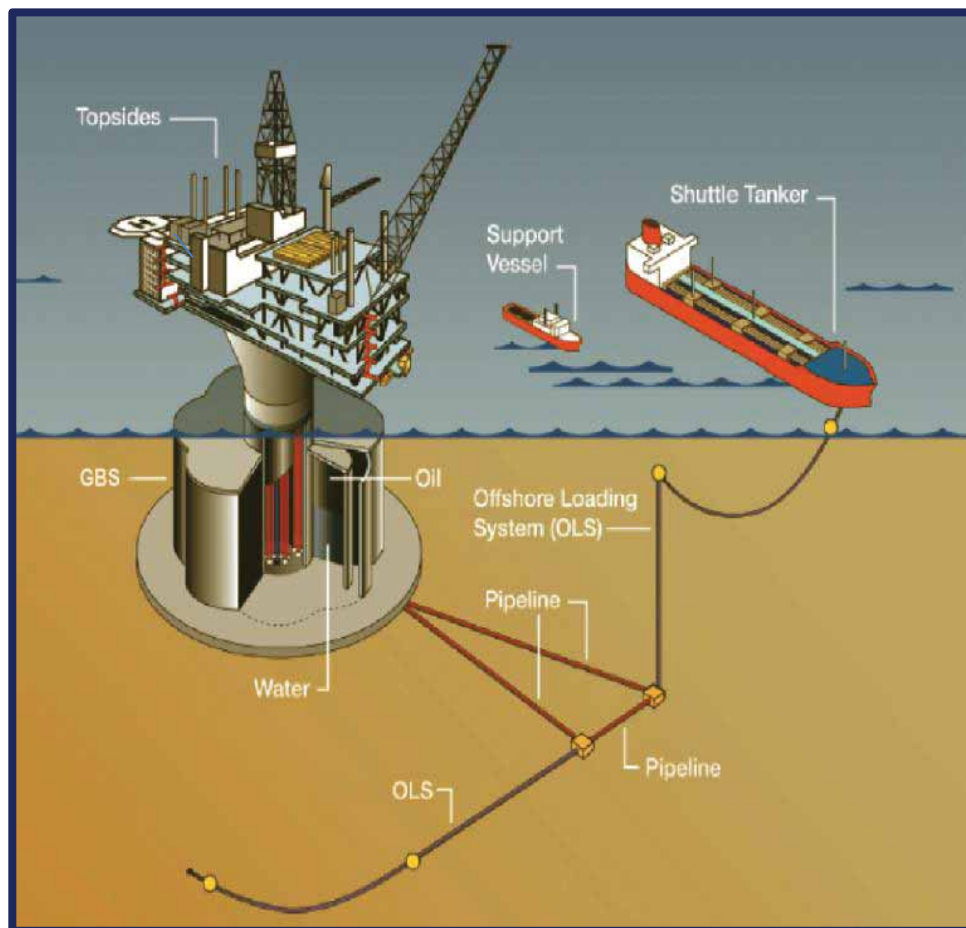


Report of the
Hebron
Public Review
Commissioner

for the
Hebron
Development
Application



Minister of Natural Resources
Government of
Canada

Submitted to
Chairman
Canada-Newfoundland
Offshore Petroleum Board
February 2012

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Government of
Newfoundland and Labrador

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February 2012

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Dear Ministers and Mr. Chairman:

In accordance with my Terms of Reference issued on July 6, 2011, I have completed the public review of the Hebron Development Application.

I have requested public input and conducted public review sessions, and undertaken my own assessment of the Development Application. I am therefore pleased to submit this report for your consideration.

Sincerely,



Miller Ayre
Commissioner of the Hebron Public Review Commission

Enclosure
MA/cm

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Hebron

Public Review

EXECUTIVE SUMMARY

The Hebron Project is the fourth major offshore development in Newfoundland and Labrador. Since commencement of the initial Hibernia oil development in 1990, the province has seen its economy transformed, its fiscal capacity significantly expanded, and its growth prospects greatly enhanced. After decades of dependency, Newfoundland and Labrador is finally a 'have' province. Since the signing of the Atlantic Accord in 1985, the province's gross domestic product has increased four-fold from \$2 billion to \$8 billion, and in 2010 it recorded the highest rate of growth among Canadian provinces. The province represents less than 30% of the population of Atlantic Canada, but in 2011 it accounted for more than 60% of the total value of major investments planned or underway in the region. The province continues to experience high levels of unemployment, particularly in rural areas that have been severely impacted by set-backs in the forestry and fishing sectors of the economy. Nevertheless its principal urban areas have achieved an unemployment rate at or below the national average.

It is in the wake of this sea change in economic circumstance that the Government of Newfoundland and Labrador in 2008 entered into agreement with ExxonMobil and its partners to develop the Hebron oil field. The Hebron Asset, which is located in the Jeanne d'Arc Basin some 340 km southeast of St. John's, was discovered in 1981, two years after the discovery of Hibernia. Situated 9 km north of the Terra Nova Field and 32 km southeast of Hibernia, the Hebron resource is beneath a water depth that ranges from 88 metres to 102 metres. The current best estimate of total oil in place is 2, 620 million barrels of oil (MBO) with an estimated recoverable production of 789 MBO.

The Proponent of the Hebron Project is a partnership of ExxonMobil, as the Operator, Chevron, Suncor Energy, Statoil Canada and Nalcor. The proposed mode of development is a gravity-based structure (GBS) similar in design to that of Hibernia. The GBS will be constructed at the 2,650-hectare Nalcor Bull Arm Fabrication Site in Trinity Bay. While a portion of the topsides structures will be fabricated at Bull Arm and elsewhere in the province, the largest and most complex module representing some 66% of the total topsides tonnage is proposed to be built outside the country. The topsides will be integrated with the gravity base at Great Mosquito Cove, Trinity Bay, not far from the Bull Arm site, before tow-out. The Hebron GBS will be constructed at an estimated cost of \$6.5 billion and in total the Proponents plan to spend over \$14 billion over the life of the project. A secondary sub-sea development may cost an additional \$3.5 billion. GBS construction is scheduled to commence before the end of 2012 with first oil projected to flow by the second quarter of 2017.

The provincial government will be a major recipient of royalties and taxes. An economic analysis conducted by the Commission concludes that the Hebron field in production may contribute \$20 billion to the provincial treasury over the life of the project. The province also holds a 4.9% ownership stake in the development. In addition to these direct benefits, the province will benefit indirectly from engineering, construction and operating activities that will take place locally. The scope of these activities is defined in a separate Benefits Agreement negotiated between the Proponents and the Government of Newfoundland and Labrador.

In June 2011, the C-NLOPB appointed Miller Ayre to conduct a public review of the Hebron Development Application. The public review process, as outlined in the Atlantic Accord Acts, is a democratic right for public discourse, input, and advice. This Commission has sought to ensure that the principle of natural justice has been observed such that each stakeholder was heard and respected. It has attempted to balance public perceptions with the facts as presented by the proponent and as gleaned from the record, the intent of the Atlantic Accord Act, the regulatory guidelines issued by the Board, and the overall contribution of the project to the future economic wellbeing of the province. The Commissioner acknowledges the important contribution of those groups and individuals who made presentations at public hearings, as well as the many others who supported its work in other ways. In particular, the Commissioner wishes to recognize the professional and courteous participation of ExxonMobil throughout this process. The 180-day schedule from August 25, 2011 to February 28, 2012 necessitated a timely response to the request for additional information and coordination during the public review sessions.

The Commission has reviewed the Hebron Development Application and ancillary documents, weighed the public input received during the 11 days of public hearings, and collected and generated discussion documents in order to gain a full appreciation of the Project as proposed.

The Commission's Terms of Reference were that the Commission review:

- considerations of human safety and environmental protection incorporated into the proposed design and operation of the Project;
- the general approach to the proposed and potential development and exploitation of the petroleum resources within the Hebron Significant Discovery Area; and
- the resulting benefits that are expected to accrue to the Province of Newfoundland and Labrador and to Canada, having particular regard to the requirements for a Canada-Newfoundland and Labrador Benefits Plan (C-NLOPB 2011).

The Commission has attempted to examine these matters within the historical context of the petroleum sector's activities in the province to date, against the backdrop of economic and technological factors that have shaped the industry globally, and always from the premise that the project must serve the province's economic sustainability for the longer term. It has studied the work of earlier review panels, the issuance of formal decisions by the C-NLOPB with respect to previous developments, and the relevant legislation, regulations and guidelines that govern the conduct of the industry. In examining the findings and recommendations of past public reviews, the Commission has identified issues that remain unresolved and relevant. It has addressed these themes in its own discussion and, where appropriate, has incorporated them in the scope of its own findings and recommendations.

The report is organized by the major subject areas, each with a chapter summary and recommendations. Appendices provide additional information concerning the Commission procedures, staff and subject matter experts, hearing summaries, economic and legal analyses.

The intent was to create a document that can be referred to over the life of the project. While all of the recommendations are germane to the Hebron project, many have relevance to this province's offshore oil and gas sector in general. Most points address a tangible, and in some cases immediate, challenge to the development of the Hebron resource in a manner that balances legitimate business concerns with the longer term public interest. Others are more intrinsic in nature, addressing, for example, the potential for improvement in the regulatory review process itself.

The Commission, following review of all of the documentation and receipt of public input, recommends that the Hebron Development Application should be approved for the initial development which includes the GBS. Pool 3 should not proceed within the existing Development Application. The drilling of Pool 3 in the Hebron significant discovery area cannot be undertaken from the Hebron GBS and would likely require a sub-sea tie-back to the GBS. Neither the Benefits Plan nor the Development Plan adequately addresses the scope and implication of a Pool 3 Development.

The Commission has made 64 recommendations to increase the value of the Hebron Project to both the province and the country. There are twelve major findings summarized here, and explained more fully in detail in the main body of the report. The order of these findings does not suggest priority, as various stakeholders will order them depending on their own mandates and priorities.

- The 2008 Benefits Agreement signed between the Proponents and the provincial government prior to the submission of the 2011 Benefits Plan should be continued for future projects. The specific benefits outlined in the agreement provide good targets and benchmarks. The provincial government

is best suited and embodies the political will and responsibility to engage in the tough negotiations the agreement requires. The C-NLOPB, as the regulator, can concentrate on monitoring, reporting and providing opportunities. The province and the country are best served when the governments and the C-NLOPB all concentrate on their own relative strengths.

- Helicopter safety should be the top priority of the C-NLOPB. Guided by the rulings of the Transportation Safety Board of Canada, Transport Canada, the Federal Aviation Administration and the European Aviation Safety Agency, the C-NLOPB Chief Safety Officer must ensure that the Category A helicopters operating in the NL offshore comply with existing and revised regulations.
- The derrick equipment set module should be constructed in the province. This is a \$100 million project that can add considerably to the local benefits from the project. The government has agreed that the Proponent may build the utilities and process module (UPM), which constitutes two thirds of the topsides tonnage, outside the province. The Proponent should therefore make every effort to assure a facility is found to build the derrick equipment set locally and that local suppliers are trained and exposed to the UPM requirements so that they have the skills for ongoing servicing and maintenance.
- The Benefits Plan for Hebron needs a specific schedule of types and numbers of skilled labour required for construction. The Hebron Diversity Plan needs to set more aggressive targets over and above existing percentages already in the general workforce. Training the workforce, growing the apprenticeship program and reaching new levels of diversification for our province should be attainable outcomes of the Hebron Project.
- Procurement information from the Hebron Proponents needs to be fully disclosed and continually updated. The prime contractors' tender calling processes and the Proponents' need for skilled labour should be more clearly articulated to the industry, labour, and government. Benefits monitoring, labour preparedness and industry growth largely depend on lead time, planning and accurate information.
- *First consideration* and *fair market pricing* should be specifically defined. Evidence before the Commission and in material associated with prior commissions and panels shows multiple interpretations of these terms. The proponent and the industry have very divergent interpretations. The Accord Acts and the C-NLOPB *Benefits Plan Guidelines* and associated legal rulings

have been carefully analyzed by the Commission. The C-NLOPB should revisit the history of the evolution of the interpretations and provide new guidance.

- Model testing for new design characteristics of the proposed Hebron GBS needs to be completed prior to final sanction and rationalized against the same ocean weather parameters as installations currently in operation. The Grand Bank and the Continental shelf are subject to extreme conditions for waves, wind and ice. While advances in knowledge and engineering are important and new variables might be acceptably applied, historical evidence of successful and safe structures operating in extreme weather conditions provide an important standard for comparison.
- Produced Water processing for the Hebron Project must conform to current international regulations to mitigate environmental risks. Produced Water associated with extracting and processing heavy oil, the type found in the Hebron project, is both greater in volume and impurities than the produced water associated with the sweet crude of other NL offshore projects.
- The environmental questions surrounding sea bird mortality on the NL offshore should be the subject of a publicly transparent process leading to the undertaking of necessary research amongst the Canadian Wildlife Service, industry partners and the wider seabird research community. A review of the previous intervention by environmentalists has revealed that the same outstanding questions remain unanswered after twenty years of public hearings.
- The Socio-Economic Impact Statement and Sustainability Report needs to be upgraded in content and upgraded in importance within the *Development Plan Guidelines*. There is a requirement for greater socio-economic research. Two very important issues, diversity and skills training, are important within the short- and medium-term labour shortage, but also must be considered in terms of long-term sustainability. The C-NLOPB should have dedicated socio-economic expertise. When viewed in terms of cumulative effects, including those stemming from prosperity and population increase, this project and all those preceding it significantly impact communities in the eastern and Avalon regions of the province.
- Research and Development/Education and Training Fund guidelines need to be more flexible to permit the approval of projects pertaining to the socio-economic impacts of the project and considerations of sustainable development. At present, the guidelines are too influenced by pure or applied research that fails to recognize the research needed on socio-economic matters.

- The C-NLOPB *Benefits Plan Guidelines* need to be rewritten to be more specific, including templates to outline the precise types and formats of benefits information that must be provided by Proponents. In reviewing the previous three oil and gas developments, the Commission observed significant inconsistencies in presented material which made evaluation of benefits very difficult. This will provide more measurable objectives for monitoring by the C-NLOPB and, in the long term, allow for better comparisons between projects.

Conclusion

The Hebron project is economically attractive and technically feasible. It is being undertaken by a recognized global industry leader with proven competence and an established local presence. Although the Development Application contains flaws, these can be corrected in response to more prescriptive guidelines. The project schedule will be stressed on a number of fronts, most notably, from the province's perspective, the requirement for qualified skilled labour. The Proponent and its main contractors must adhere to the intent of first consideration and resist narrow interpretations that thwart the intended legislative commitment to the employment and training of workers, and to supplier development. Human safety cannot be compromised in either the construction or operations phases, and best practices must be adopted on a timely basis as knowledge and international standards evolve. Environmental protection is inherent in good design and good practice; however, trust can only be assured when all parties cooperate fully.

As it prepares its fundamental decision report, the C-NLOPB will give consideration to the findings of this Commission. The Commission finds that certain aspects of the Development Application are incomplete, withheld or not supported. The Commission has recommended that, as a condition of the Board's approval, the Proponent be required to make significant improvements to the Development Application. Those caveats aside, the Commission concludes that this major development can make a very positive contribution to the economy of the province and to Canada as a whole, and is therefore pleased to offer its endorsement of the Hebron project.

1. INTRODUCTION

1.1. The Commissioner's Perspective

The Commission interpreted its mandate in a broad context that involved the examination of past projects, the evolution of application guidelines, the importance of the oil industry to the province's long-term economic sustainability and the changing needs of the province.

Such an examination required exhaustive research and in-depth reading of the material of past commissions and panels. It also required a full understanding of the Acts, the legislation and the guidelines that impacted the process. The review did reveal that many questions raised by previous panels and commissions remain unresolved, that information provided by the Proponent was inevitably elusive, and that the necessary benchmarks for monitoring benefits were usually absent.

After 20 years, local expertise and skills have evolved so that participation during the review has reached a more sophisticated level. Whether representing labour, industry, or special interest groups, all participants, who, in normal circumstances, are concerned with specific aspects of the offshore, expressed a great desire to work together in order to manage, influence, improve, and grow our offshore activity.

Why so many issues remain unresolved, in project after project, is as much a product of the specifics of the legislation, regulations or guidelines as it is a result of attitude of the proponents or actions by the C-NLOPB. Consequently, the regulatory framework of each subject is outlined within each specific chapter to provide context to the arguments and recommendations.

To assist the reader, in addition to the Executive Summary, each chapter on a specific topic contains a brief summary of contents, followed by the regulatory context and review of the Hebron Development Application documents pertaining to the specific subject. Each key issue is discussed, and recommendations are made throughout each chapter narrative.

This introduction chapter provides the context and explains the process of the Public Review. Chapter 2 provides a detailed description of the proposed Hebron Project, its design, construction, and labour shortage challenge. Chapters 3-7 examine comprehensively the subject areas of the Commissioner's mandate, with recommendations.

Chapter 3 (Development Approach) reviews the proposed development plan, method of extraction, and platform design. Chapter 4 (Human Safety) discusses measures to

reduce the risk to human safety to that as low as is reasonably practicable during all phases of the project. Chapter 5 (Environmental Protection) considers environmental protection measures to safeguard the environment during construction and operations, and to maintain a healthy environment for the future. Chapter 6 (Benefits) considers the expected benefits to result from the extraction of the resource. Chapter 7 (Socio-Economic Impact) discusses any effects to the community while the asset is being extracted and, ultimately, what should happen after the oil is depleted. Chapter 8 (Recommendations) lists all of the recommendations made in this report, organized by individual chapters for ease of reference.

1.2. The Hebron Public Review Context

The Hebron Project will be the fourth offshore development project in the province and on the Grand Banks – Jeanne d’Arc Basin. Since first oil from Hibernia in November 1997, the province has transformed its economy, fiscal position, and growth prospects. The province is now a “have province”, with multiple major capital resource projects either underway or pending. In light of this new reality, the Hebron Partners, with ExxonMobil as lead Proponent, have put forward a proposal that is conditioned by a 2008 Benefits Agreement and the 2011 Development Application.

Previous projects each have had a specific public focus: for Hibernia, it was the risk of development offshore and the financing of the GBS construction; for Terra Nova, it was the first time that a Floating Production Storage Offloading vessel (FPSO) was used in North America and equipped with a detachable turret; for White Rose, it was the opportunity to develop gas concurrent with oil and the production platform choice. For Hebron, notwithstanding the many issues raised during the public review sessions, it is the demand for skilled labour and the challenges to recruit, train and house the required workforce in order to complete the project on schedule, and to the planned budget.

The public knowledge of the varied impacts and aspects of a major development project has increased dramatically with stakeholders representing academia, engineering and construction, suppliers of goods and services, the workforce, and environmental groups. Therefore, it was the Commission’s intent to conduct this review in a substantive and meritorious manner giving equal weight to the development approach of the project, the safeguarding of human life and the environment during the project, expected benefits ensuing from the project, and any socio-economic impacts and sustainability issues arising from the project. The Commissioner engaged subject matter experts (SMEs) to advise the Commission in each area, and was pleased with the level of knowledge that is evident in this report. That the Hebron Project is proposed in a mature industry is evidenced by the fact that all SMEs have direct and extensive experience in either the design, construction,

operation, benefits, economics, legal and socio-economic impact of similar projects, and that all are either resident of the province or have worked in the province. The need to find the “remote expert” from out of province to advise the public has greatly diminished.

The Commission’s review of the Development Application is directed towards the specific, the general and, ultimately, to the future. The Hebron Project will have immediate and substantial impacts to the local economy for the next five to six years as the project moves through the construction to installation phases. The project will be vitally important to the provincial treasury for a more than 30-year period once first oil occurs and, particularly, in the first 10 to 15 years of production. The provincial government and economy are now dependent on the resulting royalties and taxation of the offshore oil industry. There are certain public expectations for improved government services, job opportunities, and wealth. The ability of the province to reverse its population decline and aging demographic is inexorably tied to attractiveness of our province for residency and investment. Ultimately, that is the legacy of these resource development projects.

The documents comprising the Development Application for the Hebron project do not exhibit a standard commensurate with a resource development of its magnitude and socio-economic significance to the province. The Development Application is deficient in a number of respects including comprehensiveness, accuracy, relevance, and consistency. There is little evidence of new research such that data recruitment is shallow, if not irrelevant. The overall depth and quality of analysis is also poor. These deficiencies contribute unnecessarily to the challenge that faces the Commission. The extent of these deficiencies was reflected to some degree in the completeness review of the C-NLOPB. While acknowledging that the Commission had an opportunity to request additional information from the Proponent, the degree of deficiency inherent in the Development Application renders the process difficult.

The severity of this problem becomes apparent upon reading materials submitted to the C-NLOPB in conjunction with prior development projects. In reviewing previous Benefits Plans, for example, the Commission noted a wide variance in the level and quality of information, and in the degree to which proponents have adhered to the guidelines and principles as set down by the C-NLOPB. This observation has led to a finding in this report that the *Benefits Plan Guidelines*, in particular, need to be rewritten to engender a more specific, consistent, in-depth response from proponents. The use of templates, as well as more exacting criteria, can be expected to achieve a greater level of conformity, commitment and relevance. This will expedite the work of future commissions and provide the C-NLOPB with a more efficient framework for monitoring and evaluating the performance of an Operator against explicit, measurable undertakings contained in the Benefits Plan. It will also

provide a basis for follow-up questions to the Proponent by defining more clearly what information, materials and clarifications the C-NLOPB, the Commission and the public are entitled to receive as part of the review process.

Previous panels and commissions have each had overarching issues or complexities and each resultant report reflects those realities. The combined issues and recommendations of the past represent recurring themes for this Commission. Therefore, the Commission has sought advice on these outstanding issues and has attempted to propose recommendations that are practical and that will find a way forward towards resolution.

The offshore industry is self-learning, and is based on a culture of continuous improvement. The Proponent's approach to development (GBS and topsides design and procurement) represents past project experience and world-wide best practices (see Chapters 2 and 3). The provincial government's approach to benefits assurance as evident in the Benefits Agreement is a direct outcome of past disappointments and is in step with other jurisdictions (see Chapter 6). Opinions on improvement of human safety and environmental stewardship were dominant throughout the public review: reduction of risk, and improvements in design, behaviour and transparency must be the highest priorities of all stakeholders (see Chapters 4 and 5).

A public review commission, as outlined in the Atlantic Accord Acts, is a democratic right for public discourse, input, and advice. This Commission has sought to ensure that the principle of natural justice has been observed throughout. Each stakeholder was heard and respected. I hope that the information contained herein will benefit all of the stakeholders that have given so generously of their expertise and time to improve the viability of this major project. The Commission applied this basic principle equally in all its dealings with the public and the Proponent. The Commissioner particularly wishes to recognize the professional and courteous participation of the Proponent, ExxonMobil, throughout this process. The 180-day schedule from August 25, 2011 to February 28, 2012 necessitated a timely response to the request for additional information and coordination during the public review sessions.

The Commissioner wishes to acknowledge the efforts of the Commission staff and subject matter experts. The timeline and scale of a review of such a major project is challenging. This completeness and quality of this final report would not have been possible without the passion that these individuals have brought to the Commission. As Commissioner, I have sought expertise in various areas including engineering, economics, benefits, legal, environment and safety. I am very pleased to have benefited from our "home-grown" experts.

1.3. The Hebron Public Review Process

According to the Terms of Reference issued by the C-NLOPB under the authority of Section 44(2)(b) of the Atlantic Accord Acts, the Commissioner was asked to complete an independent assessment and review of the Hebron Project Development Application, to consider human safety and environmental protection, the general approach to the proposed development, and the resulting benefits that are expected to accrue, in the context of the *Development Plan Guidelines* and the *Benefits Plan Guidelines*.

“Questions of energy policy, jurisdiction, the fiscal or royalty regime of governments, the division of revenues between the Government of Canada and the Government of Newfoundland and Labrador, or matters which go beyond the potential or proposed development of the Hebron Significant Discovery Area” were topics outside the scope of the review (C-NLOPB 2011).

On April 15, 2011, the Proponent, ExxonMobil, filed a development application with the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB, the ‘Board’), consisting of the Development Application Summary, the Development Plan, a Socio-Economic Impact Statement and Sustainable Development Report. This was done on behalf of the five Hebron Partners: ExxonMobil, Chevron, Suncor Energy, Statoil, and Nalcor Energy. The C-NLOPB conducted a completeness review of this Development Application, including a Benefits Plan which was submitted to the Board on May 10, 2011. The C-NLOPB deemed that the Application was in compliance with regulations and forwarded the documents to Commissioner Ayre to begin the public review process on August 25, 2011. The Commissioner had 180 days from August 25, when the Development Application was forwarded, to the time that the final report was submitted to the Board and respective Ministers.

Concurrent with the public review process, the staff of the C-NLOPB analysed the application. Following receipt of the Commissioner’s report, the C-NLOPB will complete its fundamental decision report which is subject to approval by both the Federal and Provincial Ministers of Natural Resources.

Prior to the submission of the Development Application, the Proponent submitted a Hebron project description to the C-NLOPB, who, together with Fisheries and Oceans Canada, Environment Canada, Transport Canada, and Industry Canada, initiated a “comprehensive study” level of environmental assessment under the Canadian Environmental Assessment Act (CEAA). The Proponent submitted a Comprehensive Study Report (CSR) in September, 2011. The CSR was then sent to the Federal Minister of the Environment for a 30-day public comment period. The Minister of the Environment issued an environmental assessment decision statement on December

22, 2011 which stated that “the Project is not likely to cause significant adverse environmental effects”. The Project was referred to the C-NLOPB for action under Section 37 of the Canadian Environmental Assessment Act.

1.3.1. Additional Information Review

The Commission sought advice from recognized experts to gather information for the review process and to determine whether any further information was required from the Proponent prior to the Public Review Sessions. The Commission received four public requests for additional information, from NOIA, Nature Newfoundland, the Alder Institute, and Dr. Gail Fraser of York University. These were posted to the Commission’s website. Taking into account questions asked from the public and from the Commission, on September 30, a request for additional information was submitted to the Proponent. After carefully considering the information received two weeks later on October 14, the Commissioner was satisfied that the Proponent provided sufficient information and clarification to proceed with the public review sessions. On October 21, notice was given that the public review sessions to review the merits of the Hebron Development Application would commence on November 21, 2011.

1.3.2. The Public Review Sessions

The offshore oil and gas industry has conducted seismic surveys, exploration, development and production in NL for more than 40 years. Each of the previous three development projects (Hibernia, Terra Nova, White Rose) have been subject to a public review process (panel or commission) and these processes have informed the many stakeholders on the breath of the Development Application and resulting impacts. Consequently, the Hebron Public Review was to be conducted in a maturing industrial, economic, environmental, and safety context.

Thus it was expected that the level of questioning and subsequent dialogue would be well informed and thoughtful, and this proved to be the case. Although this is the fourth major oil field development in the provinces offshore, the interest level remained high. The sessions generated a great deal of media interest surrounding all four aspects under review—safety, environment, development and benefits—as well as much public feedback in the form of web comments and extended conversations on the open line radio shows. Over 11 days of public review sessions, the commission heard 43 presentations in Marystown, Clarenville and St. John’s, with more written submissions received (Appendix G). The presenters represented every part of our community and included business leaders, municipalities, unions, leaders of advocacy and special interest groups, educators and environmental groups, charities and

contractors. These presentations were very thoughtful and thought-provoking, and consistent with regards to common themes heard:

- the need for more transparency in reporting, in terms of local benefits, safety management system, and environmental protection;
- the requirement for the Proponent's procurement processes to support effective and timely first consideration for goods and services and labour access to the project;
- better communications and cooperation in a variety of areas including project forecasts, procurement, environmental effects monitoring, socio-economic impact;
- the problems of inadequate housing and infrastructure in some municipalities as a result of economic growth; and
- the demand for skilled workers and the challenges of labour capacity and accreditation.

The Newfoundland and Labrador oil industry is maturing. This was reflected in the number of presentations that indicated willingness of diverse members to work together to solve problems, strengthen the economy and find new ways to benefit all Newfoundlanders and Labradorians now and in the future. Many presenters looked to the Proponent, ExxonMobil, as an industry leader, to establish best practices and innovations towards worker safety; towards the environment; and towards the community in terms of diversity, gender equity, local benefits, and sustainability. The informed and thoughtful nature of the presentations indicated that the public are aware of and engaged in what goes on in the oil industry, and are deeply concerned about how such a huge development should proceed.

The public review sessions also gave the Proponent the opportunity to explain the project to the general public, and provided an opportunity for interaction between various stakeholders. All questions were directed through the Commissioner, who also asked questions as issues arose. The Commissioner followed the process laid down in his Operational Procedures (Appendix C), based on Chapter 6 of the *Canada-Newfoundland and Labrador Development Plan Guidelines* produced by the C-NLOPB and his Terms of Reference (Appendix B). Transcripts of each session are provided on the enclosed CD.

2. THE HEBRON PROJECT

2.1. Project Description

The Hebron Project is a proposed oil and gas development located in the NL offshore, approximately 340 km east of St. John's (Figure 2.1-1). The project is a partnership of ExxonMobil, Chevron, Suncor Energy, Statoil, and Nalcor. As Operator and lead Proponent, ExxonMobil has made application to the Canada-Newfoundland Offshore Petroleum Board (C-NLOPB) for approval to proceed with the development of the project. If approved, the project will be the fourth stand-alone offshore development on the province's Grand Banks. The intent is to develop the Hebron oil field using a concrete gravity-based structure (GBS) similar to that employed in the province's first offshore development at Hibernia. The Hebron platform will be situated in roughly 92 metres of water approximately 32 km southeast of Hibernia, 9 km north of the Terra Nova Field, and 46 km southwest of White Rose.

The Hebron oil field was discovered in 1981, two years after the discovery of Hibernia. The Hebron asset contains separate oil accumulations in at least four reservoirs, the largest of which is the Ben Nevis Reservoir. This reservoir, which has been designated as Pool 1, is the anchor resource of the Hebron project and is expected to produce approximately 70 % of the recoverable crude oil based on the current knowledge of the asset. Hebron oils are denser than those of Hibernia, having an API ranging from 18 to 25 as opposed to 32 to 34 for the latter.¹ Higher viscosity oils such as those of Hebron add marginally to production costs and yield a slightly lower price in the marketplace. The current best estimate of total oil in place is 2,620 million barrels of oil (MBO) of which close to 800 MBO is considered recoverable at this time. The GBS for the Hebron Project will be a reinforced concrete structure designed to withstand impacts from sea ice and icebergs and the meteorological and oceanographic conditions at the Hebron Field. It will accommodate up to 52 well slots with J-tubes inside the central shaft connected to the base of the GBS for potential future expansion.

¹API gravity is a measure of how heavy or how light specific petroleum liquid is compared to water. The unit of measure is in "degrees". Oil having an API gravity of greater than 10 degrees is lighter than water and will float. Light crude oil is defined as having API gravity of higher than 31.1 degrees, while heavy oil is defined as having an API gravity of below 22.3 degrees. Both Hibernia and Terra Nova oils are characterized as light crude with 32-34 degrees API respectively. Hebron falls within the characterization of heavy oil. Heavy oils, being closer in specific gravity to water, present special challenges for production operations since it is more difficult to separate from the production stream. See discussion on Produced Water in Chapter 5: Environment.

The GBS will be designed to store approximately 1.2 million barrels of crude oil in segregated storage compartments. The planned offshore loading system (OLS) consists of two main offshore pipelines running from the GBS to separate but interconnected pipe line manifolds. The notional offloading rate of the system is 50,300 barrels per hour.

An integrated array of topsides structures weighing up to 42,000 tonnes will be mounted on top of the gravity base. The topsides will include a drilling support module, derrick equipment set, utilities and production module, flare boom and living quarters, including helideck and lifeboat stations. The GBS will have accommodations for approximately 150 personnel under normal circumstances and up to 220 during intensive operations including the initial drilling phase.

The Hebron production facilities will have the capacity to handle the predicted life-of-field production stream for 30 plus years. In the initial development phase, it is expected the facility will be designed to accommodate a nominal production rate of 150 thousand barrels of oil per day with the prospect of it being later increased to 180 thousand barrels, roughly matching that of Hibernia.

Construction of the gravity base will occur at the Bull Arm fabrication site in Trinity Bay. Fabrication of the topsides will be divided between Bull Arm, Marystown, yards outside Canada, and possibly other yards within Canada. The topsides would be mated with the gravity base at an inshore site at Bull Arm after which the completed structure would be towed to the Hebron production site. Revitalization of the Bull Arm site began in 2011 with construction and fabrication expected to occur over a five-year period through 2016. First oil is currently projected to flow by 2017.

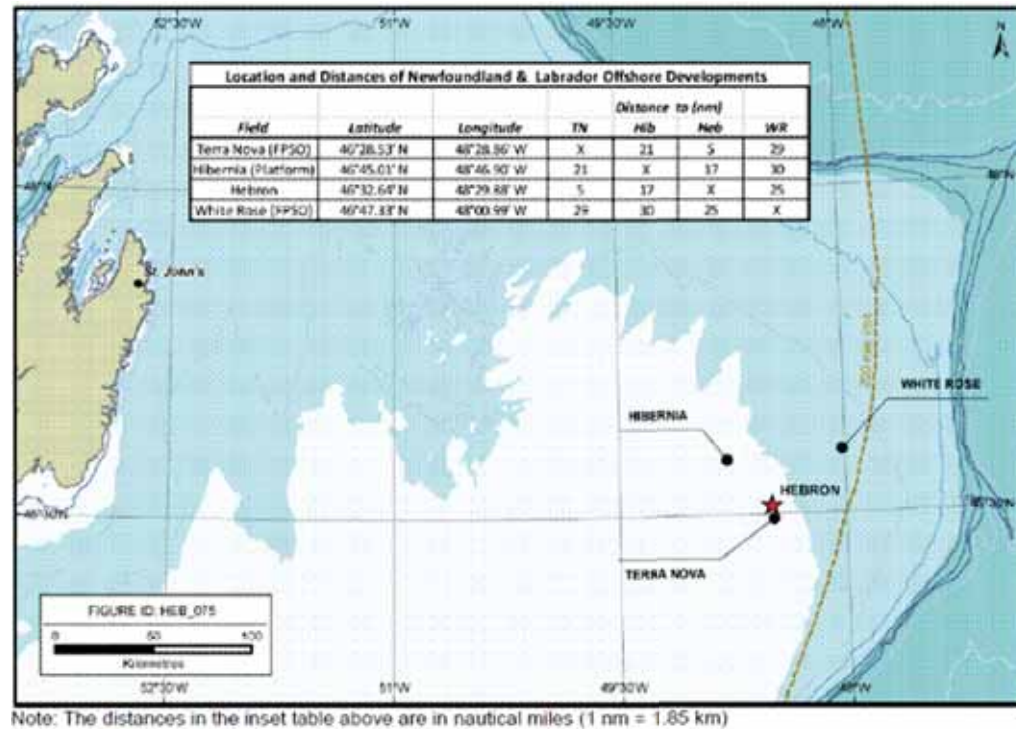


Figure 2.1-1 Location of the Hebron Oil Field

2.2. The Hebron Asset

The Hebron Asset currently contains three discovered fields (the Hebron Field; the West Ben Nevis Field and the Ben Nevis Field) and incorporates four Significant Discovery Licenses (SDLs), with ownership varying in each SDL. The four SDLs are: Hebron SDL 1006, Hebron SDL 1007, Ben Nevis SDL 1009 and West Ben Nevis SDL 1010 (Figure 2.2-1). These four SDLs contain the most likely extent of the oil for the delineated pools within the Hebron Asset. The Hebron Asset could be expanded if additional studies, seismic or exploration and/or delineation drilling proves that economically recoverable oil pool accumulations extends beyond the currently envisioned boundaries of the Hebron Asset.

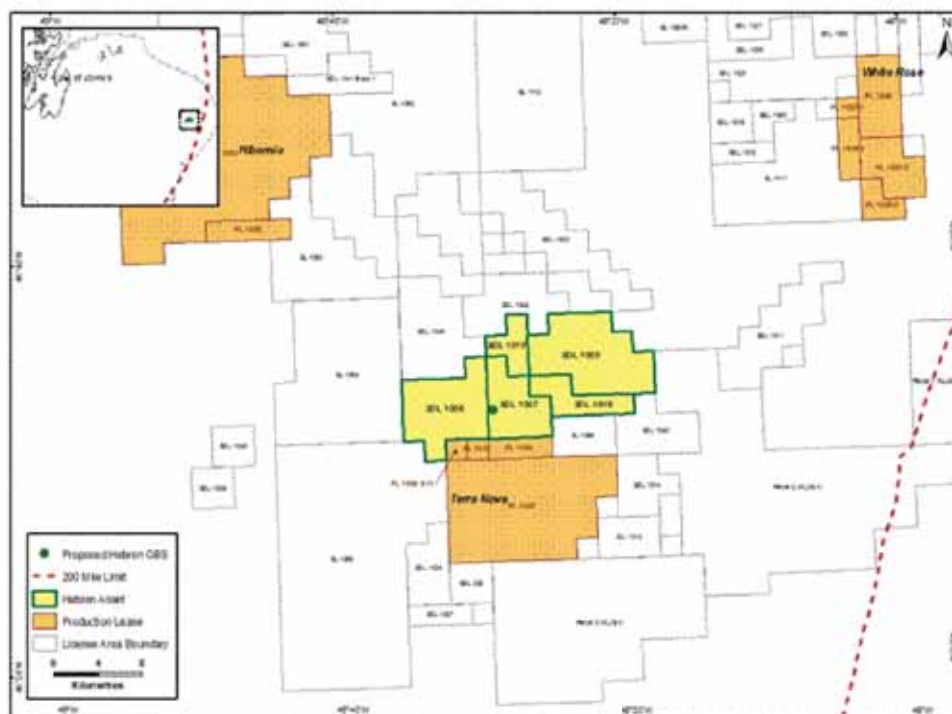


Figure 2.2-1 Significant Discovery Licenses in the Hebron Asset

Because the Hebron oil is heavy, it is more technically difficult and expensive to develop than the sweet crude of Hibernia. Therefore oil prices needed to be high enough to make the development economically feasible for a developer. In March 2000, Chevron commenced viability studies to assess whether Hebron could be a stand-alone project or a tie-back to another field. In February 2002, the project was deemed uneconomic since the oil was too heavy. In April 2005, the designated Operator, Chevron Canada, and its partners, ExxonMobil Canada, Petro-Canada, and Norsk Hydro Canada Oil & Gas, signed an operating agreement and negotiations began between the federal and provincial governments and the oil companies. However, in April 2006, it was announced that no benefits agreement could be reached since there was no agreement on a provincial 4.9 % ownership in the project. In August 2007 negotiations resumed, and a Benefits Agreement was signed in 2008 in advance of a Development Application in accordance with the Atlantic Accord Act. As of 2008, the Hebron Partners are ExxonMobil (36%), Chevron Canada (26.6%), Suncor Energy (22.7%), Statoil Canada (9.7%) and Nalcor Energy (4.9%).

2.3. Resource Exploitation Review

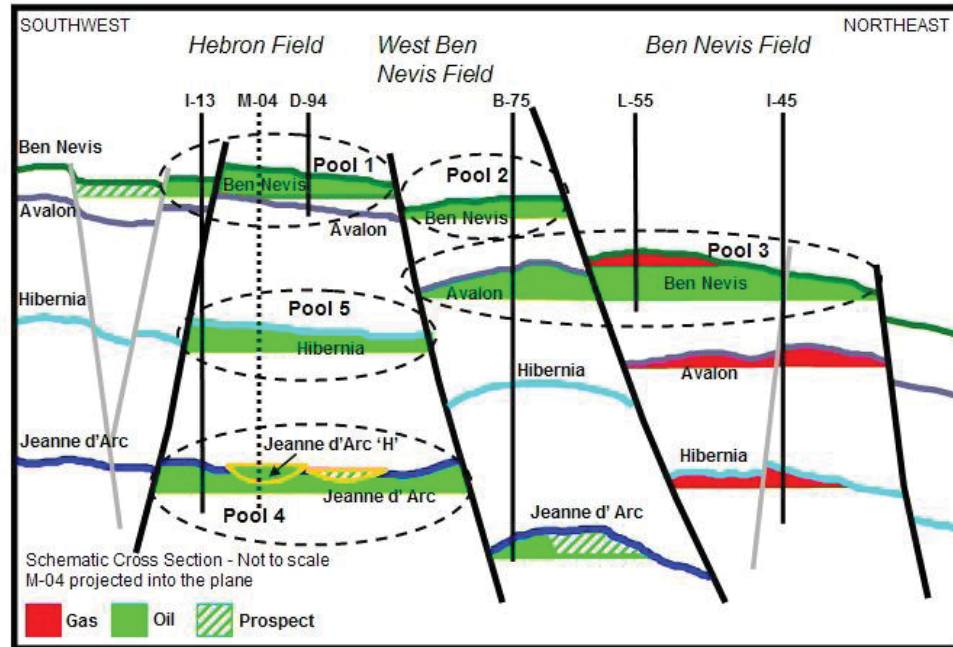


Figure 2.3-1 Schematic of Hebron Asset

The Hebron Asset contains three fields: Hebron, Ben Nevis, and West Ben Nevis (Figure 2.3-1). Four significant discovery licenses comprise the Hebron project but, given the extent of faulting and fragmentation of the Hebron Asset, new isolated reservoirs could be identified outside the designated Asset which would consequently require separate Development and Benefits Plans, as was the case with Hibernia South in 2007.² As outlined in the Development Plan, the Hebron Project will focus on two of these fields, Hebron and Ben Nevis. The initial phase will focus on three reservoirs within the Hebron Field: Ben Nevis, Hibernia and Jeanne d'Arc.

The largest reservoir within this arrangement is the Ben Nevis, designated as Pool 1, with an API of 20, and accounting for 70% of total recoverable project reserves. The oils contained in the Hibernia (Pool 5) and Jeanne d'Arc (Pool 4) reservoirs, although of higher quality than Ben Nevis, are more difficult to access. These reservoirs will be

² In 2007, the province used its veto powers under the Atlantic Accord to block C-NLOPB approval of an amendment to the Hibernia Development Plan that would have given HMDC access to an additional 223 MBO from the Hibernia South extension under the original fiscal regime. The province and HMDC reached an agreement in 2010, allowing development of the extension under a new royalty plan. First oil from Hibernia South flowed in June 2011.

accessed from the GBS platform over the production life of the project. In a secondary development, the preliminary plan for the Ben Nevis reservoir (Pool 3) in the Ben Nevis field is to access it via a subsea tieback to the platform.

The cumulative oil recovery over a 30-year period from these pools (1, 4, 5, and 3) is forecasted from a low of 660 MBO to a high of over 1,000 MBO. This represents a 30% recovery factor of the total volume that could be recovered if there were no technical or economic barriers. The latter volume is known as the Storage Tank Original Oil in Place (STOOIP) estimate.³ Hebron oils are denser than those of Hibernia. Heavy oils have a higher cost of production and typically a lower recovery factor. This is believed to be one factor in the protracted delay in reaching a fiscal agreement and the application for development. The price of crude at the start-up of Hibernia was US\$18/barrel. The average price of Hibernia oil from start up through the end of 2009 was US\$55/barrel, more than a threefold increase. The corresponding price of crude at the start-up of Hebron in 2017 is, of course, unknowable, as is the average price of crude over the life of the field. Nevertheless, for purposes of fiscal planning, the province has notionally placed a value of \$87/barrel. Accordingly, it has assessed the total royalty and tax revenues to the province of \$20 billion (assuming that all pools are developed) over the life of the project.

The Development Plan states that *“The overarching objective of the resource development planning process was to maximize the economic value of the recoverable hydrocarbons in the Hebron Asset”*. It should be noted, however, that a resource utilization strategy that maximizes economic value for the Proponent may not do so for government from a fiscal, sustainability, or benefits perspective, nor may it be the optimal strategy for protection of the environment. The Depletion Plan indicates the unlikelihood of a gas cap in the Hebron field and of a relatively minor presence in the Ben Nevis reservoir. It also notes the relatively low gas/oil ratio of Hebron’s Ben Nevis reservoir. This could represent a constraint on production and possibly on recovery factors for the prime oil-bearing zones in Pool 1, in particular.

2.4. Project Economics and Benefits

According to a study undertaken for the Commission, Hebron is expected to yield a 17% return on investment for its owners based on a price of oil at \$100 per barrel.

³ As a point of comparison, the estimated recoverable reserves from the Hebron Project, as currently configured, are approximately 30% higher than the original estimate of recoverable reserves (per the 1985 project description) from the Hibernia Project. That original estimate for Hibernia of 522 MBO has since grown to approximately 1,400 MBO recoverable with the prospect that the figure might reach 1,900 MBO recoverable.

The study notes that “Hebron appears more attractive currently than Hibernia was in 1990 when the decision to proceed was taken” (Locke 2011). Hebron will also contribute significantly to the continuity of production and stabilization of the province's revenues outlook. Assuming no new projects come on stream, Hebron is expected to account for almost 56% of total production offshore Newfoundland and Labrador between 2017 and 2037. Based on proven and probable reserves, Hebron is expected to contribute approximately \$20 billion to the provincial treasury. This places it on par with the total revenues to the province from Hibernia.

Beyond these direct economic royalties and taxes, the province will benefit significantly from the industrial spin-off associated with the project. The Benefits Plan accompanying the Proponent's Development Application envisages the creation of 11 million direct person hours of work locally during the construction phase of the project. A separate contractual agreement between the Provincial Government and the Proponent further defines the procurement and employment benefits that are to accrue to the province. The Benefits Agreement provides for a significant volume of activity to take place locally in conjunction with the design, engineering supervision, construction, fabrication, hook-up and commissioning of the GBS. Local employment and procurement opportunities will continue over the projected 30 year operation of the production system. Other features of the agreement include a commitment to encourage the participation of under-represented groups in the oil and gas industry, and to engage in research and development and education and training.

