also First Nations representation in the development of whatever Accord there might be. There has also been agreement that environmental stewardship is of crucial importance and that safety is of crucial importance, if this industry is to be developed on this coast. And I think we have learned that the industry itself is now more committed to these values than was the case in the past.

However, from a community point of view, we always have to recognize that there are different and vested interests – that the industry’s interests and our interests in the communities are not always the same – and we have to respect that on each side. We have also had a lot of consensus, very importantly, about public consultation – that there has to be what I call authentic public consultation in this process. That is crucial. This is not just, as someone put it yesterday, fly in, wave a paper in front of people, fly out and claim there has been consultation. That is not authentic public consultation – there has to be participation in the process that leads up to the decisions that are made.

We have also learned that there can potentially be significant local benefits to the people in the regions if the development goes ahead, including First Nations people. We have learned that these are possible, but they are not automatic and they will not happen unless we make it happen – we being the people in the communities and regions themselves. We cannot take it for granted.

We have learned that there are not only direct benefits but there are also indirect benefits in terms of revenues that government can redistribute to help improve infrastructure and to help invest, in other resource industries even, in the regions. We have to try to think of creative ways in which benefits from this industry, if it does develop, can accrue to people in the regions. There may even be a way in which there is some empowerment made possible for people in these coastal communities, both First Nations and non- First Nations.

I think we have also learned that there will be costs; that negative impacts can be minimized but they cannot be eliminated altogether. We have to recognize that and we have to decide what is the kind of risk that we are willing to take in developing this industry, if we do proceed to develop it. It is clearly better to do that than to stick our heads in the sand and pretend that it is not going to have any negative consequences.

We have also learned that there are lessons to be learned from the Atlantic and other jurisdictions that can be helpful in this region, if this industry is developed here; for example, about how to provide for good relations between the fishing industry and the oil industry. We in Atlantic Canada have a lot of experience now that you can build on in that regard – experience about regulatory regimes, about the involvement of local communities. At the same time we also learned that every jurisdiction nevertheless is unique and we cannot just take the model from one place and apply it to another, including British Columbia, and that it needs a tailor made approach to your needs and only you can determine what those are. Or as Robie MacDonald put it on the ecosystem side, every ecosystem has its own unique characteristics. That is true also for every socio-economic system. So we have to keep that in mind, if we do proceed.

### ***Moving forward***

We also learned that the mid-1980s review process on the west coast does provide a sound beginning – that there was a process that was gone through and we are not talking about starting from ground zero here. Rather there is a sound starting point for managing the resource.

I would also say that since this is a new resource industry, at least in the offshore (we already have onshore gas in British Columbia), there is an opportunity here, if you do proceed with development, to avoid making some of the terrible mistakes that were made with other resource industries on the coast. It is even possible to be optimistic here and think in terms of developing this resource in such a way that we can learn from it and do a better job in the future than some of the other resource industries in the region.

## **THINK TANK DISCUSSIONS**

### **Craig Orr**

***Executive Director, Watershed Watch Salmon Society  
Facilitator, Group 1.***

Our group decided that we have to really discuss what it is that British Columbia wants, and what is achievable. Is it employment, for example? The participants from Atlantic Canada offered advice but were very clear that they were trying to avoid advocacy positions. We agreed that although we can draw examples from other jurisdictions it has to be a British Columbia decision, and it has to be a national issue as well. We also need to know what Canada

wants. In addition, we agreed that we have to take the best from what we have learned and apply it - and look at the mistakes as well.

In our general discussion, we addressed the issue of whether the coastal communities are structured to respond and whether things are in place to help them make decisions. We also discussed the First Nations position issues and agreed that we must solve the land claims position – aboriginal rights and titles. With reference to consultations, we agreed that we want involvement not just consultation. By using the examples of Georges Bank and - and Newfoundland we discussed the need to come to political decisions to resolve the issues associated with the development of the oil and gas industry.