2.5. Engineering Design Review

Although other production alternatives were considered in the Development Plan, the Proponent and the province have already agreed to the choice of a GBS fixed to the ocean floor in the 2008 Benefits Agreement. *“The Project Proponents evaluated the alternative modes of development, including development drilling options, and determined that the preferred concept is to develop the Hebron Asset using a stand-alone concrete GBS (no pre-drill option) and topsides, and an OLS [Offshore Loading System]”* (DP 1.8). The GBS is the preferred alternative to the development of the project, with 52 well slots with J-tubes to allow potential tie-backs, dry trees or well heads, with drilling to occur once the GBS is in position (Figures 2.5-1).

The Hebron installation will consist of an ice-strengthened, single-shaft GBS with storage cell capacity of 1.3 MBO, and topsides, to consist of a drilling support module (DSM), derrick equipment set (DES), flare boom, utilities and processing module (UPM), and living quarters, including helideck and lifeboat stations. The oil will be offloaded via tanker using an OLS connected by two separate riser bases. The construction/fabrication program includes provision for Pool 3 tieback including J-tubes, space, and structural capacity (Pool 3/Ben Nevis Reservoir: DP 9.2. and 9.3).

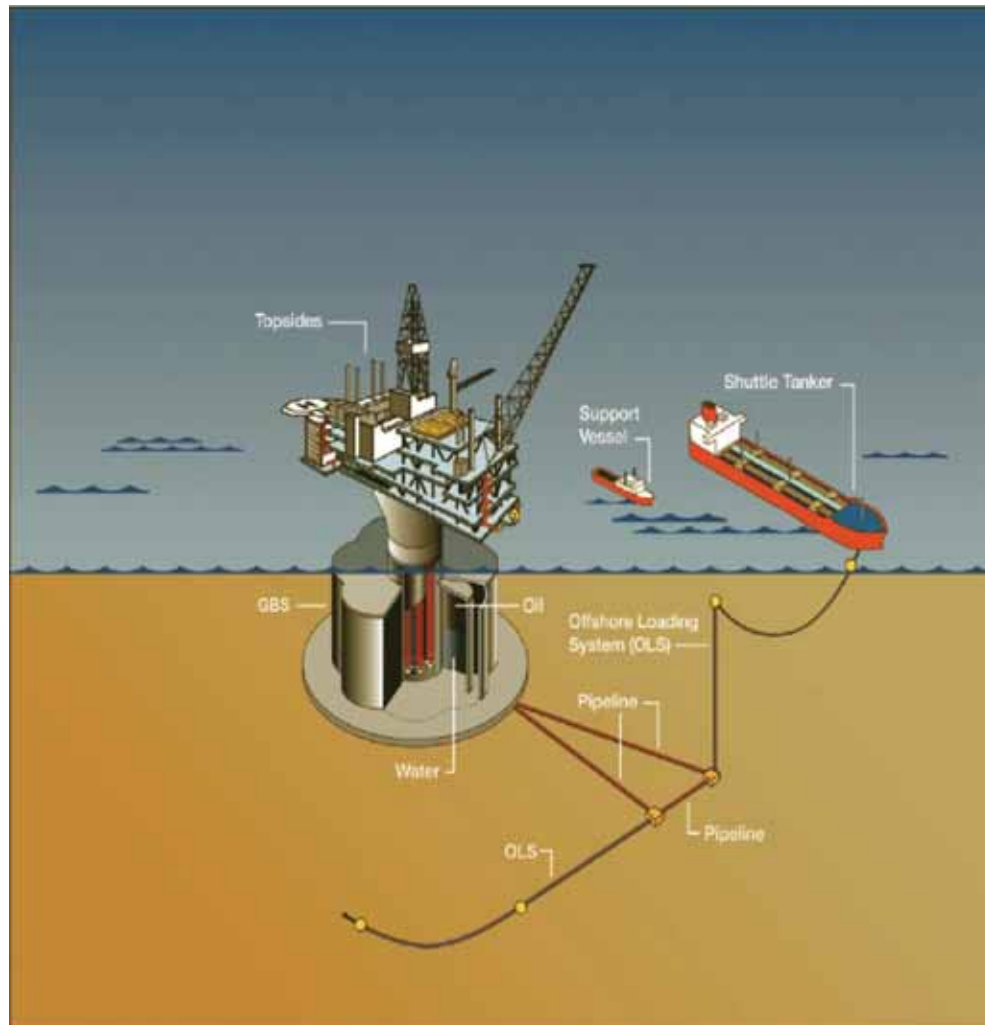


Figure 2.5-1 Hebron Platform, Stand-Alone GBS and OLS

Information obtained from public sources and from the Hebron Development Application.

Area	Hibernia	Hebron	Discussion
Topsides Weight	37,000 tonnes	30,000 to 44,000 tonnes	Current estimate ~ 42,000 tonnes
GBS Weight	550,000 tonnes	300,000 to 340,000 tonnes	
Storage Volume	~ 1.3 million barrels	~ 1.2 million barrels	
Drill Slots	2-sets of 32 (64 total)	52 (4 x 13)	
Position Water Depth	~ 82 meters	~ 93 meters	
Shaft Inner Diameter	4 x 17 metres	1 x 33 metres	Hibernia: 2-drill shafts and utilities shaft Hebron: all drill slots and utilities in one shaft
Caisson Height	~ 85.5 meters	~ 71 meters	Hibernia: roof above mean water height Hebron: submerged roof.
GBS Height	111 meters	120-130 meters	
Platform Height	224 meters	~ 235 meters	Hebron platform will be 11m higher than Hibernia (from seabed to top of drilling derrick)
Geometry	16 - "teeth"	7 - "flower petals"	The 6.0 Mpa compressive stress resulted in a Hibernia concept that included 16 - "teeth" around the perimeter of the structure to dissipate the forces.
Iceberg Impact	Iceberg crushing stress equals 6 MPa	Iceberg crushing stress equals 1.5 MPa	Advancement in Ice Engineering has resulted in a lower crushing stress
Foundation Diameter	~ 107 meters	~ 130 meters	Field location geotechnical parameters requires a larger foundation for Hebron
Concrete Volume	~ 165,000 m ³	~ 125,000 m ³	
Solid Ballast (tonnes)	~ 50,700 (at DWS) ~ 450,000 (after Platform Installation)	~ 53,400 (at DWS)	Hibernia: solid ballast installed after platform installation was problematic. Hebron: solid ballast installed during construction at the DWS.
Human Access	Yes	No	Hibernia: required access to mechanical equipment located in the GBS. Hebron: all equipment requiring maintenance will be pulled to topsides.

Table 2.5-1 Comparison of the Hibernia and Hebron Platforms

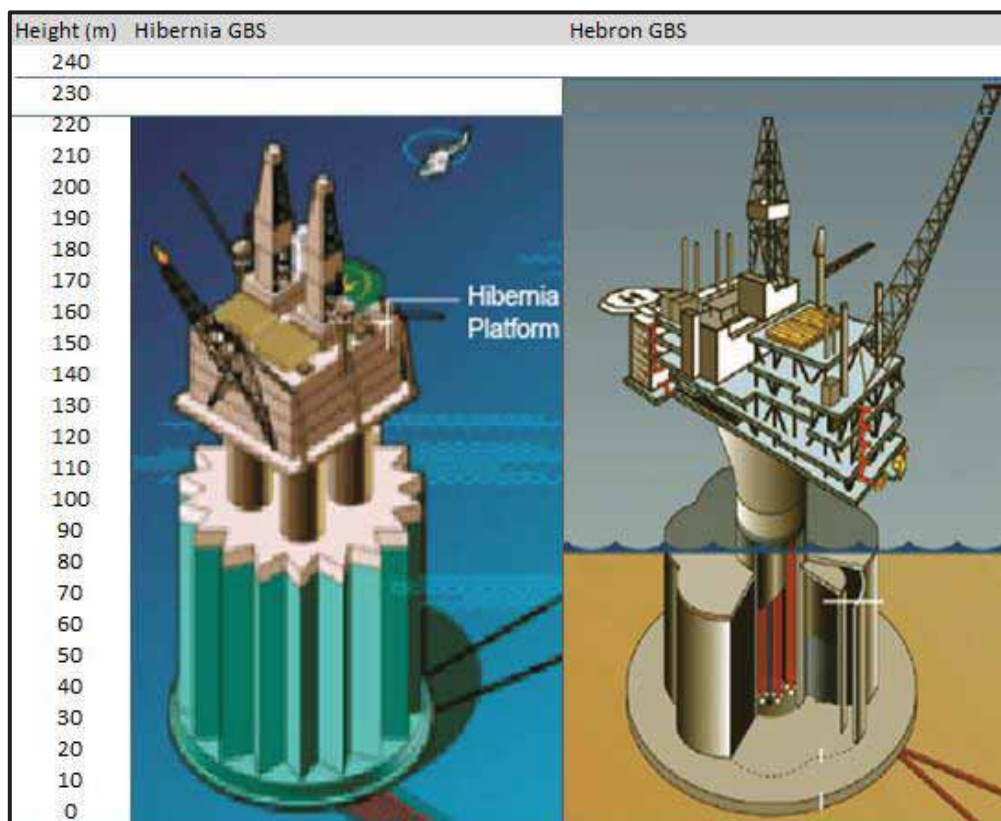


Table 2.5-2 Size Comparison of GBS Platforms

Both structures are about the same height but the Hibernia GBS is significantly heavier due to design and ballast (Table 2.5-1, 2.5-2).

While some operating parameters are provided, there is surprisingly little detail on the Hebron gravity-based design itself. What is known is that the platform will have a single shaft, and a caisson roof below the water line. Mechanical outfitting will include well conductor support frames, an oil storage system, caissons, import/export risers, and J-tubes, as well as construction and installation systems, including mooring, docking, ballasting, and grouting.

The platform will be outfitted with 52 well slots. This reflects the type of oil, the degree of fragmentation of the fields, and the need for artificial supports to maintain field pressure. This design also acknowledges the likelihood that, with further exploration and delineation, proved reserves could increase significantly.

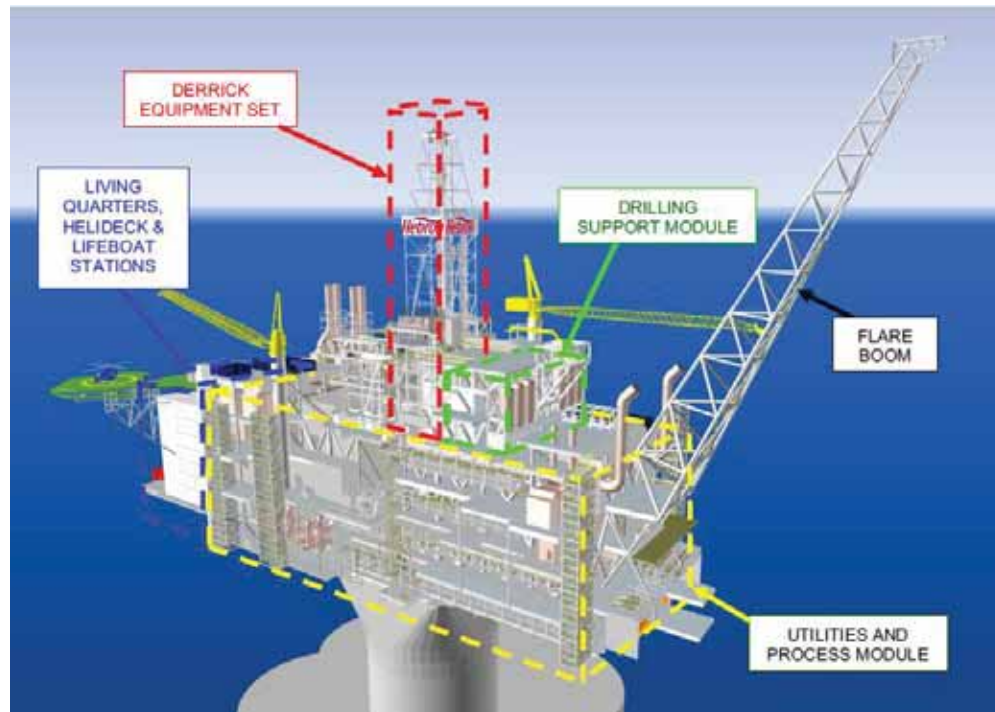


Figure 2.5-2 Schematic of Topsides

The utilities and processing components have been integrated into one module, as opposed to separate units at Hibernia. The Utilities and Processing Module (UPM) dominates the lower levels of the topsides deck and incorporates provision for heavy oil separation, gas injection and water injection. It will accommodate an initial daily production of 150,000 barrels/oil/day but will ultimately sustain a rate of 180,000 barrels/day. The integrated UPM design reduces the footprint of the topsides allowing for a smaller platform. It minimizes the extent of physical hook-up needed during integration with the other modules and it allows pre-commissioning prior to delivery to Bull Arm. While this might serve to lower costs, it also limits the number of yards capable of carrying out fabrication. For this reason (and perhaps others), the Proponents have essentially decided, with the concurrence of the province, that the UPM will be fabricated outside of Canada.

The helideck, living quarters, and control room are strategically located away from the most volatile elements of the processing module and the flare boom. The derrick equipment set is located in the centre of the topsides with the drilling support module next to it. The base design of the accommodations module was for 151 personnel on board (POB). This was identified as an issue by the C-NLOPB, the

concern was that the Proponent might not be acknowledging the peak and steady-state accommodation needs of the project, particularly when considering the need to accommodate inspections and maintenance with on-going drilling and production. The Proponent now states that design POB will be 210-220 with the intent to seek approval for a *“regulatory query to increase personnel above the design POB (210-220) during initial start-up and commissioning activities, as well as periodic shutdowns”* (EMCP 2011, Response 1). The OLS will have an offloading capacity of 50,000 barrels/hr.

There is provision for an extensive subsea development system that can be drilled, completed, gathered, and tied back to the GBS, approximately 7-10 km away. Recessed drilling centers will accommodate manifolds, trees and other assemblies, allowing water and gas injection as well as gas lift. Control of the subsea systems would be accomplished through umbilical lines reaching back to the platform via the J-tubes.

The engineering design of the production facility is divided into two main contracts which have been awarded and are in progress. The contract for the design of the topsides of the production platform has been awarded to Worley Parsons. The contract is for FEED, with the option at ExxonMobil’s discretion to include detailed engineering, procurement, and construction (EPC) services. Worley Parsons will provide overall project management of the contract, with subcontracts to be awarded to multiple third parties.

The contract for the GBS has been awarded to Kiewit Kvaerner Contractors. Kiewit-Kvaerner (KKC) is a partnership between Peter Kiewit Infrastructure Co. and Kvaerner Corp. The contract is for FEED and site preparation with the option to include detailed EPC services. The contract value including the FEED and site preparation is USD \$140 million. The contract for Provision of Certification Services for all aspects of the Hebron Project has been awarded to Det Norske Veritas.

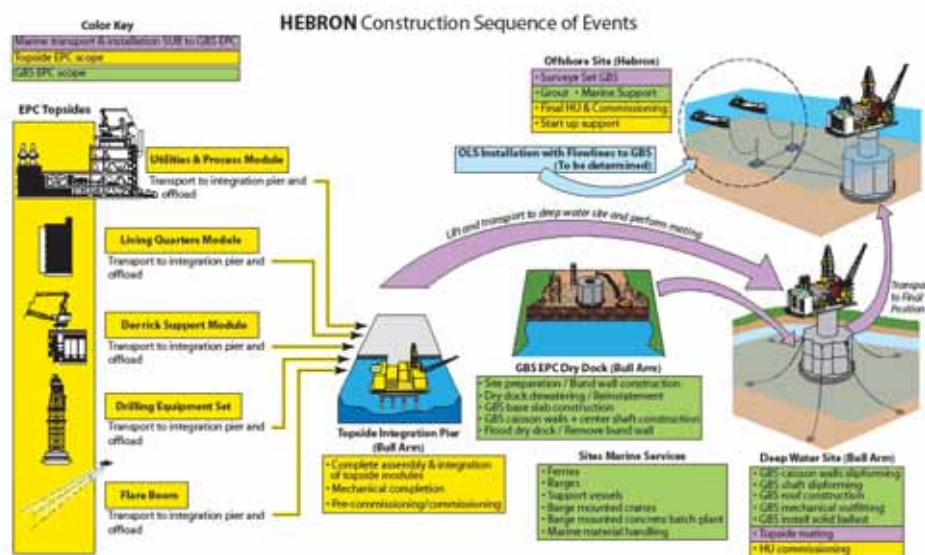


Figure 2.5-3 Hebron Construction Sequence

2.6. Construction Planning and Execution Review

Although the contracts cover FEED, it is expected that both contractors will also serve as the EPC managers (detailed engineering, procurement and construction) for the entire project. By virtue of the terms of the Benefits Agreement signed in 2008, the key engineering, design and procurement activities will occur in the province.

Construction and mechanical outfitting of the GBS are designated to take place in Bull Arm. Repairs and upgrades are required to render the site suitable for construction and fabrication of the platform components. A temporary dry dock will be re-established in the Arm at Mosquito Cove. The current concept is to construct a bund wall consisting of a sheet pile cut-off wall driven in the center of a rock-fill dike (or bund wall) across the cove to form the wall of the basin. It will be protected on the outside by a layer of crushed rock. It is estimated that the bund wall could be up to 500 meters in length and the area of the dry dock approximately 35,000 to 40,000 square meters. Once the bund wall is in place, the dry dock will be dewatered and the access roads rebuilt or replaced. Support infrastructure, including offices, cranes, and laydown areas, will be put in place. Additional infrastructure outside of the dry dock also will be either refurbished or built to support GBS construction. The concrete batch plant will be replaced. The tow-out channel to the Deep Water Site (DWS) at Great Mosquito Cove (Figure 2.6-1) will be dredged and, if necessary, blasted.

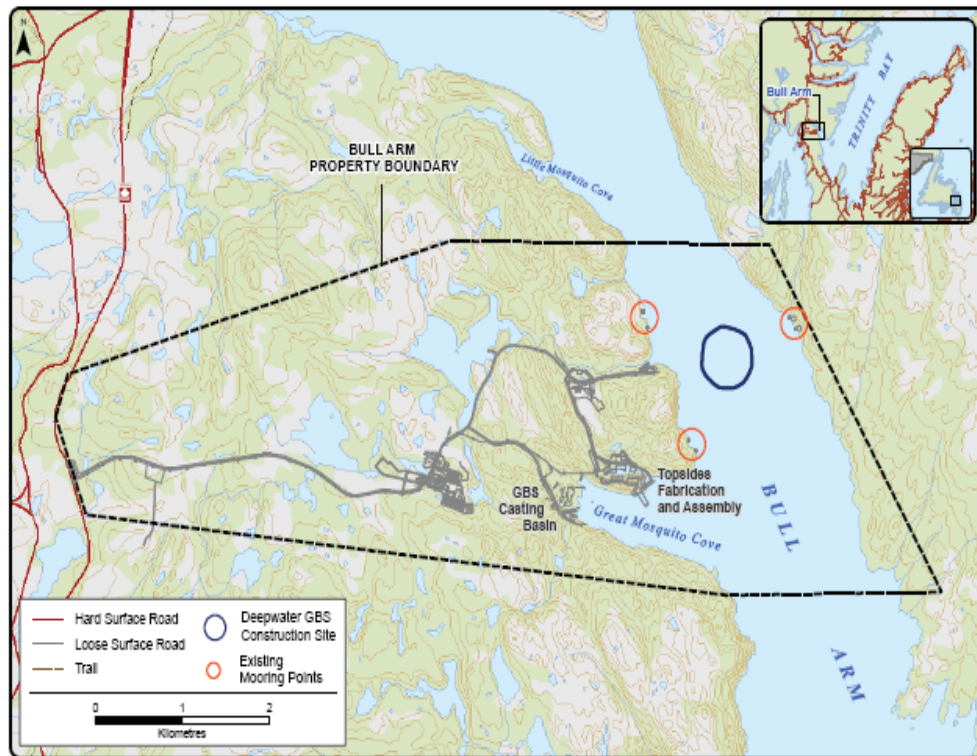


Figure 2.6-1 Onshore/Near Shore Construction Area

Construction in the dry dock will include the skirts, base slab including mechanical outfitting and cantilevered roof, conventional and slip forming of the cantilever walls including the storage cell walls and ice walls with mechanical outfitting. Construction will continue to a height sufficient to allow float-out from the dry dock while maintaining stability. Once the dry dock is flooded, the bund wall will be removed, and the partially constructed GBS will be towed to the deep-water site. Once moored at the deep-water site, slip forming of the storage cell walls and ice walls will continue to full caisson height. Mechanical outfitting will be completed at the DWS. Construction activities at the DWS will be supported by a flotilla of barges, including a floating batch plant for the production of concrete, as well as tugs and personnel ferries.

The Proponent has committed to supporting workplace safety and diversity for the construction and operation of the Bull Arm Fabrication Site. Specific initiatives are discussed in Chapter 4: Human Safety and Chapter 7: Socio-Economic Impact: Sustainability.

As previously noted, it is expected that fabrication of the main topsides modules will be divided between the province and yards outside the province. In keeping with the Benefits Agreement, certain of the modules, mechanical outfitting components of the base, and subsea systems have been deemed captive to the province. These include the accommodations module, derrick equipment set, drilling support module, flare boom, heli-deck, and lifeboat stations. Also included are riser components; offshore loading system sub-assemblies; subsea drill templates; and mooring, positioning and docking system components.⁴ The integrated UPM is designated for fabrication outside of Canada.

Prior to float-over, the completed GBS will be ballasted to the required depth using a combination of solid ballast and seawater. The topsides will be floated on barges to the GBS in catamaran formation. Once positioned, the GBS will be de-ballasted until connection is made with the topsides. After float over topsides and GBS systems will be integrated and pre-commissioning work on both topsides and GBS systems will continue. The feasible weather window for tow to field from the deep-water site to the Hebron field is only from May through September. For tow to field, the GBS will be de-ballasted to maintain a required keel clearance at the Hebron site. Tow to field is anticipated to take between 10 to 14 days. The Hebron Platform will be set in place on site on the Grand Banks. Skirt penetration into the seabed may be assisted by a skirt evacuation system to assist with release of entrapped air and water in the skirt compartments. Additional seawater ballast will be added to the platform. Grouting around the base of the Hebron Platform may be required.

The Offshore Loading System (OLS) offloading lines and risers will be placed at their location, approximately 2 km from the platform, either before or after platform installation. It is anticipated that the OLS off-loading lines will be placed using conventional pipe lay techniques; trenching or burial is not anticipated. Rock dumping and/or concrete mattress pads may be required for insulation and stability.

Final hook-up and commissioning could take between three to nine months. The Hebron Project is planning to achieve first oil prior to the end of 2017 with current project schedule indicating Q2 2017.

⁴ “The Proponents agree that the work associated with the Fabrication of the accommodations module that is generally identified in Exhibit D (referred to as the “Accommodations Module”) shall be carried out in the Province, subject to the provisions of Section 2 of Exhibit F” (BA 5.5). Section 2 of Exhibit F is not in the public domain and thus the terms cannot be evaluated by the Commission.

2.7. The Labour Challenge of the Hebron Project

Among the key concerns raised during the public review sessions was the absolute as well as the relative level of employment benefits that are likely to accrue to the province during the construction phase of the Hebron project. It is worth discussing this key issue in the context of the Development Application review in the following chapters.

In its Benefits Plan, the Proponent estimated the local labour component to be within the range of 30% to 50%. Even if the top of this range could be achieved, local employment for Hebron would still fall well short of the benchmark 66% local content achieved during the construction of Hibernia. In the worst case scenario, it would capture 30% of the total project hours, or well under half the capture rate for Hibernia. The Proponent has indicated these estimates will be further refined once the project enters the detailed engineering phase.

The Proponent acknowledges that *"the majority of requirements will be manufactured outside Canada"* (SEIS 4-17). With respect to the balance of work, it points out that *"the potential for Canadian and Newfoundland and Labrador involvement in project construction and operations activity on a competitive basis is in part potentially constrained by labour availability"* (SEIS 4-12). The Proponent further acknowledges that Hebron will inevitably compete with other major industrial projects expected to take place in the province within the same time frame as Hebron. It concludes that the expected labour demands of these projects *"contributes to a high level of uncertainty as to the availability of skilled trades personnel for Hebron in Newfoundland and Labrador"* (BP 4-20).

Given the long lead time associated with skills training, it is critical that other stakeholders be given the greatest possible notice regarding the nature and extent of expected shortfalls. The Benefits Plan does indicate that, of 16 categories of engineering and trades, a possible shortfall is anticipated in 10 of these categories. Beyond that, unfortunately, the Proponent provides little in-depth analysis of supply and demand factors that might influence the level of local construction and fabrication for Hebron. The Province has been aware of the impending shortage of skills for some time and had commissioned a task force study of the issue in 2007. Following the Report of the Newfoundland and Labrador Skills Task Force, which identified a number of impediments to skills development and retention, government implemented a series of measures that have shown significant promise. Nevertheless these achievements are not expected to close the gaps in the supply of skilled trades against the demands of Hebron and other major projects now underway or in the planning stages. In 2011, the Provincial Government released a report on the longer-

term outlook for labour in the province. The report, *Outlook 2020*, does not address the specifics of Hebron but it does examine, at least qualitatively, the expected shortfalls in skilled trades across all industries. Taken together with other available data, it provides useful insight regarding the extent of the labour shortage confronting the province.

During the period 2011 to 2015, which includes the peak years of Hebron construction, a total of 53,000 job openings are forecast. This includes 30,000 positions that will become available as a result of attrition. Assuming there is a perfect match between the skills requirements and the skills availability for these positions, and assuming the province's labour force does not shrink during this period, then it would be theoretically possible that this demand could be met by the labour supply. Nevertheless, it is clear from this and other data sources that the mismatch of skills between those leaving the labour force and those entering it is likely to increase in severity and especially be pronounced in occupational categories most relevant not only to Hebron but other large industrial projects contemplated or underway in the province.

Beyond the job openings attributable to attrition are 23,000 new positions that will be created from 2011-15 as a result of projects, such as Hebron, and the general expansion in the provincial economy. It is this incremental labour demand that presents the province with the greatest degree of challenge and concern. Satisfying any portion of this new demand is dependent on an offsetting net increase in the labour force itself and/or a proportional decrease in the numbers of unemployed. From the period 2005 to 2010, there has been an average annual growth of just 1,000 workers in the province's total labour force (*Labour Force Survey*, Statistics Canada). Were this pattern to continue, a deficit of some 18,000 workers would emerge during the period to 2015. This prospective shortfall would be exacerbated from a Hebron perspective by several other factors. For every 1,000 new labour force entrants per year, women outnumber men by a factor of eight to one. The net growth in job openings is expected to heavily favour the oil and gas, mining and construction sectors, all of which have traditionally been filled by male workers. As well, occupations most relevant to the Hebron project contain the largest share of older workers in the province and the median age of this group continues to rise. Older workers are less likely to be attracted to the construction phase of oil and gas developments or other major industrial projects. Although Newfoundland and Labrador continues to have the highest rate of unemployed in Canada, the unemployment rate within the catchment area for Hebron is at or below the national average. Although it has some room to shrink further, the right skills match and other factors are likely to limit such reductions absent a more aggressive training approach by government and industry. On a positive note, these labour challenges also represent tremendous employment opportunities for those groups who have

traditionally been under-represented in the natural resource sectors, provided that conditions are permissive for inclusion.

An examination of occupational job prospects as per Outlook 2020 readily demonstrates the extent to which occupations most relevant to Hebron, including the 'Trades, Transportation and Equipment' and 'Occupations Unique to Primary Industry' are generally earmarked as facing the tightest supply conditions of all occupations. It is noteworthy that the province does not publish numerical data on either the overall forecast gap in labour demand versus labour supply, or the projected shortage of skills within each of the four-digit sub-classifications of occupational codes. It is understood the province has this information but, for policy reasons, has chosen not to make it available to industry or the public. Other provinces such as Alberta and British Columbia have chosen to quantify publicly the gaps that are forecast to exist in specific trade categories, e.g. electricians.

In its Labour Market Outlook, for example, the Government of Alberta notes that over the next ten years, Alberta's labour market is projected to grow by approximately 607,000 workers at an annual average rate of 2.4%. A net increase of 492,000 workers is expected to join the labour force, as occupational supply increases at an annual rate of 1.9%. For the coming decade, Alberta could experience a labour shortage of approximately 114,000 workers. At the four-digit National Occupational Classification level, it reports the labour demand, labour supply and cumulative shortage on an annual basis over a 10 year horizon. It shows, for example, that in 2015 there will be a shortfall of 650 electricians in the province. While they may change in part due to underlying changes in economic or industrial circumstance, they are nevertheless an essential planning tool for stakeholders, including government, industry and educational institutions. At the individual level, they can hopefully play a role in personal decision making with respect to the opportunity for training and the prospect for gainful employment.

In Newfoundland and Labrador, the tightening labour supply, especially with respect to skilled trades, is already creating problems in the provincial economy based on anecdotal information provided by local industry. Vale's Long Harbour project is among those that have reportedly struggled to fill skilled positions. The Provincial Government has acknowledged that "*over the medium-to-long term, labour shortages associated with population decline and aging are among the most significant labour market challenges facing Newfoundland and Labrador*" (2010 Advanced Education and Skills, Annual Report).

Hebron is not immune to these problems but, in light of the Proponent's underlying financial strength and its unique investment recovery model for oil field developments (wherein capital investment is recovered pre-royalty), it is well

positioned to compete for the best the labour market has to offer. This is reflected in the Project Agreement between the Hebron Project Employers' Association and the Resource Development Trades Council of NL (RDC), a collective agreement now in place for Hebron construction activities at the Nalcor Bull Arm Fabrication Site. The agreement provides a significant wage and benefit premium over Vale's Long Harbour site, itself a relatively high value employment opportunity by Newfoundland and Labrador standards. Because it is essentially capital intensive (and therefore relatively insensitive to labour costs), the upstream segment of the oil and gas sector is generally successful in recruiting the labour it requires for projects such as Hebron. The downside for the province however is that, through labour recruitment, it can effectively cannibalize the human resources built up over time by smaller local companies.

There are several avenues available to the Hebron Proponent, and to other major developers in the province, to meet their respective requirements for skilled trades. Among these is the implementation of formal employer-supported training initiatives. Noteworthy, however, is that NL has the lowest rate of training initiatives of this type among Canadian provinces. The C-NLOPB's *Benefits Plan Guidelines* require that the Proponent submit a plan and associated budget for project specific training initiatives. However, the Benefits Plan does not contain a proposal that would appear to satisfy this requirement. Indeed the Benefits Plan and the presentations of the Proponent at the Hebron public review sessions make clear its belief that the onus for supplying an appropriately qualified workforce rests with its prime contractors and their sub-contractors. Underlying this strategy is perhaps an assumption that the Hebron project can satisfy its requirements, if minimally so, through the recruitment of trained, experienced workers, in the following order of priority:

1. Consistent with the first consideration principle, Hebron workers will be recruited from within the province to the extent that those with the requisite skills are available. A majority of the project's labour requirements can no doubt be satisfied in this manner. One downside is that, unless replacement workers have been trained and are available to be deployed concurrently, other local industries may suffer from the leakage of skills to the Hebron project.
2. The Proponent and its designated contractors can also be expected to look to other areas of Canada for skilled workers, including some share of this province's mobile workers holding positions in other provinces. There are approximately 20,000 workers originating from this province who derive a major portion of their annual income outside Newfoundland and Labrador. The majority of these workers are in classifications relevant to the Hebron project and many of them are temporarily domiciled in the provinces of Alberta and Ontario. It is not known what percentage of these workers possessing the requisite skills can be attracted

back to the province for full-time employment on the Hebron project. Although Hebron wage rates are high relative to other employers in this province, they are significantly lower than for comparable oil and gas work in northern Alberta.

3. Finally, it will look to fill any remaining shortfall from outside Canada using temporary work visas issued by the federal government. There are reportedly some 1400 foreign nationals working in this province under temporary visas at present, which is up more than 50% from the number in 2005. While the recruitment of workers outside the province and outside Canada represents a valid strategy for satisfying, in part, the requirement for skilled trades for Hebron, it does little to address the structural employment problem in this province; nor does it contribute to the expectation of a lasting economic legacy as prescribed by C-NLOPB guidelines.

These strategies, in some balance and order of prioritization, are no doubt capable of satisfying the Proponent's need for skilled labour in respect of those project elements that are considered captive to the province. Examples of this work include the construction of the GBS as well as the integration, hook-up and commissioning of the topsides. Less certainty might exist with respect of other project elements that, whether or not committed in principle to be carried out in the province, could if deemed essential to the Proponent's mandate for execution certainty be carried out in other provinces or outside Canada. A prime example of this uncertainty is the derrick equipment set. Although the Proponent originally agreed that this module would be constructed within the province, it has indicated more recently that this may no longer be possible. Although it has only broadly referenced limitations with respect to local capacity, it is not improbable that the availability of skilled labour on competitive terms was a significant factor in arriving at that conclusion.

These factors, in tandem with the Proponent's corporate philosophy that stresses the need for a high level of execution certainty, will ultimately determine the extent to which this province achieves overall employment and expenditure levels for Hebron that are in the high range of those cited in the Benefits Plan. Moreover, what some see as a perfect storm in terms of looming skilled labour shortages, others see as a golden opportunity to capitalize on a high value, world class project to significantly enhance the province's intellectual capital and human resources. Notwithstanding the many challenges cited, the prospects for achieving this outcome are favourable provided a concerted effort can be mounted in sufficient time to avert the expected shortfalls. Faced with a similar, if not more demanding proposition in advance of Hibernia, the province adopted inventive and aggressive policies to bridge the gap.

As a result of its response to the 2007 task force study, the province succeeded in growing the number of registered apprentices between 2007 and 2009 by 69% or

some 3,400 persons. In the same period it certified some 233 journey persons who had been previously registered and who could have required up to 7,200 hours of eligible work experience to complete the process. There remains a potential, therefore, for a much greater number of journey persons to be certified over the next several years. Moreover, having achieved such a high increase in new entrants, it must be presupposed that the same strategy for increasing registrants exponentially might be possible again. Success in doing so would depend, of course, on a number of factors including a rapid catch-up by the Proponent in identifying and quantifying its expected shortfalls, the availability of apprenticeship candidates, the expansion or conversion of training capacity where necessary, and identification of suitable venues to satisfy the requirement for practical job experience. The proposition advanced by various groups representing women's interests is that there exists a unique opportunity to allow women to achieve a stronger representation in the skilled trades sector. Opportunities for training can also be extended to unemployed or underemployed residents of rural Newfoundland and Labrador to the extent that they possess the necessary prerequisites. The design of training programs and, where necessary, the expansion of training facilities and the purchase of equipment can perhaps be accomplished in part under the R&D (E&T) fund for Hebron.

This report incorporates a recommendation for the creation of a training advisory group comprising senior representatives of government, the supplier community, training institutions and the Proponent. The mandate of this group would be to address the looming skilled trades shortage and the need for an aggressive, coordinated approach to training. It might be expected that such a group would adopt a much more direct, public and determined approach to quantifying the challenges ahead and formulating effective strategies to meet them. If established quickly enough, the group could perform a vital function in facilitating the development of a rapid response program designed to maximize the level of local employment from the Hebron project. A prerequisite for achieving this is access to a comprehensive database and analytical model that allows a much more precise and deliberate approach for anticipating and responding to the province's labour market requirements.

Further discussion regarding and specific recommendations concerning the way-ahead for the labour shortage are offered in Chapter 6: Benefits.

3. DEVELOPMENT APPROACH

3.1. Chapter Summary

The Development Plan as presented by the Proponent is based on conceptual engineering studies and a recognized limited knowledge of the various fields and reservoirs being developed. A gravity-based structure (GBS) is the preferred development option for the Hebron Asset. Information on alternatives, although referenced in the Development Application, was requested by the C-NLOPB, but not provided by the Proponent.

The GBS construction capital cost is estimated in the \$6.5 billion range. Total operating costs for the GBS over the life of the field are estimated at slightly less than \$6 billion with a drilling program hosted from the GBS estimated at an additional \$1.9 billion over the life of the project. The Pool 3 subsea development has an estimated capital cost of \$1.7 billion with additional drilling from a mobile drilling rig and an estimated cost of \$1.8 billion.

Capital Costs	Project Admin	Topsides	GBS	OLS	Construction Totals	Drilling	Operations
GBS	\$1,575	\$2,881	\$1,788	\$224	\$6,468	\$1,887	\$5,883
Pool 3	\$250	\$465	\$1,015	-	\$1,780	\$1,780	-
Totals	\$1,825	\$3,346	\$2,803	\$224	\$8,248	\$3,667	\$5,883

Table 3.1-1 Construction Capital and Operations Costs of the Proposed Hebron Project

The front-end engineering and design (FEED) contracts for both the GBS and topsides have been awarded, and FEED is scheduled to be completed in Q1 2012; detailed design has commenced.

The execution of any elements of the Development Plan in advance of C-NLOPB approval is at the risk of the Proponent. From a practical point of view, the degree to which the key elements of design, construction, and fabrication are amenable to change is unknown. Significant engineering decisions will have been made by the Proponent prior to the fundamental decision by the C-NLOPB in 2012. It is not unreasonable, therefore, to conclude that any stipulations which the C-NLOPB might attach to the development approval, whether emanating from its own review or that

of this Commission, will not alter the fundamental design and construction parameters of the project. Similarly, the designation of Bull Arm as the GBS construction and topsides float-over site is a given. The places of fabrication of the topsides modules within and outside the province are open to discussion. During the public review sessions at Marystown, the Proponent announced that the Kiewit shipyard has been assessed to only have the capacity to construct the drilling support module (Transcript, November 23, 8). The derrick equipment set (also referred to as the derrick equipment set or drilling derrick module), with a reported capital project value of \$100 million, may be built in the province if suitable construction site and vendor are qualified.

During the review process, the discussion centred predominantly on the level of detail in the Development Plan. There was substantial public concern about the engineering and procurement strategy of the project, and the implications for local participation. The construction locations of the topsides modules, particularly for the drilling-related modules, the mode of construction of the living quarters (assembly vs. fabrication), the UPM design that diminishes if not eliminates local participation, and shuttle tanker standards were some of the topics raised by the Commission and the public. In particular, the lack of details surrounding the development of Pool 3 caused great concern.

3.2. Regulatory Requirements

The Development Plan should provide the C-NLOPB with the information necessary to validate *“the acceptability of the Proponent’s plan and to assist the Board to make an informed decision. A secondary purpose is to make the appropriate information available for public examination”* (Development Plan Guidelines, 3).

The Development Plan is to be submitted in two parts:

Part I This part of the Development Plan should describe the Proponent’s plans for development of the pool or field, and contain a summary of all information used by the Proponent in preparing the Development Plan.

Part II This part of the Development Plan will consist of copies of studies, reports, proposals, etc. used by the Proponent in preparation of the Development Plan and in consideration of alternative modes of development. Subject to the confidentiality and privilege provisions outlined in the Acts, it is the intent of the Board to make available to the public information submitted by the Proponent to the Board prior to and during the review process (Development Plan Guidelines, 3-4).

The Part I documents which were received from the C-NLOPB and/or the Proponent by the Hebron Public Review include the Development Plan and Development Plan Summary; the Concept Safety Analysis; and the Produced Water Management Strategy. The only Part II documents received from the C-NLOPB by the Commission were the Bull Arm Site Environment Protection Plan and the Spill Prevention and Response Plan. The Commissioner requested a complete listing of the Part II documentation provided to the C-NLOPB, but this list was denied *“per the confidentiality and privilege provisions outlined in the federal and provincial Accord Acts. As part of the Board’s completeness review of the Development Application, the Board accepted EMCP’s classification of the material as privileged and confidential. Therefore the complete listing of the Part 2 documentation is unavailable to the public”* (ECMP 2011). Lacking any knowledge of the contents of Part II, the Commission is unable to comment on the legitimacy, or otherwise, of the reasons for this exclusion.

3.3. Review of Submitted Documents

The Development Plan is a technical document intended for scrutiny and evaluation by industry, the public, the respective governments, the C-NLOPB, and the Commission. The C-NLOPB conducted a completeness review prior to the release of the Development Plan to the Commission. The Commission issued a request for additional information to the Proponent and, upon receipt of the responses, issued notice for the public review sessions. The requests for clarification and for additional information from both the C-NLOPB and the Commission reflect the complexity of the document and the extent to which certain aspects are inconsistent and insufficient in detail.

Notwithstanding the fact that the Proponent’s responses were preliminary given the current FEED stage of the Project, the Commission has found it difficult to compare the Hebron Development Plan to prior projects. In its completeness review of the Development Application, the C-NLOPB has at least implicitly underscored the inadequacy of data and/or the presentation of data in sub-optimal formats.

The Development Plan can be reviewed and analysed in terms of resource exploitation; engineering design; construction planning and execution; and operations and maintenance. The Concept Safety Analysis will also be reviewed in this chapter in terms of design safety considerations as opposed to human safety considerations which will be discussed in Chapter 4: Human Safety.

3.4. Resource Exploitation

As discussed above, the Development Plan is based on a recognized incomplete knowledge of the fields and reservoirs being developed. The Commission has comments regarding methods of enhanced oil recovery in terms of Hebron heavy oil and, most importantly, the approach to developing Pool 3.

3.4.1. Enhanced Oil Recovery

The projected recovery factor for the Hebron Project is approximately 30%. In the face of rapidly rising exploration and development costs, the oil industry has begun to make improvements in the rates of recovery relative to in-place oil estimates. The volume of stranded oil – oil not extracted for technical or economic reasons – ranges from a low of 25% to a high of 78% depending on reservoir conditions. The world-wide average recovery rate is only 36%, meaning that 64% of the STOOIP is left underground. Enhanced Oil Recovery (EOR) techniques are now being developed to increase reservoir yields on an economically viable basis. To this point in time, the Proponent has conducted only ‘preliminary high-level screening’ of possible EOR strategies (DP 6-79).

An increase in recovery rates by even one or two percentage points can have an exponential impact on revenues accruing to both the Operator and government. The incremental costs, principally operating costs, of enhanced recovery invite rigorous examination. The sunk capital costs of projects, and typically high end-stage crude prices relative to those on which the project was predicated, can make such project extensions financially attractive.

Fields such as Hebron situated in particularly hostile environments present a further long-term incentive for enhanced recovery. Unlike land-based, near-shore, and less environmentally challenged offshore developments, the prospects of re-entry for fields on the Grand Banks once production has ceased must be considered very poor. Given the scale of investment required for developments in such hostile locations and reconciliation with initial environmental disruptions, there are strong environmental arguments along with the obvious economic benefits for aggressive efforts to recover the maximum possible volume of oil.

This issue is of particular relevance from a governmental, public policy perspective. Operators sometimes are preoccupied by the profit potential of the next prospect and hence might be indifferent to opportunities for enhanced recovery from existing plays. While this issue might be seen as more appropriate for consideration during the mature phase of projects, a number of reports have shown that recovery rates are more readily optimized when addressed by the Proponent during the engineering and operational design phase.

3.4.2. Pool 3

The preliminary study of Pool 3 development options is based upon the geologic and reservoir studies included in the Development Plan. Additional studies to further define the Pool 3 design basis, including cost and schedule estimates, are anticipated to be complete in 2012 (EMCP 2011, Response 59).

During the public review sessions, two individuals raised concerns regarding the plans for Pool 3 development. Local offshore industry consultant and supplier, Rob Strong emphasized Pool 3, stating it represents a significant opportunity for the local supply community. The drilling of 20 wells represents 4-5 years of rig activity alone, with all associated spin-offs. Mr. Strong sought clarification regarding the scheduling of the Pool 3 development, especially in terms of timely information to suppliers. He further suggested that Pool 3 required its own Development Application, as did Wayne Chipman, a retired reservoir engineer.

The Hebron Asset contains the following reservoir pools which have been determined and estimated from various exploration and delineation wells (Table 3.4-1, after DP 1-6).

The Proponent is seeking approval of the Development Application related to the Hebron Asset, which includes four Significant Discovery Licenses (SDL 1006, SDL 1007, SDL 1009, and SDL 1010), and Pools 1, 2, 3, 4, 5. The proposed development scenario has Pools 1, 4, 5 associated with the GBS and Pool 3 as a potential tie-back development. As part of the review of the Development Application including the Development Plan, Benefits Plan, and Comprehensive Study Report, a critical question for the Commission has been to consider if the proposed Pool 3 development should be considered as part of the Fundamental Decision.

Field	Reservoir	Wells	Pool Identifier
Hebron Field	Ben Nevis Reservoir	Including the fault block penetrated by the D-94 and M-04 wells and the fault block penetrated by the I-13 well	Pool 1
Hebron Field	Hibernia Reservoir	Defined by the I-13 and M-04 wells	Pool 5
Hebron Field	Jeanne d’Arc Reservoir Including the isolated B, D, G, and H hydrocarbon- bearing sands	Defined by the I-13 and M-04 wells	Pool 4
West Ben Nevis Field	Ben Nevis Reservoir	Penetrated by the B-75 well	Pool 2
West Ben Nevis Field	Avalon Reservoir	Defined by the B-75 well	Pool 3
West Ben Nevis Field	Jeanne d’Arc Reservoir	Penetrated by the B-75 well	Unassigned
Ben Nevis Field	Ben Nevis Reservoir	Defined by the L-55 and I-45 wells	Pool 3
Ben Nevis Field	Avalon and Hibernia Reservoirs	Penetrated by the I-45 well	Unassigned

Table 3.4-1 Hebron Reservoir-Pools

Estimated Recoverable Oil		Upside		Best Estimate		Downside	
		In-Place	Recoverable	In-Place	Recoverable	In-Place	Recoverable
Millions of Barrels (MBO)							
Hebron Ben Nevis	Pool 1	1,870	762	1,515	563	1,204	443
Hebron Hibernia	Pool 4	218	47	148	15	93	6
Hebron Jeanne d’Arc	Pool 5	464	123	317	87	243	61
Ben Nevis Ben Nevis	Pool 3	925	203	640	124	455	75
Total Hebron		3,206	1,055	2,620	789	2,283	660

Table 3.4-2. Total Estimated Reserves Associated With Each Pool

The total reserve values were computed via a combined stochastic evaluation of all pools and not from the summation of the stochastic evaluation of the individual Hebron pools.

In terms of the development of Pool 3, there is a discrepancy between the 2008 Hebron Benefits Agreement, signed by the Proponents and the province, and the submitted Development Application. The Hebron Benefits Agreement (BA) specifically addresses any subsea tieback, and thus by implication Pool 3:

Hebron Project means the initial development project using the GBS for the: (i) exploitation, development, and production of oil from the Lands, excluding any subsea development; (ii) ancillary thereto, the production of gas from the Lands, excluding any subsea tieback, for the use solely for the production of oil from the Lands, not for commercial production or sales (BA 1(dd), Definition: Hebron Project).

In Section 5.12 (c), “The Province and the Proponents acknowledge and agree that:

(c) notwithstanding any other provision in this Agreement, industrial and employment benefits relating to any exploration, development, or production of oil or gas from the Lands by any standalone development (other than GBS), subsea development, and tieback to the GBS or by any other infrastructure other than the GBS, will be the subject of a separate development plan and fundamental decision under the Accord Acts, (emphasis added) which development plan and fundamental decision under the Accord Acts shall not in any way be affected by this Agreement. Nothing relating to the development of any other lands shall affect the rights and obligations of the Parties under this Agreement”.

The Commission has evaluated the Pool 3 development approach in accordance with its Terms of Reference. The *Development Plan Guidelines* state that the “primary purpose of the Development Plan is to provide the Board with information necessary to assess the acceptability of the Proponents plan and to assist the Board to make an informed decision. A secondary purpose is to make appropriate information available for public examinations pertinent” (1.21). Part I of the Development Plan “should describe the Proponent’s plans for development of the pool or field, and contain a summary of all information used by the Proponent in preparing the Development Plan [emphasis added]. As stated earlier, the complete listing of the Part II documentation was not made available to the Commission, and the list itself was deemed to be proprietary.

The *Guidelines* further identify Ancillary Documents that a Proponent may submit with the Development Application, and one of these documents concerns satellite

developments. Satellite developments “present opportunities for potential to access smaller reservoirs, which could not be otherwise be developed on their own because of cost” (2006). It is noted that the Hebron Proponent has not chosen to identify Pool 3 as a satellite development.

If any additional information concerning Pool 3 was made available to the C-NLOPB, this is not known to the Commission. The Commission’s review of Pool 3 is based solely on the information made available in the published documents and additional questioning of the Proponent by the Commission during the review process.

Due to this lack of documentation and detail, there are many questions concerning the development of the Pool 3 resource. For example, the chart indicating the schedule for the Hebron Project does not have a committed start date for Pool 3 development (DP Figure 1.10-1 ; DP Figure 1.10-2). When asked by the Commissioner to comment on the Pool 3 schedule, Hebron Project Manager Geoff Parker reiterated that there are two independent schedules for the main development and Pool 3. He stated that Pool 3 is a challenging resource, with much more work to do before the notional Pool 3 schedule can be qualified. Dave McCurdy, Hebron Technical Manager, stated that the Pool 3 schedule *“is a very preliminary schedule and it looks at a full-field development type of concept for Pool 3”* (Transcript, November 28, p. 35). The Proponent continues to define and refine the *“best approach to Pool 3.”* A pilot programme was considered to be *“drilled from the GBS or a subsea pilot”* to obtain the *“flowing data”* required. A great deal of uncertainty remains as to the best way to develop Pool 3, but the schedule and details of what is presented in the Application refer to a subsea approach.

As part of the Additional Information Request, the Proponent was asked whether the Benefits Plan included Pool 3 development and, if so, they were further asked to specify expected local benefits attributable to Pool 3, including labour/employment figures, procurement, and R&D. The Proponent stated that the *“Benefits Plan covers the development of Pool 3. The Benefits Plan commitments apply to all potential development within the Hebron SDLs. The additional development of Pool 3 would provide incremental local benefits including incremental employment, procurement and R&D benefits”* (ECMP 2011, Response 5.2). The development of Pool 3 was not considered in providing employment percentages, however, as *“a number of alternatives are being considered for the development of Pool 3 including further appraisal, a production pilot project (drilled from the GBS or a subsea tie-back), or a full subsea development with tie-back to the GBS”* (ECMP 2011, Response 7.5). Notwithstanding these assertions, the Benefits Plan as currently constructed cannot be construed to incorporate provision for the development of Pool 3 in the manner contemplated by the Acts nor by the C-NLOPB *Benefits Plan Guidelines*.

The presentation with respect to the Pool 3 potential development is also not compliant with the *Development Plan Guidelines*. There is no defined schedule, nor is there a preferred approach to development of the reservoir. Indeed there is only a limited knowledge of the reservoir at this time, such that any discussion of its development in the Development Application can be superficial at best. In the Concept Safety Analysis, the 'Pool 3 Subsea Development' for Ben Nevis (CSA 12.3) is outlined in a very cursory fashion, considering the potential for construction of extra modules on the installation that may affect egress and escape routes, and also the risk of H₂S gas during development. While it may be loosely considered within the Benefits Plan, Pool 3 is not included in the commitments for neither procurement nor labour. The proposed development of Pool 3 is at present insufficiently defined as regards development approach, human safety, the environment, or benefits. The *Development Plan Guidelines* contemplate amendments to approved plans because of additional development, change in technology or approach to development, or use of the reservoir resource. If the Hebron Field were already approved, Pool 3 could be considered as such considering that Pool 3 would involve "substantial modifications or additions to existing production facilities at the pool or the field" (*Development Plan Guidelines*, 9).

Recommendation 3.1:

The Commissioner recommends that Pool 3 be excluded from the Fundamental Decision for the Hebron Project, and that the Proponent be required to submit a Development Application Amendment for the Pool 3 resource. This application is to define in specific detail the approach, schedule, and method proposed for development. This Development Application Amendment to also include a Benefits Plan and Concept Safety Analysis considering specific risks to human safety during the Pool 3 development.

3.5. Engineering Design

3.5.1. Design Life

The GBS is designed for a 50-year life, while the topsides is designed for a life of 30 years. When asked to explain this discrepancy during the public review sessions, Geoff Parker suggested that this is general industry practice. The Proponent will rely on ongoing inspection programme to increase the life of topsides, but it is "a better risk decision" if the GBS is designed for 50 years as it is below the waterline and therefore harder to maintain. The Commissioner also wished to know why a steel skirt was chosen rather than a concrete skirt as with Hibernia. Geoff Parker informed him that many GBSs have steel skirts, and it is beneficial in this regard, acting as a "cookie-cutter" to penetrate to the sea bed and therefore give greater stability. The steel is protected from corrosion by an anode system and the anaerobic environment

which exists at the 92-meter depth. However, the potential for microbiologically influenced corrosion (MIC) resulting in rusticles should be investigated for the Hebron GBS (Miller 2012).

The Commission acknowledges that it is common practice in the industry and allowed by Codes and Regulations to classify structural and mechanical systems in terms of ability to inspect and repair, and assign a hierarchy of appropriate design lives. The classifications commonly used range from “easily inspected and easily repaired” to “un-inspectable and non-repairable” (ABS and DNV Rules). Considering the legacy value of the Hebron platform (GBS and topsides) for service life beyond current depletion projections, due to extraction of additional reserves by means of EOR, and/or for future regional development of resources (i.e. future tiebacks), it is critical that the C-NLOPB review the specific categorization of structural and mechanical systems for all of the components of the Hebron platform (GBS, topsides, OLS, etc.) to ensure the legacy value of the Hebron platform has been achieved adequately in the design. The C-NLOPB should not rely solely on the Certified Verification Agency (CVA) to make this assessment, since the CVA assessment is limited to verifying compliance with the design basis as submitted by the Proponent. This design basis may not fully meet the expectations of the C-NLOPB in terms of sustainable development or legacy of the platform during decommissioning and post-production.

With the potential for future EOR opportunities, it is key that the production system (GBS and topsides) and offloading system be designed and constructed for the planned life of the Hebron field which is currently estimated at 30+ years, and that the platform be capable and be maintained for operation beyond this planned period of time.

Recommendation 3.2:

The Commissioner recommends that the C-NLOPB review the specific categorization of structural and mechanical systems for all of the components of the Hebron platform (GBS, topsides, OLS etc.) to ensure the legacy value of the Hebron platform has been achieved adequately in the design.

Recommendation 3.3:

The Commissioner recommends that the C-NLOPB investigate whether the potential for microbiologically influenced corrosion (MIC) exists to affect the Hebron GBS structure/skirt.

3.5.2. GBS Design Wave and Metocean Design Criteria

The Commission requested information on the Hebron foundation design, including footprint, skirt design, grouting and solid ballast, in comparison with the Hibernia

GBS, and asked whether the potential for seabed subsidence had been evaluated. In response, the Proponent provided technical dimensions of Hebron prior to final design as follows:

The foundation diameter of Hebron is 130 meters versus 106 meters for Hibernia. The skirts at Hebron are 0.7 meters in length compared to 1.8 meters for Hibernia. The purpose of the skirts is to increase the foundation's horizontal capacity by transferring horizontal loads acting on the GBS structure partially into the deeper and more competent soil layers.

Grouting of the foundation likely will not be necessary due to the level seafloor. *"The solid ballast requirements for Hebron are less than Hibernia because the Hebron design does not attract as much wave load as Hibernia."* Subsidence tests have been incorporated into FEED (ECMP 2011, 1.2).

This response provided some useful insight. The GBS skirt is confirmed to be a permanent component of the GBS structure since it is required to mobilize soil shear capacity. However, as mentioned above, this also means that the design life of the skirt needs to be same as for the GBS. Concerning solid ballast, a lesser quantity of solid ballast from Hibernia is explained by use of a larger base diameter combined with lesser global loads.

The proposed Hebron GBS design is significantly different in architecture from the Hibernia GBS. The Hibernia design is based on a large surface-piercing cylindrical structure that basically maintains the same diameter from its base to the main caisson several meters above the mean water level. Mounted on this large structure are four columns that support the topside facilities. The Hebron GBS, however, has a lower base section with a diameter of approximately 80 meters and a height of 68 meters in a water depth of 95 meters. A single column structure extends from the base section through the waterline to support the topsides facilities.

The height of this single column above the base section is an important design feature. The location where the single column is connected to the lower base will be subjected to bending moments and other forces induced by wind, waves, currents, and ice. Ice loads can be imparted at the waterline on the column or at the topsides elevation, for example, if the sail of a large iceberg should contact the topsides structure.

There may be certain advantages in keeping the height of the single column to a minimum elevation, such as to influence the natural period of the structure and to reduce bending moments and related stresses. Due to its smaller physical size, wave loading on the Hebron GBS is expected to be less than the load on the Hibernia GBS in

the same wave conditions, particularly at the longer periods with higher design wave heights. This is a distinct advantage of the Hebron GBS, which may not be as sensitive to wave loads in the range of longer periods as the Hibernia GBS simply because of its smaller size near the waterline. Consequently, selection of the design wave criteria for the Hebron GBS may vary from the same criteria for the Hibernia GBS.

EMCP confirmed in the request for information that “*two wave model tests relating to the impact of extreme metocean conditions on the platform are currently anticipated for the Hebron Project,*” to be conducted in NL.

Testing to verify platform design loads and moments, as well as a confirmation of air gap was conducted in Newfoundland in April/May 2011 as part of the FEED phase. A second model test to confirm the impact of run-up and slamming loads on the topsides is currently being planned (ECMP 2011, Response 2.1).

The design wave criterion for which the Hebron GBS will be model tested has a wave period of 16.1 seconds and a wave height of 27.8 meters. By contrast, the design wave for testing the model of the Hibernia GBS had a period of 18 seconds with a wave height of 30 meters. This design wave was used to test every other installation working in the same waters of Newfoundland and Labrador offshore. Justification for this reduction in design wave conditions is not obvious, and there are concerns related to a reduction in design wave conditions:

- The clearance between the underside of the topsides and the crest height is commonly referred to as the “air gap”. The air gap is established from the maximum expected wave crest height relative to the height of the topsides. If the wave crest height is underestimated, the risk of deck impact increases, with significant consequences to the safety of the platform;
- The hydrodynamic loads on a cylindrically shaped structure generally increase with increased wave period and height. The specified Hebron design wave conditions will result in lowered global hydrodynamic loads than those predicted by the design wave condition used for Hibernia, which may not be reflective of the actual loads to be experienced by the GBS on the Grand Banks; and
- Trying to change the design or to design around problems that become evident during detail design can devastate the schedule, with significant negative consequences. Thus it is important that the model tests be completed before detail engineering and that the environmental criteria used for the model tests be sufficiently conservative to properly evaluate “worst-case scenarios” and ensure a safe design.

For Hibernia, global wave loading⁵ was found to be equivalent if not dominant over global ice loads. A list of specific types of model tests that will be performed as part of the Hebron design process was required, and whether these shall be accomplished in NL and/or Canada. A comparison of ice pressure curves for Hebron and Hibernia was provided (ECMP 2011, 2.1 and 2.2). Based on these curves, it shows that Hebron caisson will be designed to higher local ice pressures (for areas up to 2 square meters). Global ice loads could be quite a bit lower, however, because Hebron ice pressure curves are lower than Hibernia's. From information available in the literature, Hebron local ice loads also are noted to be less than ice loads used for Terra Nova for areas greater than 2 square meters (Hebron shaft versus Terra Nova ship shape hull). Global loads also include consideration of iceberg impact (limit driving force approach) and wave loads. The considerably lesser amount of solid ballast indicates that Hebron global loads, whether wave or ice load dominated, are expected to be considerably less than Hibernia.

It is therefore critical that the C-NLOPB and Certified Verification Agencies carefully assess the metocean criteria and load calculations (wave and ice) used for the Hebron design to ensure it provides similar levels of reliability to the other platforms operating in the area (e.g. Hibernia, Terra Nova and White Rose).

Recommendation 3.4:

The Commissioner recommends that the C-NLOPB seek justification from the Proponent regarding the selection of design wave conditions used in modelling for the Hebron GBS and an analysis of the air gap and global loads on the Hebron GBS under the Hibernia GBS design wave conditions.

Recommendation 3.5:

Prior to sanction, the Commissioner recommends C-NLOPB ensure that Proponent conduct model tests to validate the Hebron design and its principal dimensions. Should significant design changes result from the first model tests, the Commissioner recommends that the final configuration be model tested to provide more accurate benchmarking of the analytical tools that will be used for detail engineering.

3.5.3. Safety in Design: Concept Safety Analysis Design Review

In accordance with Section 43 of the Newfoundland Offshore Petroleum Installations Regulations, the Proponent has submitted a Concept Safety Analysis (CSA) in compliance with the Regulatory requirements. The intent of the Concept Safety analysis is to provide a Quantified Risk Assessment (QRA) of the Proponent's concept

⁵ Global wave loading is the total wave load acting on the structure as opposed to local wave pressures acting on a small area of the structure.

for all listed topics. The level of detail is deficient with respect to the intent of the requirements in that several critical aspects are deferred to future studies as part of detailed design.

Although the CSA states that the risks of dropped objects were considered, the report also states these risks were not quantified, and the Development Plan further explain that detailed information regarding lifting operations is not yet available (DP 1.17.1). Although a lack of detail is an insufficient reason for lack of provision of a comprehensive QRA, with proper quantification of all listed categories of risks, in this case the Commission partially agrees with the Proponent's stated assumption that dropped objects risks can be mitigated during the detailed design phase. This agreement applies to minor lifts and material-handling aspect of operations for which the mitigations will likely not have impact on overall concept or have significant weight implications. However, it is the Commission's opinion that risks associated with material handling (e.g. casing, drill pipe, etc.), handling of large objects (e.g. blow-out preventers, surface trees, etc.) associated with drilling operations and equipment handling related to topsides equipment maintenance and change out, need to be properly quantified at the concept stage since the measures necessary to mitigate the risks could have significant impact on the concept's general arrangements and its weights.

There is one Temporary Safe Refuge (TSR) and there are two lifesaving stations/muster points planned. The diagram of the platform shows only some of the deckheads and bulkheads as fire rated and that surrounding the helo-pad is not designated as blast rated (CSA, figure. 3-1). When asked whether thought had been given to increasing the firewall rating around these areas to more than the mandated two hours, the Proponent said that the *"Escape, Evacuation, and Rescue study and Emergency System Survivability Assessment are in the planning stages. These studies will identify whether there is any need for increased fire protection in compliance with industry code and/or regulatory requirements"* (EMCP 2012, Response 13.2). Currently, there is significant revamping of blast rating specifications for production facility walls and fire ratings for exploration and production activities amongst the US-based standards and regulator groups. These new fire ratings could impact the Hebron design.

Recommendation 3.6:

Prior to sanction, the Commissioner recommends that the Proponent examine recent changes to blast rating specifications for production facility walls and fire ratings for exploration and production activities amongst US-based standards and regulator groups to determine any potential impact to the Hebron design.

The CSA makes a series of 11 recommendations to be completed during detailed design which are deemed necessary for a thorough risk analysis of the project, including:

1. *Whether there is potential for escalation of explosions to areas protected by blast walls;*
2. *Detailed smoke, gas and flame modelling studies, and escape, evacuation and rescue studies;*
3. *Potential for explosions in the GBS should be evaluated further to ensure risk is tolerable;*
4. *Perform a parts count, based on piping and instrumentation drawings, to determine leak frequency estimates; and*
5. *A dropped object study should be carried out;*
6. *Further studies on the precautionary evacuation rate;*
7. *Review of adequacy of potential risk reduction measures;*
8. *Assessment of number of valves required to ensure isolation during detailed QRA;*
9. *More complex modelling to assess risk of iceberg;*
10. *Review the assumption that all support and stand-by vessels will be ice-strengthened in considering evacuation systems; and*
11. *Consider the ability of the GBS to withstand passing vessel collisions and assessment of risk due to ship collision (CSA, 90).*

Recommendation 3.7:

Prior to sanction, the Commissioner recommends that the Proponent complete the outstanding recommendations in CSA, Section 13 and update the CSA accordingly. Specific focus by the Proponent should be applied to the subjects of environmental criteria and loadings (e.g. iceberg impact, wave loads, air gap); dropped objects; and safety in terms of protection and survivability of safety systems in the GBS shaft as well as structural redundancy to topsides support in the event of fire in the GBS shaft.

The measure of acceptable risk should not be limited to industry standards of “tolerable risks.” Hebron forecasted risk levels should be benchmarked against the risk levels evaluated for Hibernia and other comparable platforms using equivalent methodologies.

3.5.4. Offshore Loading System Design

The Offshore Loading System (OLS) will be similar to existing systems currently used for Hibernia and other producing fields. The design challenge with the Hebron OLS is that there is a possibility that the Hebron heavy oil could form a gel or wax in the flowlines. Regarding the OLS, Captain Charles Newhook, a tanker captain, stated that he did not see anything in the Development Plan that speaks to how this will be addressed for the subsea line, how Hebron crude will behave considering that “*a possibility exists that the crude may gel or form wax deposits, thus restricting the subsea line and creating a pressure surge hazard when starting crude transfer pumps for tanker loading operations*” (PRS-06, Supplement).

The existing shuttle tanker fleet is equipped to handle heavier crude oils provided the proposed off-loading system operates in a similar manner to that of Hibernia as described in the Development Plan. Should the design of the off-loading system be changed in order to accommodate the characteristics of the crude oil produced at Hebron, then further analysis would be required to ensure the compatibility of the off-loading system and the existing shuttle tankers (PRS-06, Supplement).

Captain Newhook suggested a simple solution to solve a potential surge hazard problem would be to install flow meters on the tankers, so it can be instantly known if there is a problem with gel crude in the pipeline.

The Commissioner posed the question as to whether oily discharge from buffer cells will the 15 mg/l discharge limit in the C-NLOPB *Offshore Waste Treatment Guidelines* for storage displacement water and how this discharge is expected to behave in comparison to other GBS projects, including the issue of paraffin build-up. The Proponent answered that no specific studies have been done with Hebron oil, but

“Based on experience from other similarly designed storage systems, it is expected that displacement water from the storage cells will be within the discharge limit for oil-in-water in accordance with the C-NLOPB Offshore Waste Treatment Guidelines” (ECMP 2011, Response 17.1).

The GBS designer has indicated that they are not aware of operational excursion issues with any of their previously installed GBS designs. When asked about the behaviour and potential emulsification of Hebron oil, especially concerning paraffin build up on GBS wall, the Proponent stated that the

...build-up of heavy sedimentation in the storage cells is not expected as sand is not produced and transferred into the cells. Silt and heavy hydrocarbons in the storage cells are expected to be arrested in the interface layer. Expansion of the emulsion-layer in the GBS storage cells will be bounded by routinely filling and offloading the storage cells to shuttle tankers (ECMP 2011, Response 17.1).

Recommendation 3.8:

The Commissioner recommends that the C-NLOPB review the OLS design in relation to the potential effect of heavy oil on offloading flow lines.

3.6. Project Design and Execution

When asked whether the design approach for the GBS, topsides, and UPM will maximize the number of specialty skids, major package supply, construction material supply, and construction services that can be sourced from local and national companies, the Proponent responded that:

The fabrication packages have been designed in consideration of the Proponents’ undertakings in the Benefits Agreement to allow for in-province fabrication for specific modules as a whole. The UPM will be fabricated on a fully international competitive basis. The UPM contractor will determine the most efficient utilization of subcontractors and suppliers (ECMP 2011, Response 3.1).

On this basis, it is the Commission’s assessment that in-province suppliers in many instances will be at a competitive disadvantage both in terms of cost and schedule for the supply of equipment, specialty skids, and major packages due to geographic disadvantage of shipping to UPM contractor’s facilities outside of Canada.

When asked to provide a list of candidate facilities considered qualified to undertake the fabrication of the UPM, drilling support module, derrick equipment set, living

quarters, flare boom, helideck and lifeboat stations, it was verified that the living quarters would be executed and assembled at Bull Arm and that the scope of work to fabricate the living quarters is the base plan for fabrication at the Bull Arm site (ECMP 2011, Response 3.3). Furthermore, the Proponent's *"present strategy for mechanical outfitting [of the GBS] is to pre-fabricate offsite, within the province. Major items such as the conductor guide decks will be fabricated in sections and then transported to Bull Arm for installation into the GBS"* (ECMP 2011, Response 3.5). Determination of other qualified fabricators for drilling modules is under way, following *"expression of interest and pre-qualification process"*. During the public review sessions, Geoff Parker made it known that the KKC yard at Marystown is considered suitable for the construction of the drilling support module (DSM) but it does not have the capacity to construct the derrick equipment set (DES) concurrent with the DSM, as discussed earlier.

The Commission enquired as to the source of the aggregate, cement, rebar, and additives for the GBS. The Proponent could not confirm where these materials would be sourced as the contracts had not yet been awarded, but *"the aggregate will be supplied from a NL source"* (EMCP 2001, Response 3.4).

3.6.1. Topsides Fabrication

The Hebron Partners and the provincial government signed a Benefits Agreement on August 20, 2008. Article 5.4 (GBS Construction) and Article 5.5 (Fabrication and Other Works) set out the minimum and prospective levels of construction that would be executed in the province. The in-province construction of the drilling support, the drilling equipment or derrick and the accommodations modules is subject to provisions in Section 2 of Exhibit F. This Exhibit is confidential and not available to the Commission or the public, as discussed in Chapter 6: Benefits.

Through the request for additional information, and during the public review sessions, the Commission attempted to further understand the size and value of the GBS and topsides components. The request was tabled to the Proponent during the public review sessions, framed on similar information provided by the White Rose Proponent to that Commission and to the C-NLOPB (C-NLOPB 2001.01, White Rose Decision and Appendix D).

The Proponent provided the Commission with the following table that outlines some of the potential construction tonnage of some topsides modules and some GBS and OLS components.

Current Assessment of in Province Fabrication Tonnage ^{1,2}				
Fabrication Components	Total Component Weights kte		In Province kt _e	
	Aug-08	Sep-11	Aug-08	Sep-11
Topsides				
- Drilling Equipment Module, Drilling Support Module	4	6	4	3
- Living Quarters	2	3.5	2	3.5
- Helideck, Lifeboat, Flare Boom	1	1	1	1
- Integration Structure	5	7.5	5	7.5
Total Weight	12	18	12	15
Fabrication Components	Weight kte	In Province kte		
	Sep-11	Sep-11		
GBS and OLS				
- Mechanical Outfitting (pipes, risers, J-tubes)	2	2		
- Other (Skirts, other outfitting)	2.5	2.5		
- GBS Integration Structures	2.5	2.5		
- Offshore Loading Station (fab/assembly)	0.5	0.5		
- Subsea Drilling Template Replacement Barge(s)	2	2		
Total Weight	9.5	9.5		
Notes:				
1. Subject to "in progress" EOI and tendering process				
2. Subject to Capacity				
3. Weights do not include GBS Concrete or Rebar				
4. Number reflect weights assessed part way through FEED (Front End Engineering and Design)				
Weights will change as the design matures				
kte - Metric Tonne				

Table 3.6-1 Current Assessment of In-Province Construction Tonnage

The Commission received various submissions from industry and labour reflecting concerns about the lack of information provided by the Proponent, or information that is vague, inconsistent or incomplete such that it thwarts reasonable examination and conclusion. The Commission had asked the Proponent to provide a breakdown of estimated engineering hours, capital cost by major component, the associated labour and by Newfoundland, Canadian and non-Canadian categories and that this be in the topics as outlined in Section 10 – Construction and Installation of the Development Plan. The Proponent was unable to provide this level of information, stating that it was unavailable.

The Commission finds the lack of cooperation, in a meaningful manner, by the Proponent to answer the questions from the Commission and the C-NLOPB perplexing.

The Benefits Agreement set out the reasonable expectations that, while the UPM would be constructed outside of the province (and likely outside Canada), all other modules would be constructed in the province.

The Proponent has extensive experience and knowledge of the construction process of a GBS and topsides. This experience provides the Proponent with sufficient knowledge to know if significant challenges exist with its ability to meet these Benefit Agreement commitments in a reasonable timeframe which, is the case of Hebron, is a three-and-a-half-year period from the signing of the Benefits Agreement to the current controversy surrounding the derrick equipment set in February, 2012.

During the public review session in Marystown, the Proponent announced that it had concluded that the Kiewit shipyard does not have the capacity to construct both the drilling support module and the derrick equipment set within the planned project timeline (Transcript, November 23, 8). Consequently, the Proponent would be issuing an EOI to determine if any other contractor would have the capacity and site to build this module in Newfoundland. If no other suitable contractor could be found, then the expectation was that the module would be open to international bids and would consequently be removed from local benefits.

It is inconceivable by the Commission that the Proponent would put this critical industrial benefit in such a precarious position so late in the procurement evaluation cycle.

The Proponent has committed to fabrication of the living quarters at Bull Arm and has indicated that two joint venture bidders, comprised of local and international companies, have been prequalified. During the public review sessions, the Commissioner asked if the living quarter's module will be assembled in the province or built from scratch in the province. Geoff Parker responded by saying,

We did talk about the living quarters as perhaps a different contracting model where more of the decisions are up to the independent contractor. I mean, there is the principle of the independent contractor needing to make his own decisions (Transcript, November 29, 21).

It is difficult to reconcile this procurement philosophy with the *Benefits Plan Guidelines* or with the Proponent's own undertakings in the Benefits Agreement. The Benefits Plan cites as one of its Benefits Principles the selection of "*contractors and suppliers that will work diligently with us to deliver benefits.*" It notes that its commercial terms on key contracts will allow it "*greater flexibility to influence strategy, drive implementation and adjust as issues emerge*" (BP, 3-4). It adds that bids will be structured to encourage local participation and that guidance will be provided to main contractors so that plans are developed and implemented in accordance with contract specifications (BP, 3-22). In essence, the Proponent's hands-off approach enunciated during the public review sessions is at odds the hands-on approach stressed in its Benefits Plan. Understandably, such pronouncements add to the apprehension of local industry that commitments to local fabrication can later be

diluted to the point that the province becomes an assembly point for structures fabricated elsewhere.

Recommendation 3.9:

As a condition to the fundamental decision, the C-NLOPB should require the Proponent to provide assurance that topsides structures and modules, as defined and referenced in the BA, are substantially fabricated in the province.

3.7. Construction Planning and Execution

The proposed schedule is 60 months from sanction to first oil. When asked to rationalize and benchmark this schedule, the Proponent stated:

Development and rationalization of the Hebron overall schedule leverages EPC and industry benchmarks for similar projects, subject matter expert input, and best practices of Hebron Proponents, Aker Solutions, topsides EPC contractor Worley Parsons, GBS EPC contractor KKC, and ExxonMobil Development Co. The schedule includes consideration of in-province work scope (ECMP 2011, Response 4.1).

This answer does not provide the level of specific detail and benchmarking from similar projects that one would have expected.

The Commission has been able to assess that the 60-month duration is reasonable for large GBS projects and falls mid-range within the variance of projects of similar scale. For the topsides, the Proponent has presented a 39-month schedule from start of detail engineering to delivery of UPM and other modules to Bull Arm. There is an additional seven months allocated to integration, hook-up, and pre-commissioning. Overall, the topsides schedule is considered achievable by industry standards.

The Commission is concerned, however, that further delay in sanction date and/or increase in project duration will put the GBS tow to field period at risk and could therefore cause an eight- to twelve-month delay for the tow to field with similar impact to first oil date. Risk to the Hebron schedule could come internally from unanticipated engineering issues but also externally, for example, from the high utilizations and backlogs currently experienced in the industry.

Recommendation 3.10:

The Commissioner recommends that the Proponent, now that FEED is complete, provide an updated Hebron Development Schedule to the C-NLOPB as a condition of the fundamental decision, and that this schedule provide a risk analysis to proposed milestones and mitigation strategies.

Hebron

Public Review

4. HUMAN SAFETY

4.1. Chapter Summary

The people of Newfoundland and Labrador (NL) are very aware of and sensitive to offshore safety as a result of the two major disasters which have occurred since oil and gas operations commenced in the province. The public view of safety is that it is a matter of passion, a matter of remembrance, and a matter of honouring those who have perished from accidents that were entirely preventable. Although the knowledge to prevent these accidents existed, there also existed cultural safety problems where procedural failures resulted in major accidents and multiple fatalities.

Concerning the Hebron Project, the harshness of the North Atlantic environment, in conjunction with iceberg and pack ice conditions, brings greater risk to routine oil and gas operations. Thus, there is a need to continuously improve standard operating and emergency procedures based on past experience in the area, and develop better equipment and processes for working safely in such a harsh environment.

In addition to the exploration and production development risks, there are other unique risks to human safety during the Hebron project, including saturation diving operations during the subsea installation, the increased potential for hydrogen sulphide gas (H₂S) later in field life, helicopter transport in a harsh environment, search and rescue capability, and the remoteness of the worksites/lack of proximity of shore support in the event of major catastrophic events.

The Hebron Project Manager, Geoff Parker, emphasized the importance of safety to the Proponent, ExxonMobil, and to the Hebron Partners during his initial presentation to the Commission:

Safety is a core value for ExxonMobil and our co-venturers. To us, it is vitally important that everybody who works on the project works safely and gets to go home at the end of the day in the same healthy condition they were when they started work that day. We have already started applying programs to ensure the safety of our engineering offices and our construction sites. It really is important to us that we meet our vision of nobody gets hurt...But safety isn't just about construction safety; we also see part of our mission as designing an offshore platform that will operate safely (Transcript, November 21, 6-7).

All participants in the public review process agreed that human safety is of great concern, and that constant vigilance is required by all stakeholders in the NL offshore. Representing the views of offshore workers, CEP Local 2121 President Brian Murphy stated, *“We must be ever vigilant...to strive for zero harm”* (Transcript, November 30, 12). Citing ExxonMobil’s vision of *“Nobody Gets Hurt”*, Murphy suggested that *“to achieve this, we must all work together.”* It is hoped that the efforts and recommendations of the Commission will serve to improve the culture of human safety and, by so doing, help the Proponent achieve its goal of zero harm.

The Commission has reviewed the Development Application for considerations of human safety, most importantly, the Development Plan and Concept Safety Analysis. During the public review process, the following human safety concerns were identified:

- limited details of the safety management system (i.e. near-miss/proactive safety management efforts), or “competency strategy” integration into safety management;
- the need to establish a separate Safety Regulator from the C-NLOPB;
- the need to update and improve safety regulations, e.g. for diving;
- the need for a more collaborative approach towards safety management, while engaging all stakeholders in building a culture of continuous improvement;
- specific concerns about construction safety and lack of risk assessment for the construction and removal phases of the project; and
- concerns regarding personnel transport, by helicopter and by marine vessel.

Many offshore safety concerns had been raised in the aftermath of the crash of Cougar Flight 491, and following the Offshore Helicopter Safety Inquiry (OHSI).⁶ Since the release of Commissioner Wells’ recommendations, the C-NLOPB has made significant progress in implementing measures and researching the way forward for the recommendations still outstanding. During the public review sessions, Brian Murphy said,

⁶ As required under the *Atlantic Accord Implementation Acts* (the Acts), the C-NLOPB initiated the Offshore Helicopter Safety Inquiry (OHSI) to *“inquire into, report on and make recommendations in respect of matters relating to the safety of offshore workers in the context of Operators’ accountability for escape, evacuation and rescue procedures while travelling by helicopter over water to installations in the Newfoundland and Labrador offshore area, in compliance with occupational health and safety principles and best industry practice”*: OHSI phase I, vol. 1, 18.

with all honesty, the improvements that have been made, and that are ongoing as a result of the Inquiry and as a result of the actions taken by the C-NLOPB and the Operators are huge....Looking back on it, it is a little startling that there was that much work to be done (Transcript, November 30, 12).

The Hebron Public Review Commission recognizes the tremendous contribution of the Offshore Helicopter Inquiry (OSHI) to the future safety of offshore workers in this province and around the world and endorses the recommendations made by Commissioner Wells and the Transportation Safety Board. While acknowledging the progress of the C-NLOPB and the Operators to date in implementing the recommended safety reforms, the Commission encourages the Board and the Proponent to review the OSHI report more specifically for its implications for the Hebron project. It is the intent here to make recommendations leading to a safer workplace in the NL offshore.

4.2. Regulatory Requirements

The *Newfoundland Offshore Petroleum Installations Regulations* (NOPIR) outline the requirements for a Concept Safety Analysis. When applying for a Development Plan approval, the Proponent “shall submit to the Chief [Safety Officer] a concept safety analysis of the installation...that considers all components and all activities associated with each phase in the life of the production installation, including the construction, installation, operation and removal phases” (NOPIR 43.1). The CSA is to be used as a decision-making tool concerning safety in design.

Under the *Development Plan Guidelines*, the Proponent is required to submit a Concept Safety Analysis with Target Levels of Safety; a risk development plan; explanation of method of quality assurance; a training plan; a proposed strategy to the safety management system and the Proponent’s approach to the Development of the Safety Plan, with specific reference to:

- *all systems that are subject to major hazards including structures, topsides, pipelines, flow-lines, sub-sea installations, loading facilities and riser, with particular attention paid to those systems that are important in mitigation;*
- *all major hazards that could result in loss of or serious threat to life, loss of structural integrity of an installation, equipment failure or uncontrolled or unauthorized discharges; and*
- *all assumptions and measures proposed to mitigate damage or ensure the threat to life or damage to the environment will be reduced to an acceptable level, including contingency plans and monitoring procedures* (Guidelines, 27).

Concerning safety plans, the 2006 *Development Plan Guidelines* state that:

The Board acknowledges that the system designs are preliminary at the time the Development Application is submitted. Therefore, the full details of these plans generally are not available at the time of the submission of the Development Application, but once approved will become publicly accessible (Guidelines, 8).

A significant number of the questions and concerns regarding human safety arising from a review of the Development Application documents might have been answered had a preliminary Safety Plan been submitted during the public review process. It should be noted that a preliminary safety plan was required as part of the White Rose Development Application for public review, including a description of the safety management policy, occupational safety and health, training, contingency plans, operational procedures and facilities and equipment as well as a “*preliminary safety analysis*” that could be updated throughout the life of the project (C-NOPB, 1988, pp. 20, 39-41). A Safety Plan is required for “operations authorization” (*Drilling and Production Regulations*, sec. 6 and 8; *Safety Plan Guidelines*, i). In responses to the Commissioner’s request for additional information the Proponent stated “*Specific Emergency Response Plans and Procedures will be developed for all credible platform scenarios*” (EMCP 2011, Response 14.1). Thus it is reasonable to expect that a preliminary safety plan could be submitted with the Hebron Development Application, as was the case with White Rose.

Recommendation 4.1:

As a condition of the fundamental decision, the Commissioner recommends that the Proponent be required to submit a preliminary Safety Plan and Emergency Response Plan, and that these documents be reviewed as part of the Development Application process in order to facilitate dialogue and information exchange amongst all stakeholders at the earliest opportunity.

4.3. Review of Submitted Documents

Safety is a focus in two main documents of the Development Application: the Development Plan and the Concept Safety Analysis. Safety is also referred to in the Development Application Summary, the SEIS, Benefits Plan and Comprehensive Study Review. The Development Application Summary provides a section on the Safety Analysis and Commitment and gives a general overview of development plan’s safety orientation. The document refers to, but does not provide, the Hebron Project Risk Management Plan.

Chapter 9 of the Development Plan discusses safety design considerations. Safety Systems are discussed and the safety policy is referred to, but not attached (DP 9.2.4). Chapter 11 (Operations and Maintenance) provides an overview of the policies and procedures, including operations procedures, safety, security and health Policies and Procedures (11.2.9). Chapter 14 (Safety Analysis and Commitment) describes how safety has been integrated into the design of the proposed development”, including aspects of Safety and Emergency Preparedness/Response Training, the Safety Management System and Safety Plan (14.5). Specific plans referred to in the Development Plan were not provided with the document.

The Concept Safety Analysis (CSA) submitted by the Proponent must outline safety in all phases of the project, but the construction and removal/abandonment phases are not discussed. The tow-out is a major component of the construction where risks to human safety should be considered. It was noted during the public review sessions that “saturation diving will play a major role in the installation phase in 2015 and 16” (Phil Towers, Transcript, November 30, 58), but that it is not discussed in the CSA.

The CSA should also include for “*each potential accident*” contingency plans designed to avoid the occurrence of, mitigate or withstand the accident, and personnel safety measures designed to protect all personnel outside of the immediate vicinity of the accident site. The CSA as submitted does not supply detailed contingency plans for any of the major hazards or emergencies listed.

It was raised during the public review that the CSA and Development Plan did not appear to take into consideration recent events which may affect risk to human safety offshore, such as the crash of Cougar Flight 491, the Macondo blow-out or the planned closure of the Maritime Rescue Sub-Centre (MRSC St John’s). With the recent implementation of a dedicated and coordinated 24/7 SAR helicopter with a 20-minute response time based at St John’s airport specifically to service the offshore oil industry, one might question whether the closure of the MRSC has any impact to the Hebron project at all. Helicopters, as important as they are, are but one type of asset that a rescue coordination centre can draw upon in an emergency situation. Often, marine-based assets are tasked due to operational limitations of the aircraft or if the type of emergency is better served by a marine asset, such as a vessel in distress which needs to be taken under tow. The coordination of multiple assets to conduct a search and rescue cannot be achieved by a private operator with no authority for such tasking. In accordance with the *Petroleum Installations Regulations*, “*the Operator shall maintain and update the concept safety analysis*” and *define such “situations, conditions and changes in operating procedures and practices that would necessitate an update”* (NOPIR 43(8)). Thus it is key that such factors be considered in updating the assessments and analyses of risk.

Recommendation 4.2:

As a condition of the fundamental decision, the Commissioner recommends that contingency plans be provided within the CSA for the major hazards chosen for assessment in the CSA and any potential accidents resulting thereof, and that the conditions for updating the CSA be defined by the Proponent. The Commissioner also recommends that the CSA consider major risks to human safety during saturation diving operations, and during the tow-out/construction and abandonment phases of the Project.

4.4. Responsibility and Accountability

Safety is not just the responsibility of the oil operators, helicopter operator(s), and the Regulator. Safety responsibility extends to every person working offshore and onshore for the oil industry, in every capacity (Robert Wells, OHSI, phase I, vol. 1: 238).

As Commissioner Wells stated, safety is a concern of all stakeholders in the offshore, but certain responsibilities lie with each stakeholder. The offshore is a dangerous place, and will ever remain so, no matter what safety protocols and contingency plans are in place. The best that anyone can hope for is a mitigation of risk, by operating within a “*culture of safety*”, as the Proponent has committed to do.

In her presentation to the Commission on safety, the President of the Newfoundland and Labrador Federation of Labour, Lana Payne, called for greater collaboration between all industry stakeholders with regard to every aspect of safety. She cited the findings of a recent International Labour Organization meeting regarding the importance of good channels of communication between government, employers and workers to discuss and promote safety concerns (ILO 2009). There needs to be not only top down but a “*bottom-up approach to worker safety*” (Transcript, December 5, 23). At a recent helicopter safety conference organized by the C-NLOPB, communication between all parties in the offshore workforce was flagged as one of the most important issues in offshore safety. Indeed, this point was raised in the OHSI report: “*Audits are important and have their place, but there is no substitute for high-level multi-party input into how safety is developed*” (OHSI, phase I, vol. I, 252).

4.4.1. The Regulator

According to the C-NLOPB website,

C-NLOPB Operations and Safety Department administers the Atlantic Accord Implementation Acts and subordinate legislation regarding the safety of petroleum operations in the Newfoundland and Labrador Offshore Area. The

Department encourages persons exploring and exploiting petroleum to maintain a prudent regime for achieving safety. In the context of the legislation, the Department oversees operators' risk management with the goal of minimizing risk to persons engaged in offshore petroleum activities.

The Department expects operators to make all reasonable efforts to identify all the hazards associated with their proposed operations and to implement all appropriate measures to reduce the risk from these hazards to a level that is as low as reasonably practicable.

In short, the Board's safety mandate is:

- To verify that operators have appropriate safety plans in place.*
- To verify, through audits and inspections, that operators follow their safety plans and applicable statutory requirements.*
- To verify, through compliance actions, that deviations from approved plans and applicable statutory requirements are corrected (http://www.cnlopb.nl.ca/safe_about.shtml).*

A new Chief Safety Officer was hired in July and safety and operations departments were separated (C-NLOPB, August 18, 2011). The separation of operations and safety oversight at the C-NLOPB was in response to OHSI Phase I Recommendation 29 (Phase II Recommendation 4), calling for the creation of an “*independent and stand-alone Safety Regulator*”. This independent regulator would be comprehensive and have an “*all-encompassing oversight role to consult with any persons or entities, regulatory or otherwise, with regard to offshore safety issues and to take such actions as may be necessary in the interests of safety and transparency*” (OHSI Phase I, vol. I, 302; Phase II, 125). The main Safety page of the C-NLOPB website has yet to be updated to reflect the new organization and responsibilities within the Board.

MHA Dale Kirby reiterated the importance of implementing a separate safety authority as was recommended by the OHSI. Citing some anonymous emails sent to the NDP caucus regarding “*terrifying near misses while attempting to land in fog at the rigs; stressful sudden returns to St. John's by helicopter, no real information given to passengers on what was wrong*”, he suggested that “*an independent safety authority... would provide yet another venue for individuals to air such concerns*” (Transcript, November 30, 34).

Notwithstanding significant changes that have been made to the safety organization of the C-NLOPB, the Commissioner endorses OHSI Phase I Recommendation 29 a/c

and Phase II Recommendation 4, for the provincial and federal governments to create a stand-alone, independent Safety Regulator to be solely responsible for the regulation of offshore safety.

4.4.2. The Operator

The C-NLOPB does not guarantee the safety of workers or the environment; the operators are responsible for the protection and safety of workers and the environment (http://www.cnlopb.nl.ca/abt_mandate.shtml).

As the development license holder, the Operator is accountable for the safe execution of all work activities at its worksite, under provincial and federal regulation through its subcontractors at the Bull Arm Fabrication Site,⁷ and under *NOPIR* for offshore work. Operators are tasked to make “*all reasonable efforts to identify all the hazards associated with their proposed operations and to implement all appropriate measures to reduce the risk from these hazards to a level that is as low as reasonably practicable*” (http://www.cnlopb.nl.ca/safe_about.shtml).

ExxonMobil is globally recognized for well-run business processes and rigid adherence to proven practices. The Benefits Plan outlines the company’s safety policy:

EMCP’s highest priority is to achieve a workplace environment where ‘Nobody Gets Hurt’—aspiring for no injury of any kind. ExxonMobil is an industry leader in safety performance and knows that this is challenging but possible. Key to achieving ‘Nobody Gets Hurt’ is heightened attention to intervention by every person at a work site—approaching each other in a caring manner to prevent an injury or eliminate a hazard. EMCP senior management will back this up with personal leadership, supported by resources and tools, and work with industry, the labour unions and other stakeholders to seek to create a lasting legacy of a culture of safe work practices.

The Commission looks to ExxonMobil for on-the-ground leadership that can make this stated vision a reality, leaders who will follow through on a corporate vision, backed by a supportive world-class organizational structure which will be proactive in managing all aspects of its safety programs. Following from the corporate vision, the Commission would expect that, when the regulatory regime is slow in making changes to adjust the regulatory framework to improve operational safety, ExxonMobil will take the initiative to move beyond the minimum standard in the interest of achieving the goal of “*Nobody Gets Hurt*”. The Commissioner recognizes that the Proponent

⁷ The C-NLOPB does not intend to issue any work authorization under Sec. 138 of the Atlantic Accord Act in relation to the Hebron construction activities at the Bull Arm Fabrication Site (J. Bugden, pers. comm., February 1, 2012).

must focus its efforts at both the process safety level and at the individual/occupational safety level while operating in the harsh environment of the NL offshore.

4.4.2.1. Safety Management System

The Commission recognizes that the Macondo incident in the Gulf of Mexico represents an incident of historic proportion. One of the reasons given for the Macondo explosion and spill in the official report was a failure to notice imminent danger resulting from a “kick”, because of conflicting priorities and inattention to the task at hand. Operators and Regulatory Bodies around the globe are evaluating and revising current practices in terms of design and equipment testing requirements, operating guidelines, and response preparedness based on findings from the incident.