We created a list of what we need to move forward; for example, information on environmental impacts that affect everybody, economic benefits, and the current political level.. Again we went back to examples of land claims being a national issue. From the Newfoundland participants we learned about Voisey’s Bay (nickel mine) where a four party agreement was reached on environmental assessment. They had a memorandum of agreement between the federal, provincial and two First Nations governments, signed and implemented, on how they were going to move forward on these types of issues. This example demonstrated that it was not possible to get all the land claims settled first but there was an agreement on how things should move forward in terms of the review process. And again we noted the importance of looking at the impacts on the community at large first – the opportunities and environmental risks for everybody - before we start talking about the impacts on land claims. We need to know the specifics first before we can move the dialogue ahead.

We discussed the lessons we learned in the workshop from the Newfoundland participants; trying to dictate the terms, having the industry balk at those terms, having the industry go away for a year, and then coming back and Newfoundland saying that they had done their homework, had completed an assessment on what it should get out of the deal, and finally then the industry coming back a year later and agreeing to those terms.

The point was made that we did not have the industry participation that we really wanted here at this workshop; for example, from Chevron, the leaseholders. This was not for the lack of trying. We did discuss ownership and noted that Chevron has about 85% of the leases here, but we made the clarification that the acreage is actually owned by Shell and farmed out to Chevron. We also had some discussion about what happens after the industry has gone and the concerns that the oil and gas industry could be the cause of a ‘boom or bust’ situation. This is important when we are talking about building a sustainable industry, *if* we were to go ahead with development. We also discussed the need to control the pace of development and here we pointed out the fact that industry is industry – they are business and big business – and they have an exploration budget with political and geographical concerns. We also noted that they have to weigh all those concerns and that for them British Columbia is not the centre of the world; in fact, there are many sites in the world where people are looking at exploring and developing oil and gas resources.

We had further discussions about the need for home grown opportunities and to avoid parachuting people in.

The meat of our discussion was to identify the stages that we feel that we are in right now, or that we will be getting into, *if* we decide to go ahead with offshore oil and gas exploration and depending on how we proceed.

#### STAGES

1. We need to consider the issues— Aboriginal rights and title, environmental considerations, socio-economic aspirations, opportunities, and impacts (community, regional). MCRI needs to recognize these needs.
2. Is it worth reviewing the moratorium? Consider the differences between oil and gas; consider regional differences. Think in a cost/benefit sense, and in a political sense. Consider lifting the moratorium in some regions, keeping it in others.
3. Make a decision on whether to allow for exploration, with the reasonable expectation of going into



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| production  |
| <p><b><i>THOSE INVOLVED</i></b></p> <p>Who are the legitimate interests?</p> <p>Who are the the decision-makers?</p> <p>How do we kickstart this?</p> <p>Do we have another panel?</p> <p>An agreement like Voisey's Bay?</p>   |
| <p><b><i>WE NEED TO IDENTIFY</i></b></p> <ul style="list-style-type: none"> <li>• the resources and support;</li> <li>• who are the stakeholders? <ul style="list-style-type: none"> <li>• what is the process?</li> </ul> </li> <li>• how to action these three steps;</li> <li>• what does the committee need to know? <ul style="list-style-type: none"> <li>• what is the new information?</li> </ul> </li> <li>• what information is not available now?</li> </ul> |

***First Stage***

We are in the moratorium right now – we know this. We decided however that it is very critical at this time to consider the issues – and this is what we have been doing during this workshop.

We originally had land claims in here – the need to consider aboriginal land claims – but Charlie Bellis pointed out that we are really specifically talking about rights and title and those issues need to be discussed. This is not to say that they need to be decided – but rather we need to make sure they are discussed – and we also need to discuss the environmental considerations. We spent a lot of time on the wordsmithing of the socio-economic aspirations section. Originally we just had impacts there but then we decided that that did not cover everything and so we decided on the words ‘aspirations, opportunities and impacts’. We did however recognize that there is a subset of these as well based on community level, regional level and others. We also recognized that after the good talk on the MCRI (Major Collaborative Research Initiative) yesterday that not only does MCRI need to recognize these needs, but we also need to recognize the MCRI process and make sure that these things are linked, as we have these discussions in Stage 1.

***Second Stage***

The next stage that we recognized that we would be going into after this addresses the question: Is it worth reviewing the moratorium, after these preliminary discussions are held? A very important point that was raised, and it was raised by First Nations and others, is that we need to consider the differences in between oil compared with gas exploration – that there are differences in terms of risk benefits, cost, and environmental considerations, as well as delivery. We recognized that there are substantial differences and that point was driven home, especially by Ralph Gorby’s talk on the Sable Island Energy Project. We also had discussions about the possibility of lifting the moratorium in certain regions and have it maintained in other regions.

Again we addressed the need to consider the regional differences – in both a cost benefit sense and in the political sense. We also noted that there needs to be a political will – we had a federal Member of Parliament at the table who assisted us in moving that that discussion along.

### ***Final Stage***

The final stage that we see down the road - and we are not saying these are the stages we have to go into, rather they are potential stages - is to make a decision on whether to allow for exploration with a reasonable expectation of going into production. All of these stages have to consider how they are going to be actioned in terms of those that are involved. We need to define and discuss again who the legitimate interests and decision makers are and we need to kick start all of this. Perhaps we have kickstarted it at this workshop. Is there another panel that we need to be looking at? Do we need to look at this memorandum of agreement such as the one in Voisey’s Bay? What can we apply from the lessons we have learned from the Atlantic?

Finally, we noted that it is very crucial to identify the resources and support processes. We asked the questions: Who are the stakeholders and the players? What is the process? How do we action these three stages based on all of these considerations? What does the committee need to know? What is new information – and what information is not available?

There was some discussion re: NF and Hecate Strait not being comparable. The main points were these three phases.

### **Doug House**

***Professor, Sociology, Memorial University of Newfoundland, St John’s, NF  
Facilitator, Group 2***

What happened in our group is that we had a number of different positions and differences in terms of people’s familiarity and knowledge about the oil and gas industry and impacts. Therefore, part of the challenge was to allow for a discussion that would recognize this and at the same time be fruitful. There was a seeking of direction at the beginning – we started out asking some questions that were very specific and then the questions became more general as we went along.

In terms of the original issue here, what we decided was that you cannot really deal with one specific issue without knowing a lot more about the project. For example, for threatened salmon stocks being a specific ecological issue, you need to know a lot more the whole ecosystem of the British Columbia coast and take that larger ecosystem kind of approach – with respect to whether it be salmon stocks or whales, crab or seabirds. The issue then is that we need to understand how unique this ecosystem is – is it something that has special characteristics that we need to take into account when developing the kind of approach that we are going to use? And is it so unique that in the long run we might decide we do not even want to take the risk of having any development here?

The assumption beyond that was, assuming that we are going to proceed, then we have to be very careful and look at every aspect of going ahead (Strat Canning was very helpful here with information from the Atlantic coast). We discussed a number of issues:

***Do we need to develop oil for the sake of the British Columbia economy?***

One of the agonists noted that there are a lot of benefits quite apart from the world oil situation that the British Columbia economy can enjoy from oil and gas development in terms of revenues and in terms of offsetting the need to import oil. They noted that we could use the revenues from oil to invest in projects such as improving social services to people in all regions of the province and developing alternative industries.

***What are the regional impacts with respect to social and economic development and the cultural implications of that?***

We asked Wade Locke a question: As an economist, is it in fact possible to build in to your approach to oil and gas development, means by which you can ensure that there are benefits to people in local communities, including First Nations people? His answer was *yes*, it is possible. You can do it but you always have to gear it to the particular project, and the particular play that you are talking about. However, in principle there is nothing to prevent a regulatory agency from building in certain kinds of requirements; for example, in terms of: employment, something like a regional development fund; or education and training for local people in the industry. This can be done, but when you do it you have to take into account that there may be some trade-offs. For example, the cost of production may be higher because you are building in these kinds of requirements. Therefore, you may have to accept less in terms of overall government revenues and royalties and taxes and so on, thinking in the short term, in order to allow these to be put into place over the long term. The feeling around the table was *yes* we recognize that. Fortunately the labour costs as a percentage of the total costs for most of these projects is low and you can make these kinds of arrangements if the decision is made that that is what you should do.