With regard to the Safety Management System and process safety, the Commissioner asked the Proponent to comment on what safety lessons have been learned from the Macondo incident. In response, the Proponent did not offer any specifics but cited it would employ the Operations Integrity Management System (OIMS) for the project. Geoff Parker stated:

Safety is more than just managing the personal safety and being worried about an individual worker slipping or falling or injuring themselves in a particular activity. We also need to consider the overall process safety... and to me that incident does highlight the need for a culture of safety and incident prevention which ties back to some of the core principles of our Operations Integrity Management System and its focus on prevention of incidents... We're really worrying about design of safe facilities, about having an ongoing program to assess the risks and mitigate the risks, to ensure that we have the right training of personnel, to ensure that we have the leadership to empower people as we talked about earlier to stop work if they think that that work is not being done safely. So I think all of those elements in the Operations Integrity Management System do lead to this overall culture of safety that really does help prevent incidents such as Macondo (Transcript, November 30, 37).

Recommendation 4.3:

The Commissioner recommends that the C-NLOPB independently evaluate the findings from the Macondo incident and determine those specifically applicable to the Hebron development. The C-NLOPB should evaluate the new requirements and measures being imposed in revised regulations from other jurisdictions and consider implementation of those found to be relevant to the Hebron project and more generally for all operations on the NL offshore.

The Commissioner agrees with the Proponent's belief that workers need to be empowered through the Safety Management System and through actions of the leadership team to stop unsafe work.

Recommendation 4.4:

The Commissioner recommends that the Proponent evaluate options for training worksite personnel to make key decisions under pressure for key / high-risk operations (i.e. situational well control training).

From the details available on the ExxonMobil OIMS processes for safety, security and health, the Proponent significantly emphasizes compliance to standards (internal and external), and analyzing incidents of mainly occupational/individual safety events (i.e. Lost Time Injuries and Recordable Injuries). OIMS processes also appear to consider worker health in the limited context of safety management and reduction of health hazards. The Commissioner encourages the Proponent to adopt a broader, more proactive, strategy for promoting employee safety health and well-being.

4.4.2.2. Culture of Continuous Improvement

It is the Commissioner's view that an effective safety culture is one where:

- the organizational structure clearly defines who is accountable for delivering safe operations;
- individual safety and process safety are given equal emphasis in the proactive identification and management of risk;
- workers at all levels in the organization feel empowered and obliged to stop unsafe activities, and in doing so to continuously strive to improve work processes; and
- there is no job that is so important that it cannot be done safely.

The Commissioner encourages the Hebron Proponent, its partners and subcontractors to adopt and integrate these basic principles into their work programs.

4.4.3. The Individual**4.4.3.1. Involvement in the Safety Process**

As stated earlier, Dale Kirby discussed some correspondence that the NDP caucus has received from offshore workers which suggested there was a perception of an unhealthy work environment in the NL offshore. A retired C-NLOPB engineer, Wayne Chipman suggested that there has been a reactive rather than proactive posture

towards safety on the part of the Operators in general. The Regulator, Operators and workforce all need to be engaged in the development of safety legislation and initiatives. CEP 2121 President Brian Murphy stressed that representation on any safety committee, including the OHSI Implementation Teams, should be by election and not by appointment.

These committees that are formed on the installations must be given the training and the encouragement, which will permit them to effectively carry out their mandate. And their mandate is to bring forth the safety concerns of workers and to have them addressed in a satisfactory manner... Unfettered worker input and feedback is invaluable and must be encouraged to the highest degree (Transcript, November 30, 13).

The Commissioner recognizes that there are many factors which need to be considered in appointing or electing workers to the various safety and other specialist committees. For instance, if an individual has a specific skill set or experience base that would be of benefit to a particular working group or committee, it may be appropriate to request that individual to be an appointed member.

Recommendation 4.5:

As a general rule, the Commissioner recommends that the election of members to safety committees and other working groups concerning safety be fully transparent and in accordance with OHSI Recommendation 19.

4.5. Workplace Safety

The construction and operations phases of the Hebron Project each pose specific risks and challenges to maintain workplace safety. The public review revealed concerns about human safety during both phases. Of particular concern for the construction phase was the method of statistical reporting and encouraging a culture of on-site safety; for the operations phase the Commissioner considered concerns about air emissions, diving operations, training, and hours of work.

4.5.1. Construction

In the additional information review, the Proponent was asked to explain specific initiatives which are planned to mitigate risk to human safety in the construction of the project. The Proponent offered further details of a

...defined strategy for achieving a safety step change for the Hebron project. It was developed in consideration of lessons learned from other projects, and establishes many mandatory project initiatives such as Safety in Leadership Workshops (2 Day), NLCSA Construction Worker Safety Training, interactive

site orientation, an extensive site specific safety training program, a 'green hand' orientation process (ECMP 2011, Response 11.1).

With weather being an important safety factor in any activity in NL, the Proponent committed to a *“weather forecasting service that will be an integral input to the planning of marine operations”* at the Deep Water Site (ECMP 2011, Response 11.1.6).

Travel to and from Bull Arm is a risk specific to the construction phase of the Hebron project. Commenting on the dangers associated with adverse driving conditions due to winter weather or to mitigate traffic accidents due to fatigue, the Proponent responded that

...while it is not possible to eliminate all risks from winter driving associated with personnel commuting to and from work, it is intended to make every effort to mitigate these risks through a formal Project Journey Management Program [to include] provision of a daily shuttle service for the Bull Arm site from designated pick-up and drop off locations, and safety requirements for other approved travel. In extreme weather conditions, provision for accommodating commuting workers at the Bull Arm site is envisioned in the site planning activities. The company is fully supportive of project personnel exercising their personal responsibility for safety when making individual choices based on their specific circumstances (ECMP 2011, Responses 11.1.2-3)

When asked how off-site road accidents will be monitored for Bull Arm, off-site accidents and near-misses will also be reported through *“a worker safety recognition program...based on a balance of leading and lagging indicators of safety performance...to encourage the reporting of all incidents, near misses, as well as participation in all safety programs.”*

When asked how contractor safety through the supply chain, including required Canadian statistics, will be monitored, audited by, and/or reported, the Proponent responded that *“There are contractual requirements for the EPC contractors to report safety statistics for all Project work sites. These requirements are subject to verification and monitoring processes by EMCP.”*

It should be noted that, ultimately, the EPC is legally responsible for workplace safety at the Bull Arm Fabrication Site or at any other project construction site, as the C-NLOPB does not intend to issue a work authorization order under the Acts. The Commissioner is pleased with the initiatives undertaken in construction safety thus far by the Proponent and its EPCs, and encourages further leadership and oversight in this area.

4.5.2. Air Emissions

The air emissions modeling for the Hebron Platform showed that for air contaminants of regulatory interest none of the expected values would exceed the regulatory limits in the area modeled. The Commission notes, however, that the modeling provided values starting at a boundary 500 meters from the platform. Furthermore, no air quality monitoring to validate the predictions of the model is provided for in the CSR. While it may be argued that the immense dispersion offered by the winds in the North Atlantic makes this kind of monitoring impractical, there is the question of what air quality is expected for the area within 500 meters of the platform and on the platform itself during normal or upset operations. From the point of view of the Commission, poor air quality is potentially a health and safety issue for workers on the platform and supporting supply vessels that needs to be clarified. Whether air quality from the perspective of worker health and safety can be accurately modeled on and within 500 meters of the platform requires investigation.

Recommendation 4.6:

The Commissioner recommends that the C-NLOPB require the Proponent to develop and implement a plan to monitor air quality on the platform from a human health and safety perspective and ensure that the results of that monitoring program are communicated to the platform Workplace Health and Safety Committee on an ongoing basis.

4.5.3. Diving Operations and Offshore Medicine

Two of the presenters to the Commission commented on risks to human safety during diving operations and associated concerns with respect to out-dated regulations, standards and equipment. Saturation diving is a technique allowing divers to work at depths for lengthy periods and live in a saturated or hyperbaric environment on a diving support vessel (DSV) for up to 28 days, without having to decompress after each dive, thereby reducing the risk of decompression sickness or “the bends”.

Concerning the current regulations, diver Phil Towers stated that

All international diving contractors comply with the International Marine Contractors Association (IMCA) guidance and codes, and all operators insist that their diving contractors are compliant, which gives them a level of comfort in their contractor's level of competency and safety.

IMCA is a self-regulating body that writes “diving guidance and policy and also [audits] potential member companies and global standards are formulated from global sharing of information” (Transcript, November 30, 57).

Dr. Ken LeDez, MD, a hyperbaric specialist, also commented on “*grossly out dated*” diving regulations, suggesting that the C-NLOPB requirements need to be reviewed by experts in diving medicine and revised accordingly after appropriate consultations with industry stakeholders. This revision should be undertaken in a collaborative manner. He also remarked that the current medical requirements for offshore diving support vessels are likewise out-dated. The medical kits required by diving support vessels (DSVs) have not been revised in decades but, without updated regulations, it is difficult to impose any standard (Transcript, December 1, 3).

Recommendation 4.7:

The Commissioner recommends that the C-NLOPB comprehensively review its diving regulations and standards with input from industry stakeholders and hyperbaric medical practitioners to comply with International Marine Contractors Association regulations and Canadian Standards Association standards.

Both diving specialists who presented at the sessions suggested that the current hyperbaric medical equipment in the province is unsatisfactory and substandard from both an emergency/first response and a critical care perspective. Memorial University is a centre of excellence for the use of information technology in remote medicine (<http://www.med.mun.ca/eHRU/Mission.aspx>). The technology exists to monitor a diver in saturation using an electrocardiogram monitor within a hyperbaric chamber, but currently this equipment is not required on the DSVs, therefore limiting what a hyperbaric physician can achieve. The Canadian Standards Association is in the process of updating offshore medical regulations. The Hebron Partners through Petroleum Research NL have recently called for proposals to develop technologies to reduce health, safety and environmental risks for offshore operations in Arctic and harsh environments. The Commissioner encourages the Proponent to support the advancement of research, education and training in information technology/medical and hyperbaric requirements for the offshore, and to advance medical knowledge of humans working in harsh environments for the benefit of all Hebron and offshore workers.

4.5.4. Training

Each offshore worker must maintain an extensive suite of development and recertification training to document his/her competency for their job. Some training can be conducted at the offshore worksite during both work and leisure time, whereas a large portion of the training can only be offered at specialized facilities onshore. With weather delays, crew-change delays, and course scheduling changes, many workers have their home/family time regularly disrupted due to training commitments.

To give but one example: every offshore worker must initially complete the Basic Survival Training and thereafter the Basic Survival Training (Recurrent) every three years to maintain certification and competency for offshore travel. Certain elements of this training, although extremely useful, can be cancelled at short notice due to inclement weather or training equipment malfunction. Although financially compensated, a worker must complete survival training and other safety courses when onshore, during off-work hours. If a worker has scheduled a week of personal time in order to attend a safety course and part or all of it is rescheduled, this may result in a negative attitude or resentment towards having to undertake such training. Indeed, negative attitudes are so prevalent so as to cause a safety instructor to suggest to the Commission that such attitudes are the single largest barrier towards improving safety in the offshore.

The Commissioner recognizes that effective training and competency development is a key element to the overall safety management system, and the Commissioner recognizes the need for employers and employees to effectively balance time-off and family needs with offshore work and training needs.

Recommendation 4.8:

The Commissioner recommends that the Proponent consider employee training time as one of the parameters to be included in a comprehensive analysis of the optimal shift rotation for offshore workers employed at the Hebron Platform.

4.5.4.1. Survival Training

Dr. Ken LeDez raised the issue of training fidelity where he advocates more robust helicopter underwater escape training than that currently offered by training providers (PRS-26). He recommends the use of emergency breathing systems (EBS or HUEBA) in the HUET (helicopter trainer) in a cold, salt water pool as opposed to the cool chlorinated pool that is currently used. *“Effective breath-hold time in very cold water [20-30 seconds] is considerably shorter than the time needed to escape from an inverted submerged helicopter [45-60 seconds and] drowning is therefore very likely”* (PRS-26; see also OHSI, phase I, vol. II, 142-48 and 160-61).

Such training is not offered at present because of the *“risk of barotrauma injuries if the user holds their breath during ascent to the surface”* after inversion in the helicopter trainer. Use of an underwater breathing apparatus during helicopter training would likely also require a more stringent medical (OHSI 2010, 145).

Recommendation 4.9:

The Commissioner recommends that the Proponent, along with the training providers, evaluate the best and most appropriate survival training methods offered worldwide, compared to what is currently available through local training facilities, and recommend what, if any, changes would be needed to enhance local training fidelity, reduce cold-water shock and increase survivability.

4.6. Personnel Transport

The Development Plan states that crew transfers will primarily take place via air, but that, during extended no-fly periods, marine vessels could be used for personnel transport. The Proponent was asked to discuss the basis for designating helicopter as the primary means of transport to the offshore in terms of assessed risks for marine and air transport, past experience, and any weather and logistical constraints.

The decision to use helicopter as primary means of transport is based on “*precedence, synergy opportunities with existing facilities and the area’s operating environment*” (ECMP 2011, Response 12.1). The Proponent further stated that:

The specific risks associated with helicopter and vessel transport will be assessed during the project’s development phase. Hebron will take advantage of the operating experience in the region to minimize risks to as low as reasonably practicable for both means of transportation (ECMP 2011, Response 12.1.1).

There is little doubt that, in terms of the existing equipment and vessels in the NL offshore, helicopter is the most expedient and convenient means of routine crew transport for industry and passenger alike. However, helicopters are precision machines and things can, and will, go wrong when operating in a harsh environment such as the NL offshore. Several issues identified by the Offshore Helicopter Safety Inquiry (OHSI) concerning helicopter safety need resolution, including, most prominently, the issue of the 30-minute safe operation and run-dry capability following loss of oil to the main gear box. The issue is not the type of helicopter employed, but the measures employed to mitigate loss of life as a result of accident and, subsequently, to mitigate known risks and faults with the equipment.

According to the CSA, offshore helicopter transport presently constitutes the single highest risk factor for mortality in the industry during the drilling and production phase of development. Conversely, marine transport of personnel is considered relatively safe, but other hazards exist with marine transport in terms of the duration and conditions during the voyage and the capability and limitations of personnel transfer systems on site. Thus, it is ever more important to mitigate the risks to

human safety via helicopter transport and reduce the risk to human safety to as low as reasonably practicable.

4.7. Helicopter Transport

Personnel transfers will be conducted “by helicopter 5 days per week, 52 weeks per year” with 300-350 crew change and ad hoc flights per year, allowing for a maximum of 5100 personnel transfers offshore. “Based on historical weather and recent operating experience of similar facilities in the region, it is expected that approximately 70-75% of flights will operate on the scheduled day of departure” (ECMP 2011, Response 12.1.2).

The Commissioner asked what oversight the Proponent has over helicopter contractors and whether it intends to exceed current regulatory standards to ensure the fleet is always the most safe available. Geoff Parker reiterated that they rely on the relevant regulators to certify equipment and will order compliance with current regulations (Transcript, December 5, 25-26).

4.7.1. 30-Minute Safe Flight Operation

This outstanding point was raised by several presenters during the public review. The Transport Safety Board (TSB) investigation into the March 12, 2009 crash of Cougar Flight 491 determined that the crash occurred 11 minutes after a complete loss of main gear box (MGB) lubrication (TSB Aviation Reports A09A0016).

4.7.1.1. Actions by the Transportation Safety Board and Regulators

The TSB report, released February 9, 2011, included two recommendations concerning the “30 minute safe operation and run dry”, which are:

A11-01: The Federal Aviation Administration, Transport Canada and the European Aviation Safety Agency remove the “extremely remote” provision from the rule requiring 30 minutes of safe operation following the loss of main gearbox lubricant for all newly constructed Category A transport helicopters and, after a phase-in period, for all existing ones.

A11-02: The Federal Aviation Administration assess the adequacy of the 30 minute main gearbox run dry requirement for Category A transport helicopters.

The TSB report notes that “the newly appointed Minister of Transport indicated that he has instructed officials to modify the consultation process to accelerate the action required as a result of the recommendations contained in this report.”

Transport Canada (TC), the European Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA) have responded subsequent to the TSB report. The TSB has reviewed and assessed these responses as having **Satisfactory Intent** (www.tsb.gc.ca).

4.7.1.2. Federal Aviation Authority

The FAA response, dated April 28, 2011, is the most critical as the FAA original certification of the Sikorsky S-92 has permitted the helicopter to operate as a transport Category A helicopter worldwide, and it is useful to cite this FAA response in full:

All transport Category A helicopters certified to 14 CFR 29.927(c) (effective Amendment 29-26), including the Sikorsky Model S-92-A, have met the 30-minute “loss of lubrication” requirement. The Model S-92-A MGB used an oil cooler bypass valve to meet this requirement by eliminating the most likely source of leakage, which are the cooler and external lines and fittings. Events that have occurred during the operational use of the Model S-92-A, such as the MGB oil filter bowl failure associated with the S-92 Cougar accident, have shown that certain failures not considered during certification testing were more likely that “extremely remote”. The service history therefore does not support the method of compliance that was originally accepted by the FAA as the time of the Model S-92 type certification. Because of this very tragic and regrettable experience, the FAA will propose a rule change to either clarify or eliminate the “extremely remote” provision of this regulation. In the interim, the FAA will revise the guidance material associated with the rule to prevent confusion and to achieve a more robust and standardized method of compliance with the loss of lubrication requirements.

The FAA does not believe it is practical or necessary to require that all existing and newly-manufactured transport Category A helicopters be equipped with MGBs that meet the 30-minute “loss of lubrication” requirement under 14 CFR 29.927 (c), amendment 29-26. The cumulative flight hours on these helicopters are well into the millions, and their service history supports that they are operating at a satisfactory level of safety. Furthermore, modifying these helicopters to be equipped with new MGBs would have a significant economic impact on the aviation community, and the costs would outweigh any improvements in safety (www.tsb.gc.ca; FAA April 28, 2011).

The TSB has issued an analysis to the FAA, Transport Canada and the European Aviation Safety Agency responses to its recommendations. The TSB Assessment of the FAA response states:

The FAA has indicated that it will propose a rule change to either clarify or eliminate the “extremely remote” provision in this regulation. This statement acknowledges the deficiency. In addition, one proposed course of action, eliminating the “extremely remote” provision, follows A11-01’s recommended course of action. However, no timeframe to complete this process is specified. The FAA has proposed action which, if implemented in full, will substantially reduce or eliminate the deficiency for newly certified Category A helicopters.

However, the FAA goes on to say it “does not believe it is practical or necessary to require that all existing and newly-manufactured transport Category A helicopters be equipped with MGBs that meet the 30-minute “loss of lubrication” requirement under 14 CFR 29.927(c), Amendment 29-26.” This suggests that Sikorsky, having already certified the S-92A under the existing “extremely remote” criteria, may not be required to redesign and refit its S-92A MGB, which would not be in keeping with the Board’s recommendation. The Board will be seeking clarification from the FAA on this point.

As of June 23, 2011, the TSB has taken the following action concerning the FAA response:

Re A11:01: The TSB will monitor the progress on actions taken by the FAA, TC and EASA to ensure the risks inherent in the “extremely remote” provision for Category A helicopter certification are reduced. The TSB is seeking prompt clarification from the FAA regarding its intentions with respect to the S-92A’s MGB.

Re A11:02: The TSB will monitor the actions taken by the FAA to assess of the adequacy of the 30-minute loss of lubrication requirement. The response to this recommendation will be re-assessed by the Board in 6 months.

It notes that “the FAA is participating in a coordinated formal review of the rules related to the “extremely remote” provision and the 30 minute requirement, with Transport Canada (TC) and the European Aviation Safety Agency (EASA).”

4.7.1.3. European Aviation Safety Authority Response

Subsequently, the EASA has issued an Invitation to Tender: HELMGOP – Helicopter Main Gearbox Loss of Oil Performance Optimization (EASA.2011.OP.29), with the project scheduled to be completed by the end of 2012.

The Objective of this project is a survey of different gearbox lubrication system architectures, options for minimising occurrences of loss of oil events, and

investigation of possible design solutions to increase the capability of continued operation after loss of oil (www.easa.eu.int).

The TSB continues to monitor the regulatory bodies, and any change to international regulations, and report their actions publicly. The TSB has reassessed a further response from the FAA received in September, and their response shall be made public in April 2012.

4.7.1.4. Actions by the Manufacturer and Operators

The Commission attended a two-day Helicopter Safety Forum organized by the C-NLOPB on October 31 - November 1, 2011. The OHSI provided various recommendations, including the need for better communications, planning and execution of safety initiatives. In response to a need for better and more multilateral communications, and following OHSI Recommendation 20, the Helicopter Operations and Safety Committee (HOSC) was initiated and supported by the C-NLOPB with representation from all stakeholders (<http://www.cnlopb.nl.ca/hosc.shtml>). Ken Dyer, the current committee chair, stressed the importance of stakeholder engagement with all parties involved and communicating fully to ensure everyone who flies is informed of safety issues and solutions (Dyer 2011). The Commission commends the work being done by the HOSC, and notes that, prior to the Cougar accident, there was no such industry committee or forum that had any form of mandate to review helicopter safety or general safety offshore or to bring helicopter safety lessons learned from other operating jurisdictions. The stakeholders are moving forward and making progress.

Sikorsky has implemented an improved oil filter assembly that reduces the “single point of failure” that the original mounting represented and replaced the four titanium mounting studs with steel mounting studs and have installed a new cap assembly over the oil filter assembly. The specific problem which caused the oil loss in Cougar Flight 491 has been substantially remediated if not eliminated. Cougar Helicopters, in participation with the manufacturer, has improved the training of its maintenance and flight crews, and revised the emergency response procedures of its crews to warning alarms related to MGB. This response has the flight crew descending to a possible ditching elevation and procedure within 6.5 minutes if warning alarms occur. Many other improvements have been implemented regarding passenger flight suits and breathing apparatus.

Although all of these changes ensure that the Sikorsky S-92A is safer than it was prior to the terrible crash of Cougar 491, there is no certainty of continued safe flight of the helicopter for more than 11 minutes following a complete loss of MGB lubricant. A fundamental question for those who travel via the S-92A relates to the “extremely remote” provision. Although it seems realistic for the Commission to conclude that

the suite of improvements has lessened the likelihood of the catastrophic loss of oil in the MGB, the Commission is not qualified to offer any opinion on the probabilistic assessment of risk related to the “extremely remote” provision for the 30-minute certified safe flight operation.

Recommendation 4.10:

The Commissioner recommends that the C-NLOPB, working with the TSB and other regulatory organizations (TC, FAA, EASA), ensure that the Category A helicopters operating in the C-NL offshore comply with existing and revised regulations.

4.7.2. Operational Parameters

It should be noted that the requirement for a 30-minute safe flight operation after loss of lubricant in the main gear box is to provide sufficient time for the pilots to effect safe ditching on the surface, thereby maximizing survivability. Therefore, it is critical that operational parameters be set to ensure favourable environmental conditions for safe ditching and for effective search and recovery in the event of a ditching. When asked to provide environmental and seasonal parameters for helicopter operations, the Proponent provided general information but did not identify their own specific parameters and constraints in the context of what is currently regulated (ECMP 2011, Response 12.1.5). Transport Canada Aviation Regulations dictate that visibility must be greater than one-half a mile for helicopter take-off, which often precludes helicopter operations in spring and summer fogs. High winds, icing conditions and sea states of higher than 6m prevent helicopter operations in the winter months.

The operational parameters for safe flight are currently the concern of the OHSI Implementation Team for Recommendation 9: *“R&D activity be undertaken to improve the accuracy of offshore weather forecasting, with specific emphasis on improving the accuracy of predicting en route sea state, freezing precipitation, and visibility at the offshore installation”*. As the Proponent has committed to employing a weather forecasting service at the Deep Water Site at Bull Arm (Response 11.1.6), the Commissioner asked whether this forecasting initiative could be extended to offshore marine operations. In reply, current forecasting for sea states to determine ability to fly is available from St John’s and the Hibernia platform. Mike Ryan, Hebron Operations Manager, also referred to the use of supply vessels to improve the weather picture *en route*, but no further initiatives are planned at this time (Transcript November 30, 22).

Recommendation 4.11:

The Commissioner supports the initiatives and progress arising from Recommendation 9 of the Offshore Helicopter Safety Inquiry ('Goal-oriented objectives for operational requirements'), and recommends that the Proponent extend their weather forecasting services to improve the accuracy of predicting *en route* sea state, freezing precipitation, and visibility.

4.7.3. Night Flights

At time of writing, night flights are still suspended and the OHSI Implementation Team for Recommendation 12 have produced their advisory document to the C-NLOPB. Concerning night flights, Brian Murphy said *"It is just harder to do things in the dark than it is in the daylight, and the statistics show that the loss of life was greater in the night time"* (Transcript, November 30, 17). A report by Michael Taber for the OHSI found that the risk to human safety during night flights is higher than day flights for all personnel concerned, but, in considering any regulation to ban night flights, Commissioner Wells had *"doubts about the prescription, by regulation, of conditions over and above those of Transport Canada"* (OHSI, phase I, vol. I, 199; see also Taber, OHSI, phase I, vol. II, 220).

With recent equipment upgrades and the provision of a dedicated Search and Rescue helicopter by Cougar Helicopters with Forward Looking Infrared (FLIR) capability, the risk to passengers during a ditching or crash at night is mitigated somewhat, but is this risk reduced to as low as is reasonably practicable? It should be remembered that personnel transfers are routine flight operations and should not be held to the same standard as emergency flights where a higher level of risk to the crew is tolerated. The question which remains is: do the logistical benefits of flying at night outweigh the significant known risks?

The OHSI Implementation Team delivered its advice to the board of the C-NLOPB. The C-NLOPB is the process of developing an action plan concerning night flights (M. Hawco, C-NLOPB, email, February 7, 2012).

4.7.4. Helicopter Fleet Size

One of the reasons cited for a return to night flying is to clear backlogs which frequently occur when helicopters cannot fly due to weather, maintenance or other constraints. In his presentation to the Commissioner, Brian Murphy cited OHSI Recommendation 9, concerning operational limitations for flying. Compliance with this recommendation by the Operators has led to increased limitations in the opportunities for flying.

This has, and will continue, to lead to increased pressure for flights when sea states permit. We refer to this as "backlog". So, to clean up the backlog is a priority objective once sea states, or other conditions, improve to allow flights. It is our fear that there will be a tendency to "push the limits", whereas an augmented fleet will help alleviate this (Brian Murphy, Transcript, November 30, 11).

Citing that *"pressure to fly is a safety consideration"*, Murphy suggests that the *"Operators require...that the Helicopter Transportation Operator be able to augment its fleet during periods of the year when operational restrictions limit flight time availability"* (Transcript, November 30, 11).

In the ensuing discussion, the Commissioner asked how do the operators forecast and plan for fleet capacity of helicopters and ships used for personnel transport, and whether such decisions are made unilaterally or as a group. Mike Ryan explained that helicopter fleet size is driven by the combined passenger load for all offshore facilities, but backlog is driven by weather and sea states which are difficult to predict with consistency and accuracy for use in a helicopter transportation model. The Proponent will also *"work with the other operators to apply operational synergies to determine solutions during backlog periods"* (Transcript, November 30, 19).

The Commissioner supports OHSI Recommendation 11 regarding helicopter fleet size and is satisfied that the determination of a safe fleet size will be conducted by the C-NLOPB Aviation Advisor who will be provided full access to all offshore flight statistics.

4.8. Marine Transport and Operations

Marine Transport and Operations are key to the success of the Hebron Project and thus marine safety and the suitability of the fleet is of concern to the Commission. Concerning marine transport, the Proponent

...recognized that during prolonged poor weather conditions or helicopter unavailability, personnel may be transported by supply vessel to and from the Hebron Platform. Based on experience of similar facilities operating in region, it is expected that approximately 10-15% of personnel crew changes will be carried by marine vessel per year. It is anticipated that the majority of these transfers would be during the summer months due to fog (ECMP 2011, Responses 12.1.3-4).

Using the base POB of 220 and planned number of personnel transfers by helicopter, this 10-15% represents 510-765 individual personnel transfers by sea per year of a total of 5100 individual transfers from crew and ad hoc trips for the project.

Safety during marine transport is less affected by environmental and seasonal parameters, but adverse weather conditions, high sea state and low visibility “*will impact the ability to transfer personnel by crane and personnel transfer device.*” Sea state and weather in fall/winter can also adversely “*impact the comfort of personnel on board the vessel.*” Marine transport is considered a less favourable option for routine transport because of the limited passenger carrying capacity of the current fleet and the long travel time (12-14hrs) to/from the platform (Mike Ryan, Transcript, November 30, 20). The supply vessels are currently used for crew changes when the primary means of helicopter transport is not possible, but most workers would rather fly, due to extended transit times, particularly sea in harsh conditions and the lack of comfort of the current fleet (Brian Murphy, Transcript, November 30, 23).

The Hebron Project is a 30-plus-year project, and modern ships will be needed to service this project that will address the environmental and safety standards of the future. The current Maersk supply vessels servicing the NL offshore are over 25 years old, the Atlantic Towing vessels are almost 10 years old. The opportunity exists with the Hebron development to replace these ageing vessels with a multi-purpose vessel capable of supply, tow and personnel transport.

Further, shuttle tanker Captain Charles Newhook suggested that it may be extremely difficult to find appropriate vessels for the prevailing circumstances and conditions, in terms of ice-class, dynamic positioning, and other safety specifications, needed to meet specific project requirements (PRS-06).

In an addendum to his presentation during the public review sessions, Captain Newhook stated that, although Statoil requires shuttle tankers with DP class 1 for a stationary offshore loading system, Class 2 is required for offloading from the FPSOs where additional redundancy of station keeping equipment and machinery is required for safety.

Past practice has shown that when tankers are removed from operation for maintenance, equipment failure, or other reasons, they (the tankers) will be replaced by the remaining tankers in the pool. From the Development Plan, it would appear the practice of pooling existing tankers for Hebron operations will be utilized until such time as the operators/Proponents decide the existing tankers are no longer suitable. [Therefore, all ships should be Class 2 DP ice-classed tankers] to set a minimum standard that is appropriate for the unforgiving Grand Banks environment (Supplement, PRS-06).

Concerns were also raised about the type of marine vessels to be used during the construction of the Hebron platform at the Deep Water Site (DWS). The Proponent was asked to explain any special considerations concerning barge safety management

and ice-class considerations for vessels at the DWS. The Proponent reiterated its commitment to providing safe working conditions during all phases of the project, and “to ensuring the highest standards for all marine operations, including construction and other support barges” (EMCP 2011, Responses 11.1.4-5). When asked to specify which vessels will be used during the construction phase, the Proponent responded that

The selection of vessels for use at the Bull Arm site will be carefully evaluated on a case-by-case basis on the highest industry standards appropriate for the intended use. Vessels will meet all regulatory requirements as well as other applicable project requirements. Lessons learned from previous projects will be applied and, where specific hazards are identified such as impact from pack ice, then the appropriate class of vessel will be utilized (ECMP 2011, Response 11.1.1).

Recommendation 4.12:

The Commissioner recommends that the Proponent consider the following in the Development of the Hebron Vessel Strategy:

- need for new, multi-purpose marine supply vessels to transport personnel to the offshore during heavy fog, or to safely transport personnel during times of stress on helicopter fleet;
- need to review and revise SAR equipment and capability of supply vessels in accordance with OHSI Recommendation 9;
- need for ice-classed ships to be used during the construction phase; and
- requirement for new shuttle tankers with appropriate heavy weather ballasting capability and necessary equipment for offloading the heavy oil of Hebron.

Hebron

Public Review

5. ENVIRONMENTAL PROTECTION

5.1. Chapter Summary

The Hebron Project poses environmental risks and challenges, some of which are generally similar to those posed by previous projects in the Jeanne d’Arc Basin, and some that are consequences of producing “heavy oil”, as discussed in Chapter 3: Development Approach. Hebron’s crude oil is several times more viscous than the crudes produced from other operating fields in the Jeanne d’Arc Basin. To put this in the context of day-to-day experience, Hebron crude is 3 to 4 times thicker than olive oil.

Successful extraction of oil from reservoirs in the NL offshore requires injection of both produced gas and seawater to maintain reservoir pressure. The seawater, along with water from the reservoir itself, returns to the production platform with the oil. This is generally referred to as “produced water” (PW). Re-injection of this water stream back into the reservoir is the preferred method of disposal, but this is not always technically achievable due in part to the nature and long-term integrity of the reservoir and the risk of “souring” the reservoir through the production of hydrogen sulphide gas (H₂S) that raises both safety and facility design concerns. This means that PW, the largest waste stream by volume, is often treated and discharged to the marine environment. For Hebron, the need to effectively separate water from the heavy oil and manage the large volumes of PW anticipated creates challenges for the treatment of this water stream whether it is re-injected or discharged to the marine environment. Notwithstanding the fact that the Proponent has committed to certain treatment technologies, the PW discharge still poses a risk to seabirds if oil sheens result.

The characteristics of the heavy oil that will be produced from this project also have implications for oil spill response planning. If spilled, the more viscous Hebron crude will weather differently from other Jeanne d’Arc Basin crudes and be more difficult to recover mechanically from the sea surface. Dispersants, although considered to have been effective in the Macondo oil spill, have yet to be tested for effectiveness against Hebron heavy crude, and the Proponent has committed to such tests (Geoff Parker, Transcript, December 6, 9).

During the public review process, other concerns and issues were raised:

- discharge of PW and its potential environmental effects;

- the attraction of marine birds to offshore oil and gas platforms, and potential exposure to discharges resulting in increased mortality;
- the need for clarity in spill reporting, spill risk assessment and evaluation of environmental effects, particularly with small or chronic spills;
- the need for research programs to monitor marine bird populations in the NL offshore to establish benchmarks and monitor annual and seasonal survival rates;
- air emissions from flaring, platform power generation and other sources;
- the risk and environmental consequences of consequences of a major oil spill for the short- and long-term economic viability of the fishery, and spill response preparedness;
- the form, content and rigor of current environmental assessment and regulatory processes;
- the cumulative effects and long-term impacts of the oil and gas industry to the fishery and access to traditional fishing areas;
- effects of seismic work on marine life; and
- the need for a legacy of environmental stewardship.

Apart from the offshore production phase of the project, there are environmental issues and concerns particular to the inshore construction phase at the Nalcor Bull Arm Fabrication Site including: the effects of construction activity on marine life and habitat as a result of sedimentation and near-shore blasting operations; and the management of discharges from land-based activities and from the platform at the Deep Water Site (DWS). These issues are similar to those encountered during the construction phase of the Hibernia GBS at the same location from 1990 to 1997.

In addition to discussing the specific issues outlined above, members of the public also raised important philosophical issues that need to be taken into consideration as the Hebron Project moves forward. There is some concern that the C-NLOPB is in a conflict of interest with regard to its responsibilities as environmental regulator and its role of promoter of the oil and gas industry. Some members of the public feel that independent environmental observers should be placed on offshore platforms as one component of a process to increase transparency and public access to information. Without proper benchmarks, most presenters feel it is very difficult to develop

protocols to understand bird migration and behaviour, and thus understand the potential effects of any spills on bird populations.

5.2. Regulatory Content

The Federal Minister of Environment, pursuant to the Canadian Environmental Assessment Act (CEAA), required a Comprehensive Study Report (CSR) to assess the environmental impacts of the proposed Hebron Project. The CSR also satisfies the requirements in Chapter 5 of the C-NLOPB *Development Plan Guidelines*. The federal review of the CSR, coordinated through the C-NLOPB as regulator, was concurrent with the Hebron Public Review.

The C-NLOPB *Development Plan Guidelines* (2006) define the topics to be addressed in the environmental assessment of a Proponent's Development Application. This requirement was integrated into the 2009 Hebron Project Scoping Document issued by the C-NLOPB subsequent to input received from the following provincial and federal regulatory agencies:

- Newfoundland & Labrador Department of Natural Resources;
- Newfoundland & Labrador Department of Fisheries and Aquaculture;
- Newfoundland & Labrador Department of Environment and Conservation;
- Fisheries and Oceans Canada;
- Environment Canada;
- Transport Canada;
- Health Canada; and
- Natural Resources Canada.

On December 22, 2011, the Federal Minister of the Environment, based on the results of the CEAA review of the CSR, rendered a decision that the Hebron Project can proceed, *"taking into account the mitigation measures described in the Comprehensive Study Report, the Project is not likely to cause significant adverse environmental effects"*, and that *"the mitigation measures and follow-up program described in the Comprehensive Study Report are appropriate for the proposed project"*.

Apart from the project-specific environmental terms and conditions that the C-NLOPB will impose arising from both the CSR review and the Hebron Public Review, the Hebron Project will also be subject to the following guidelines and regulations that have relevance to environmental protection enforced directly through the authorizations issued by the C-NLOPB:

- *Newfoundland Offshore Certificate of Fitness Regulations SOR/95-100;*
- *Newfoundland Offshore Petroleum Drilling and Production Regulations SOR/2009-316;*
- *Canada Oil and Gas Operations Act R.S.C., 1985, c. O-7;*
- *Oil and Gas Spills and Debris Liability Regulations SOR/87-331;*
- *Newfoundland Offshore Area Petroleum Geophysical Operations Regulations SOR/95-334;*
- *Newfoundland Offshore Petroleum Installations Regulations SOR/95-104;*
- *Compensation Guidelines Respecting Damages Relating To Offshore Petroleum Activity 2002;*
- *Environmental Protection Plan Guidelines 2011;*
- *Geophysical, Geological, Environmental and Geotechnical Program Guidelines 2011;*
- *Offshore Waste Treatment Guidelines (OWTG) 2010;*
- *Offshore Chemical Selection Guidelines for Drilling & Production Activities On Frontier Lands 2009;* and
- *Guideline for the Reporting and Investigation of Incidents 2009.*

As with any other offshore oil and gas project, during the environmental assessment of the Hebron Project, the C-NLOPB is the primary regulatory authority and lead agency under the CEAA. However, in accordance with that legislation, the C-NLOPB seeks technical review and advice from various federal and provincial agencies. The review of any development like the Hebron Project is an ongoing process with the C-NLOPB working in collaboration with other environmental regulatory authorities with environmental mandates and expertise relevant to the project. Memoranda of Understanding to support this process are in place with several of these agencies that

have regulatory mandates and technical expertise relevant to oil and gas development in the NL offshore. The input of other agencies to the Hebron Project is cited on the C-NLOPB's website

5.3. Review of Submitted Documents

The Hebron Project Comprehensive Study Report (CSR) describes the proposed development, defining the geographic areas that will be affected and the temporal scope of the Project. The Valued Ecosystem Components (VECs)⁸ defined and considered in the CSR are listed in Table 5.3-1.

The environmental assessment methodology defines the rationale for defining potential project effects on the VECs including, for example, accidental events like oil spills, and the criteria for determining the significance of those effects having considered proposed mitigation measures. The effects analysis considers the cumulative effects of other existing and future activities or projects on these VECs.

Sections 14, 15 and 16 of the CSR describe the environmental management aspects of the project including spill response planning, compliance and effects monitoring and the environmental management system to be implemented for both onshore and offshore phases. The CSR also documents the issues brought to the attention of the Proponent during their public and stakeholder consultations conducted between February 2009 and January 2010 (CSR Section 5).

The Development Plan and CSR conclude there is no alternative to the project other than a GBS from either an economic or technical perspective. Only limited information is provided in either the Development Plan or the CSR with respect to the process through which this decision was made and the underlying studies and information used to inform that process. This is not just a matter of interest from an environmental perspective but has a bearing on the economic analysis of the project as well.

Recommendation 5.1:

The Commissioner recommends that the C-NLOPB, in consultation with the Canadian Environmental Assessment Agency, develop specific guidance as to the scope and technical content of the alternatives analyses for offshore oil and gas projects in the NL offshore subject to Comprehensive Studies. This guidance, in its draft form, should be subject to suitable public review prior to publication.

⁸ Valued Ecosystem Component (VEC) is defined as the environmental element of an ecosystem that is identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

The CSR describes the measures to help mitigate or eliminate the risk of significant adverse environmental effects as a result of the Project. These measures are discussed in the context of Valued Ecosystem Components assessment in the CSR (CSR Table 17.2). The primary management mechanism for ensuring these measures are implemented is the ExxonMobil Operations Integrity Management System (OIMS) which incorporates a process that provides for activity-specific environmental protection and management plans and supporting procedures.

As a result of the assessment described in the CSR, the Proponent concluded that, subject to the successful implementation of the planned mitigation and management measures described, the project would not result in any significant residual environmental effects on any of the VECs with the exceptions of those highlighted in Table 5.3-1.

Valued Ecosystem Components	Construction Installation Phase	Operations Maintenance Phase	Abandonment Phase	Accidents Malfunctions Unplanned Events	Cumulative Effects
Air Quality Fish & Fish Habitat Commercial Fisheries	No significant effect predicted after relevant mitigation measures applied				
Marine Birds	No significant effect predicted after relevant mitigation measures applied			Significant Effect on this VEC regardless of mitigation should an oil spill event occur	No significant effect predicted after relevant mitigation measures applied
Marine Mammals Turtles Species At Risk – Marine Fish Species At Risk – Birds	No significant effect after relevant mitigation measures applied				
Species At Risk Marine Mammals & Sea Turtles Marine Fish Birds Nearshore Sensitive or Special Areas	No significant effect predicted after relevant mitigation measures applied			Significant Effect on these VECs regardless of mitigation should an oil spill event occur	No significant effect predicted after relevant mitigation measures applied
Offshore Sensitive or Special Areas	No significant effect predicted after relevant mitigation measures applied				

Table 5.3-1 Valued Ecosystem Components

While the CSR predicts that there would be significant effects as a result of an oil spill on marine birds in general, on marine species (birds, mammals and turtles) at risk offshore, and for sensitive or special areas identified within the near-shore affected area, it is assessed that *“the likelihood of this occurring is considered very low. Emphasis on both pollution prevention and effective response planning will further reduce the potential for these unlikely significant environmental effects to occur”* (CSR 17.2.1).

As with other oil and gas developments, the Hebron Project will implement environmental effects monitoring programs for its near shore and offshore project

areas. The Proponent commits to designing these programs in consultation with both federal and provincial regulators and fish harvesters and to link these programs to the corresponding environmental protection or management plans for those areas.

For the near shore (construction) phase, the Environmental Effects Monitoring programs committed to by the Proponent include:

- an environmental effects monitoring program, the parameters of which are to be designed with stakeholders and regulators;
- monitoring of marine mammals during blasting operations during the near shore construction phase; and
- monitoring for the presence of seabirds and migratory birds in the safety zone established for blasting.

For the offshore project phase, the Proponent has committed to the following effects monitoring programs:

- an environmental effects monitoring program comparable to those already in place for existing oil and gas operations in the NL offshore;
- environmental effects monitoring program for a “major” spill;
- monitoring for compliance with regulatory guidelines and collecting data on seabirds and marine mammals during offshore seismic programs; and
- *“development and implementation of a research monitoring program at the Hebron field location...to allow assessment of risk and mortality regarding potential seabird attraction to offshore structures” (CSR 66-67) using radar technology.*

A program to conduct marine bird observations from Hebron supply vessels will also be considered. Like other oil and gas developments, fish habitat compensation programs will also be required by Fisheries and Oceans Canada to offset the effects of project activities on fish habitat in both the near shore and offshore project activity areas.

5.4. The Regulatory Process

5.4.1. Public Access to Information

During the public review, several presenters argued for greater access to environmental data and raw data), suggesting that the current legislative framework does not permit timely access to information. Currently, such environmental data and information can be released by the C-NLOPB subject to the constraints of section 119 of the federal Accord Act. This section states that an “environmental study” provided to the Board for the purposes of Part II (Petroleum Resources) or Part III (Petroleum Operations) of the Accord Act is privileged and shall not be disclosed without the provider’s consent until a period of five years has passed since the completion of the study.

If, however, the information or documentation in the “environmental study” relates to, and has been obtained as a direct result of, drilling an exploratory, delineation or development well, the expiry of the section 119 privilege is determined by reference to the relevant “well termination date”. For exploratory wells, the privilege expires two years after the “well termination date”. In the case of delineation wells, the privilege expires once two years have passed since the well termination date of the relevant exploratory well and ninety days have passed since the well termination date of the delineation well. For development wells, the privilege expires once two years have passed since the well termination date of the relevant exploratory well and sixty days have passed since the well termination date of the development well.

In recent years, the C-NLOPB has attempted to address the issue of public access to information by providing information regarding spill events on its website (http://www.cnlopb.nl.ca/env_stat.shtml). The Board also provides online environmental effects monitoring program updates from the operators. The Commission notes that, through the National Pollution Release Inventory maintained by Environment Canada (<http://www.ec.gc.ca/inrp-npri/>), the public can access information on release of air contaminants and greenhouse gas emissions from specific offshore production facilities. Despite these sources of information, in the interests of public understanding of the offshore oil and gas industry, it is believed that more information can be made available to the public without detriment to the legitimate interests of the oil and gas industry.

The Commission is sensible to the practical realities facing a Proponent in deciding when in the project cycle it has enough information technically and financially to table a project description for regulatory and public review. However, the need for regulatory and business efficiency must be balanced against the need for transparency in environmental protection measures.

Recommendation 5.2:

The Commissioner recommends that the C-NLOPB review Section 119 of the Atlantic Accord Implementation Act to determine the extent of environmental information that can be made available to the public, and that this information is made available on its website or in another easily accessible form.

5.4.2. Environmental Assessment Process

Some participants were concerned with apparent changes reflected in the CSR with regard to how residual effects and their significance were reported and assessed as compared with other environmental assessments for the NL offshore. Although the CSR describes and assesses the expected effects of the various specific project activities on the VECs, as described at Table 4-1, the rationale behind the assessed risk and scientific confidence in that assessment is not presented on an activity-by-activity basis but rather is reported on the basis of each general phase, for example, construction/installation or operations/maintenance, with each phase comprised of many activities. This is a departure from environmental assessments of other oil and gas projects that provided more precise understanding of which specific environmental effects resulted from specific activities and the bases for prediction of these. The determination of which follow-up programs are required is also based on an understanding of risk and uncertainty for each activity in the project. Thus, it is argued that accuracy in determining what follow-up programs are required may be lost if each specific risk is not discussed in its own right (PRS-34; PRS-02).

FFAW President Earle McCurdy raised the concern that environmental assessments are project-specific and do not address cumulative effects of decades of oil and gas industry activity in the NL offshore (Transcript, December 6, 29). This was reiterated by Janet Russell who suggested that, since the environmental assessment of Hebron is the fourth major assessment for the industry, the recommendations of each previous Public Review and each environmental assessment should be reviewed for completion to ask whether the issues have been addressed.

Recommendation 5.3:

The Commissioner recommends that the C-NLOPB provide status updates of recommendations made by previous public reviews and environmental assessments of offshore oil and gas projects to date, identifying which have been fully addressed, which are still in progress, and which have not been achievable, and why. These status updates can be modelled after the progress of the Offshore Helicopter Safety Inquiry Implementation Teams.

The Commission recognizes that the environmental assessment process implemented by the C-NLOPB must be compliant and consistent with the Canadian Environmental Assessment Act (CEAA) for the offshore activities to which that Act applies. Consistent

with the CEA, the C-NLOPB provides the required public access to documents generated as a result of that process through its website. Notwithstanding this, the Commission believes there are changes that could be made, within the framework of the current legislation, procedural guidance and practice that would improve public confidence in the process. The Commission noted points made by the public with respect to the design and execution of environmental assessments. Specifically, the Commission has decided to focus on two issues: the mechanisms for public input to the scoping and conduct of an environmental assessment, and the process for determining whether a predicted environmental effect is significant or not.

5.4.2.1. Public Participation in Scoping and Conducting an Environmental Assessment

The format and content of the CSR were shaped by the 2009 Hebron Project Scoping Document issued by the C-NLOPB, subsequent to input received from provincial and federal regulatory agencies. The Scoping Document was posted to the C-NLOPB website and public input was to be accepted on the required parameters for the CSR. Inspection of the C-NLOPB's CEAA Public Registry, however, revealed that although members of the general public were invited to comment on the Hebron scoping document as part of the routine process, none took the opportunity to do so. Furthermore, under the CEA, funds can be made available to those wishing to participate in the review of a CSR review under CEAA. In this case a fund of \$30,000 was available to potential applicants; however, the Commission understands that there were no applicants for these funds.

Participation of the general public and environmental stakeholders is an important facet of environmental assessments and is to be encouraged. It is therefore surprising and of concern that issues regarding the design and scope of the environmental assessment were raised by several presenters during the public review long after input to the scoping of the environmental assessment was requested.

Recommendation 5.4:

The Commissioner recommends that the C-NLOPB (and the Canadian Environmental Assessment Agency) raise the profile of the scoping stage of the EA process, and develop a mechanism to encourage and support public and stakeholder input into the scoping document. Furthermore, public understanding of the availability of funding resources to help with participation in the environmental assessments at both the Comprehensive Study Review and Panel Review level should be enhanced in the same manner.

5.4.2.2. Process for Determining the Significance of a Predicted Environmental Effect

The criteria and processes for determining the significance of a potential environmental effect has been a critical issue for environmental assessment

practitioners and the public since the advent of formal environmental assessment processes in Canada in the 1970s. With respect to the technical process of determining whether a potential environmental effect should be deemed significant or not, the Commission notes that the CEAA guidance is dated November 1994. The White Rose Public Review Commission also noted and made a recommendation concerning this issue (Recommendation 5.8). Clearly there is a need for improved public understanding of this aspect of environmental assessments and an even greater need for transparency as to how these determinations are made within each assessment.

Recommendation 5.5:

The Commissioner recommends that the C-NLOPB engage with the Canadian Environmental Assessment Agency to undertake a review of the CEA document entitled *Reference Guide: Determining Whether A Project is Likely to Cause Significant Adverse Environmental Effects*, and update the guidance provided in this document in line with the current state of scientific knowledge and best practice.

5.5. Environmental Protection

The Proponent commits to complying with all environmental regulatory requirements that are applicable to the Project during its various phases. However, the Commission notes that at no time did the Proponent indicate that it would seek to exceed regulatory requirements when possible to do so for the specific or general benefit of the environment. To achieve environmental compliance ExxonMobil's Operations Integrity Management System (OIMS) will be used, ostensibly designed to "Protect Tomorrow. Today". It addresses all aspects that can affect personnel and process safety, security health and environmental performance.

As a consequence of this approach, the Proponent also commits to overseeing and auditing the various subcontractors hired to execute the construction, installation and operation of the Project facilities at Bull Arm and offshore. At Bull Arm, the Proponent will have oversight teams and liaison advisors for environment, fishery, and community.

Compliance reports and implementation of permit conditions will also be monitored by the Proponent. Weekly meetings are held with each Engineer, Procure and Construct (EPC) contractor's Environment and Regulatory teams (ECMP 2011, Response 20).

The Proponent stresses the importance of communications and collaboration with regard to Environmental Protection Measures. The Proponent also provided the *Bull Arm Site Environmental Protection Plan* for review, stating that the EPC contractors, as operator at Bull Arm, "will be responsible for spill response under federal legislation

governing marine spills and under provincial legislation for land spills or for spills originating from shore” and “all site operations” (EMCP 2011, Response 18.1). The C-NLOPB is not responsible for the environmental aspects of the construction phase at Bull Arm which is within the purview of the relevant provincial and federal environmental agencies. It is therefore incumbent on both the Proponent and those agencies to provide the public with the transparency and accountability to demonstrate that the management systems employed during the near shore construction phase are being effectively implemented.

The nature of oil production means that certain discharges and emissions will be produced in addition to oil and gas such as PW, air emissions, and drill muds and cuttings. These discharges and emissions expected from the Hebron Project need to be scrutinized by the Operator, the C-NLOPB and its collaborating regulatory agencies with respect to ensuring an adequate level of environmental protection in the first instance and rigorous monitoring to ensure unanticipated adverse environmental effects do not arise from authorized discharges.

5.5.1. Produced Water (PW)

Produced water (PW) is a term that is applied to all the water that comes out of an oil and gas reservoir as that oil and gas is extracted. It is comprised of “formation water”, found with the oil and gas in the reservoir, as well as water that is pumped into the reservoir intentionally to help maintain the pressure needed to extract the petroleum resource. Understandably, as the amount of oil and gas in the reservoir decreases, more water is produced as more of the formation water is extracted and more water has to be pumped into the reservoir to maintain the correct pressure to extract the resource. There are only two choices for dealing with PW: either it is re-injected into the reservoir to maintain pressure, or it is treated and discharged overboard.

The Proponent’s primary strategy is to *“inject produced water into the producing formation, provided all risks are manageable”*. The Development Plan states that reinjection of PW is the preferred course of action, but this is *“an unacceptable risk”* until certain challenges are resolved (DP, 9-11). Reinjection of this water stream back into the reservoir is the environmentally preferred method of disposal, but this is not always technically and/or economically achievable for various reasons because of the nature of porosity and long-term integrity of the reservoir. The re-injected PW may damage the reservoir physically (by pressure fracturing, for example), or through “souring”, that is, cause the production in the returning oil, gas and water stream of hydrogen sulphide gas (H₂S), a volatile substance that is toxic to humans and corrosive to pipes and other equipment unless it is specifically mitigated against in platform design.

In the initial stages of production, until data is available to answer some of the questions surrounding produced water re-injection (PWRI), the PW will be treated and discharged overboard, in accordance with the C-NLOPB *Offshore Waste Treatment Guidelines* (EMCP 2011, Response 16.2; OWTG, 2010). For Hebron, there are two challenges to discharge the PW: to effectively separate the water from the heavy oil, and to manage the large volumes of PW anticipated.

In its Development Application Documents and its responses to questions from the Commission, the Proponent identifies several phases of treatment technology that will be used including technology new to offshore NL. Additional space for future treatment equipment will be provided for in the final design of the platform, which also has ramifications for expected industrial benefits of the development. When asked to describe the plan to mitigate environmental risks from PW discharge, the Proponent stated that it has designed a multi-stage PW treatment system in the event that it is to be discharged to the marine environment. Conventional separation technologies will be used as well as *“two advanced electrostatic coalescence technologies that are expected to improve oil water separation versus conventional technology and provide greater operational flexibility.”* The proposed process represents a step change in the way in which PW is mitigated in the NL offshore. The Proponent states in the Development Plan that there could be some 366 million cubic meters of PW discharged during the 30-year life of the Hebron Field. This is a significantly greater volume than which is projected for the other offshore fields.

The foregoing all speaks to the importance of PW discharge, normally the largest volume waste stream from an oil production operation, and its potential environmental implications. Current C-NLOPB guidelines call for oil concentration in PW discharged to the marine environment to be 30 milligrams per liter or less, based on a 30 day weighted average and a 24 hour average of a minimum of two samples of less than 44 milligrams per liter (OWTG, 2010).

Apart from oil content, the range of constituents in the PW needs to be considered. The PW dispersion study submitted in support of the CSR modeled the dispersion of the PW stream that will be discharged at a depth of 49 meters in the water column and defined its physical behaviour in terms of a target dilution factor of 300 times that equates to an oil in water concentration of approximately 1/10th of a milligram per liter (AMEC, 2010). The CSR modeling study states that this dilution factor was based on literature indicating that potential effects on fish larval stages may occur at this concentration.

As might be expected, the distance from the platform to reach this dilution criterion varies with the salinity and temperature and, hence, density of the PW stream, as well as the current and temperature conditions of the water column. Model results suggest that, under some conditions of discharge rates, current and plume salinity,

the specified dilution criterion could be met within a few tens or hundreds of meters of the discharge, while under the influence of different conditions these distances could be in excess of 1600 meters.

There are two broad concerns related to PW discharges from an environmental perspective. One is the contaminant burden imposed on the local environment from both the perspective of oil-in-water as well as the chemicals used in the processing of oil. The second is the risk of the PW discharge causing oil sheens on the sea surface resulting in seabird mortality.

With respect to contaminants, the CSR did not specifically attempt to model or predict the constituent contaminants in the PW discharge either as a result of the chemicals that might be entrained in the PW discharge water due to platform processes, or those resulting from the various kinds of hydrocarbons from the oil itself. These may include organic compounds that are soluble in water, often referred to as Water Soluble Organics (WSO). There was no attempt in the CSR modelling to account for chemical transformations, beyond reference to precipitation of some contaminants to the seafloor, or bacterial degradation processes, as discussed for dispersed oil during an oil spill, that might in and of themselves modify the effects of this discharge. The Commission suggests that directed research on the role of such processes in the NL offshore should be considered by the Proponent and the C-NLOPB in the context of the recommendations provided below.

Although the 2010 revision of the *Offshore Waste Treatment Guidelines* reduce the concentrations of oil in water, the constituent contaminants potentially entrained in produced water are not addressed. There are recognized challenges in efficiently and effectively separating heavy oil from water. If reinjection of PW is not implemented, Hebron will discharge more PW per day and hence over the life of the project that other fields operating in the Jeanne d'Arc Basin. Thus, particular attention needs to be given to the management and monitoring of this waste stream.

Recommendation 5.6:

The Commissioner recommends that the Proponent undertake modeling of the produced water stream in terms of the expected contaminants to be entrained therein, including process chemicals and water soluble organics, to determine the potential dispersion and toxicity of these components in the waste stream. The results of that modeling should be verified by appropriate in-field sampling and toxicity testing.

Recommendation 5.7:

The Commissioner also recommends that the C-NLOPB undertake a review of current scientific literature, best practice and global regulatory standards with respect to produced water to determine:

- whether additional modeling and effects monitoring requirements should be applied to existing offshore production operations; and
- how the *Offshore Waste Treatment Guidelines* and/or *Environmental Protection Plan Guidelines* should be revised to address this issue.

5.5.2. Air Emissions

The Proponent modeled air emissions from the proposed offshore platform. Modeling predicted that the Criteria Air Contaminants will be below federally regulated limits for land-based sources. The CSR Air Emissions Study estimates that cumulative emissions of greenhouse gases will be approximately 596 thousand tonnes per year. This is comparable to Hibernia, somewhat more than White Rose and somewhat less than Terra Nova based on Environment Canada's 2008 *National Pollutant Release Inventory* (<http://www.ec.gc.ca/inrp-npri/>).

Flaring refers to the controlled burning of natural gas from oil and gas production, a venting operation for safety reasons (operational upset), or because the gas is redundant. The re-injection of gas in order to reduce flaring is the single most effective means of reducing air emissions from the Hebron or any other offshore oil platform. A key element of the mandate of the C-NLOPB is to conserve the hydrocarbon resource hence their traditional focus on gas re-injection for the offshore oil production platforms.

Section 9 of the Development Plan states that there will be two sets of compression turbines, each set capable of dealing with 60% of the expected gas compression needs for re-injection. In response to written questions from the Commission the Proponent stated that *"There are no peculiar reservoir properties that would prohibit rapid introduction of gas injection into any of the Hebron reservoirs"* (EMCP 2011, Response 15.2). In addition, the Proponent pointed out that *"Aero-derivative gas turbines have been selected for the compression trains because they are highly reliable in offshore marine applications versus heavy duty industrial-type turbines in use on some facilities in the region"* (EMCP 2011, Response 15.1). The intent is to use some of the produced gas in a dual-fuel compression system that *"will use diesel fuel initially on start-up"*, thereby minimizing *"the start-up compression time and thus reduced flaring."* It is also the Proponent's intent to drill a gas injection well after the first two production wells to store the gas for future use for the platform's turbines.

The Commission takes these statements to mean that the Proponent will focus on rapid initiation of gas injection after production start up to minimize flaring for reasons of resource conservation and the rapid reduction in emissions of air contaminants and greenhouse gases, and use produced gas for operations thereafter.

The results of the modeling exercise noted above is used as the basis for the prediction that the project will have no significant residual effect on the environment as the regulatory limits will not be exceeded. While the Commission accepts this argument for normal operations, it is unclear at what point would the CSR's prediction of no residual effects be invalidated in the event of an equipment or process malfunction, for instance, if the gas compression turbines are impaired partially or completely or, the expected ability to inject gas does not materialize.⁹ The Commission believes that these extenuating adverse circumstances could be modeled with reasonable accuracy and that this modeling is necessary to inform the C-NLOPB's operational decision making with respect to its responsibilities to manage the resource and environmental protection should such a contingency arise.

Recommendation 5.8:

The Commissioner recommends that the C-NLOPB require the Proponent to model what departure(s) from normal operational circumstances would cause a violation of predictions made with regard to air emissions. In the event that there is a departure(s) from normal operating conditions, the Proponent should monitor air emissions to determine if the predictions made in the CSR are exceeded and provide this information to the C-NLOPB.

5.5.3. Drill Muds and Cuttings

Drill muds provide down-hole lubrication for drill bits, the weight to maintain pressure in the well bore for well control and the chemical agents to ensure the integrity of the walls of the well bore. In conventional drilling operations those drill muds that cannot be recovered from the cuttings or rock fragments after treatment to meet the regulatory criteria laid down in the OWTG are discharged to the marine environment.

In the case of the Hebron Project EMCP has chosen to design a cuttings reinjection system to re-inject drill muds formulated with "non-aqueous" drilling fluids and the attendant cuttings into one of two disposal wells. Water-based drilling fluids will be used to drill the three upper sections of each of the 52 wells planned for Hebron.

⁹ The criterion for an environmentally significant effect on air quality in the CSR is that it exceeds the referenced one hour air quality criteria more than once a week or the 24-hour air quality criteria more than once a month.

Water-based drill muds and cuttings are to be discharged overboard in accordance with the OWTG. The final section of each of these wells will be drilled with the non-aqueous drilling fluids which will be disposed of as noted above, as the CSR states that there will be no treatment facility on the Hebron GBS to treat drill muds and cuttings from these well segments to the OWTG requirements for discharge.

The elimination of the discharge of non-aqueous drill muds, common to other oil production facilities in the NL offshore with the exception of Hibernia, is a positive step in minimizing the volume and nature of discharges to the marine environment.

5.6. Oil Spills

The issue of oil spills, be they small and chronic or catastrophic, is an important one for the natural integrity of the marine environment and for those who rely on that environment to make their living. For that reason, the implications of oil spills are also addressed under the sections of this report dealing specifically with seabirds and the fishery.

The CSR addresses the issue of oil spills for both the near shore and offshore phases of the proposed project. The CSR models a near shore diesel fuel spill and various scenarios of crude oil spills or blowouts offshore. These predictions provide an appreciation for the areas in both Trinity Bay and in the NL offshore that might be affected by spills. The CSR concludes that, regardless of mitigation measures and arguably the low probability of their occurrence, spills of the nature modeled in the report would have significant effects on marine birds and species at risk both in both the offshore and near shore project areas and to near shore sensitive and significant areas as defined in the CSR. It is clear from this modelling that such spills would affect extensive areas of Trinity Bay and beyond in the near shore case and similarly extensive areas of the NL offshore should there be a spill or blow out in that environment.

With the Macondo disaster and other recent spills, there is a great deal of interest in oil spill prevention and preparedness. During the review sessions, the Commissioner asked whether a Macondo-type disaster could happen in the NL offshore. In response, Geoff Parker suggested that there were key technical differences: the Macondo well was drilled from a floating rig in deep water, while Hebron wells will be drilled on a GBS sitting on the seabed, through the shaft, and the water depth is a lot shallower. Therefore it would be easier to stop a spill should a blow-out occur (Transcript, November 30, 37).

Concerning offshore spill response:

EMCP emergency response management personnel will be drawn from in-house resources. However, in the event of a hydrocarbon spill, the incident may require considerable resources over an extended period. In such a case, EMCP will engage the services of a recognized external response organization. In addition, EMCP can also be supported by the ExxonMobil North American Regional Response Team (NARRT). NARRT is a pool of experienced responders from various business units within the ExxonMobil Corporation. During a major spill, this team may be activated and mobilized to St. John's. NARRT provides oil spill experts to support the EMCP response under way at the Hebron field (EMCP 2011, Response 18.1).

The Macondo disaster was a lesson in preparedness and readiness response to which we would do well to heed. It demonstrated vividly the scope and nature of the massive response needed to deal with such an event, and the extensive and disruptive environmental and economic effects it would cause. Two points are perhaps worth noting here as a result of that incident. One was the participation of local people, particularly the fishing community, in the actual response. The other was the intensive use of dispersants in an effort primarily to get the oil off the sea surface and hence minimize the risk of oil reaching near shore areas and shorelines, but also with the intent of transforming the oil in to small droplets to enhance and accelerate natural biodegradation processes in the water column.

Section 5.8 (The Fishery) speaks to the potential role of the fishing industry in spill response and makes recommendations. The issue of the use of dispersants as a potential response measure was noted by Geoff Parker with the caveat that the effectiveness of dispersants against Hebron's heavy oil is yet to be tested (Transcript, December 6, 9). The Commission also takes note of the recommendations on the potential for dispersant use in the recent review undertaken by the Government of Newfoundland and Labrador in response to the Macondo incident (Turner 2010). It is clear to the Commission that lessons learned as a result of the Macondo incident regarding the use of dispersants need to be taken into account by the Proponent, other operators and regulatory agencies in terms of efficacy and practicability and, of equal importance, short- and long-term environmental effects. In particular, there is a need to better understand the environmental effects, beneficial or otherwise, of dispersing oil into the water column to enhance its biodegradation.

Recommendation 5.9:

The Commissioner recommends that the C-NLOPB, in collaboration with other relevant regulatory agencies, encourage the Proponent, and other operators, to undertake a program of research with regard to the implications of the use of dispersants as a response tool for the NL offshore in terms of both efficacy and environmental effects, and to publicize the results of this research.

Issues around both the prediction of the risk of oil spills, reporting by operators and the C-NLOPB arose during both the review of the CSR and the Commission's public review sessions. There were questions from both regulatory reviewers of the CSR and the Commission regarding the differences in risk estimates between the Proponent's concept safety analysis and the estimates presented in the CSR. In response, the Proponent explained that the two documents were written for different purposes:

The CSA provides a safety assessment, and therefore includes separate blowout frequencies for the drilling phase, the production phase, and for various unit well operations...The focus of the accident analysis in the CSR was on the environmental threat of drilling and production operations, and provides estimated frequencies of spills during drilling and production operations. The frequencies are expressed for various spill sizes as spill magnitude and are of interest for spill impact assessment (EMCP 2011, Response 18.3).

Depending on the nature of the analyses, differing data sources were used and the data aggregated in different ways. It is important to understand the level of risk and what project engineering safety design or other measures are required to reduce and maintain that risk to an acceptable level as a basis for determining whether a project should proceed. This applies to many aspects of a project and not just spill risk.

Notwithstanding that the predictions for the frequency of spills in the NL offshore are comparable with global experience; the issue for many presenters was that of self-reporting of operators to the C-NLOPB, and the reporting of this environmental information by the C-NLOPB on its website. There was a call for independent observers on platforms and more transparency on the part of the C-NLOPB with regard to the type and frequency of sheens around platforms.

It is evident that the real problem is lack of trust between some environmental groups and industry. This has been a recurrent theme in both the Terra Nova Panel Report and the White Rose Project Commissioner's report. This is a continuing problem, irrespective of the fact that, in this jurisdiction, all losses of hydrocarbon to the sea must be reported. Spill statistical information is posted to the C-NLOPB's website. Spills can also be detected by means of satellite surveillance, as well as by visual surveys or remote-sensing technologies deployed on aircraft while making regular, unannounced, surveillance flights.

In addition to the recommendations made in Section 5.7 addressing the issues of seabird attraction to platforms, seabird mortality and the need for a means for the detection and tracking of sheens, the Commission believes that the issue of the lack of trust concerning spills needs to be addressed directly.

Continuous requests for information and monitoring should be allayed by the establishment of a more cooperative arrangement with all stakeholders. Maximum communication should be encouraged between all stakeholders to solve the perceived or actual problems of communications, monitoring and transparency. There is an opportunity here for the C-NLOPB to act as a broker, perhaps in partnership with a neutral party, and resolve these long standing issues of data collection and dissemination, spill mitigation, spill response, seabird monitoring and recording, and offshore observation.

Recommendation 5.10:

The Commissioner recommends that the C-NLOPB encourage the Proponent, and other operators, to develop a protocol to detect, monitor and track hydrocarbon sheens arising from platform activities.

5.7. Seabirds

Most of those presenting to the Commission with regard to environmental issues were deeply concerned about potential effects of production operations on marine birds. As Dr. Bill Montevecchi discussed, the NL offshore is an area of extreme global importance for migratory birds and there is a collective responsibility to sustain bird populations due to both their inherent value and as indicators of change, either positive or negative, for the environments they inhabit.

In the CSR, the Proponent formally recognized that the predicted effect of an offshore oil spill would be significant to seabird populations and could not be fully mitigated. Apart from this, valid concerns exist for the chronic effects of sheens and small losses of oil- and hydrocarbon-based materials from industry operations on seabird populations. *“There are chronic regulated, permitted discharges that are known to kill seabirds”* (Janet Russell, Transcript, December 7, 37). This directly relates to mortality due to impairment of a bird’s thermoregulation ability or from potential morbidity/mortality due to the ingestion of hydrocarbons while preening.

As noted previously, the Proponent has committed to a study to evaluate bird attraction to the platform subsequent to platform commissioning. The suggested technology for this is radar, as the Proponent does not plan to host dedicated observers on the platform to undertake this study.

The Commission considers that, given the longstanding concern raised by interveners on several offshore oil industry environmental reviews for the effects of oil industry operations and spill events, a comprehensive approach to address this issue is required. It is not the sole responsibility of a single Proponent to carry out a program of research that should properly be carried out by industry, regulatory and research community stakeholders. Hence, the following recommendations identify those

aspects of the program that should be attributed to the Proponent particularly and those that should be carried out by a larger group of parties responsible for offshore oil and gas industry activities, regulatory agencies responsible for the resource at risk and the research community.

Recommendation 5.11:

The Commissioner recommends that the Proponent, given the data and information collection and communications technology to be incorporated on the platform, evaluate the use of real-time visual imaging to supplement and provide a means of validation of the radar data concerning bird attraction, and to provide a back-up if the radar method proves unsuccessful.

Recommendation 5.12:

The Commissioner recommends that the C-NLOPB incorporate the proposed seabird platform attraction study as a component within the Proponents' planned environmental effects monitoring program thus ensuring that the design of the study has input from both Canadian Wildlife Service and the wider seabird research community and also takes into account lessons learned from the Encana initiative.

The Commissioner further recommends that the C-NLOPB collaborate with industry partners, the Canadian Wildlife Service, and the wider seabird research community to develop a program of research to comprehend seabird mortality from both chronic and episodic spills.

5.8. The Fishery

The CSR concluded that there would be no significant impacts on the fishery as a result of the near or offshore phases: contingent on the implementation of mitigation measures, *"the potential environmental effects of the Hebron Project on Commercial Fisheries are predicted to be not significant"* (CSR 8-68). The Socio-Economic Impact Statement (SEIS) reports that, to the extent that there are any immediate problems for fish harvesters, such as denial of access to a resource, or fouled or destroyed fishing gear, a *"gear compensation program and fisheries compensation plan will be developed"* (SEIS 4-21). The Proponent is also committed to a *"fish habitat compensation follow-up monitoring program for fish habitat compensation in the near shore and offshore Project Areas"* (CSR xxi). These suggestions signify good intentions to mitigate immediate problems, but do not address long-term cumulative effects of oil development, as will be discussed in Chapter 7: Socio-Economic Impact.

During the public review sessions, representatives from the fishing industry did not concur with the CSR's conclusion and felt that the Hebron Project would, in fact, result in significant impacts to the fishing industry. Fish harvesters, although generally

supportive of the benefits of oil and gas development to the province, feel that they are subject to a disproportionate portion of the risk associated with that development (Earle McCurdy, Transcript, December 6, 32). Based on the balance of evidence, the Commission has determined that substantive progress needs to be made in two key areas: the effects of seismic survey activities and oil spill preparedness, leading to a better management of interactions between both industries. There is also the management of routine interactions between the two industries in the context of their respective businesses.

5.8.1. Oil Spill Preparedness and the Fishery

Citing his recent trip to the Gulf of Mexico, which was organized through One Ocean, the formal liaison mechanism between the oil and gas and fishing industries for the NL offshore, FFAW President Earle McCurdy discussed risks to the environment and risk of spills. The compensation to fish harvesters affected by the Macondo spill is still not settled. Spills devastate the area in which they occur and would destroy those parts of rural NL that still depend upon the fishery or, indeed, on the blossoming eco-tourism industry. Economically, any product which tried to be harvested or location which tried to be promoted post-spill would not be viable due to negative public opinions resulting from a spill.

In the event of a catastrophic oil spill, the fishing industry contends that it should be closely involved in the planning for and response to the spill.

Tabletop exercises and mock at-sea events involving local response organizations and the Canadian Coast Guard are occurring without participation or knowledge of a large contingent of capable and willing people—our fish harvesters...who have the most to lose if an oil spill were to happen....Instead, the oil companies and Coast Guard generally leave the fishing industry in the dark as to what would happen in the event of a spill (PRS-07).

The FFAW has advocated that fish harvesters should be trained in advance of an accidental spill or discharge so that they can be ready to assist in any containment/clean-up efforts. The FFAW should also be informed of the compensation plans established by the Hebron Proponent and other industry operators to recompense fish harvesters in the event of an oil spill.

The Commission takes note that, in the aftermath of large spills such as the Exxon Valdez, the Prestige, and recently Macondo, fish harvesters were engaged to assist in the spill response. The Commission also recognizes that response to an offshore oil spill more than 300 km into the North Atlantic poses significantly different challenges than that of any historic spill response closer to shore. Notwithstanding this, there is

significant benefit to be gained by both industries in involving the fishing industry in planning for, and potentially participating in, a spill response. This involvement has the benefit of improving communications with all stakeholders and is in keeping with the recommendations of the International Association of Oil and Gas Producers to mobilize, manage and integrate local responders to major oil spills to form a “common operating picture” (IAOGP 2011, 10).

Recommendation 5.13:

The Commissioner recommends that the C-NLOPB work with both the oil and fishing industries in conjunction with One Ocean to involve fishing industry representatives in oil-spill response exercises conducted by operators in active roles, with due regard for safety and efficacy in the event of an actual spill.

5.8.2. Seismic Surveys

Fish harvesters are concerned that seismic survey operations interfere with physical fishing operations and negatively affect catch rates of commercial species. The Environmental Studies Research Funds (ESRF) has sponsored several recent studies to address the implications of seismic for commercial fish species. These studies range from studies of the response of caged snow crabs to an operational seismic survey off Cape Breton, to the effect of sound energy from an air gun under controlled conditions on monkfish eggs, to the physiological and behavioural effects of laboratory exposures of snow crab and lobsters to sound energy under controlled conditions. ESRF is currently developing a study on the potential relationship of snow crab and shrimp catch data in relation to seismic survey activity over recent years.

While no significant mortality to fish from current seismic survey technology has been demonstrated by research, the effect of seismic surveys on fish behaviour, and by extension commercial fish catch, remains uncertain at best. There is evidence in the scientific literature that fish do respond in various ways to the kind of sound energy generated by air gun arrays, but the evidence is less clear for invertebrates (CEF Consultants Ltd. 2011).

The Commission believes that there are adequate mechanisms and resources to address this issue in terms of a collaborative liaison between the two industries, One Ocean, and funding mechanisms, such as industry R&D funds and Environmental Studies Research Funds, to design and conduct a program of research to respond to fishers concerns.

Recomendation 5.14:

The Commissioner recommends that the C-NLOPB work with the oil and fishing industries in conjunction with One Ocean, through the existing liaison and funding mechanisms, to develop a program of research focused on the effects of seismic survey operations on fish behaviour in relation to catch rates of commercial species.

5.8.3. Managing Routine Interaction

The fishing industry considers that the increasing level of oil industry activity, including the establishment of safety zones around production installations in the NL offshore, inhibits traditional patterns of use for offshore fish harvesters. In addition, there is concern for the future in terms of access to rebuilding fish stocks given that *“our three producing oil fields are located on prime cod fishing grounds”* (Earle McCurdy, PRS-07).

There is a liaison mechanism in place called One Ocean (www.oneocean.ca) to allow the oil and gas and fishing industries to resolve issues. The One Ocean mechanism was established as the interface between the fishery and oil and gas industries for the NL offshore area and is unique globally. The mandate of One Ocean, which is comprised of senior members of the oil and gas industry and the fishing industry, is to *“enhance coexistence and facilitate communication, understanding and cooperation between the fishing and petroleum industries”*. In its written submission to the Commission, the FFAW comments that *“While this organization certainly serves its mandate it has existed for almost a decade with the same annual budget it started with in 2002”* (PRS-07). It is the role of the fishing and oil and gas members of One Ocean to ensure that it is properly supported organizationally, by both industries, so it can work to find mutually acceptable resolutions to issues that affect either or both industries.

Hebron

Public Review

6. BENEFITS APPROACH

6.1. Chapter Summary

The Benefits Plan outlines the range of goods and services required to support the construction of the gravity-based structure and fabrication of the topsides and support the operations phase of the Project. It provides a brief summary of engineering firms and major fabrication sites in Newfoundland and Labrador as well as eastern Canada that offer relevant capabilities. It identifies specific project elements that are targeted at least notionally for construction or fabrication in the province. Certain of these components, such as the gravity-based structure itself, are essentially captive to the province and will utilize a revitalized Bull Arm facility constructed for Hibernia. However, the plan provides little assessment of the available capacity or analysis of shortcomings.

Because of the Proponent's fundamental topsides design decision, one which favours a mega-module approach for Hebron over the super-module approach employed for Hibernia, the fabrication of the largest and most complex of the topsides within the province or Canada is largely impractical.

The Benefits Plan states that, subject to certain considerations, the drilling support module (DSM), derrick equipment set (DES) and living quarters (LQ) module will be fabricated in the Province, along with smaller structures such as the helideck, flare boom and lifeboat stations. During the public review session in Marystown, the Proponent announced the likelihood that the DSM will be fabricated at Marystown and that the LQ will be undertaken at Bull Arm.

That the Hebron Project proposes the construction of a gravity-based structure (GBS) results in a comparison with the local benefits resulting from the first GBS to be built in the province, the Hibernia GBS constructed from 1990-1997. On the international front there are several developments that have significant implication for the local offshore fabrication industry and, more specifically, for the province's ability to replicate or eclipse the achievements of Hibernia with respect to benefits. The first of these is the exponential increase in the size and weight of modules that can be lifted and transported by sea to any offshore oil and gas frontier. Internationally the industry now prefers large, vertically integrated fabrication yards of the type found in Southeast Asia that have leveraged their access to capital, relatively cheap steel from China, and low cost labour to make significant inroads in a booming international market for complex mega modular steel structures. This competitive shift is accentuated by oil industry outsourcing of design, engineering and procurement to

highly efficient, centralized management structures that have long standing relationships with global supply chains. These developments, in combination with the liberalization of trade on a global basis, have led to a more pronounced internationalization of procurement and fabrication within the oil and gas sector.

Locally, there were a number of economic and industry specific factors which influenced the province's expectations and priorities at the time of the Hibernia development. Unemployment was high, the province's economic outlook was poor, and its fiscal capacity was severely constrained. Hibernia was seen by the province and by the federal government as a vehicle for kick-starting the moribund provincial economy. Given the relatively low price of oil and the perceived risks associated with production in a harsh new frontier, significant concessions and incentives were required from government. These economic circumstances, together with the project's implications for the province's equalization transfers, strongly motivated government to seek the maximum level of participation for local industry and local workers.

The C-NLOPB *Benefits Plan Guidelines* (2006) state that progress in benefits should be seen by comparing similar projects over time. Hibernia is the important reference for Hebron, notwithstanding the fact that many facets of the oil and gas industry have changed since 1997. Construction of the Hibernia GBS was essentially captive to the province but the initial topsides design involved a main structural frame (MSF) that the Proponent, HMDC, felt was beyond the physical capacity of the province's industry to accommodate. Because of the Accord's emphasis on provincial participation, the Board requested that Hibernia explore other avenues for assembling and outfitting the MSF locally. The ensuing review led to major design changes that saw the MSF and 16 smaller modules replaced by five structurally stiffened "super-modules" and a series of smaller topsides mounted structures. Although four of the super-modules were assigned to yards in Italy and Korea, the remaining super-module and several topsides mounted structures were fabricated in the province.

Quality control problems were encountered and the Korean modules necessitated significant remedial work upon their arrival in the province. As a result of this and the one-time cost of establishing the green-field construction and assembly facilities at Bull Arm, the total person-hours of activity in the province increased significantly. Bull Arm employment peaked at 6,000 workers and ultimately some 26 million person-hours or 66% of the construction labour was carried out in Newfoundland and Labrador. The natural consequence of these cost impacts was increased local benefits beyond a normally anticipated level.

The project exceeded early cost estimates of \$4.6 billion but the final \$5.8 billion tally was within \$200 million of the revised budget. Hibernia thus became the single largest oil development in North America and the largest project of any kind ever undertaken in Newfoundland and Labrador.

These are the changes in global outlook and local circumstance that have set the stage for the development of Hebron. Discovered within two years of the Hibernia field, Hebron has today more proven and probable reserves of oil than did Hibernia at the same point in the regulatory approval process. The oil has a higher viscosity which adds to production costs and yields a slightly lower price in the marketplace. As indicated, however, by the economic analysis carried out for this Commission, the pre-production capital costs per barrel of oil for Hebron is expected to be at least 25% lower than that for Hibernia after adjusting for inflation (Locke, 2011). The project is set to deliver a 17% return on investment to the Proponents and has the potential of contributing some \$20 billion in royalty and taxes to Newfoundland and Labrador over a 30-year period.

It is against this backdrop that the province's objectives for the Hebron project were formulated. Beyond the terms of its generic royalty regime, the province and the Proponents agreed to a 6.5% royalty premium to have effect whenever the benchmark price of crude exceeds US\$50 per barrel. Government also negotiated a 4.9% ownership stake in the project. Although the province has negotiated local benefits understandings with the industry in the past, this Benefits Agreement of 2008 represents the first time the province has entered into a formal agreement as a contractual companion to its fiscal agreement on royalties. It is necessary, therefore, to review the Benefits Agreement in the context of the Development Application documents that follow it.

Nearly all of the participants in the public review process were concerned with the expected benefits from the project, how these were to be distributed, how these were to be gained, and whether the Proponent's commitment to maximize these benefits could be tracked and measured in a meaningful way. Other specific concerns included:

- the noted discrepancies between the signed Benefits Agreement and the Benefits Plan regarding CAPEX/OPEX for labour/employment and in the percentages for local employment/benefits, R&D/E&T expenditures;
- the noted decrease of cumulative local expenditure for Hibernia (47%) versus a planned expenditure for Hebron (44%), and labour for Hibernia (66%) versus Hebron (40%);

- a lack of understanding of and transparency in benefits reporting and need for a mechanism to benchmark and compare benefits from previous projects;
- a need to foster a vigorous effort to scale individual bid packages and sub-assemblies to the physical and financial capacities of local firms thereby maximizing industrial benefits;
- that Pool 3 is not addressed by the Benefits Plan;
- a need for a clear, detailed analysis of employment capacity versus demand;
- the loss of a large share of the topsides module fabrication activity to the Province; and
- a need for a stronger declaration of the local preference principles enshrined in the Atlantic Accord Acts.

It is a challenge for jurisdictions that are in the early stages of oil and gas development to maximize local industrial benefits through a fostering of local service and supply capabilities, and by shielding local companies from the full impact of an increasingly competitive international procurement process. The implicit trade-off between royalties and benefits was underscored during the public sessions by Geoff Parker, who stated:

I thought it is important that we remember as we push for all of these additional industrial benefits that there is a price associated with it, and that cost of the benefits does reduce the economic viability of projects and lessens the revenue that the province will get, and so, from the province's point of view, they, like us, are trying to balance the answer here in terms of the overall interest of all stakeholders. I think NOIA do their job in representing the position of the supply community but the optimal project will balance the interests of all the stakeholders to come up with a project that is best for everyone in the province (Transcript, November 29, 25).

In the most simplistic terms, royalties and taxes gained by government should provide short- or long-term economic benefits which can be diffused to those not directly involved in the industry for the general good of all. Industrial benefits are just that: benefitting those working in industry, and therefore somewhat localized, individualized, and presenting an opportunity for long-term investment. A combination of royalties and industrial benefits is the optimum solution to maximize benefits for all Newfoundlanders and Labradorians. It is that balance, in part, and the mechanisms designed to achieve that balance between royalties and more tangible individual benefits, that are the focus of this benefits review.

6.2. Regulatory Requirements

6.2.1. The Act

The C-NLOPB approval of a Benefits Plan, submitted in accordance with Sec. 45 of the *Atlantic Accord Act*, is a precondition of the approval of the Development Plan. The C-NLOPB will consult with both federal and provincial Ministers prior to approving the Plan. For the sake of maximum clarity, it is worth citing the requirements of the Act (emphasis added):

45. (1) In this section, “Canada-Newfoundland benefits plan” means a plan for the employment of Canadians and, in particular, members of the labour force of the Province and, subject to paragraph (3)(d), for providing manufacturers, consultants, contractors and service companies in the Province and other parts of Canada with a full and fair opportunity to participate on a competitive basis in the supply of goods and services used in any proposed work or activity referred to in the benefits plan;

(2) Before the Board may approve any development plan pursuant to subsection 139(4) or authorize any work or activity under paragraph 138(1)(b), a Canada-Newfoundland benefits plan shall be submitted to and approved by the Board, unless the Board directs that that requirement need not be complied with

(3) A Canada-Newfoundland benefits plan shall contain provisions intended to ensure that:

(a) before carrying out any work or activity in the offshore area, the corporation or other body submitting the plan shall establish in the Province an office where appropriate levels of decision-making are to take place;

(b) consistent with the Canadian Charter of Rights and Freedoms, individuals resident in the Province shall be given first consideration for training and employment in the work program for which the plan was submitted and any collective agreement entered into by the corporation or other body submitting the plan and an organization of employees respecting terms and conditions of employment in the offshore area shall contain provisions consistent with this paragraph;

(c) expenditures shall be made for research and development to be carried out in the Province and for education and training to be provided in the Province; and

(d) first consideration shall be given to services provided from within the Province and to goods manufactured in the Province, where those services and goods are competitive in terms of fair market price, quality and delivery.

(4) The Board may require that any Canada-Newfoundland benefits plan include provisions to ensure that disadvantaged individuals or groups have access to training and employment opportunities and to enable such individuals or groups or corporations owned or cooperatives operated by them to participate in the supply of goods and services used in any proposed work or activity referred to in the benefits plan;

(5) In reviewing any Canada-Newfoundland benefits plan, the Board shall consult with both Ministers on the extent to which the plan meets the requirements set out in subsections (1), (3) and (4); and

(6) Subject to any directives issued under subsection 42(1), the Board may approve any Canada-Newfoundland benefits plan.

6.2.2. The Guidelines

In 2006 the C-NLOPB issued *Canada-Newfoundland and Labrador Benefits Plan Guidelines* to provide pertinent guidance to meet the requirements of the Act. With regard to “first consideration” of suppliers and contractors,

This means that not only must contracting procedures not unfairly disadvantage local suppliers, but the Proponent must demonstrate all reasonable efforts have been taken to ensure that local suppliers have been afforded an opportunity to participate in the contracting process on a competitive basis. Also, the contracting outcome cannot be determined solely on the basis of lowest price (Benefits Plan Guidelines, 7).

With regard to “first consideration” of employment,

Employers have the right to establish, in advance of the recruitment process, the qualifications, experience and competencies required of candidates for employment. However, the “first consideration” requirement means that once the requirements for a position have been established, a Newfoundland and Labrador resident who meets these requirements must be given employment preference over non-residents. Further, the Proponent should describe in its

Human Resource Plan an approach for the succession of qualified residents of the Province and other Canadians to any positions not initially held by such persons (Benefits Plan Guidelines, 8).

With regard to R&D and E&T expenditure, the C-NLOPB has provided guidance and parameters in the *Guidelines*. Concerning diversity,

In the context of the plan disadvantaged groups and individuals are considered to include: women, aboriginal groups, persons with disabilities and members of visible minorities. The Proponent is expected to review, assess and apply models such as the federal Employment Equity Act, the Federal Contractors Program, and other models as appropriate in preparing its action plans in this regard. Such plans will normally encompass employment equity measures with an explicit objective to facilitate the participation of disadvantaged groups and individuals (Benefits Plan Guidelines, 9).

The Guidelines also reiterate that “Paragraph 45(3)(b) of the Acts stipulates that a collective agreement may not frustrate access to training and employment opportunities for residents of the Province; this applies particularly to disadvantaged individuals or groups” (Benefits Plan Guidelines, 9).

6.2.3. Public Reporting of Industrial Benefits

The regulatory emphasis is on the optimization and diffusion of local benefits by ensuring that local groups are given preferred access to opportunities for employment and for the supply of goods and services. This emphasis has recently been underscored by the publication of new guidelines and reporting frameworks for the public disclosure by Operators of their performance from an industrial benefits perspective. The guidelines require quarterly as well as annual reporting of benefits that highlight the following parameters:

- goals and objectives identified in the approved benefits plan;
- achievements from the application of the principles of the approved benefits plan;
- steps taken to provide information on project requirements and activities to the supply and service sector including contracting and sub-contracting opportunities;
- any special initiatives, processes, procedures or other provisions implemented to meet the full and fair opportunity requirements of the legislation;

- examples of successes of first consideration in the procurement of goods and services;
- supplier development initiatives aimed at increasing the participation of NL and other Canadian firms in the supply of goods and services for the project;
- technology transfer successes to improve the participation of NL or other Canadian firms in the supply of goods and services to the project;
- any other benefits accomplishments, achievements or successes; and
- any initiatives that have potential for realizing further improvements in industrial benefits.

The Commissioner applauds the new benefits reporting initiative by the C-NLOPB. The guidelines will contribute to greater consistency, clarity and comparability of data as well as enhance the timeliness of its release. Nevertheless, the changes fall short of the level of disclosure regarding benefits sought by local industry groups. Among the shortfalls noted are the following:

- employment-related data is not available in person hours in all instances;
- reporting of jobs by National Occupation Classification (NOC) does not include key sub-classifications of those codes;
- reporting periods include quarterly and annually, but not project-to-date; and
- reports do not contain a list of contract awards for the period.

Recommendation 6.1:

The Commissioner recommends that the C-NLOPB, in consultation with the local supply community and labour, further refine the reporting process to facilitate direct evaluation of benefits performance against benchmarks established in the Benefits Agreement and in the updated Benefits Plan.

6.3. Review of Benefits Agreement

The announcement of a Benefits Agreement (BA) between the Government of Newfoundland and Labrador and the Hebron Partners in August 2008 marked a milestone in the development of the province's offshore petroleum resources. It is a contractual undertaking by the Proponent to deliver a prescribed array of industrial benefits and employment activity. It was the first major development wherein a comprehensive, enforceable benefits regime was concluded and made public prior to

the submission of a Development Application for the project. There are a number of distinctions between the Benefits Plan and the Benefits Agreement. The Benefits Plan is required to address all phases of the project, that is, construction and operations; the Benefits Agreement, however, is intended to cover the pre-production period. It differs in form and substance from the Benefits Plan in that it provides for a greater level of specificity and certainty with respect to benefits outcomes for the pre-production development of the main field. It is important to note that the Benefits Agreement excludes the prospective subsea development of Pool 3 resources, and does not cover the ongoing post-production operating activities and benefits of the project.

The Hebron Benefits Agreement was one of a suite of agreements negotiated and signed concurrently. The other pre-application agreements include the agreement governing the province's purchase of a 4.9% ownership stake in the project, the fiscal agreement setting out a royalty regime that is unique to Hebron, and a lease agreement giving the project access to the Bull Arm construction site. The agreement, which is in the form of a contractual undertaking between the parties, establishes parameters for local participation in the pre-production capital expenditure phase of the entire Hebron project (www.releases.gov.nl.ca/releases/2008/exec/).