***The issue of trust***

We discussed this most important issue extensively. The notion that we have seen in coastal British Columbia over the last few years, with serious difficulties in other resource sectors – in the fisheries sector, in the forestry sector – is that there is a feeling of distrust among a lot of people, both First Nations people and others. The questions that arise are: Can we really trust our own governments provincially and federally? Can we trust the industry? And if we are going to have a new kind of resource development, it is going to be different?

We talked about trust from the perspective of what happened in Atlantic Canada. Susan Sherk who worked for Mobil for a number of years in the early stages, argued convincingly that you cannot build trust overnight – you cannot just build up trust, or repair the distrust that has been developed, and replace it with a strong feeling of trust between the people in local communities, provincial government and federal government people overnight. However, you can begin to work towards building that trust. Clearly, it can be done but it takes time. It also requires a certain continuity of personnel. You have to have people that become knowledgeable and that keep working on this over a long period of time and gradually develop those kind of relationships. In Newfoundland and Labrador, the big change occurred in terms of the initial kinds of fears that people had and in the end what actually happened was that we developed a better understanding of the industry and what the real issues were as opposed to things that people were worried about that never really happened.

***The issues of jobs and opportunities***

In terms of the number of jobs and also the business opportunities related to the development of the industry we noted that the way in which you word the requirements for the industry can have an important effect. For example, in the case of the United Kingdom if you say that local firms have to have the first opportunity, that has a different kind of a meaning than simply saying there has to be equal opportunity in terms of price and delivery and so on. It has a bit more powerful message to it for the industry. Therefore, we should think very carefully in terms of crafting any kind of preference guidelines – to get the message that you really want to convey to industry in that respect.

With regard to jobs, Susan Sherk pointed out that oil companies ideally want to hire local people, despite the assumption that people sometimes make which is that industry wants to bring in all its workers from outside. In fact, this is actually the opposite of what industry wants to do. What industry ideally prefers to do is to hire people locally – generally it is more cost effective, more convenient, and more expeditious for them to do that. Thus, as long as they can find qualified people locally that is what they would ideally like to do. One of the questions that arises from this then is: How do you make sure that it is possible to find qualified people locally? That brings up the

whole issue of education and training for the industry, which we really did not have time to address, but it is an implication of that question.

### ***The importance of treating each project differently***

We agreed that each project should be treated very differently. For example, Hibernia is very different from the Sable Island Energy Project, and both of these projects are different from whatever projects *might* be developed here. We noted that you have to tailor your approach to your needs and to the particular project.

### ***The importance of monitoring***

A number of the participants in our group had looked at some of the Newfoundland material in the briefing book and were critical of the monitoring procedures. I noted that in fact we did not do that good a job with the monitoring aspects initially, but that we are getting better at it. Susan Sherk pointed out that based on her experience with the industry, there are three main ways of monitoring: one is through the offshore regulatory board which does its own monitoring and has a mandate to do it; second, you can build it into your environmental impact statement as a requirement for the proponent of any particular project; and third, for the company itself – it is to its own advantage to do a good job of monitoring, although it does depend on the company and some companies are better than others. She noted that you have to get to know the nature of the corporate personality of the companies that you are dealing with, and I would go further than that and suggest that you could think in terms of selecting companies partly on the basis of the type of companies they are. You could then select companies to be operating that have the kind of corporate personality that you feel you can work with.

### ***Whether or not to lift the moratorium?***

The point was made that the lifting of the moratorium itself does not in any way necessarily mean that there is going to be an oil and gas industry developing in this province. It certainly does not mean it is something that is going to happen overnight. Further, it may well be that there would be a gas industry but not an oil industry. So in a sense, the lifting of the moratorium would be a start to a public consultation process that must then continue. It is not a move to immediately start developing the resource. This is a key point that has come out over the last two days. The essential message is that public consultation needs to be ongoing and needs to be given the highest kind of priority.

Finally, you need to have a good understanding of the industry. It is really important that people who are concerned about oil and gas development, whether it should go ahead, how it should go ahead, *if* it does go ahead, need themselves to become a lot more knowledgeable about the industry. The more knowledgeable you become, the better you will be able to decide on whether you are going to have the industry, and control the development the way that you want it *if* you decide that you are going to have it.