The Benefits Agreement specifies a minimum of 6.35 million person-hours of work to take place the province prior to production start-up. This number includes minimums of 4.1 million hours in the construction of the GBS at Bull Arm, 1.25 million hours in front-end as well as detailed engineering design, and 1.0 million hours in project management (BA 5.1-5.4). It should be noted that the amount agreed to in the BA is less than the 11 million hours of pre-production local activity as reflected in the Benefits Plan as the Benefits Plan estimate incorporates in-province labour during the fabrication of topsides and other structures included but not quantified in the Benefits Agreement (BP 4-19; Table 4.2.5-1).

The BA confirmed that the following elements would be fabricated in the province:

- GBS: mechanical fabrication and outfitting, along with FEED, detailed engineering;
- OLS: structural steel riser components and assembly, tie-in spools and buoys;
- flare boom;
- helideck;
- lifeboat stations;

- subsea drilling template, field mooring system and positioning and docking system;
- hook-up and commissioning fabrication and work; and
- float-over of topsides and GBS fabrication and work (BA 5.5(A)).

Subject to “*provisions of Section 2 of Exhibit F*”, the accommodations module, drilling support module and derrick equipment set “shall be carried out in the province” (BA 5.5(B-C)). Exhibit F contains a number of provisions that could potentially diminish or displace certain of these benefits as prescribed in the agreement, which might relieve the Proponent from specific undertakings. By agreement, the parties are obliged to keep confidential the contents of Exhibit F. Absent any knowledge of these specific provisions of Exhibit F, this must at least be regarded as a worrisome aspect of the Benefits Agreement.

Not allocated to the province or to Canada is the utilities/processing module (UPM) which represents almost two-thirds of the total weight of the topsides structures. The agreement stipulates that the engineering and fabrication of the UPM is to be bid on a “*fully international competitive basis pursuant to the Accord Acts*”(BA 5.5(D)). This provision, together with sheer size of the module, effectively excludes Newfoundland and Labrador yards and, in all likelihood Canadian yards, from competing at least on the prime tender for fabrication of the UPM.

Engineering and management are assigned a high priority within the agreement. Beyond the confirmed minimum hours of local engineering, and excepting engineering associated with front-end engineering and the UPM, all other engineering activity must take place in the province unless a lack of capacity can be demonstrated by the Proponent. Any engineering activity that does take place outside the province must offer employment to qualified Newfoundland and Labrador personnel within relevant technical and professional categories on commercially reasonable terms.

The Benefits Agreement also reiterates that all special considerations with respect to local labour, manufacturing, consulting, contracting and service activities as prescribed by the Act must remain in force irrespective the location of project activity. This is taken to mean that successful bidders on all work taking place outside the province or outside the country must comply with the full and fair opportunity, as well as the first consideration principles established by the Act.

The minimum one million hours of local project management activities include procurement as well as contract and general project management functions (BA 5.1 and 5.6). It also includes pre-production reservoir and drilling engineering (BA 5.1).

The BA includes provision for a minimum expenditure of \$120 million on research and development and education and training (BA 5.9(A)). The Operator will also “*develop and subsequently implement a Gender Equity and Diversity Program for its Hebron Project activities*” including a women’s employment plan and business access strategy and a Diversity Plan for disadvantaged groups (BA 5.11).

Any subsea development, tie-back or stand-alone development, or any other infrastructure will be the subject of another development plan and fundamental decision (BA 5.12(C)). Crude oil shall either be shipped direct to market, or, to the extent that crude is trans-shipped, it must be trans-shipped in the province (BA 5.15).

A further concern arising from the Benefits Agreement is that of compliance. The impetus, in part, for the province’s decision to seek an arrangement outside the regulatory structure of the C-NLOPB and the benefits provisions of the Act was to provide a greater degree of certainty with regard to local benefits. Even to the extent that the C-NLOPB discharges its responsibilities for monitoring and measuring adherence to approved benefits plans, its ability to ensure compliance is limited from a practical perspective.

Although the Benefits Agreement approaches enforcement from a contractual as opposed to a regulatory perspective, the remedies in the event of non-compliance are limited. The BA incorporates a dispute resolution mechanism with a three-stage negotiation, mediation, and arbitration process. An arbitration panel cannot compel specific performance or award monetary damages. Where the Proponent is found to be in breach of the contract, any award is limited to replacement work of equal “*duration, intensity and complexity*”. The BA does not specify that replacement work must be Hebron related. Nor does it address the circumstance in which the Proponent is unable or unwilling to provide such replacement work. The agreement provides that responsibility for monitoring and oversight will rest with the C-NLOPB. The C-NLOPB has not publicly confirmed its role in ensuring the Proponent’s compliance with the terms of the agreement.

Subsequent to signing the Benefits Agreement the Proponent altered its pre-drilling plans for Hebron such that local fabrication work was lost to the province. In accordance with the terms of the agreement, the Proponent undertook to build one or two barges in the province by way of compensation. The barge project represented almost 2,000 tonnes of steel and more than 100,000 fabrication hours. In the event that all or part of the barge project was not completed, the province was to receive a pro-rata portion of its \$20 million value. Although the valuation of the lost work was questioned, the deal did demonstrate the potential for resolving such issues amicably under the terms of the Benefits Agreement. The ability to do so could well be a key determinant of the province’s success in realizing the level of local participation contemplated under the BA.

Although the BA has some very positive features, it presents something of a two-edged sword. While the province might see industry undertakings in the agreement as a floor, it is likely the Proponent will see them as a ceiling. Nevertheless the agreement is a logical and perhaps inevitable step in the maturation of government policy with respect to the management of offshore resources. It does not usurp or diminish the responsibilities of the C-NLOPB.

The C-NLOPB remains the logical instrument for the benefits monitoring, evaluation, reporting, and compliance functions prescribed by the Act. But ultimately it is the province that must strike the optimal balance between direct economic rents from oil and gas resources and the associated industrial spinoffs, that is, between royalties and benefits.

This division of responsibilities and government control in the context of the Hebron Project is cited as best practice in a 2011 report for the Government of Western Australia. In examining the policies adopted by different jurisdictions to extract maximum benefits from offshore resources, the study concluded that the *“stronger influence on local content outcomes was the degree of political encouragement exerted to ensure project Proponents focus on this issue”* (Government of Western Australia 2011, 16). In that context, the Benefits Agreement and Benefits Plan can be seen as complementary elements of an overall benefits strategy that optimizes local participation.

6.4. Review of Benefits Plan

The Proponent notes that its proposed Benefits Plan is *“driven by ExxonMobil’s corporate commitment to developing industrial and human capacity, and creating and developing strategic benefits to host nations down to the community level”* (BP 1.1 and 3.2). In the public review sessions, the Proponent emphasized that the Benefits Plan must be looked at in the context not just of the construction and development phase but across the entire life expectancy of the project:

That approach covers both the development and the operations phases. And by the development phase, I mean the engineering and construction phase. And it is worth remembering...that the construction and engineering period is about five years and the ongoing operations will go for 30 or more years. So we really want to focus on long-term sustainable industrial benefits. We see our role as leaving a lasting legacy in the province. We would like to further advance development of industry in the province to utilize and build on capability from previous offshore projects (Geoff Parker, Transcript, November 21, 8).

The Benefits Plan asserts the Proponent's corporate commitment to the maximization of economic and industrial benefits for the province, while outlining the particular principles, strategies, policies and guidelines which it will employ in the pursuit of that objective. It includes a limited discussion of the province's industrial and labour capacity in the context of expected project demands. The Benefits Plan (BP) contains a number of tangible commitments to local engineering, construction and fabrication. It identifies the topsides and topsides mounted structures that, together with the gravity base platform, are earmarked for construction in the province. The Benefits Plan notes, however, that the UPM, the largest module representing approximately two-thirds of total topsides by weight, will be fabricated outside the province.

The Benefits Plan identifies a wide margin of possible outcomes with respect to the relative values of local procurement and employment for both Canada and the province. Local versus national employment levels are estimated to be 60% and 40% respectively, while local and national expenditure levels to 40% and 67%. The estimates include provision for a 25% margin of error. The plan also incorporates an annual forecast for the province of estimated work hours by trades' classification.

Although the Benefits Plan provides some level of detail with regard to specific project elements to be undertaken within the province, it is by and large a statement of policy and principles. In form, the document is not inconsistent with the approach set out in the C-NLOPB *Guidelines*. In substance, however, it fails to address the prescribed headings in a clear and comprehensive manner consistent with the spirit of the *Guidelines* and commensurate with the magnitude and breadth of the project. This shortcoming underpinned many of the concerns raised during public review sessions. Presenters questioned how the Proponent will implement the requirements in the Act and the guidelines as set out by the C-NLOPB with respect to industrial and employment benefits, and how it will:

- provide full and fair opportunity for local businesses and provide first consideration for individuals for training and employment;
- ensure there is an ongoing information exchange and substantial transfer of technical knowledge;
- honour the first consideration principle for local goods and services;
- reconcile project demands for goods and services as well as labour with the local industrial capacity;
- provide access to opportunities for disadvantaged groups;
- demonstrate continuous improvement in the level of local benefits over that of previous projects; and
- contribute to sustainability and deliver a lasting economic legacy.

The Benefits Plan is deficient with respect to the Guidelines as outlined above and in accordance with the Acts.

Recomendation 6.2:

As a condition of the approval of the Benefits Plan, the Commissioner recommends that the Proponent amend the Benefits Plan to address the following deficiencies in accordance with the requirements in the current Benefits Plan Guidelines and the Acts:

- measures for first consideration for employment of local people, and include specific training measures and an associated budget;
- assurance that the UPM engineering design team has NL representation, including a provision for technology transfer, particularly for commissioning and long term support;
- more explicit description of the policies, procedures and methods that will be adopted to satisfy the first consideration principles of the Act and guidelines;
- provision to the C-NLOPB the planned labour forecast by project phase, by skilled trade, and make of this information available to key stakeholders including provincial Government, labour and industry;
- inclusion of gender equity provisions in calls for bids and criteria for evaluation;
- demonstration of a “positive trend of continuous improvement” in the level of local employment and participation in the supply of goods and services when measured against benchmarks and achievements established by projects of similar scope;
- demonstration of the extent to, and manner in which the Hebron Project creates a lasting economic legacy for the people of the province, and more particularly, that the development of human resources and intellectual capital within the province as a cornerstone of sustainability be more fully addressed; and
- satisfactory notification of the Proponent's acceptance of the formula for calculating required R&D expenditures as prescribed by the Guidelines for Research & Development Expenditures per Appendix II of the Benefit Plan Guidelines.

6.5. Full and Fair Opportunity

...not only must contracting procedures not unfairly disadvantage local suppliers, but the Proponent must demonstrate all reasonable efforts have been taken to ensure that local suppliers have been afforded an opportunity to participate in the contracting process on a competitive basis. Also, the contracting outcome cannot be determined solely on the basis of lowest price (Benefits Plan Guidelines, 7).

The Proponent has acknowledged this requirement in its Benefits Plan, and has identified some procurement initiatives which it feels will serve this purpose. Full and fair opportunity can only be assured, however, if there is a timely release of detailed procurement forecasts, expressions of interest, bidders' lists and contract awards.

6.5.1. Bid Process

Numerous presenters discussed the lack of information surrounding contract bidding and what is required for each contract. NOIA reiterated many of the concerns the organization has concerning the flow and timely release of procurement information and a consistent bid process:

If we're going to make an impact and actually do more on this project and exceed our local benefits requirements, we need information early. If you can imagine how businesses need to attract labour and attract supply, it takes a great deal of investment. So we need the information early in time and throughout in a very clear and transparent and consistent manner so that we, as businesses, can take the risks to invest (Mike Critch, NOIA, November 21, 24).

The Proponent and its main EPC contractors (Worley Parsons, KKC) have admitted to growing pains with the Hebron procurement web sites and the timely flow of information (Geoff Parker, Transcript, November 21, 24). The accurate, timely and cooperative flow of procurement information to the local and international supply community is in the best interest of the project and its Proponents.

Since the public review sessions, there have been some improvements in the websites of the major contractors of KKC and Worley-Parsons, but information still could be provided in a more useful way. Beyond the Hebron project, there is an opportunity within the oil and gas industry to make procurement information for all projects more readily accessible for all vendors and suppliers. Moreover, it should be noted that the timely availability of procurement requirements early in the development phase is particularly crucial to local companies insofar as it impacts their

ability to seek out joint ventures, international suppliers and to forge relationships that might allow their participation in the bidding process.

Recommendation 6.3:

The Commissioner recommends that, on a priority basis, the C-NLOPB issue new guidelines for a standardized and timely publication of expressions of interest (EOIs), pre-qualification results, and tender awards for the development phase of the project, as is done in other jurisdictions. It is critical that such notices are widely and freely distributed, that a full record of such notices is maintained and made accessible to the public, and that the timeframe for response recognizes the limited resources of local companies.

6.5.2. Scalability

Many other factors have the potential to adversely impact the realization of full and fair access. Among these is scalability: the ability to package bids to suit the available capacity of local companies.

NOIA recommends that the Proponent and its EPC contractors scale bid packages to meet the local capability and capacity. This means issuing smaller bid packages that more closely resemble the capabilities for the local supply and service community, enable small and medium-sized contractors to bid on the work they can do and also to develop joint ventures. Local business capacity and capability must be considered in the design of bid packages or bid package in stages of development (NOIA, Transcript, November 21, 17).

The *Benefits Plan Guidelines* require that bid specifications and packages be prepared “in such a manner, and on a timely basis, to ensure that they provide full and fair opportunity for qualified Newfoundland and Labrador and other Canadian suppliers and contractors to participate in the bid process” (11). In the Benefits Plan, the Proponent has asserted that the “project procurement processes will be scalable and may include applicable benefits team, management and/or C-NLOPB reviews” (BP 3-19). Unfortunately, this is not the trend in the industry, nor is it evident in the design metrics for Hebron. The principal example of this is that the proposed packaging of the utilities and processing components within a single module representing two-thirds of the total topsides greatly diminishes the prospects for local participation.

The issue of packaging has also arisen with respect to project elements intended to take place within the province. “During construction of the Hibernia GBS and the White Rose topsides, bid packages were scaled to fit the capabilities of the local companies”, noted NOIA, but “the opposite is happening in the Hebron Project. We are being advised by our members that the bid packages are scaled in such a way that they feel disadvantaged in the bidding process” (Transcript, November 21, 18). NOIA

offered as an example changes in the combination of camp construction, outfitting and services under one contract that prejudiced local suppliers.

Even within the proposed geographic allocation of main project components, and to the extent that such allocations are ultimately approved by the C-NLOPB, there is a need to foster a vigorous effort to scale individual bid packages and sub-assemblies to the capacities of local firms. While the Proponent's Guidelines for Contractors acknowledge the principle of scalability, it does so only in the context of diminished reporting requirements for smaller contracts.

Concerning the issue of scalability, the Proponent stated that,

where feasible, we will break down the packages to suit local capability but in many cases that won't be logical and it wouldn't be prudent because I think increasing, further increasing the complexity of this project really would introduce excessive execution risks. So, it's a balance. We have to do that balance between the execution certainty...referred to and creating additional complexity by breaking down packages into smaller units (Geoff Parker, Transcript, November 21, 30).

Recommendation 6.4:

The Commissioner recommends that the Proponent undertake a vigorous review of pending contract notices to ensure that, where the capacity of local industry permits, bid packages are scaled to suit that capacity. It is recommended that the C-NLOPB work closely with the relevant government departments and with industry groups such as NOIA and ESDA to ensure that local companies are not unreasonably denied an opportunity to bid as a result of unnecessary agglomeration of procurement needs.

6.5.3. Bid Bonds

Another aspect of scalability is the demand for performance guarantees. Bid bond requirements, if onerous, can exclude small, local suppliers. During the public review sessions, NOIA requested clarification on whether “local companies are being asked to take on more financial risk and liability to land contracts on the Hebron project.”

The feedback we received is that certain bid packages and modules of work are being put together in a manner that would require local industry businesses to take on more financial risk. What we mean by that is when you take on construction of a piece of work, you need to guarantee your work, you need to bond your work, and for that you need to carry a line of credit. You need to go to, in the case of Newfoundland and Labrador businesses, an A-rated Canadian bank and get a guarantee from the bank. If we're used to

doing a chunk of work in so many tons and all of a sudden it's been expanded twofold, fivefold, tenfold it becomes harder to spread yourself around financially and gain the bonds you need to carry out the larger scale of work. So that precludes us or eliminates us from the process of, even, sometimes bidding the work or bidding multiple bits of work (Mike Critch, NOIA, Transcript, November 21, 27).

In its January 19, 2012 response to questions asked by the Commissioner during the public review sessions, the Proponent noted that the requirement for financial guarantees is governed by ExxonMobil's standard Terms and Conditions “*which detail supplier’s liabilities under the contract*” and are mirrored in the terms of its prime contractors and their sub-contractors and suppliers.

Some instruments of financial guarantee may be required (e.g. Letter of Credit or Parent Company guarantee), depending on contract value, duration or complexity. These instruments would be required regardless of supplier location (i.e. would not just apply to local suppliers) and part of the standard contracting process (EMCP, 2012).

Recommendation 6.5:

The Commissioner recommends that, consistent with the guidelines relating to scalability, the C-NLOPB review the Proponent's worldwide standard for bid bonding to determine the degree, if any, to which it unreasonably constrains full opportunity to participate by local suppliers.

6.6. First Consideration: Procurement and Supply

...not only must contracting procedures not unfairly disadvantage local suppliers, but the Proponent must demonstrate all reasonable efforts have been taken to ensure that local suppliers have been afforded an opportunity to participate in the contracting process on a competitive basis. Also, the contracting outcome cannot be determined solely on the basis of lowest price (Benefits Plan Guidelines, 7).

Perhaps more than any other, the precise meaning and significance of this provision of the Act are the subject of considerable confusion and debate. In its presentation, NOIA noted that

Nowhere in the Atlantic Accord does the phrase 'globally competitive' appear as the basis for local participation in oil and gas projects. In NOIA's view the Proponent should focus efforts on advancing the local industry towards global competitiveness, not make it a condition of our success (PRS-27).

Indeed, the Proponent's policy on this issue has not always been consistent. On November 4, 2011, in response to a question from the C-NLOPB, the Proponent wrote that *"Benefits criteria will be used in contract award decisions where all other factors are equal, i.e. safety, quality, schedule and cost."* However, the Proponent advanced the view during the sessions that the clause requires that local firms be considered, and it is worth citing the statement in full:

The guidelines come from the Board and the Board has been very clear that local companies need to compete. That's outlined in great detail in the report on the White Rose Commission and the Board's report on that. And so in the example you give where a local company was more expensive than somebody who was international without local content, the lowest bidder would win the job, and that has been the very clear guidelines from the Board (Geoff Parker, Transcript, November 29, 22).

This understanding of *"global competitiveness"* in the context of the first consideration principle as interpreted by the Proponent was further evident in responses to questions asked by the Commissioner. The Proponent states it will *"fully address the relevant legislative provisions including the Board's expectations related to the application of the 'first consideration' principle"* as reflected in the C-NLOPB's Fundamental Decision on the White Rose Project (C-NLOPB 2001; EMCP 2012). It must be noted, however, that the C-NLOPB has provided more recent guidance on this issue in its 2006 *Benefits Plan Guidelines*, which post-date the White Rose Fundamental Decision. It is clearly stated in these updated *Guidelines* that *"contracting outcome cannot be determined solely on the basis of lowest price"*, as stated above (*Benefits Plan Guideline*, 7).

It is the Commission's view that, on the issue of local preference, the term *"first consideration"* must be read in conjunction with the remainder of Section 45(3)(d) which states that

first consideration shall be given to services provided from within the province and to goods manufactured in the province, where those services and goods are competitive in terms of fair market price, quality and delivery (emphasis added).

It is significant and perhaps instructive that the phrase *"lowest price"* was not adopted by the legislative framers. Taken in context with the term *"first consideration"* and the overall thrust of Section 45 of the Act, reference to fair market price can be reasonably interpreted to confer some additional, if marginal, advantage on a local bidder.

This Commission acknowledges the concern expressed by participants in the review process that there presently exists something of a policy vacuum on the issue of local preference. In its public presentation, the Resource Development Council (RDC) questioned whether it was time these terms were more clearly defined (PRS-33). As stated by NOIA, *“a mechanism for comparing projects must be publicly available and information released on an ongoing timely basis and at the completion of the project”* (PRS-27). As noted elsewhere, the C-NLOPB has recently introduced new guidelines that partially address the need for improved reporting.

Although the C-NLOPB clearly states on its website that it does not *“guarantee the participation of Canadian and Newfoundland workers or businesses”*, one can read this to mean that, while it is required by the Act to oversee the fairness of the process, it is not empowered to impose any particular outcome. The Commission takes no exception to the C-NLOPB’s interpretation. However, CNLOPB can effect change and standards through carefully directed policy. For example, the Commission takes note of precedents wherein the C-NLOPB has relied on the authorities granted it under the Act to promulgate more explicit and exacting policies with respect to local benefits. The C-NLOPB’s prerogative to redefine benefits expectations relating to research and development, for example, has received judicial affirmation.

In the context of current guidelines, the Proponent’s own undertakings with respect to the advancement and participation of local workers and suppliers, as reflected in its Benefits Plan for Hebron, can be seen for their singular importance. This is because the only targets available are those of the Proponent with the exception of the targets contained in the Benefits Agreement.

As noted by a number of presenters to this Commission, the Benefits Plan does not unequivocally declare or accept the local preference principles enshrined in the Act. In its correspondence with the Proponent as part of its completeness review exercise, the C-NLOPB made similar observations with respect to the language employed in the Benefits Agreement. It questioned, for example, use of the words *“seek to ensure”* as lacking in certitude (C-NLOPB, September 30, 2011). A related concern is that the Hebron Benefits Team does not report to the Proponent’s Senior Project Manager. From these and other nuances, it is clear that the benefits imperative mandated by the Act is not yet fully entrenched in the corporate culture and management mindset of the Proponent and its prime contractors.

Recommendation 6.6:

The Commissioner recommends that the C-NLOPB undertake a review of Section 45 of the Act to evaluate the statutory capacity for more explicit and exacting policies and guidelines in relation to Canadian and local preference in support of the C-NLOPB's responsibilities for monitoring, reporting and providing opportunity with regards to:

- provisions of 45(3)(d) relating to 'fair market price' as a measure of competitiveness permits a more demanding standard than that of lowest price;
- provisions of 45(3)(b) & (d) relating to 'first consideration' can be assigned a value and significance beyond the standard of duty implied by current C-NLOPB policies and guidelines; and
- 'first consideration' can be understood in Section 45(3)(b) & (d) as also applying to project elements undertaken outside of the province.

6.7. First Consideration: Employment

The “first consideration” provision of the legislation clearly requires that the Proponent and its contractors look first to the Newfoundland and Labrador labour market to meet their human resource requirements....Further, the Proponent should describe in its Human Resource Plan an approach for the succession of qualified residents of the Province and other Canadians to any positions not initially held by such persons (Benefits Plan Guidelines, 8).

The extension of first consideration to residents of the province for training and employment, which mirrors the requirement for first consideration for local companies, is mandated by the Accord Act and prescribed by the Benefits Plan Guidelines.

6.7.1. Collective Agreement

Article 9.01 (Hiring) of the Collective Agreement for Bull Arm incorrectly alludes to “full and fair opportunity for employment...to qualified Canadians”. The Act reserves this provision for employment preference to residents of the province. The Collective Agreement does, however, prioritize the hiring of workers such that qualified local residents who are members of unions within the Resource Development Council (RDC) are given first consideration followed by qualified residents who are not members of the unions.

Neither the Benefits Plan nor the Collective Agreement provides a clear description of the safeguards utilized in the recruitment process to ensure compliance with the first consideration principle. In particular there is no indication whether, in light of

anecdotal complaints from some non-union residents, there is a challenge mechanism in relation to hires available under the collective agreement. A series of articles in the *Telegram* in December, 2011, explored not only the growing shortage of skilled trades in the province but also the hurdles faced by workers with regard to the portability of credentials across provincial lines, mobility from union to union for experienced workers, and initial access to union membership for new apprentices (Ashley Fitzpatrick/Andrew Robinson, *The Telegram*, December 21-24, 2011). These, and similar articles in the *Globe and Mail*, elicited a large reader response that perhaps underscored the need for greater clarity, uniformity and efficiency in this area. Access to union memberships was also identified as a problem by the Coalition of Persons with Disabilities, Newfoundland and Labrador (Transcript, December 5, 42). Unions are often the gatekeepers for much of the hiring on projects such as Hebron, and, as such, they play a pivotal role in the maximization of local employment benefits. Nevertheless, the policies and practices of local unions are largely beyond the scope of this Commission and any issues arising in that regard must be left to the responsible agencies of government. Project challenges relating to the availability of skilled trades are discussed further in Section 5.2.9 (Labour Capacity).

While the Benefits Plan makes provision for succession planning for long-term jobs initially held by non-residents, it does not define “long-term” (3-29). Benefits *Guidelines for Contractors* developed by the Proponent also state that

In practical terms, the expectation for first consideration is tempered by an acknowledgement that contractors are not expected to significantly grow their overall employee base by hiring Newfoundland and Labradorians if there are underutilized resources elsewhere in their organization.

The *Benefits Plan Guidelines* include no limitation with respect to the term of employment, nor do they provide an exemption for existing contractor staff. While the Proponent's *Guidelines for Contractors* state that “an appropriate balance” must be struck, there is a concern that, in the absence of rigorous monitoring and enforcement, that balance might not always favour local workers to the extent contemplated by the Act. There might be specific issues or individual complaints that arise as a result of these principles, but, during the public review sessions, there was less evidence of confusion or controversy with respect to first consideration employment than to first consideration procurement.

The economic imperative and guidelines favouring the local recruitment of labour breaks down, however, on the issue of training. Although the first consideration requirement of the Act and guidelines extends to training opportunities, there is no prescribed definition, measure or requirement with respect to the training aspect of the recruitment process. Although some level of training is often required, this

represents an incremental cost to contractors and is therefore countenanced only to the extent deemed essential.

In general, it is often more attractive to hire prequalified workers from outside the province than to bring local workers up to the standard specified for any particular position. There is universal agreement on the need for an aggressive program to train residents of the province to meet the expected high demand for skilled labour; there is no clear consensus, however, on the degree to which the various stakeholders, including the Proponent, should bear the cost of training and the associated employment experience required for certification on the accreditation process (see Chapter 7: Socio-Economic Impact).

The availability of clear, timely, helpful information is as much an issue for stakeholders in respect of the labour requirements of the project as it is for local suppliers and contractors. In its presentation to the Commission, the RDC pointed to a problem with the reliability of initial employment forecasts, such as those contained in the Benefits Plan. It noted that such forecasts typically underestimate requirements for specific skilled trades by a large margin. By the time that more reliable numbers are made available later in the FEED process, there is often insufficient time to permit the necessary training of local workers thereby increasing the requirement for workers from outside the province.

To this end, the C-NLOPB's recently published reporting requirements for local benefits may prove helpful in this regard. Operators are now required to report quarterly and annually:

- a total employment summary indicating the participation by NL residents and other Canadians (see Table 3.1);
- an employment summary by location (see Table 3.2);
- an employment summary by discipline (see Table 3.3); and
- person hours of employment (see Table 3.4).

This section should also provide a narrative description of:

- any achievements in terms of increasing the participation of NL residents and other Canadians during the reporting period;

- explanations of any decrease in the percentages of NL residents or other Canadians employed on the project; or
- any initiatives in the area of succession planning (C-NLOPB, 2012).

These required tables may help to answer the questions raised in the public review process concerning local employment benefits.

6.8. Capacity

The Benefits Plan should provide an analysis of the potential for Canadian companies, and in particular Newfoundland and Labrador companies to participate in the engineering, supply, fabrication, construction, operation and support activities of the project. A similar analysis of the labour force should be provided to meet the employment needs of the project (Benefits Plan Guidelines, 14).

The assessment of capacity prescribed by the C-NLOPB encompasses two key elements: industrial capacity and labour capacity. Industrial capacity is a measure of the ability of Canadian and local firms to satisfy the engineering, supply, fabrication, construction and operational supports required for the project. An assessment of labour capacity requires a reconciliation of existing technical and skilled trades with the projected demands of the project in both a spatial and temporal context. Moreover it requires intervention strategies to address expected shortfalls that include training, access to on-the-job experience, and recruitment.

6.8.1. Industrial Capacity

The Benefits Plan provides little assessment of the available capacity or analysis of shortcomings of industrial capacity locally or nationally. Because of the Proponent's fundamental topsides design decision, one which favours a mega-module approach for Hebron over the super-module approach employed for Hibernia, the fabrication of the largest and most complex of the topsides within the Province or Canada is largely impractical.

The Proponent raised concerns that it might not be able to identify sufficient industrial capacity to fabricate the derrick equipment set in the province, as noted earlier. Replied NOIA,

We believe it's the Proponent's responsibility to find ways, look for creative ways, to build all three modules in Newfoundland and Labrador....We would

like to better understand some of the gaps in labour and yard capacity that may prevent this work from being done in the province at the end of the day. We are concerned that these assessments are being made fairly late in the game, with EOIs closed for things like the GBS skirts, embedment plates, anchor bolts and the like. We may lose the opportunity to do more of the complex... fabrication depending on how much of the capacity is taken up by these other items (Transcript, November 29, 17).

These are understandable concerns that reflect on the adequacy of the overall treatment of industrial capacity issues in the Benefits Plan.

6.8.2. Labour Capacity

With respect to labour capacity, the Benefits Plan broadly references supply issues. It notes a “*high level of uncertainty as to the availability of skilled trades personnel for Hebron in Newfoundland and Labrador*”. It cites a study by Kellogg Brown and Root and Strategic Concepts, which was conducted for Chevron in 2005 and updated for the Proponent by Strategic Concepts in 2010, providing “*a comprehensive labour capacity assessment for the Hebron Project*”. The *Benefits Plan Guidelines* require a further breakdown for the rest of Canada, but this information is not available for the Hebron Project.

The Strategic Concepts study was not included as a supporting document to the Benefits Plan. In light of the critical importance of labour capacity to the province’s ability to participate fully in the development of Hebron, the C-NLOPB and this Commission filed separate requests with the Proponent for a copy of the report. The Proponent refused both requests on the grounds that the study was proprietary. The refusal by the Proponent to allow access to such documents by agencies charged with the responsibility of reviewing and evaluating the project is disquieting.

The Benefits Plan includes a summary of the findings of that study including a table denoting the levels of certain technical and skilled trades categories (BP Table 4.2.6-1, 4-22); reproduced at Table 6.8-1.




















Category	Theoretical Supply	Net Effective Capacity	Hebron Peak Demand	Probabilistic Peak Demand	Result
Trades					
Mechanical Trades	1,732	245	300	600	
Construction Inspectors	512	19	58	89	
Electricians	2,172	686	147	316	
HVAC	371	51	50	189	
Instrument/Telecom	209	6	124	313	
Piping Trades	1,230	808	222	946	
Surface Protection	684	381	162	254	
Structural Trades	2,797	1,399	565	914	
GBS Concrete	9,583	4,742	866	1,693	
Engineering					
Piping Engineering	272	8	30	130	
Electrical Engineering	1,031	34	29	129	
Civil and Structural Engineering	1,174	38	133	342	
Mechanical Engineering	437	13	76	176	
Materials Engineering	20	1	4	85	
Process Engineering	99	3	8	128	
Project & Construction Mgmt-Owners Costs	543	15	259	314	
Key:  Shortage of labour with peak demand from Hebron being greater than the net effective supply.  Possible shortage of labour with peak demand from multiple projects being greater than the net effective supply.  No shortage in labour expected.					

Table 6.8-1 Hebron Skilled Trade Assessment

The table indicates that Hebron peak demand could represent almost one-half of the probabilistic peak demand for industry in the province as a whole. However, the table combines a number of different occupational categories to the point that the information cannot be reconciled against individual classifications as presented in Appendix C (Estimated Person-Hours By Detailed Trades Designations). The forecast at Appendix C reflects only the person-hour estimate and profile for in-province work. The usefulness of the analysis contained in the Benefits Plan is therefore limited.

Some participants in the review process expressed frustration with the quality and timeliness of data made available by the Proponent. NOIA recommended that the Proponent provide specific percentages of employment and expenditure goals expected to occur in Newfoundland and Labrador at each stage of the project, including FEED, detailed engineering, GBS construction, topsides fabrication, mechanical outfitting, hook-up and commissioning, and operations and maintenance. The Resource Trades Development Council (RDC) also *“urged the Hebron partners to become more proactive with information concerning specific trade and skill requirements”* (PRS-33).

In the past, the C-NLOPB has recognized the import of timely release of labour requirements. In its Decision of 97.02 with respect to the Terra Nova project, the C-NLOPB noted that

In discharging its responsibilities in this area, the Proponent must identify its labour requirements in a timely manner and make reasonable provision for the training of Newfoundland residents who meet the basic qualification requirements to become fully qualified for the employment opportunities arising from the project (C-NLOPB 1997, 97.02).

Recommendation 6.7:

As a condition of the fundamental decision, the Commissioner recommends that the Proponent provide to the C-NLOPB the study by Strategic Concepts Inc., entitled “Effective Labour Capacity Analysis for the Hebron Project, 2010”, for review.

Recommendation 6.8:

The Commissioner recommends that the Proponent hold strategic planning meetings with stakeholders to address the skilled labour shortfalls.

6.8.3. Training and Accreditation

Regardless of the first consideration principle concerning employment, the Benefits Plan does acknowledge that *“the potential for Canadian and Newfoundland and Labrador involvement in project construction and operations activity on a competitive*

basis is in part potentially constrained by labour availability.” It adds that “the majority of requirements will be manufactured outside Canada” and that “not all positions may be filled by residents of the Province.”

With respect to the skills requirements for work that will take place locally, the plan highlights the Proponent's consultative and scholarship supports to educational institutions. Beyond that, however, it effectively disclaims any direct responsibility for the training of workers, noting that it is the responsibility of successful bidders to provide a trained workforce. Although the *Benefits Plan Guidelines* require the identification of special training requirements to address the expected gap in supply and demand, there is little discussion on this point. Nor does it evaluate the expected impact on the province's educational infrastructure as required. It reviews existing and prospective initiatives that indirectly support training including career fairs, scholarship funding and consultation with educational groups. However, the Proponent eschews any direct responsibility for training noting that, where required, *“it is the responsibility of independent contracting companies to provide it”* (BP 3-29). This stance is not compliant with Section 4.4 of the *Benefits Plan Guidelines* issued by the C-NLOPB. Among other measures, the *Guidelines* require that the Benefits Plan describe plans for

- project organization and staffing for the design, construction and operations phases;
- succession of qualified residents of the Province, and other Canadians, to any positions held initially by non-Canadians;
- education and training programs to be provided in the Province for Newfoundland and Labrador residents and other Canadians to participate in the project;
- specific education and training programs, including associated expenditures, to be provided in the Province, pursuant to paragraph 45(3)(c) of the Acts (see Appendix II);
- assistance to government departments and agencies and to private and public training institutions in identifying and developing suitable employment-related training programs; and
- any planned trans-boundary crewing requirements between the Newfoundland and Labrador Offshore Area and any other Canadian offshore jurisdiction (*Benefits Plan Guidelines*, 12).

The Benefits Plan is not compliant with these requirements.

While the looming shortage of skilled labour for Hebron is clearly acknowledged by all of the stakeholders, there is no consensus regarding the solution. Underpinning the many structural deficiencies in the present mechanism for training more skilled workers is a financial issue. Who pays? Aside from the trainee, governments have been the principal contributor to the development of skills in the province. Indeed the private sector in Newfoundland and Labrador has accounted for the lowest level of employer-funded job training of any province in Canada. This model is entrenched and is unlikely to change in the short term or without a seismic shift in government policy. In its presentation to the Commission, Lana Payne, the NL Federation of Labour, took a holistic view of the worker to address a way forward from cradle to employment, and judged the efforts of both government and industry as inadequate and misdirected.

[B]oth government and industry have demonstrated serious concern over possible pending labour and skills shortages. Clearly the Proponents, as major employers in our province, must aid in the attraction, retention and retraining of the provincial labour force. In fact, it is to your benefit if you do. To that end, we would like to see the Proponents commit to and establish a \$250 million skills, training and social development fund. The Skills, Training and Social Development Endowment Fund should be structured as follows: 30 % to be designated to the university sector, in particular but not limited to the engineering and related applied sciences, which service the sector, for example, funding might be used to enhance those sectors that study the impacts of the oil and gas sector on the environment or society; 40 % to be designated to retraining and apprenticeship and technical programs which are relevant to the skill profile existing and future of the oil and gas sector; 30 % to be invested in early learning and childhood education and child care (Transcript, December 7, 15-16).

The Federation was one of many organizations that underscored the urgency of new training initiatives if more severe shortages of skilled trades are to be averted. The Federation and Resource Trades Development Council (RDC) recommended the establishment of some variation of advisory or consultative group to address more aggressively the training and local employment objectives relating to Hebron and other mega-projects. The group could help develop a timely and precise forecast of labour demands in the province, coordinate the training and certification of workers in response to those demands, and recruit skilled Canadian and, where necessary, foreign trades persons to satisfy any shortfall in local supply. Given the current trend of modularization and internationalization of procurement in the offshore oil sector,

the group could also help promote productivity, innovation, and competitiveness within the province's offshore fabrication and supply community.

Recomendation 6.9:

The Commissioner recommends that the provincial government pursue the creation of a Ministerial Committee comprised of representatives of industry, labour, education and government, the mandate of which would be to facilitate cooperation across public, institutional and private sector lines as a means of enhancing local readiness for, and access to industrial and employment opportunities from the Hebron project and other major developments.

The process of accreditation and certification to journey status for the skilled trades is failing. Many apprentices do not graduate to certified journey status. They encounter difficulty logging the required work experience (up to 7,200 hours) under the direction of a journeyed worker. The leakage of skilled trades to other jurisdictions is both a problem and a solution. As mentioned earlier in this report, the 2007 Skills Task Force Report identified a number of impediments to skills development and retention in the province. The province has made significant strides over the past several years. Its improved fiscal capacity has allowed it to invest more than a half-billion dollars in post-secondary infrastructure. The college system is thought to be among the most flexible and responsive in Canada. Government has increasingly engaged major employers, labour groups and training institutions in the planning process. Newfoundland and Labrador now boasts the highest participation rate in trades across the country. Between 2007 and 2009 the number of registered apprentices grew by 69 %, or some 3,400 persons, while the number of certified journeypersons increased by 89%, or 233 persons. Although promising, these achievements are not expected to close the gaps in the supply of skilled trades already evident in some industries. A number of structural impediments remain, especially those relating to the apprenticeship system.

As many as eight percent of the province's workers are considered mobile on an annual basis. Although temporarily lost to the job market in Newfoundland, these workers often continue to make significant contributions to the province's economy through the transfer of wages home. Once fully domiciled outside the province however, there is an associated economic loss to the province and the underlying cost of replacing skills lost in this manner can be substantial.

The challenge to the province's full participation in employment opportunities from the Hebron project was a contentious issue for presenters at the public review sessions. As previously noted, there was a general dissatisfaction with the level of detail regarding the numbers, timelines and classification of skills required. Moreover there was a pervasive feeling that, given the lead time since the Hebron agreement

was reached in 2008, too little had been done either by industry or government to address the expected shortfall in skills. Bill Gaulton, a veteran of college instruction and on-the-job training for Hibernia, noted

the cruel paradox in which you have thousands of workers who are unable to get jobs or advance in their apprenticeships, and who have been lulled into thinking that it's our resource developments - that the Vale Inco Project, the Hebron Project, and Muskrat Falls are going to be the solutions...We had a lot of lead time to do a major resource development project here in Newfoundland and Labrador, and here we are into the construction schedule and looking for hundreds and hundreds of skilled trades people (Transcript, December 5, 69-70).

Marystown Mayor Sam Synard also underscored the egg-chicken predicament:

You do a nine-month program in welding or electrical, and you come out and you apply for a job. You can't get a job because you have no experience and you're not even a part of an apprenticeship program. So you can't become a part of the apprenticeship program unless you get a job, and often you can't get a job unless you're a part of the apprenticeship program. It's obviously a major problem (Transcript, November 23, 30).

In the Hebron Project Agreement, RDC and the Hebron Employers agreed to “maximize the training and development of NL residents through a plan of Apprenticeship training as part of their joint responsibility to maintain a supply of qualified tradespersons for the site” (Project Agreement Article 30: Apprenticeship). The hiring of apprentices shall be achieved through the name-hire process, outlined at Article 9.02. The minimum ratio for each trade is 1 apprentice to 4 workers, and the maximum ratio is usually 1 apprentice to one qualified worker, except with carpenters, electrical and ironworkers, where a maximum apprentice-worker ratio of 1 to 2 qualified workers is employed in the interests of safety and supervisory considerations.

The Commission acknowledges that the skilled trades anticipated shortages and issues related to achieving accreditation are complex and affect many projects including Hebron. These problems are not isolated to a single project and nor are they common to each trade. The Commission has heard from apprentices and qualified workers in a variety of trades and problems of gaining hours for accreditation experienced by pipefitters, for example, is not shared by apprentice electricians. The problems experienced by each trade need to be closely examined in order to devise individualized solutions to problems of education, accreditation and meaningful employment.

Recommendation 6.10:

The Commissioner recommends that the proposed Ministerial Committee comprised of labour, industry, education and government, conduct an objective and public assessment of the requirements for each skilled trade and associated accreditation processes.

6.9. Public Awareness and Benefits Reporting

One theme that has permeated public input and discussion at all levels relating to the Hebron Project is the disclosure of information. Information is required for purposes of project evaluation prior to C-NLOPB approval as well as for public understanding and industry/labour analysis of constraints and opportunities. A second aspect of disclosure is the need to facilitate the responsibilities of the C-NLOPB for monitoring, evaluation and compliance following project approval, as well as the ongoing need for public access to information on a timely, comprehensive basis in the broader interest of public accountability.

Presenters at the public review sessions took issue with the perceived lack of transparency and disclosure in the province's offshore petroleum sector across a broad spectrum of activities including safety, environment, diversity and industrial benefits, current policies and practices with respect to the dissemination or access to information were found wanting.

NOIA firmly asserts that more transparency and consultation with the local supply community will actually help the Hebron Project meet its targets on time and on budget...Transparency [is] the criteria for decision making. As part of the regulatory requirements, project operators are required to regularly submit...detail on local benefits in project employment and spending. Operators collect much of this information from their contractors, and these contractors are NOIA members, and our members want to know the end result of that reporting process. While the C-NLOPB tracks the data and publishes a portion of this in its annual reports, it doesn't publicly release detailed information, and the lack of publicly available information about local content at each stage of the project makes it difficult to tell if we are achieving increased local benefits or local content at levels in engineering design and fabrication from one project to the next (NOIA, Transcript, November 21, 14-15).

The Resource Trades Development Council (RDC) advocates for the establishment of a three-party agency of government, industry and labour “to promote the maximization of fabrication of work in the province”.

This agency would have the ability to collect information and set realistic targets that Proponents seeking to capitalize on our natural resources are to follow. This tripartite agency would be mandated to ensure that the objectives and action plan set in the August 20th, 2008 Hebron Benefits Agreement is diligently pursued on the basis of facts and capability. This arm's length agency will do more than promote the maximization of fabrication and work in the province through the collection and release of data, and this agency will make the fact-based cases that will cause the work to be formed in the province fulfilling the realistic expectations the proponents seeking to capitalize on our natural resources are to follow.

RDC recommends the creation of this agency outside of the mandate of the C-NLOPB.

While the C-NLOPB tracks [benefits] data and publishes a portion of it, in annual reports, it does not publish all related detailed information on the percentage of local benefits derived from each stage of the project, such as front-end engineering or topsides construction on a regular and ongoing basis through the project. This work by the C-NOPB is not sufficient to ensure work that should be done in this province is actually performed in this province (PRS-33).

Lana Payne of the Federation of Labour felt that “the Proponents should promote to the greatest possible degree the transparent, accurate and timely, and hopefully annual public dissemination of information as it relates to the specific objectives outlined in your Benefits Plan” (Transcript, December 7, 18). The C-NLOPB has responded to public dissatisfaction with benefits reporting and has implemented a series of benefits templates, to be used to report Q1 2012.

Recomendation 6.11:

The Commissioner recommends that the C-NLOPB conduct an annual public meeting for the purpose of presenting and reviewing information relation to local benefits from the Hebron project and that, as a condition of the Benefits Plan approval, the Proponent and its prime contractors be required to participate in the public meeting and to respond to issues relating to local employment and procurement.

The observations of participants are not inconsistent with the experiences of this Commission and of the C-NLOPB itself in their respective requests for additional information as part of the completeness review of the Proponent's Development Application. In some instances the Proponent simply advised that the requested information was not available. Among the reasons cited by the Proponent was that the information was beyond the scope of the Accord Act, that the requirement was

not specified in the C-NLOPB's guidelines, that the information was proprietary or problems of commercial confidentiality and competitive concerns.

The Proponent was largely non-committal but did undertake to review the issue further and respond at a later date. On January 19, 2012, the Proponent wrote *"ExxonMobil will continue to make information available to the CNLOPB and the public as required by regulatory requirements applicable to the specific phases of the project."* This can be taken to mean that it will meet the minimum standard required by law.

The Atlantic Accord Act, unlike the Accord Memorandum, does contain a number of restrictive covenants on the public disclosure of information supplied to the C-NLOPB by the regulated entities. Section 119(2) of the Act precludes the public distribution or disclosure to third parties of information supplied to the C-NLOPB without the prior written consent of its originator. The Act identifies certain materials that can be released without such consent.

Although the C-NLOPB has been criticized at times for its failure to demand transparency from the industry, it is clear that it is legally constrained from doing so in cases where the industry chooses not to cooperate. C-NLOPB Chair Max Ruelokke acknowledged that this province's C-NLOPB had been confronted by a legal issue stemming from the Accord Act *"which to date has impeded the Auditors General from gaining access to certain operator-supplied information."* In 2011, auditors in Nova Scotia working in cooperation with the Auditor General of Canada announced they had abandoned their audit of the CNSOPB because the C-NLOPB *"acting on the instructions of operators ExxonMobil Canada Ltd. and EnCana Corporation, denied us access to most of the information needed."*

These restrictions within the Accord Act represent an impediment to the public's right to know, and the C-NLOPB's ability to respect that right, even where it is satisfied that the release of information would have no adverse impact on the commercial interests of the operator. The C-NLOPB's inability to furnish information to the public on a timely and comprehensive basis serves to frustrate other objectives of the Act. These include the right of Canadian business, as well as NL workers and suppliers, to full and fair access, and to first consideration, in relation to employment and procurement opportunities in the industry. It also deprives the public of the right to participate on an informed basis in the discussion of public policy relating to offshore oil and gas.

A review of Section 119(2) of the Atlantic Accord is warranted to ascertain the extent to which it unreasonably burdens the C-NLOPB and deprives the public of relevant information. The C-NLOPB could exercise its prerogative under Section 17(2) to recommend amendments to the Act accordingly. As clearly outlined in the *Guidelines*, the C-NLOPB is required to be informed of procurement forecasts, pre-qualification

companies, qualified bidders, contract awards and rationale, and a quarterly procurement report. The C-NLOPB's reporting of benefits is accomplished in its annual reports and, as previously noted, on its website. The level of benefits reporting in these annual reports varies considerably. The Industrial Benefits webpage provides very high level project expenditures and labour and on-going expenditure and labour. It could be argued that this level of reporting is sufficient for general public information. However, for industry participants, this level of reporting is insufficient, as already noted by NOIA.

The White Rose Decision Document required that:

The Proponent report on a quarterly basis, in a format satisfactory to the C-NLOPB, expenditure and employment information, including Canadian and Newfoundland & Labrador content. Each quarterly report should also include an assessment of progress toward the achievement of Canada-Newfoundland Benefits commitments, as referenced in Condition 7. Such reports will be shared with the public. The Proponent should provide the results of internal audits completed with respect to Benefits reporting and an assessment of performance against identified contract goals to the C-NLOPB and the public when complete (C-NLOPB, 2001, Condition 10)

The new reporting mechanism of the C-NLOPB will hopefully lead to a similar level of quarterly public reporting for Hebron for the duration of the Project.

Recommendation 6.12:

The Commissioner recommends that the C-NLOPB, in consultation with the Ministers, undertake a review of issues relating to the timely public disclosure and access to information to which the C-NLOPB is privy in conjunction with the discharge of its responsibilities under the Accord Act.

6.10. Diversity

In the context of the plan disadvantaged groups and individuals are considered to include: women, aboriginal groups, persons with disabilities and members of visible minorities. The proponent is expected to review, assess and apply models such as the federal Employment Equity Act, the Federal Contractors Program, and other models as appropriate in preparing its action plans in this regard. Such plans will normally encompass employment equity measures with an explicit objective to facilitate the participation of disadvantaged groups and individuals (Benefits Plan Guidelines, 9).

The Benefits Plan incorporates a Hebron Diversity Plan in compliance with Section 45(5) of the Act, the C-NLOPB *Benefits Plan Guidelines* and the Benefits Agreement

gender equity and diversity program requirements. The Hebron Diversity Plan was developed in consultation with relevant stakeholders and includes the following key tasks:

- supporting and improving education programs with a focus on science and mathematics and involvement with community organizations to develop skills and provide experience to fill human resources needs;
- implementing a recruitment strategy to provide sustainable employment to members of the designated groups, with a focus on providing timely communication regarding job availability and requirements to candidates;
- fostering a work environment that supports diversity and enables employees to work to their greatest potential;
- creating a process to monitor and report progress through the use of both leading and lagging indicators, and using this information to further refine diversity processes, policies, guidelines and initiatives; and
- implementing initiatives to facilitate the participation of companies owned and operated by members of designated groups (BP 3-32; Appendix B).

Few of these elements in the Benefits Plan are uniquely targeted to diversity objectives and provide little detail regarding the means by which disadvantaged individuals or groups will be afforded priority with respect to training and employment.

6.10.1. Diversity in Employment

The Hebron Diversity Plan acknowledges that, in accordance with Section 45(3)(b) of the Act, union agreements may not frustrate access to training and employment for local residents. The Project Agreement between the Hebron Project Employers' Association and the Resource Development Trades Council of NL (RDC) has implemented name hiring provisions "*to facilitate achievement of diversity objectives*". However, Article 9 (Hiring) makes no specific reference to the hiring of diverse groups, only that priority will be given to qualified union members who are residents of NL, and then qualified NL residents, qualified Canadian workers, and so on. Workers on the union's out of work list will be hired first, notwithstanding the fact that name hires might allow the implementation of specific targets for female workers.

Though supported by the Proponent in the public review sessions, the Hebron Diversity Plan does not specifically pledge to use this provision to hire and train women and members of underrepresented groups. The Proponent does state that it

will “seek to employ qualified members of the designated groups to the same extent they are available in the workforce.” When asked whether ExxonMobil targets any particular levels or quotas for female workers, Geoff Parker suggested that “the concept of quotas...gets mixed reviews in terms of trying to create an inclusive workforce, we have goals and those goals are based around the current representation of women in the workforce” (Transcript, November 30, 25). In its presentation to the Commission, the Provincial Advisory Council on the Status of Women (PACSW) rejected this as an acceptable target, noting that “it serves only to perpetuate women’s low and often lack of participation in many of the relevant occupational categories” (PRS-05).

The council and other groups called for enumerated targets as well as more aggressive monitoring and reporting on progress toward diversity targets. This position was echoed by other presenters, including a group representing five communities on the Isthmus of Avalon which stated that “unless there is more precision within the language in the document, unless the definitions of terms and expectations are clear, unless outcomes are defined, the document cannot provide the kind of long-term, meaningful benefits it promises” (PRS-28).

The *Benefits Plans Guidelines* do not require the imposition of targets. They defer to the federal Employment Equity Act and the Federal Contractors Program as relevant models. In its diversity report to the C-NLOPB for 2010, Husky Energy indicated that women comprised 28% of its local workforce during that year, which included 17% in management, 15% in engineering but only 5% in the skilled trades. Husky cited privacy rules that prevented it from collecting or reporting progress with respect to other diversity relevant groups.

Females have been traditionally underrepresented in the skilled trades required for the construction phase of the project and in occupational categories for the long-term operations and supply of the project, both on- and offshore. “Since approximately half of our population is female, encouraging more women to work in the natural resource sector can be a solution to the skilled trades shortage” (PRS-10).

Concerning people with disabilities, it was suggested that employers need to be open to meeting the needs of disabled persons in order for them to join the workforce (PRS-03). Many suggestions and recommendations were made concerning the training, recruitment and retention of employees from underrepresented groups which may serve to address this labour disparity and thereby address the larger problem of the labour shortfall.

For example, the Office to Advance Women Apprentices works collaboratively with government, labour, training institutions, and other stakeholders “to mitigate obstacles and barriers to employment”. It has maintained a database of 440 female

apprentices since its inception in 2008. WRDC recommended that 10% of the apprentices at Hebron be women, and that this minimum target is met, maintained and reviewed by a diversity committee on a quarterly basis.

While the C-NLOPB's own annual reports briefly acknowledge diversity as an objective, they provide little insight regarding the extent of progress achieved by year, by project, or over the course of the province's offshore history. It is this Commission's view that the Hebron Diversity Plan as presented does not reflect satisfactory evidence of proactivity. Absent targets as well as more diligent and transparent compliance efforts, it is improbable that the activities cited will have the effect of significantly increasing the representation among the diversity eligible groups.

Recommendation 6.13:

The Commissioner recommends that the Proponent and its EPCs set increased and enumerated aspirational employment targets for underrepresented groups within NL, coupled with aggressive, proactive measures to ensure workers of these groups are specifically targeted, trained, recruited, hired and retained, over and above targets based on Statistics Canada Employment Equity Data. To achieve these targets the Proponent should:

- undertake strong promotional efforts and training supports need to be targeted at and available to females, differently-abled individuals and others from under-represented groups;
- raise awareness amongst older women who are already in the workforce and perhaps are considering a career change; and
- Hebron's diversity team should work with unions to ensure that they accept female apprentices into their unions.

To successfully recruit and retain under-represented workers, the workplace must be supportive of all under-represented groups, from the top down. As Charmaine Davidge from the Women in Resource Development Committee suggested, *"If we put the same degree of diligence in building the social structure as the technological structure, then we will go some way towards meeting the goals"* (PRS-10). Brian Murphy, President CEP 2121, recommended that there be changes made to make the offshore work environment friendlier for female workers and workers with young families, such as a change to offshore rota. In the discussion which followed, the Commissioner asked of Geoff Parker what proactive measures were being taken to encourage female participation in the offshore, whether there was any *"particular program that was aggressively trying to improve the offshore representation"*.

For the offshore in particular, Geoff Parker stated the Proponent has designed the living quarters with female workers in mind during FEED, with the plans reviewed by a diversity coordinator. There will be separate female quarters and smaller common areas throughout these living quarters, *“as opposed to one large area that can be a bit more intimidating and...some of the dining areas [will have] some smaller private areas....the offshore platform is really designed so that it will create a supportive work environment for women as well as men.”*

Recommendation 6.14:

The Commissioner recommends the Proponent employ the following tangible measures to contribute to a diverse workplace:

- use of gender awareness training in the workplace to instil a deeper diversity culture amongst employees, contractors and partners
- provision of appropriately sized safety equipment to be readily available to all employees;
- on-site ‘diversity officers’;
- develop qualified women as trainers and mentors where possible and have female Shop Stewards on site;
- where possible more than one woman is placed on the same job site so that women are not to spread out and segregated from each other;
- flexibility in work schedules for working parents and caregivers; and
- creation of childcare centres for the children of its employees in order to create and maintain a diverse and open workforce, thereby minimizing the impact of existing shortfalls in childcare spaces particularly for the construction phase of the project.

The issue of childcare is further discussed in Chapter 7: Socio-Economic Impact.

The Benefits Plan is required under Section 45(2) of the Act to ensure the participation of diversity eligible vendors in the supply of goods and services to the project. The Hebron Diversity Plan should therefore prominently identify diversity eligible businesses within its vendor registration database. By implementing a formal supplier diversity program, Hebron has an unprecedented opportunity to capitalize on the untapped potential of women-owned business to supply to this project, subsequently solidifying the project’s goals of leaving a lasting legacy for the province.

Recommendation 6.15:

The Commissioner recommends that the Proponent include gender equity provisions in its calls for bids and criteria for evaluation.

6.11. Continuous Improvement of Benefits

It is expected these measurements will show an increasingly positive trend of continuous improvement as the industry and the local supply community continues to evolve and mature; and, any slippage or deterioration in these measurements from benchmarks and achievements established by previous projects of similar scope, or similar concepts and technologies will require significant explanatory documentation (Benefits Plan Guidelines, 2).

The plan does not overtly address the continuous improvement of benefits. Given their similarity in design and construction cost, Hebron lends itself most closely to comparison with the initial Hibernia development. As cited in a report commissioned for this review, the cumulative local expenditure for Hibernia was 47% versus a planned expenditure for Hebron of 44% (Locke 2011). With respect to local labour, the values are 66% for Hibernia and 40% for Hebron. This apparent discrepancy was cited by a number of presenters during the public review sessions.

The Proponent's response cited several factors that contributed to the high level of person-hours locally during the Hibernia project. These included the construction of the Bull Arm site, remedial work performed locally on topsides fabricated overseas and modifications to the construction process of the GBS. The Proponent maintained that although a larger percentage the Hebron platform will be constructed in the Province than was the case for Hibernia, the person-hours maybe less.

At the Commissioner's request the Proponent undertook to review its projections for the purposes of confirming this assertion and clarifying the manner in which it will be achieved. The Proponent's response, filed with the Commission on January 19, 2012, noted that the work undertaken locally for Hebron will be greater in overall "scope and complexity" than for Hibernia; However, it is was not able to confirm that the percentage of work hours or expenditures would be greater. It remains in doubt, based on expenditure and employment criteria, whether Hebron will achieve the objective of continuous improvement over earlier projects.

Recommendation 6.16:

The Commissioner recommends that the C-NLOPB amend its *Development Application Guidelines* to ensure a more relevant, thorough, consistent and transparent planning approach that facilitates evaluation against previous developments, provides more comprehensive and timely data for Canadian as well as local businesses and workers, and expedites the public review process.

6.12. Hebron Legacy

[I]t is the intent of the benefits provisions of the legislation, that exploitation of these resources creates a lasting economic legacy for the people of the Province (Benefits Plan Guidelines, 2).

The oil and gas deposits off the province's coast represent a non-renewable resource. The *Benefits Plan Guidelines* acknowledge the intent of the Act, to ensure that they are exploited in a manner that contributes to long-term sustainability of the provincial economy. The Proponent should demonstrate the manner in which the project will create that economic legacy with particular emphasis on the development of intellectual capital and human resources. However, the legacy objective was not the subject of a separate, thorough discussion in the Benefits Plan filed by the Proponent. While some additional insights were obtained in response to a follow-up request from the C-NLOPB, the Proponent's overall interpretation of what constitutes long-term sustainability lacks clarity and depth (see also Chapter 7: Socio-Economic Impact).

The Proponent has made certain commitments in the Development Application and during the review process towards creating an economic legacy for the province. It has worked with the Eastern Suppliers Development Association (ESDA) to develop relationships and understanding between local suppliers and Tier 1 contractors. The proactive approach proposed by ESDA has given companies the opportunities and knowledge in advance of procurement to enable them to qualify and bid in good time.

6.12.1. Research and Development/Education and Training

The Benefits Plan acknowledges the importance of research and development as well as education and training to sustainable development. The Proponent has identified certain research priorities including subsurface production, heavy oil, and harsh environment challenges. The C-NLOPB reports aggregate expenditures of \$100 million on eligible R&D or Education & Training activities since the current guidelines were established in 2004, with a total of \$13 million was spent during 2009/2010 (C-NLOPB 2011, 40). The C-NLOPB should be commended for instituting measurable benchmarks and targets for R&D/E&T expenditures in the province, thus providing transparency and confirming expectations.

Subject to the price of oil, the formula established under the guidelines for mandatory expenditures on local research as well as education and training could exceed \$200 million over the life of the Hebron project. This amount exceeds that agreed to under the Benefits Agreement of \$120 million.

This requirement contemplates the provision of training supports under the Guidelines for Research and Development Expenditures as per Appendix II of the Benefits Guidelines. Section 3.4 of the R&D guidelines establishes the parameters of eligibility for such expenditures. They include the establishment and/or maintenance of infrastructure, support for technology transfer and trades training, and the seeding of Fellowships and Chairs, and scholarships. Expenditures for wages and salaries for job training are not eligible. The Benefits Plan acknowledges several contributions, including scholarship funding, which might be considered eligible under this element. Nevertheless the indicated investments appear limited in relation to the expected size of the R&D fund, the severity of the expected skills shortage, and the widely recognized need for incremental training initiatives.

A second element under Section 4.4 of the guidelines requires that the Benefits Plan discuss the Proponent's plans for education and training programs to facilitate the participation of residents in the project. This can be distinguished from the previous element in that planned expenditures are not eligible under the R&D fund. In essence, the C-NLOPB guidelines underscore the responsibility borne by the Proponent to assist administratively and financially in the expansion of training capacity and the direct training of workers to help bridge the gap between the project's need for skilled labour and the available local supply.

The Proponent and its prime contractors must, of necessity, recruit and/or train skilled workers to meet the requirements of those project elements, such as the GBS, that are captive to the province or awarded to the province under the terms of the Benefits Agreement. Beyond that, the Proponent's support for training could determine whether, in accordance with the terms of the Benefits Agreement, there is a sufficiency of skilled labour to facilitate the in-province fabrication of all three of the super-modules, notably the living quarters, the drilling support module and the derrick equipment set.

Recommendation 6.17:

The Commissioner recommends that Proponent allocates a proportion of the R&D/E&T fund to specifically address the education and training requirements of skilled labour as required in paragraph 45(3)(c) of the Accords Acts. This allocation, pending project sanctions, to be committed for 2012 and throughout the construction phase of the project. The determination of the size of the Education and Training funding to be jointly reviewed and decided by the C-NLOPB, Proponent and Provincial Government through its department of Advanced Education and Skills. The Commission recognizes that the skilled trades challenge is not unique to the Hebron project and that investment by other stake holders, such as the Provincial Government and other major project Proponents, will also be required.

6.12.2. Supplier Development and Technology Transfer

The true strength and importance of a Benefits Plan is to provide the opportunity for the local supply industry to outlive the non-renewable resource. The lasting benefit of projects such as Hebron is to provide the opportunity for our people and business to gain the experience and expertise to compete globally. Technology transfer enables companies to gain that experience and expertise (PRS-38, The Maritimes Energy Association - OTANS).

The *Benefits Plan Guidelines* identify supplier development as one of six categories within which the Board will determine the acceptability of the Proponent's policies and procedures and certainly the Commission heard of the excellent working relationships being developed between the Proponent as ESDA, for example. As a companion to the Benefits Plan, the Proponent is required to submit a Management Systems and Procedures Manual that ensures compliance of all clients and contractor groups with the benefits commitments contained in the Plan. The thrust of supplier development is to develop reliable domestic sources of goods and services including management, technical and engineering support. Among the mechanisms for achieving this objective is the "transfer of technology and know-how" to local and Canadian suppliers and contractors (*Benefits Plan Guidelines*, 4.2).

The Benefits Plan acknowledges the submission of the Management Systems and Procedures Manual, although it was not released to the public or shared with the Commission. Although the Plan provides a listing of supplier development initiatives, the list does not reflect a substantive commitment to the technology transfer process. (BP Table 3.3.2-1). In discussing technology transfer, the Proponent views its role as largely a passive one, that is, to undertake project activities that that will allow others to recognize and exploit technology transfer opportunities. There is a reasonable expectation that a significant level of technology transfer will occur as a natural outgrowth of those project activities. The emphasis, for example, on local engineering participation in project design and construction will, of necessity, see a transfer of knowledge to the province.

The achievement of technology transfer during the Hebron project will also be influenced by other factors, such as the level of proactivity demonstrated by the Proponent and its major subcontractors and the level of complexity associated with the project elements slated for the province. Unfortunately, the engineering and construction of one of the most challenging components is proposed to take place elsewhere.

The Development Plan calls for the construction of a single large module that comprises approximately two-thirds of the total topsides by weight. Under the terms

of the Benefits Agreement, government has consented to a fully internationalized competitive bidding process for the utilities and processing module (UPM) that would likely see most, if not all, the associated engineering and fabrication activity take place outside the province and outside the country. Although there are dissenting views, the province's decision to give up such a large share of the topsides fabrication is perhaps defensible in the context of the present economic climate and limitations on local industry capacity. Far more disappointing, however, is that the UPM, given its very high level of complexity, would have provided the province with the greatest opportunity for technology transfer.

In his presentation to the Commission, local offshore supply executive Rob Strong recommended that prequalified prime bidders on the UPM contract be required to hold a seminar in St. John's for prospective sub-contractors and suppliers. He suggested as well that, once the contract was awarded, the successful bidder should be required to establish an office in the province. Opportunities could include sub-assemblies for the project but also a range of service and supply activities during the 30-year life of the UPM. Early involvement in the UPM—even in a modest way—would help position local companies to compete for related work in the post-production phase. NOIA suggested that additional information detailing the requirements of the UPM should be made available to local companies, and that the successful bidder should be encouraged to work with local companies as a supplier development initiative.

Recommendation 6.18:

The Commissioner recommends that as a condition of the contract award for the UPM, the Proponent and its successful yard should be required to provide a detailed breakdown of supplies, services and sub-assemblies required for the project, and to locate a representative in the province for the purpose of encouraging local participation in the sub-contract bidding process.

7. SOCIO-ECONOMIC IMPACT: SUSTAINABILITY

7.1. Chapter Summary

After the discovery of the Hibernia field in 1979, when oil-related development was on the horizon, there was a great deal of discussion in Newfoundland and Labrador about the potential social and economic impacts of this new industry. Local people speculated about possible negative impacts such as inflation, increased crime, prostitution, alcohol and drug addiction, and even the erosion of the Newfoundland and Labrador way of life. The spectre of concern was ever present in discussions of the socio-economic situation.

In the event, few, if any, of these fears were realized concerning discernable negative effects from the industry. Indeed, following in the wake of the 1992 northern cod moratorium, the industrial benefits and opportunities resulting from oil and gas development proved most welcome. A certain amount of complacency arose amongst the general public and policy makers as a consequence of ever increasing provincial oil royalties and economic prosperity, most evident in the northeast Avalon, with little discussion of any negative effects from oil and gas development.

However, with this development of the fourth major oil field, concerns regarding the cumulative social effects of oil and gas development are beginning to materialize. Prosperity from the oil industry, though welcome, is disparate, and not all individuals will benefit from the economic growth associated with the Project. First-time home buyers and those on low and fixed incomes may find that the cumulative effects of general economic growth and demographic and consumer demand changes will adversely affect them if house prices and rental accommodation costs increase. The challenges of rapid economic growth are felt most keenly in the northeast Avalon, and the majority of rural NL does not appear to benefit from this industry at all. Despite having one of the fastest growing economies in Canada, Newfoundland and Labrador continues to have the highest rate of unemployment. Labour shortages are forecast, yet there is a lack of social programmes such as childcare to enable parents to go to work. Workers in the skilled trades are required, but apprentices are finding it difficult to obtain positions in NL to earn their accreditation.

During the public review sessions, the Commissioner heard from presenters representing municipalities, special interest groups, community organizations, and other groups who drew attention to some very important contemporary social needs:

- the need for improved information exchange between industry and community;

- the requirements for upgrades to physical and social infrastructure;
- the need for timely municipal planning, and easing of housing pressures;
- the need to improve people through education and accreditation of apprentices;
- the enabling of workforce diversification;
- the need to maintain a safe and healthy environment, including mitigation of any cumulative effects of oil and gas development to the fishery;
- the need for original socio-economic research;
- the lack of a definition of sustainability; and
- the requirement of a legacy from oil and gas development and need for socially responsible corporations.

It is stated in the SEIS that *“projects to date have not had any significant effects on community infrastructure and services”* (SEIS 5-1). But, from the evidence and views presented, it is clear that the Hebron project, in the context of other mega-projects currently or about to be underway, will have significant socio-economic impacts on communities, both positive and negative. It can be argued that the social and economic context of these earlier studies, from which this conclusion is based, is different than that relating to Hebron (Storey 1995; Jones 1998). Therefore, the data used to justify conclusions in the Hebron SEIS are not entirely current or reflective of the contemporary socio-economic situation. Although the C-NLOPB has accepted the Hebron Socio-Economic Impact Statement: Sustainable Development (SEIS) and asked for no further information, the need for further socio-economic research on the cumulative effects of oil and gas development is evident. There is little evidence in the SEIS on which to base informed decisions to address the challenges of rapid economic growth in the face of several mega-projects, and to create public policy which best addresses these challenges.

While it is important to be realistic, and it is encouraging that most oil-related impacts to date have been minimal and well-mitigated, the Commissioner is concerned that, on some key variables, the SEIS for the Hebron project fails to take into account some important changes that have occurred in the Newfoundland and Labrador economy during the past decade. These impacts are more problematic and challenging than the SEIS indicates, notably with regard to labour availability, community infrastructure, and availability of local housing.

One might reasonably ask, what is the obligation of private industry to solve any social problems that are encountered during a period of rapid economic development? The simple answer, of course, is that it is ultimately government's responsibility to provide adequate access to social housing, to repair crumbling highways, to provide money for social infrastructure. For the purposes of this report, *"The goal is to encourage all partners of the Hebron Development to ensure that, while they are supporting the economic benefit of the community, that a compassionate lens is given to mitigating any challenges that come with economic wealth"* (PRS-09). Some problems such as the skilled labour shortage may be more directly related to the project and thus the Proponents have a duty to mitigate them. Yet rapid economic development creates stressors to the socio-economic system that magnify any negative effects on those who do not necessarily share the benefits from oil and gas operations. To make correct policy decisions that will ensure maximization of benefits from oil development amongst all citizenry, governments at all levels need timely and correct information from industry and it is industry's responsibility to provide that information to the fullest extent.

Newfoundlanders and Labradorians are used to dealing with hardship, but prosperity brings with it its own challenges. A plan for the present is required which addresses the cumulative effects of this project in the context of the previous forty years of oil development. A way-ahead is required for the next forty years and beyond, based on updated research and accurate findings.

7.2. Regulatory Requirements

In accordance with Section 44(2)(c) of the *Acts*, a socio-economic impact statement (SEIS) is an ancillary document which may be required as part of the Development Plan to identify and address the anticipated impacts of the Hebron project on *"a variety of social, demographic and labour market factors, as well as on public infrastructure and other land and resource uses"* (*Development Application Guidelines* 2006, 6).

In the 2006 *Development Plan Guidelines*, the C-NLOPB added sustainable development issues to its requirements for SEIS. Hence, whereas for White Rose a "Socio-Economic Impact Statement" was required, for Hebron the requirement is for a "Socio-Economic Impact Statement and Sustainable Development Report". The concept of "sustainable development" is defined in the C-NLOPB's *Guidelines* as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (*Development Application Guidelines*, 6). The *Guidelines* further state that

The Proponent should describe its corporate commitment and approach for an inclusive, planned and transparent strategy whereby its activities and investment will contribute to a better quality of life for the current and future generations. The Proponent should prepare a framework to address how it intends to improve the community and maintain a safe and healthy environment, together with a set of business practices, and policies that will contribute to sustainability in the long-term. Such a description should include the identification of stakeholders and their needs and how those needs can be addressed [emphasis added].

A “lasting economic legacy” is equated with what economic benefit can be gained from the extraction of a non-renewable resource through royalties and taxes (*Guidelines* 3.9). What governments choose to do with royalty and tax revenue is out of the control of industry. But, the *Guidelines* also underscore the importance of maintaining a healthy environment, and a corporate commitment and contribution towards a “better quality of life for the current and future generations” (*Guidelines* 1.3.3). In these areas, the Proponent can contribute to socio-economic and environmental sustainability.

7.3. Socio-Economic Impact Statement: Sustainable Development Report Review

Both the White Rose SEIS and the Hebron SEIS use the same methodology—examining a number of what are termed Valued Environmental Components—and reach the same conclusion, namely that there will be no significant effects on such variables as education and training, medical services and infrastructure, policing and fire protection, recreation and housing.

Experience from previous offshore petroleum projects in NL has shown that a project such as Hebron will bring changes but these changes are generally acceptable and positive, and where they are not, these are manageable or can be mitigated satisfactorily (SEIS, p. iii).

Therefore, it could be concluded that, lacking evidence to the contrary, no adverse effects are expected from the project.

In justifying the methodology, the SEIS authors suggest that, “with appropriate management strategies in place, the socio-economic effects of oilfield development projects are almost entirely positive”, citing the 1995 Terra Nova SEIS. Additionally, the SEIS report states that “There has been very little data compiled recently to measure the local effects of the industry....While there are no data to demonstrate changes in recent years, the industry presence in the St John’s area has continued to

increase and total tax revenues generated are likely to be higher than in 2003” (SEIS 4-20).

The current information concerning labour capacity and capability to support the Hebron project is vague and unsubstantiated (SEIS 4.3.1). The lack of information concerning labour capacity also impedes the ability to evaluate the Valued Environmental Component (VEC) ratings provided for education and training (SEIS Table 5.2-1). The analysis that details how the specific numerical magnitude estimates are derived is not provided, and thus compounds the difficulty to evaluate these findings.

The geographic scope of the SEIS focused “on communities within an easy commuting range of the main possible Project-related workplaces” (SEIS 4-1), and followed census consolidated subdivisions (CCS) (Canada 2007) within a 50km radius from the primary work sites. A 50-km commute to worksites is too limiting in scope: historically, many workers at the Bull Arm site commute from St John’s and the greater northeast Avalon. One could also argue that these areas were selected prematurely as the contracts to fabricate topsides modules had not yet been decided at time of writing. Expanding the geographic study area to boundaries following existing regional economic zones or political boundaries which are much greater in scope would facilitate a fuller analysis of the project impacts in terms of captured statistics for each zone, and for the province more generally.

Recomendation 7.1:

As a condition of the fundamental decision, the Proponent should provide additional information and analysis of socio-economic impacts relative to existing economic zones of an area no less than 150 km from Bull Arm.

Recomendation 7.2:

In advance of the preparation and submission of development applications, the Commissioner recommends that the Board clearly delineate primary impact zones.

As stated above, both the White Rose SEIS and the Hebron SEIS use the same methodology—examining a number of what are termed Valued Environmental Components (SEIS 2-18). Both SEIS reach the same conclusion, namely that there will be no significant effects on such variables as education and training, medical services and infrastructure, policing and fire protection, recreation and housing. In its completeness review of the Hebron Development Application, the C-NLOPB determined that the SEIS addressed all requirements without making any further comment on the content of same (C-NLOPB, Letter, May 31, 2010, 10). It should be noted as well that the 2008 Decision Report for North Amethyst makes no reference to the SEIS whatsoever, a statement made in conjunction with the fact that it was assessed that the “small size” of North Amethyst “provides the basis for concluding

that there will be no significant adverse social and community impacts” (C-NLOPB 2008, 85). Hebron, on the other hand, is a huge project that will be developed concurrently with several other mega-projects in the province, and the C-NLOPB must be more attentive to any potential socio-economic impacts in relation to it. Thus, it is assessed that the C-NLOPB acceptance of the SEIS is perfunctory and inadequate based on out-dated information upon which the resulting findings are based.

Recommendation 7.3:

The Commissioner recommends that the capacity and expertise of the C-NLOPB for evaluating socio-economic impacts and sustainability issues needs to be strengthened.

Recommendation 7.4:

As a condition of the fundamental decision, the Proponent should revise and reissue the Socio-Economic Impact and Sustainable Development Report to resolve the issues related to currency and accuracy of data and the resultant findings.

7.4. Improving People

There was a great deal of public interest concerning the diversification of the Hebron project workforce, thus underscoring the potential to address two important objectives at once: close the gap in the skilled trades shortfall while open doors to “*women, aboriginal groups, persons with disabilities and members of visible minorities*”, and other underrepresented groups recognized by the Atlantic Accord Act (*Benefits Plan Guidelines*, 9). For example, the Women in Resource Development Committee urged a proactive approach to increasing participation by female workers: “When a shortfall of workers has been identified in a particular under-represented occupation, consider collaborating with a training institution to offer a training program for women to meet that shortfall” (PRS-10).

The challenges of labour shortfalls arising from attrition and concurrent mega-projects, and possible solutions to these challenges are discussed in Chapters 2 and 6. The improvement of people through education and knowledge transfer is a very tangible and direct area of potential long-term benefit from the Hebron Project. This was reflected in presentations at the public review sessions from suppliers and supplier organizations like the Eastern Suppliers Development Association and the Canadian Manufacturers and Exporters Association. ESDA and CME call on the industry to work with local suppliers and contractors to create long-term sustainability during the life of the Hebron project, and beyond. To do this, we must look to the next generation to train the workforce of the future.

7.4.1. Early Education

Concerning the training of new workers, consultations with MUN and CNA were referenced in the SEIS, but there is little detail of specific plans to address labour shortfalls, as discussed earlier in Chapter 6: Benefits (SEIS 5-6). A Hebron Project Diversity Scholarship fund was established in early 2011, endowed at \$1.5 million, to support the education of underrepresented groups in the oil and gas sector.

ExxonMobil Canada and the Hebron co-venturers believe that supporting diversity is a key factor for the long-term success of the industry, and creating an environment that supports the diversity will help to increase the pool of candidates for hiring and promote a more diverse workforce in our industry (Geoff Parker, Transcript, November 21, 43).

While advocating for increased industrial opportunities for women, Linda Ross of the Provincial Advisory Council for the Status of Women (PACSW) also urged that there be more educational opportunities for rural areas of the province. Spokespersons for rural areas have long decried what they see to be inequities in distribution of economic benefits from the oil and gas sector that favour the northeast Avalon. Some see a convergence of interests among governments, the Proponent and rural communities that would see a dramatic proactive effort to identify, recruit or re-train unemployed residents of rural Newfoundland. The Hebron Benefits Plan states that innovations involving the promotion of opportunities and delivery of sustainable benefits in rural parts of the province are under consideration but offers no specifics. It should be realized that structural unemployment cannot be solved by creating jobs for which unemployed workers are not qualified.

Communicating the importance of skilled trades and technology is important in the context of diversity, and in this regard the Commission commends the Proponent for sponsoring several programmes administered by Women in Resource Development Committee (WRDC), thereby creating a legacy in terms of diversification of the workforce and knowledge transfer. These programmes, such as TOTT (Techsploration Orientation to Trades and Technology), GREAT (Girls in Renewable Energy and Alternative Technologies), and GUSTO (Girls United in Skilled Trades and Operations), are designed to promote female student participation in the skilled and technical trades. One could suggest that these programmes should not specifically target one particular group as the need is far greater than one subset of society could provide.

Paul Tilley, an instructor from the College of the North Atlantic in Clarenville, suggested there is a lack of information flow to current and future students who do not know about opportunities arising from these mega-projects like Hebron. Concerning those who are differently abled, early intervention is required to engage youth in the province to be informed of energy-sector jobs and potential scholarships.

Another challenge which was noted by Tilley was that of finding and keeping qualified post-secondary instructors. A shared arrangement between industry and post-secondary technical institutions may be an answer for long-term benefit. Hebron Project or ExxonMobil engineers might also be given sabbaticals to work on a part-time basis at Memorial University to facilitate the cross-pollination of research and knowledge transfer.

Ultimately, the challenges of obtaining instructors and accreditation pale in comparison with the challenge of attracting students to the technical and skilled trades in the first place. A recent opinion editorial in *The Telegram*, written by the editor of MUN's student newspaper, suggested that "what this province needs is a shift in thinking, one that not only supports the idea of trade workers as a viable career option—carpenters, welders, millwrights or what have you—but holds them in high regard as vital to the future of our province's economy" (Hussey 2012). This shift in attitude must occur amongst the decision makers, parents and teachers predominantly, in order to encourage students to not only consider but enter the trades.

That the skilled trades are not the first career choice among students was recognized by the 2007 Report of the Newfoundland and Labrador Skills Task Force which identified a number of impediments to skills development and retention in the province, as well as problems with training and accreditation. The report provided a plan to address these problems, especially those that could hinder the province's participation in major projects such as Hebron. Its strategy included programs and policies that would help change attitudes, better match training with demand, document the skills of existing workers, improve the efficiency of the apprenticeship process, recruit skilled trades from other jurisdictions, and retain more of those trained in the province. The report also called for greater coordination and cooperation between the stakeholders, as noted in Chapter 6 of this report.

7.4.2. Childcare

Kelly Hickey, from the Office to Advance Women Apprentices, argued that lack of access to adequate childcare is a fundamental problem and a huge barrier to female employment in the Hebron project. Not only does the inadequacy of childcare resources have implications to the short- and medium-term labour shortfall, but a lack of childcare and early childhood resources has major negative implications to the long-term economic prosperity of NL and the sustainability of the economy.

Concerning the workforce, many parents cannot work because they cannot find a place for their child/children and this "*pertains to employment because there is just nowhere to put your child so you can continue your career*" (K. Hickey, PRS-04). Currently, NL has 65,460 children age 0 to 12. Of those children, 48,000 have working

parents, but there are only 6,772 childcare spaces, a percentage of 14% of children with parents in the workforce having access to childcare spaces.

It was recognized in the public review sessions that the majority of licensed childcare centers are within the St. John's area where, arguably, there is a greater need for them. It was suggested that, in rural NL, the need for licensed childcare was less than in urban areas. However, the Commissioner heard from the organizers of the only family resource centre in Clarenville with a client base of 725 as of November 2011, and growing exponentially. They described the inadequacy of social programmes such as childcare in the region, and they themselves had a waitlist of 75 families in the Clarenville area alone for their family programmes, some of whom relocated for the Hebron Project (PRS-14).

All participants cited the Early Years Study 3, which rated NL last nationally in early childhood and childcare initiatives (<http://earlyyearsstudy.ca/en/report/>). The study cites overwhelming evidence regarding the benefits of investment in childcare and early childhood education in the short, medium, and long term. For example, as a result of initiatives undertaken in Winnipeg,

for every child care job, 2.15 others were created or sustained. Child care also allows mothers and fathers to work. Parents with children in child care earn an estimated \$715 million per year. Overall, every \$1 invested in child care provides an immediate return of \$1.38 to the Winnipeg economy, and \$1.45 to Canada's economy (<http://earlyyearsstudy.ca/en/report/>).

Regarding the lack of licensed and publicly-funded childcare spaces,

Publicly funded child care is not a requirement for women to work; most make do without it. Women's tenacity in piecing together underground arrangements takes the pressure off the state to find formal solutions. For some mothers, however, the absence of reliable, affordable child care is an impenetrable barrier. They stay out of the labour force altogether, delay returning to work until their children start school or they work part-time. In 1997, Quebec women were less likely than other Canadian women to work outside the home; today, they are the most likely. Fortin and his colleagues wanted to identify the gap between those women who would work anyway and those whose presence in the workforce could be attributed to available, affordable child care (<http://earlyyearsstudy.ca/en/report/>).

It should be noted that after Quebec initiated publicly-funded childcare spaces, by 2008, "70,000 more Quebec women were at work and their presence could be attributed to low cost preschool. This meant a 3.8 % boost in women's employment, and a 1.8 % increase in total provincial employment".

As the Office to Advance Women Apprentices stated, “There is a clear dissonance between well-meaning policies on diversity and the lack of women being hired and retained. This discrepancy demonstrates the need for additional resources and support, such as more accessible and affordable childcare spaces, to facilitate the employment connection for women” (PRS-04).

Knowing the barriers to women participating fully in the Oil and Gas industry allows us ways to decipher solutions to remove them. One such major barrier is the lack of reasonable and actual childcare spaces. By removing the barriers and building childcare centers for the project, the Hebron Project would be regarded as a leader in the industry and it would women in the trades and in other sectors that the project has a real commitment to diversity, leaving an admirable legacy for years to come (PRS-04).

The focus in this discussion has been on the benefits of childcare provision on the economy and the parents, to say little of the benefits to the child itself. Children who attend daycare were more likely to graduate from secondary and post-secondary school, were less likely to become incarcerated, and more likely to become productive members of society (<http://earlyyearsstudy.ca/en/report/>). As Hebron is a 30-year project, it perhaps does not have to be said that the babies of today are quite literally the Proponent’s future workforce. And, as women are entering the workforce at a rate eight times that of men, the mothers of these children are quite literally the workforce of the present.

The Commission believes the lack of adequate childcare is a real and pressing social issue that requires address by all stakeholders who wish to create a viable and sustainable NL economy.

Recommendation 7.5:

The Commissioner recommends that the Proponent work with the provincial government to assist the funding of an early childcare initiative in the Clarenville area in support of its diversity plan for Bull Arm employees and that the C-NLOPB approve such spending against the R&D/E&T expenditure.

7.5. Improving Communities

The socio-economic impacts are entirely understated in the SEIS regarding impacts to communities.

[T]here is now little concern about the ability of municipal governments to deal with offshore-related projects. The Hibernia, Terra Nova and White Rose projects clearly demonstrated that they are able to, and local governments appear to be well prepared to deal with future projects. No concerns

regarding the capacity of municipal governments were raised either prior to the approval of the Terra Nova and White Rose projects, or in connection to Hebron (SEIS 2-11).

As noted in the public review sessions, the impact of the Project on communities, especially adjacent communities, is potentially significant and adverse, particularly concerning housing, traffic, and other infrastructure.

The Proponent has committed to successfully delivering the Hebron Project, while *“building and strengthening relationships with the Newfoundland and Labrador community”* (Geoff Parker, Transcript, November 21, 6). The Proponent has already taken some substantive initiatives which show that this commitment to improve the community is more than just empty rhetoric, including municipal partnerships, as will be discussed below, and the commitment towards improving construction safety on the project, as discussed in Chapter 4: Human Safety.

The Benefits Plan states that ExxonMobil *“has a commitment to developing industrial and human capacity, and creation and delivering sustainable and strategic benefits to host nations down at the community level”* but, as stated in the Isthmus Research Project submission,

The language used in the plan is general is not specific in either obligations or outcomes....Community members will read the plan and interpret the vague wording in their own way. In doing so, they are most likely going to be disappointed. Because the plan does not ensure everyone involved understands exactly what must happen to provide benefits (PRS-28).

Communities must be strong and healthy to benefit all citizenry, including the workforce, which ultimately is of benefit to the Project. Thus it is in the Proponent's best interest to work together with stakeholders to make positive improvements in the communities, for the individuals who live there, and to the environment that sustains everything. There is a real opportunity for the Proponent to be a model corporate citizen, working with the local population to help fuel its social and economic development in a more profound way than just exploiting a resource while minimizing environmental and social disruptions.

7.5.1. Needs in Adjacent Communities

An underlying theme running through many of the presentations and submissions during the public review was the need for partnership and improved information flow. Communities adjacent to the Hebron project areas (Sunnyside, Clarenville, Marystown, St. John's) are, in effect, asking the Proponent to work with them to ensure that they reap maximum benefits with minimal costs. *“Although industry has*

worked to lighten impacts, these communities nearest the industrial activity are bearing the largest burden of this activity” with regard to infrastructure, childcare, housing, and negative impacts on the environment (PRS-28).

The Mayor of Clarendville, Fred Best, made the point that, although Hibernia, White Rose and Hebron have generated a great amount of federal and provincial income, there has been “*very little improvement in road transportation*”, with an inadequate two-lane highway linking Whitbourne to the Nalcor Bull Arm Fabrication Site and the Clarendville area. There is a significant increase in traffic on the highway due to the Hebron and Long Harbour Projects. The existing two-lane highway is totally inadequate for this increase. It is the position of the Clarendville Council that serious consideration be given to a divided highway west to Clarendville. As the Bull Arm Site will continue to be utilized for future developments, the Commissioner concurs with Mayor Best that “serious consideration must be given to extending a divided highway further west” to Clarendville (Transcript, November 24, p. 34).

The Mayor of Sunnyside, Robert Snook, noted that, although it is closest in proximity to Bull Arm, the Town of Sunnyside was not specifically mentioned in the SEIS. Mayor Snook took issue with the conclusion that the “use of the site for Hibernia, Terra Nova and White Rose has been beneficial to the local as well as provincial economies and any use made of it for Hebron would continue these benefits” (SEIS 6.3.2). Mayor Snook declared that, until recently, Sunnyside had seen no benefits from the Bull Arm site. Instead, he itemized significant adverse effects from industrial activity with regard to more traffic in the area, and more wear and tear on municipal infrastructure in that the town has provided water, waste disposal and firefighting services to the Bull Arm site during start-up.

To mitigate these effects, a grant in lieu of taxes “for the duration of the project” has been negotiated between ExxonMobil and the Town of Sunnyside. It is hoped by Mayor Snook that this agreement serves as a template for dealings with future project Proponents. The Commissioner applauds ExxonMobil for taking this step towards improving the community and setting an example for industry, and encourages them to consider other agreements with municipalities adversely affected by industrialization and/or who require improvements to physical infrastructure leading to sustainability.

7.5.2. Information Exchange and Community Partnerships

Real engagement between industry and these communities is required and needs to be explicit in its definitions and outcomes (PRS-28).

In order to efficiently identify challenges of development to the community, good communication and information exchanges between the Proponent and community

stakeholders are paramount. The Mayor of St. John's, Dennis O'Keefe, stressed the importance of timely information from major developments such as Hebron in order to anticipate needs and shortfalls in infrastructure, housing, labour, and other aspects of community and regional planning. To this end, the City will be preparing a socio-economic report about impacts on the community from the major planned projects in the near future.

The Proponent has partnered with the Resource Development Trades Council (RDC) and Women in Resource Development Committee (WRDC) to develop the labour force of the province thereby maximizing local employment. The Proponent has worked with business organizations, such as the Eastern Suppliers Development Alliance (ESDA), to maximize local business opportunities from the project. Diversity groups, including the Newfoundland and Labrador Organization of Women Entrepreneurs (NLOWE) and Coalition of Persons with Disabilities (COD-NL), ask the Proponent to continue to partner with them to maximize employment opportunities for their members. ExxonMobil officials themselves have commented on how impressed they have been by the willingness amongst all parties and stakeholders to collaborate and improve the benefits and opportunities from the Project. Many of the submissions to the Hebron Public Review provide other possibilities for further innovative partnership initiatives.

Recommendation 7.6:

The Commissioner recommends that the Proponent continue to foster partnerships with labour, and work with the various community and local industry groups to make the Hebron project an exemplar for corporate/community partnership.

7.5.3. Housing

Pressures on available housing are noted in the SEIS which notes that *"Growth in the petroleum sector will have some contributory effect to housing demand and house prices, but at the present time this is only one component of a complex set of factors that are driving demand and prices"* (SEIS 6-10). The average house price in the St. John's area has risen from \$101,000 in 2000 to \$268,000 in 2011, an increase of 166% in 10 years (Maceachern 2012).

Such growth brings economic benefits, but it may have negative consequences for some. While the housing market is generally segmented according to price, the take-up and renovation of lower value properties, particularly in the downtown core of St. John's...may have indirect or inflationary effects and place a burden on those on low incomes who are not homeowners (SEIS 6-10).

Although the SEIS does recognize that housing pressures may adversely affect the public in St. John's, other presenters from Clarenville described great difficulties in

local housing. Pressures on housing in Clarendville are compounded by the concurrent housing needs of the project-related workforce at the Vale Inco project at Long Harbour and the Come By Chance Oil Refinery. In order to mitigate any potential shortfall and pressure on housing during the construction phase at Bull Arm, on-site accommodation for workers will be available. In accordance with the Project Agreement, each worker will be given one opportunity to sign up for on-site accommodation. However, prior to the camp's construction and implementation, there will be a continued need for rental properties in the Clarendville and isthmus area.

Employees of the family resource centre in Clarendville expressed their deep concerns about the exponentially increased housing costs in the region and the negative impacts of such increased costs on their clientele, mostly young families and some single-parent families, many of whom have been forced to leave the area. A social worker assigned to Clarendville referenced the Canada Mortgage and Housing Corporation's indicator which states that a family should not pay more than 30% of its net income on shelter or else "*they are in a core housing need*" (PRS-24). The majority of rents in the region far exceed \$625/month (30% of a net low income of \$25,000), and have increased to between \$750 to \$1800/month (*The Packet* and MLS, February 13, 2012).

The Proponent has attempted to lessen the impact of the Project on the local communities by constructing a work camp at Bull Arm. However, the commuting allowance a worker receives in lieu of staying in on-site accommodations may cause added pressure on a stressed housing system. Further to this, if migrant labour should prove necessary to offset current labour shortages, this must be carefully planned with respect to the size of the camp, especially if there is stress in available housing in these communities. On a great scale, the cumulative socio-economic impacts on various mega-projects on the Clarendville region need to be better understood. This is a provincial and regional (municipal) responsibility which should be supported by the project Proponents.

The Commission considers the housing shortage in the Clarendville area to be an urgent issue that must be addressed cooperatively between stakeholders (government, industry and labour), with leadership resting with the provincial government.

Recommendation 7.7:

The Commissioner recommends that the Proponent urgently communicate its workforce requirements and schedule to the Provincial Government and Municipalities in the Isthmus area and to develop strategies and plans to lessen the inflationary impact on housing.

7.6. Improving Understanding

7.6.1. Research and Development

Several presenters identified opportunities for R&D concerning the engineering of the project and in the long term. While R&D/E&T is not the sole mechanism by which the Project can help develop the capacity for innovation, technology transfer and technical learning in the province, it provides a significant vehicle for doing so.

Dr. Claude Daley from the Ocean Engineering Research Centre at Memorial University discussed the Ocean and Naval Architecture Engineering programme offered at MUN, which is the only one of its kind in Canada and the only co-op programme in the world. The Centre has special strengths in arctic research, small craft, safety, and submersibles, which are complementary to the Hebron Project. He asked that ExxonMobil create more entry-level positions for first- and second-year undergraduate work terms within the Hebron Project. He also stressed the importance of industry partnerships in research projects. He noted that as a "world class project", Hebron had the potential to further this province's recognized leadership in ocean engineering. Professor Daley's comments on the enormous value of R&D to grow industry in the province were echoed by Mayor Dennis O'Keefe, as well as several other presenters.

Bob Tetford, Chair of the local branch of the Canadian Manufacturer and Exporters' Association, pointed out that the real opportunity arising from research and development, and "where we fall down", is in the actual commercialization of these processes into viable businesses. As a practical example of the role of innovation in better positioning the province to compete for offshore work is a joint venture between the CME and the College of the North Atlantic in the area of lean welding (Transcript, November 22, 34).

The successful exploitation of the R&D fund, however, requires a broader awareness and better understanding of its purpose and criteria for consideration. This can be achieved through better promotion and timely feedback. In particular, the opportunity for third-party access to funding for research, technology transfer and specialized training should be given additional consideration by the Proponent as well as the C-NLOPB.

The application of the R&D fund to education and training also received attention during the public review sessions. Lana Payne of the Federation of Labour raised a concern that most of the fund is directed towards research and development and not skills enhancement. However, as pointed out by the Commissioner, there is no set limit on education and training within the R&D envelope. Indeed, the research and

development guidelines anticipate the submission of a budgeted plan by the Proponent for education and training.

Recomendation 7.8:

The Commissioner recommends, in order to ensure that the provision for mandatory R&D expenditures by operators has the desired effect of contributing to the economic legacy of offshore developments, that the C-NLOPB promotes public understanding and participation in the R&D process, ensure that the process reflects best practice across jurisdictions, undertake periodic evaluation of eligible expenditures to determine the value for money spent, and facilitate the exploitation of resulting new technologies to the benefit of the province.

Future offshore developments in Eastern Canada will see the industry move into ice-covered deep water at greater distances from shore bases. Technology related to deep water is currently implemented in open water environments such as the Gulf of Mexico and offshore Brazil. However, there are a number of challenges unique to the NL offshore, such as ice interaction with moored structures, disconnectable floaters with large storage capacity, and evacuation systems from these installations while in ice-covered waters.

There is a need to develop alternatives to the GBS and FPSO that can be delivered from local infrastructure such as Bull Arm and otherwise maximizing local infrastructure. These alternatives will require new technologies that can be developed in Newfoundland and Labrador and throughout Canada. It is critical that R&D funding be made available and directed toward facilitating these developments. A large part of the skill and knowledge base and physical facilities to successfully carry out these activities are available in the local community. Funding to support these initiatives is critical. Information related to the process of qualification and logistics of securing this support should be clearly available to individuals and organizations interested in becoming engaged.

Recomendation 7.9:

The Commissioner recommends that the C-NLOPB, in consultation with Operators, CAPP and Petroleum Research Newfoundland and Labrador, review the strategic directions of planned research with particular interest in fostering research and development of production platforms that could be engineered, designed and constructed in the province and that would be suitable for potential emerging fields in deeper water offshore Newfoundland and Labrador.

7.6.2. Socio-Economic Research

With this, the fourth major oil field development, the socio-economic concerns are not the same as those affecting people when Hibernia, or even White Rose, was

proposed. Given that there is a forty-year history of oil-related development in NL, and that the pace of development for major resource projects is accelerating, a thorough, in-depth investigation of the cumulative effects of development on the economic and social fabric of NL is required.

However, there appears to be little socio-economic research commissioned or undertaken by the Proponent in the development of the SEIS. Currently, the C-NLOPB's *R&D Expenditure Guidelines* state that "*eligible R&D expenditures may extend beyond science and technology to include research in such areas as fiscal regimes, business models and socio-economic and environmental matters*" (Section 3.3; emphasis added). At their discretion, oilfield operators are allowed to include some unspecified proportion of socio-economic research as a valid part of their R&D program, but there is more financial and business incentive to fund R&D which meets the eligibility requirements of the federal CRA Scientific Research and Experimental Development tax credit (SR&ED). Projects which meet the CRA eligibility requirements for the SR&ED tax credit "will be accepted by the C-NLOPB". Currently, socio-economic research projects are not eligible for SR&ED, but "*may qualify [for the C-NLOPB R&D requirements] if they meet the other eligibility criteria in the Board's guidelines*" (C-NLOPB 2011). Thus, industry requires incentive and encouragement to fund socio-economic research.

During the review process, certain issues were raised that might prove to be productive areas of socio-economic research. Several presenters raised the issue of optimizing work rotations offshore. Dale Kirby from the NDP argued that a "favourable rotation benefits our offshore industry workers. The benefits of this initiative are many, more people employed in the offshore, an increase in the tax base of the province, a better work/life balance for families with loved ones working in the industry, and indications that this work rotation would be an enticement to attracting more women to work in the offshore" (PRS-36). The quality of life of workers was also addressed by Brian Murphy, who stated that a career offshore also extracts a heavy toll on workers' families. He cited the change of rotations in other jurisdictions, example, for some projects in UK Continental Shelf area where the shift rotation is 2 on 3 off, which "provides an improved work/life balance", as well as improving worker morale and motivation (Transcript, November 30, 10). It was also suggested that an unequal rotation may result in more female workers being attracted to offshore employment.

The Commission has learned that there are challenges to using a 2 on 4 off rota. Working one month in a three month cycle brings its own risks with competency and inexperienced personnel not getting enough time and exposure to routine activities. Indeed, the same HSE report does caution that "extending shore breaks to three weeks [from a 2 on 2 off] may reduce the extent to which offshore personnel can

maintain situational awareness of operating processes, and the ‘sharpness’ of skilled performance, over the leave weeks. Effective crew handover procedures are therefore particularly important following longer shore breaks, possibly augmented by ‘pre-mobilization briefing’ sessions to update personnel on any changes that may have occurred while they were on leave.”

Working hours, shift rotations, effective handover processes between shifts, training and development activities, competency assurance, competitive compensation programs, and worker morale are all influencing factors that must be balanced in workforce performance management. Noting the lack of a standard rotation around the world, Geoff Parker stated there is no consensus “around what is the best rotation, so actually the suggestion of doing some research in that we could certainly consider that as one of our research initiatives” (Transcript, November 30, 35).

Recommendation 7.10:

The Commissioner recommends that the C-NLOPB encourage socio-economic research in their review, focusing on the merit of projects in relation to the concept of “sustainable development” in accordance with the Acts. Such projects may include:

- a comprehensive research-based evaluation to determine the most suitable workplace rota schedule to achieve the safest workforce and optimum home-work balance;
- a study of demographic and labour market issues to provide assistance to municipal capacity studies over the life of the project; and
- research relating to diversity needs in the offshore and onshore workplace.

7.6.3. Cumulative Effect

On many issues, the Proponent, through its consultants, has made an effort to consider cumulative effects of various activities pertaining to the project, following the earlier oilfield developments of Hibernia, Terra Nova and White Rose. In addition, other concurrent major projects related to mining and hydroelectricity should be taken into account when considering cumulative effects. This consideration is based on the sound principle that, while the impacts of any one project like Hebron may be considered to be minimal when studied in isolation, the cumulative socio-economic effects of several mega-projects could be quite pronounced. The cumulative total of several minimal impacts could constitute a major impact—on a whole range of variables from labour availability to housing prices to access to fishing grounds.

But this is done in a somewhat impressionistic way. *“Cumulative socio-economic effects (after any mitigation and based on the criteria outlined in Chapter 2) are summarized in Table 4.5-2. The Project is expected to add further business and employment benefits to all regions and the Province as a whole. No significant adverse effects are predicted”* (SEIS 4.4; Table 4.5-2). The underlying problem here is not bad faith on behalf of the Proponent, but rather that the extensive efforts that would be needed to address cumulative effects thoroughly and systematically are beyond the scope of what have become the accepted norms for development applications.

The Commissioner has identified a pressing need for an extensive research project that considers the cumulative effects of oil development over the past forty years. While it is not necessarily required of the Proponent under the Board’s current guidelines, consideration should be given to strengthening the importance of a socio-economic research component of future R&D expenditures. Suggestions for socio-economic research were raised during the Public Review and, at its own discretion, the Proponent is in a position where it could initiate such research projects itself. This could be done in partnership with researchers at the Harris Centre, Memorial University; or by partnering with the labour market division of the provincial Department of Advanced Education and Skills; or the Population and Labour Market Committees of the Strategic Partnership Council of business, labour and government leaders.

Recommendation 7.11:

The Commissioner encourages the Proponent to fund and support socio-economic research to create a comprehensive, in-depth study of both the cumulative effects of offshore oil-related development in Newfoundland and Labrador and prospects for long-term sustainable development.

7.7. Improving the Environment

Not only should the Proponent improve individuals and communities, thereby contributing to a lasting economic legacy, they must also maintain a safe and healthy environment, leading to sustainability in the long term. Linda Bartlett from the NL Environmental Industry Association (NEIA) spoke passionately about sustainability and the environment. Regarding sustainability, one thinks of the planet, society and the economy. The economy is dependent on the environment and the environment is not dependent on the economy. Sustainability is about living within the earth’s limits. The oil and gas industry is not sustainable since once fossil fuels are gone, they are gone forever. What is sustainable, however, is the environment on which we all depend ultimately for our livelihoods and existence. Thus, the emphasis should be placed squarely on protection of the environment, above all else.

To its credit, in 2006 the C-NLOPB added sustainable development issues to its requirements for a socio-economic impact assessment. Hence, whereas for White Rose a socio-economic impact statement was required, for Hebron the requirement is for a Socio-economic Impact Statement and Sustainable Development Report. The Proponent for the Hebron project has interpreted sustainability to mean the sustainable development of Newfoundland and Labrador's oil and gas industry, with spin-off benefits for related industries such as ocean technology, while minimizing adverse environmental impacts, especially over the next thirty to forty years of the Hebron project.

There are other, broader and longer-term considerations related to sustainability, however, that are not addressed by this approach. The Newfoundland and Labrador economy is rapidly becoming more and more dependent on two non-renewable resources: oil and minerals. One might consider what this dependence means for the long-term sustainability of the provincial economy, and what effect the extraction of oil and gas has on renewable resources like the fisheries. What steps should be taken during the oil era to diversify the economy into other, non-resource-dependent sectors that can contribute in perpetuity beyond the oil era itself? These are important questions that affect sustainable development in ways that go beyond the issues addressed in the Hebron SEIS and Sustainable Development Report as submitted.

Again, it seems that to undertake such a fundamental approach to long-term sustainable development would go beyond what has become the accepted practice for specific project proposals. But the issues are important and need to be addressed, if not in the Development Plan directly, then through some other means. As for cumulative effects, considerations about sustainable development call for a new priority for comprehensive social and economic research and analysis, as recommended by this Commission.

There is a need to look to the future, to do things better, and to strive to do no environmental harm, thus leaving a legacy for the post-oil future. Whether it would be reasonable to expect ExxonMobil or any other individual operator to address such fundamental issues to our society is debatable, but the idea of cumulative impacts of the oil and gas industry and a lasting legacy from such for NL society were addressed by several presenters in the public review sessions.

Linda Bartlett also stressed the cultural and economic dependence of us all on the environment, and the sea in particular. Much of economy depends upon what are fragile ecosystems. Newfoundlanders and Labradorians *"celebrate this place in community and song"* but *"historically we have not been great stewards of our environment"* (Transcript, December 7, 14-15). There are many current environmental issues in the province concerning water and waste management, a

high rate of motor vehicle use, and the prevalence of unhealthy lifestyles and degenerative diseases. Bartlett stressed the value of doing business in an environmentally informed manner, and encouraged the Proponent:

Use the environment to inform all aspects of business operation, influence change and values in a more positive direction and lead by example to protect our assets for future generations (Transcript, December 7, 15).

Dr. Ian Goudie made the same point in his presentation, emphasizing the link between NL culture, especially rural culture, and how it is tied indelibly to the environment, the sea and land. He asked the Commission to consider “*what are the cultural costs*” of oil and gas development. Here, Goudie gives voice to a genuine fear felt by many in the province concerning the potential for a major environmental catastrophe in the NL offshore or near shore as a result of the Hebron Project and oil and gas development more generally. As Earle McCurdy, President of the FFAW stated,

Although the fishery is such an important part of our history and culture, in a nutshell, what the oil and gas activity has meant for different people, the oil companies get the oil and the economic activity derives from it, provincial government and the federal government get revenue levels, especially for the province, previously unheard of. St. John's gets the boom. St. John's gets the boom, which has some good and bad with it, but they get the economic development, the new hotels going up, the expensive houses going and so on and so forth. A lot of people get the jobs for which I think we're all thankful. And people in the fishing industry get the risk. That's first and foremost what our people get from the oil and gas development off our coast is the tremendous amount of risk. The best they can possibly hope for is that the extent to which of no fishing zones, no-go zones is kept, is not too serious and doesn't impact their fishery operations too much, and that the next time a supply ship collides with a drill rig or whatever the hell happens in the environment, that somehow we'll escape the potentially horrendous consequences of a major disaster. And that's as good as it gets (Transcript, December 6, 37).

The potential impacts of the project on the fishing industry are not discussed in depth in the SEIS, save for the acknowledgement that “*an accidental spill could temporarily limit access to fishing grounds, cause damage to fishing gear or result in a negative effect on the marketability of fish products*” (SEIS 4-21). It is the responsibility of the Proponent to maintain a safe and healthy environment, and the regulator to monitor environmental protection measures being taken.

With the help of One Ocean, the formal liaison body between the industries, the oil industry does appear to be doing a reasonable job of addressing any immediate problems for the fishing industry. These are distinguished from “fundamental problems”: over-dependency of the rural economy on oil and gas; loss of people from or failure to attract young people to the fishing industry; and the erosion of fishing communities and fishing cultures. These are important considerations because, unlike oil, fish are a renewable resource which, if managed properly, will be around in perpetuity. Royalties from oil and gas activities should benefit our citizens of tomorrow including those employed in the fishing industry.

The Proponent also commits to the following:

To reduce the potential of cumulative environmental effects on commercial fisheries, EMCP supports a comprehensive and cooperative inter-industry approach for the management of all vessel traffic within the Jeanne d’Arc Basin area. One of the prime objectives would be to improve and enhance the offshore operating environment for both industries. EMCP will commit resources to this process, and will work with One Ocean to encourage and secure the participation of all relevant industry stakeholders and agencies. With these protocols in place for current and future petroleum projects in the region, potential adverse economic effects can be minimized and any anticipated adverse cumulative environmental effects will be not significant (SEIS 4.3.3.2).

Although a robust Vessel Traffic Management System would minimize rules of the road situations in a busy piece of ocean, these proposed measures do not really address the nature of cumulative effects on the environment. As discussed in Chapter 5 (Environmental Protection), there are no studies to use as a baseline of comparison, and hence great uncertainty as to the nature of any cumulative effects of 40 years of offshore oil and gas exploration and production on these prime fishing grounds and the offshore marine environment. Fishing industry representatives consider that the cumulative, ecosystem effects of oil industry activities and their consequences have not been adequately taken into account by the oil and gas industry or the regulatory agencies. Earle McCurdy stated that the FFAW is “*not confident that regulatory agencies are looking at the ecosystem as a whole...in terms of being a regulator and a facilitator*” (Transcript, November 30, 32).

A strong healthy fishery is predicated on a strong healthy environment. The future implications for recovering fish stocks is not taken into account and the effects of inshore fish habitat works to compensate for offshore habitat effects may simply be benefitting one species at the expense of another. The fishing industry has called on the federal and provincial governments, the regulatory bodies and the oil and gas

industry to consider cumulative impacts of offshore oil and gas activities and how they will impact our province's future.

Recomendation 7.12:

The Commissioner recommends that the Proponent, in cooperation with federal, provincial agencies, One Ocean, and the C-NLOPB, commit to a study to understand what might be the cumulative effects of oil and gas production on the areas of Grand Banks known to be especially productive for fish stocks.

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8. RECOMMENDATIONS

DEVELOPMENT APPROACH

The Commissioner makes 10 recommendations concerning the development approach, three directed to the Proponent, concerning safety in design of the platform (3.6 and 3.7) and to provide an update of the project schedule (3.10).

Seven are directed to the C-NLOPB: to exclude Pool 3 from the fundamental decision (3.1); to ensure certain structural elements, modelling and tests are justified and completed prior to sanction (3.2; 3.3; 3.4; 3.5; 3.8), and to ensure that the topsides modules previously agreed to are fabricated in NL (3.9).

RECOMMENDATIONS:

3.1

The Commissioner recommends that Pool 3 be excluded from the Fundamental Decision for the Hebron Project, and that the Proponent be required to submit a Development Application Amendment for the Pool 3 resource. This application is to define in specific detail the approach, schedule, and method proposed for development. This Development Application Amendment to also include a Benefits Plan and Concept Safety Analysis considering specific risks to human safety during the Pool 3 development.

3.2

The Commissioner recommends that the C-NLOPB review the specific categorization of structural and mechanical systems for all of the components of the Hebron platform (GBS, topsides, OLS etc.) to ensure the legacy value of the Hebron platform has been achieved adequately in the design.

3.3

The Commissioner recommends that the C-NLOPB investigate whether the potential for microbiologically influenced corrosion (MIC) exists to affect the Hebron GBS structure/skirt.

3.4

The Commissioner recommends that the C-NLOPB seek justification from the Proponent regarding the selection of design wave conditions used in modelling for the Hebron GBS and an analysis of the air gap and global loads on the Hebron GBS under the Hibernia GBS design wave conditions.

3.5

Prior to sanction, the Commissioner recommends C-NLOBP ensure that Proponent conduct model tests to validate the Hebron design and its principal dimensions. Should significant design changes result from the first model tests, the Commissioner recommends that the final configuration be model tested to provide more accurate benchmarking of the analytical tools that will be used for detail engineering.

3.6

Prior to sanction, the Commissioner recommends that the Proponent examine recent changes to blast rating specifications for production facility walls and fire ratings for exploration and production activities amongst US-based standards and regulator groups to determine any potential impact to the Hebron design.

3.7

Prior to sanction, the Commissioner recommends that the Proponent complete the outstanding recommendations in CSA, Section 13 and update the CSA accordingly. Specific focus by the Proponent should be applied to the subjects of environmental criteria and loadings (e.g. iceberg impact, wave loads, air gap); dropped objects; and safety in terms of protection and survivability of safety systems in the GBS shaft as well as structural redundancy to topsides support in the event of fire in the GBS shaft.

The measure of acceptable risk should not be limited to industry standards of “tolerable risks.” Hebron forecasted risk levels should be benchmarked against the risk levels evaluated for Hibernia and other comparable platforms using equivalent methodologies.

3.8

The Commissioner recommends that the C-NLOPB review the OLS design in relation to the potential effect of heavy oil on offloading flow lines.

3.9

As a condition to the fundamental decision, the C-NLOPB should require the Proponent to provide assurance that topsides structures and modules, as defined and referenced in the BA, are substantially fabricated in the province.

3.10

The Commissioner recommends that the Proponent, now that FEED is complete, provide an updated Hebron Development Schedule to the C-NLOPB as a condition of the fundamental decision, and that this schedule provide a risk analysis to proposed milestones and mitigation strategies.

HUMAN SAFETY

Twelve recommendations are made concerning human safety: nine to the Proponent, three to the C-NLOPB. The Commissioner recommends that the Proponent submits safety plans (4.1), and revises and resubmits the Concept Safety Analysis prior to the fundamental decision (4.2). The Commissioner makes recommendations concerning health and safety in the workplace (4.5; 4.6; 4.8; 4.12), concerning training (4.4 and 4.9), and concerning the transport of personnel to the workplace (4.11).

The C-NLOPB is asked to review its regulations (4.7; 4.10) and to ensure the Proponent has considered recent events in its risk assessments (4.3).

RECOMMENDATIONS:

4.1

As a condition of the fundamental decision, the Commissioner recommends that the Proponent be required to submit a preliminary Safety Plan and Emergency Response Plan, and that these documents be reviewed as part of the Development Application process in order to facilitate dialogue and information exchange amongst all stakeholders at the earliest opportunity.

4.2

As a condition of the fundamental decision, the Commissioner recommends that contingency plans be provided within the CSA for the major hazards chosen for assessment in the CSA and any potential accidents resulting thereof, and that the conditions for updating the CSA be defined by the Proponent. The Commissioner also recommends that the CSA consider major risks to human safety during saturation diving operations, and during the tow-out/construction and abandonment phases of the Project.

4.3

The Commissioner recommends that the C-NLOPB independently evaluate the findings from the Macondo incident and determine those specifically applicable to the Hebron development. The C-NLOPB should evaluate the new requirements and measures being imposed in revised regulations from other jurisdictions and consider implementation of those found to be relevant to the Hebron project and more generally for all operations on the NL offshore.

4.4

The Commissioner recommends that the Proponent evaluate options for training worksite personnel to make key decisions under pressure for key / high-risk operations (i.e. situational well control training).

4.5

As a general rule, the Commissioner recommends that the election of members to safety committees and other working groups concerning safety be fully transparent and in accordance with OHSI Recommendation 19.

4.6

The Commissioner recommends that the C-NLOPB require the Proponent to develop and implement a plan to monitor air quality on the platform from a human health and safety perspective and ensure that the results of that monitoring program are communicated to the platform Workplace Health and Safety Committee on an ongoing basis.

4.7

The Commissioner recommends that the C-NLOPB comprehensively review its diving regulations and standards with input from industry stakeholders and hyperbaric medical practitioners to comply with International Marine Contractors Association regulations and Canadian Standards Association standards.

The Commissioner recommends that the Proponent consider employee training time as one of the parameters to be included in a comprehensive analysis of the optimal shift rotation for offshore workers employed at the Hebron Platform.

4.9

The Commissioner recommends that the Proponent, along with the training providers, evaluate the best and most appropriate survival training methods offered worldwide, compared to what is currently available through local training facilities, and recommend what, if any, changes would be needed to enhance local training fidelity, reduce cold-water shock and increase survivability.

4.10

The Commissioner recommends that the C-NLOPB, working with the TSB and other regulatory organizations (TC, FAA, EASA), ensure that the Category A helicopters operating in the C-NL offshore comply with existing and revised regulations.

4.11

The Commissioner supports the initiatives and progress arising from Recommendation 9 of the Offshore Helicopter Safety Inquiry ('Goal-oriented objectives for operational requirements'), and recommends that the Proponent extend their weather forecasting services to improve the accuracy of predicting *en route* sea state, freezing precipitation, and visibility.

4.12

The Commissioner recommends that the Proponent consider the following in the Development of the Hebron Vessel Strategy:

- need for new, multi-purpose marine supply vessels to transport personnel to the offshore during heavy fog, or to safely transport personnel during times of stress on helicopter fleet;
- need to review and revise SAR equipment and capability of supply vessels in accordance with OHSI Recommendation 9;
- need for ice-classed ships to be used during the construction phase; and
- requirement for new shuttle tankers with appropriate heavy weather ballasting capability and necessary equipment for offloading the heavy oil of Hebron.

ENVIRONMENT

The Commissioner makes 14 environmental recommendations. Three of which are directed to the Proponent to conduct further produced water and air emissions modelling (5.6 and 5.8), and with regards to monitoring of seabirds (5.11).

Eleven recommendations are directed to the C-NLOPB: to recommend a review of the Atlantic Accord Act (5.2), specific environmental guidelines (5.1; 5.4; 5.5; 5.7), and to report the status of recommendations made in previous environmental assessments (5.3). The C-NLOPB is also asked to coordinate specific improvements in monitoring practices and in research concerning dispersants (5.9), sheens (5.10), seabirds (5.12), and the cumulative effects of oil and gas activity (5.14) and seismic surveys on fish stocks (5.13).

RECOMMENDATIONS:

5.1

The Commissioner recommends that the C-NLOPB, in consultation with the Canadian Environmental Assessment Agency, develop specific guidance as to the scope and technical content of the alternatives analyses for offshore oil and gas projects in the NL offshore subject to Comprehensive Studies. This guidance, in its draft form, should be subject to suitable public review prior to publication.

5.2

The Commissioner recommends that the C-NLOPB review Section 119 of the Atlantic Accord Implementation Act to determine the extent of environmental information

that can be made available to the public, and that this information is made available on its website or in another easily accessible form.

5.3

The Commissioner recommends that the C-NLOPB provide status updates of recommendations made by previous public reviews and environmental assessments of offshore oil and gas projects to date, identifying which have been fully addressed, which are still in progress, and which have not been achievable, and why. These status updates can be modelled after the progress of the Offshore Helicopter Safety Inquiry Implementation Teams.

5.4

The Commissioner recommends that the C-NLOPB (and the Canadian Environmental Assessment Agency) raise the profile of the scoping stage of the EA process, and develop a mechanism to encourage and support public and stakeholder input into the scoping document. Furthermore, public understanding of the availability of funding resources to help with participation in the environmental assessments at both the Comprehensive Study Review and Panel Review level should be enhanced in the same manner.

5.5

The Commissioner recommends that the C-NLOPB engage with the Canadian Environmental Assessment Agency to undertake a review of the CEA document entitled *Reference Guide: Determining Whether A Project is Likely to Cause Significant Adverse Environmental Effects*, and update the guidance provided in this document in line with the current state of scientific knowledge and best practice.

5.6

The Commissioner recommends that the Proponent undertake modeling of the produced water stream in terms of the expected contaminants to be entrained therein, including process chemicals and water soluble organics, to determine the potential dispersion and toxicity of these components in the waste stream. The results of that modeling should be verified by appropriate in-field sampling and toxicity testing.

5.7

The Commissioner also recommends that the C-NLOPB undertake a review of current scientific literature, best practice and global regulatory standards with respect to produced water to determine:

- whether additional modeling and effects monitoring requirements should be applied to existing offshore production operations; and

- how the *Offshore Waste Treatment Guidelines* and/or *Environmental Protection Plan Guidelines* should be revised to address this issue.

5.8

The Commissioner recommends that the C-NLOPB require the Proponent to model what departure(s) from normal operational circumstances would cause a violation of predictions made with regard to air emissions. In the event that there is a departure(s) from normal operating conditions, the Proponent should monitor air emissions to determine if the predictions made in the CSR are exceeded and provide this information to the C-NLOPB.

5.9

The Commissioner recommends that the C-NLOPB, in collaboration with other relevant regulatory agencies, encourage the Proponent, and other operators, to undertake a program of research with regard to the implications of the use of dispersants as a response tool for the NL offshore in terms of both efficacy and environmental effects, and to publicize the results of this research.

5.10

The Commissioner recommends that the C-NLOPB encourage the Proponent, and other operators, to develop a protocol to detect, monitor and track hydrocarbon sheens arising from platform activities.

5.11

The Commissioner recommends that the Proponent, given the data and information collection and communications technology to be incorporated on the platform, evaluate the use of real-time visual imaging to supplement and provide a means of validation of the radar data concerning bird attraction, and to provide a back-up if the radar method proves unsuccessful.

5.12

The Commissioner recommends that the C-NLOPB incorporate the proposed seabird platform attraction study as a component within the Proponents' planned environmental effects monitoring program thus ensuring that the design of the study has input from both Canadian Wildlife Service and the wider seabird research community and also takes into account lessons learned from the Encana initiative.

The Commissioner further recommends that the C-NLOPB collaborate with industry partners, the Canadian Wildlife Service, and the wider seabird research community to develop a program of research to comprehend seabird mortality from both chronic and episodic spills.

5.13

The Commissioner recommends that the C-NLOPB work with both the oil and fishing industries in conjunction with One Ocean to involve fishing industry representatives in oil-spill response exercises conducted by operators in active roles, with due regard for safety and efficacy in the event of an actual spill.

5.14

The Commissioner recommends that the C-NLOPB work with the oil and fishing industries in conjunction with One Ocean, through the existing liaison and funding mechanisms, to develop a program of research focused on the effects of seismic survey operations on fish behaviour in relation to catch rates of commercial species.

BENEFITS

The Commissioner makes 18 recommendations concerning the benefits approach to the Project, nine to the Proponent, seven to the Board and two specifically for the provincial government.

The Proponent is asked to amend and resubmit its Benefits Plan prior to its approval in order to address several deficiencies (6.2). The Proponent is asked to provide more specifics in terms of labour capacity (6.7) and local involvement (6.4; 6.17; 6.18). The Commissioner makes recommendations leading to greater opportunities for diversity within the Project (6.13; 6.14; 6.15) and leading to greater information flow amongst key stakeholders (6.8).

The Commissioner makes suggestions to the C-NLOPB for revision of the *Benefits Plan Guidelines*, following a review of pertinent aspects of the Atlantic Accord (6.3; 6.5; 6.6; 6.16). The C-NLOPB is also asked to change the manner in which it reports benefits to the public (6.1; 6.11; 6.12).

The provincial government is advised to create a Ministerial Committee comprised to address the skilled trades shortage and look to the future (6.9 and 6.10).

RECOMMENDATIONS:

6.1

The Commissioner recommends that the C-NLOPB, in consultation with the local supply community and labour, further refine the reporting process to facilitate direct evaluation of benefits performance against benchmarks established in the Benefits Agreement and in the updated Benefits Plan.

6.2

As a condition of the approval of the Benefits Plan, the Commissioner recommends

that the Proponent amend the Benefits Plan to address the following deficiencies in accordance with the requirements in the current Benefits Plan Guidelines and the Acts:

- measures for first consideration for employment of local people, and include specific training measures and an associated budget;
- assurance that the UPM engineering design team has NL representation, including a provision for technology transfer, particularly for commissioning and long term support;
- more explicit description of the policies, procedures and methods that will be adopted to satisfy the first consideration principles of the Act and guidelines;
- provision to the C-NLOPB the planned labour forecast by project phase, by skilled trade, and make of this information available to key stakeholders including provincial Government, labour and industry;
- inclusion of gender equity provisions in calls for bids and criteria for evaluation;
- demonstration of a “positive trend of continuous improvement” in the level of local employment and participation in the supply of goods and services when measured against benchmarks and achievements established by projects of similar scope;
- demonstration of the extent to, and manner in which the Hebron Project creates a lasting economic legacy for the people of the province, and more particularly, that the development of human resources and intellectual capital within the province as a cornerstone of sustainability be more fully addressed; and
- satisfactory notification of the Proponent's acceptance of the formula for calculating required R&D expenditures as prescribed by the Guidelines for Research & Development Expenditures per Appendix II of the Benefit Plan Guidelines.

6.3

The Commissioner recommends that, on a priority basis, the C-NLOPB issue new guidelines for a standardized and timely publication of expressions of interest (EOIs), pre-qualification results, and tender awards for the development phase of the

project, as is done in other jurisdictions. It is critical that such notices are widely and freely distributed, that a full record of such notices is maintained and made accessible to the public, and that the timeframe for response recognizes the limited resources of local companies.

6.4

The Commissioner recommends that the Proponent undertake a vigorous review of pending contract notices to ensure that, where the capacity of local industry permits, bid packages are scaled to suit that capacity. It is recommended that the C-NLOPB work closely with the relevant government departments and with industry groups such as NOIA and ESDA to ensure that local companies are not unreasonably denied an opportunity to bid as a result of unnecessary agglomeration of procurement needs.

6.5

The Commissioner recommends that, consistent with the guidelines relating to scalability, the C-NLOPB review the Proponent's worldwide standard for bid bonding to determine the degree, if any, to which it unreasonably constrains full opportunity to participate by local suppliers.

6.6

The Commissioner recommends that the C-NLOPB undertake a review of Section 45 of the Act to evaluate the statutory capacity for more explicit and exacting policies and guidelines in relation to Canadian and local preference in support of the C-NLOPB's responsibilities for monitoring, reporting and providing opportunity with regards to:

- provisions of 45(3)(d) relating to 'fair market price' as a measure of competitiveness permits a more demanding standard than that of lowest price;
- provisions of 45(3)(b) & (d) relating to 'first consideration' can be assigned a value and significance beyond the standard of duty implied by current C-NLOPB policies and guidelines; and
- 'first consideration' can be understood in Section 45(3)(b) & (d) as also applying to project elements undertaken outside of the province.

6.7

As a condition of the fundamental decision, the Commissioner recommends that the

Proponent provide to the C-NLOPB the study by Strategic Concepts Inc., entitled “Effective Labour Capacity Analysis for the Hebron Project, 2010”, for review.

6.8

The Commissioner recommends that the Proponent hold strategic planning meetings with stakeholders to address the skilled labour shortfalls.

6.9

The Commissioner recommends that the provincial government pursue the creation of a Ministerial Committee comprised of representatives of industry, labour, education and government, the mandate of which would be to facilitate cooperation across public, institutional and private sector lines as a means of enhancing local readiness for, and access to industrial and employment opportunities from the Hebron project and other major developments.

6.10

The Commissioner recommends that the proposed Ministerial Committee comprised of labour, industry, education and government, conduct an objective and public assessment of the requirements for each skilled trade and associated accreditation processes.

6.11

The Commissioner recommends that the C-NLOPB conduct an annual public meeting for the purpose of presenting and reviewing information relation to local benefits from the Hebron project and that, as a condition of the Benefits Plan approval, the Proponent and its prime contractors be required to participate in the public meeting and to respond to issues relating to local employment and procurement.

6.12

The Commissioner recommends that the C-NLOPB, in consultation with the Ministers, undertake a review of issues relating to the timely public disclosure and access to information to which the C-NLOPB is privy in conjunction with the discharge of its responsibilities under the Accord Act.

6.13

The Commissioner recommends that the Proponent and its EPCs set increased and enumerated aspirational employment targets for underrepresented groups within NL, coupled with aggressive, proactive measures to ensure workers of these groups are specifically targeted, trained, recruited, hired and retained, over and above targets

based on Statistics Canada Employment Equity Data. To achieve these targets the Proponent should:

- undertake strong promotional efforts and training supports need to be targeted at and available to females, differently-abled individuals and others from under-represented groups;
- raise awareness amongst older women who are already in the workforce and perhaps are considering a career change; and
- Hebron's diversity team should work with unions to ensure that they accept female apprentices into their unions.

6.14

The Commissioner recommends the Proponent employ the following tangible measures to contribute to a diverse workplace:

- use of gender awareness training in the workplace to instil a deeper diversity culture amongst employees, contractors and partners
- provision of appropriately sized safety equipment to be readily available to all employees;
- on-site 'diversity officers';
- develop qualified women as trainers and mentors where possible and have female Shop Stewards on site;
- where possible more than one woman is placed on the same job site so that women are not to spread out and segregated from each other;
- flexibility in work schedules for working parents and caregivers; and
- creation of childcare centres for the children of its employees in order to create and maintain a diverse and open workforce, thereby minimizing the impact of existing shortfalls in childcare spaces particularly for the construction phase of the project.

6.15

The Commissioner recommends that the Proponent include gender equity provisions in its calls for bids and criteria for evaluation.

6.16

The Commissioner recommends that the C-NLOPB amend its *Development*

Application Guidelines to ensure a more relevant, thorough, consistent and transparent planning approach that facilitates evaluation against previous developments, provides more comprehensive and timely data for Canadian as well as local businesses and workers, and expedites the public review process.

6.17

The Commissioner recommends that Proponent allocates a proportion of the R&D/E&T fund to specifically address the education and training requirements of skilled labour as required in paragraph 45(3)(c) of the Accords Acts. This allocation, pending project sanctions, to be committed for 2012 and throughout the construction phase of the project. The determination of the size of the Education and Training funding to be jointly reviewed and decided by the C-NLOPB, Proponent and Provincial Government through its department of Advanced Education and Skills. The Commission recognizes that the skilled trades challenge is not unique to the Hebron project and that investment by other stake holders, such as the Provincial Government and other major project Proponents, will also be required.

6.18

The Commissioner recommends that as a condition of the contract award for the UPM, the Proponent and its successful yard should be required to provide a detailed breakdown of supplies, services and sub-assemblies required for the project, and to locate a representative in the province for the purpose of encouraging local participation in the sub-contract bidding process.

SOCIO-ECONOMIC IMPACT: SUSTAINABILITY

There are 12 recommendations made to improve the socio-economic and sustainability perspective, seven are directed towards the Proponent and five are directed towards the C-NLOPB. The Proponent is asked to revise and resubmit the SEIS based on current research (7.1; 7.4; 7.11), and also consider the effects of the project on childcare (7.5), housing (7.7), the fishery (7.12), in order to improve communications (7.6).

The C-NLOPB is asked to strengthen its SEIS expertise (7.3) and consider a R&D/E&T strategy in the context of future projects and expanding local expertise (7.8; 7.9; 7.10). It is also asked to provide more specific guidelines concerning the scope of the SEIS (7.2).

RECOMMENDATIONS:**7.1**

As a condition of the fundamental decision, the Proponent should provide additional information and analysis of socio-economic impacts relative to existing economic zones of an area no less than 150 km from Bull Arm.

7.2

In advance of the preparation and submission of development applications, the Commissioner recommends that the Board clearly delineate primary impact zones.

7.3

The Commissioner recommends that the capacity and expertise of the C-NLOPB for evaluating socio-economic impacts and sustainability issues needs to be strengthened.

7.4

As a condition of the fundamental decision, the Proponent should revise and reissue the Socio-Economic Impact and Sustainable Development Report to resolve the issues related to currency and accuracy of data and the resultant findings.

7.5

The Commissioner recommends that the Proponent work with the provincial government to assist the funding of an early childcare initiative in the Clarendville area in support of its diversity plan for Bull Arm employees and that the C-NLOPB approve such spending against the R&D/E&T expenditure.

7.6

The Commissioner recommends that the Proponent continue to foster partnerships with labour, and work with the various community and local industry groups to make the Hebron project an exemplar for corporate/community partnership.

7.7

The Commissioner recommends that the Proponent urgently communicate its workforce requirements and schedule to the Provincial Government and Municipalities in the Isthmus area and to development strategies and plans to lessen the inflationary impact on housing.

7.8

The Commissioner recommends, in order to ensure that the provision for mandatory R&D expenditures by operators has the desired effect of contributing to the economic legacy of offshore developments, that the C-NLOPB promotes public understanding

and participation in the R&D process, ensure that the process reflects best practice across jurisdictions, undertake periodic evaluation of eligible expenditures to determine the value for money spent, and facilitate the exploitation of resulting new technologies to the benefit of the province.

7.9

The Commissioner recommends that the C-NLOPB, in consultation with Operators, CAPP and Petroleum Research Newfoundland and Labrador, review the strategic directions of planned research with particular interest in fostering research and development of production platforms that could be engineered, designed and constructed in the province and that would be suitable for potential emerging fields in deeper water offshore Newfoundland and Labrador.

7.10

The Commissioner recommends that the C-NLOPB encourage socio-economic research in their review, focusing on the merit of projects in relation to the concept of “sustainable development” in accordance with the Acts. Such projects may include:

- a comprehensive research-based evaluation to determine the most suitable workplace rota schedule to achieve the safest workforce and optimum home-work balance;
- a study of demographic and labour market issues to provide assistance to municipal capacity studies over the life of the project; and
- research relating to diversity needs in the offshore and onshore workplace.

7.11

The Commissioner encourages the Proponent to fund and support socio-economic research to create a comprehensive, in-depth study of both the cumulative effects of offshore oil-related development in Newfoundland and Labrador and prospects for long-term sustainable development.

7.12

The Commissioner recommends that the Proponent, in cooperation with federal, provincial agencies, One Ocean, and the C-NLOPB, commit to a study to understand what might be the cumulative effects of oil and gas production on the areas of Grand Banks known to be especially productive for fish stocks.

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BIBLIOGRAPHY

- Advanced Education and Skills. 2010. *Annual Report*. St. John's: Government of NL.
- CEF Consultants Ltd. 2011. *Report on a Workshop on Fish Behaviour in Response to Seismic Sound*. Halifax, NS: Environmental Studies Research Funds Report.
- C-NLOPB 2012. "Industrial Benefits Reports to be Made Public", February 1, 2012.
- C-NLOPB. 2001. *Decision Report: White Rose*.
- C-NLOPB. 2006. *Canada-Newfoundland and Labrador Development Plan Guidelines and Benefits Plan Guidelines*. St John's.
- C-NLOPB. 2008. *Decision Report: North Amethyst*.
- C-NLOPB. 2011. "Terms of Reference: Hebron Public Review Commissioner."
- EMCP. 2011. "Responses to Additional Information Request." October 14, 2011.
- EMCP. 2012. "Response to Clarification Questions from the Commission." January 27, 2012.
- Government of Canada. 2007. Statistics: "census consolidated subdivision"
- Government of NL. 2007. *All the Skills to Succeed, Report of the Newfoundland and Labrador Skills Task Force*. St. John's.
- Government of NL. 2010. *Labour Market Outlook 2020*. St. John's.
- Government of Western Australia. 2011. *Local Content Report*. Department of State Development.
- Hussey, Paul. "Reasons to leave this place." *The Telegram*, January 5, 2012: B5.
- IAOGP. 2011. *Oil Spill Response: Global Industry Response Group Recommendations*. London.
- ILO. 2009. *Tripartite Meeting on Promoting Social Dialogue and Good Industrial Relations from Oil and Gas Exploration and Production to Oil and Gas Distribution*. Geneva, May 11-14, 2009.
- Maceachern, Daniel. "Hot housing market tougher for buyers: broker." *The Telegram*, January 11, 2012: D1.
- Miller, Jonathon D. *et al.* 2012. "Microbiologically Influenced Corrosion of Gulf of Mexico Mooring Chain at 6000 Feet Depths". OMAE.
- OHSI. 2010 and 2011. *Offshore Helicopter Safety Inquiry*, phased I and II. St. John's: C-NLOPB.
- Statistics Canada. 2012. *Labour Force Survey*. Ottawa: Government of Canada.
- Turner, M. 2010. *Review of Offshore Oil-Spill Prevention and Remediation Requirements in NL*. St. John's: Government of NL.

Hebron

Public Review

APPENDICES

Hebron

Public Review

Appendix A

Biography of Commissioner, List of Commission Staff and Consultants

Commissioner

Miller Ayre, CM, BA, MBA, LL.D

Mr. Miller Ayre was appointed as the Commissioner for the Hebron Development Application Public Review. The former publisher of The Telegram, Mr. Ayre is a member of the Order of Canada. He is National Vice-Chair of the Canadian Forces Liaison Council and a member of the Advisory Council of the Royal Newfoundland Regiment. Mr. Ayre served as Chair of the Canadian Chamber of Commerce, the Retail Council of Canada, the Advisory Board of Memorial's School of Business, the Newfoundland Medicare Commission, and Vice-Chair of The National Theatre School of Canada. He was Director of a number of TSX-listed public companies including Aliant and ResourceCan Limited. He is a former Member of the Economic Council of Canada, the Institute for Research in Public Policy, and the Policy Advisory Committee of the C.D. Howe Institute. Mr. Ayre also served as a member of the St. John's City Council, Honorary Chair of the Newfoundland Business Hall of Fame and Provincial Chair of the Task Force on Canadian Unity. Mr. Ayre holds a BA (Honours) in Economics from Harvard University, a Masters of Business Administration from McGill University and an Honorary Doctorate of Laws from Memorial University. He was appointed Hebron Public Review Commissioner on June 24, 2011.

Commission Secretariat

Project Manager – Ed Foran, BComm, CMC

Ed has over 30 years of consulting and business experience with offshore petroleum, information technology and telecommunications and various public and private sector clients. He has a Bachelor of Commerce from Memorial University and is a Certified Management Consultant. He currently serves on the Board of Atlantic Canada-Certified Management Consultants. He is a past board member of NOIA and United Way of Newfoundland and Labrador.

Communications Manager – Shannon Lewis-Simpson, CD, PhD

Shannon Lewis-Simpson is a communications specialist, writer, researcher and editor who has taught post-graduate courses in English literature and Viking-Age language and archaeology at the University of York, York, UK, and Memorial University. She is a Bridge Watch Officer in the Naval Reserve, and has served in Her Majesty's Ships in the Royal Canadian and Royal Navies. She has written and edited books and articles on Viking-Age and Newfoundland history and culture.

Executive Assistant – Claudine Murray

Claudine has 15 years of administration experience working in the petroleum industry, with expertise in Occupational Health & Safety, Document Control and Engineering. Claudine attended the College of the North Atlantic and graduated from Accounting, Business and Computer Administration program.

Legal Counsel – Peter A. O'Flaherty, LL.B, LL.M

Peter A. O'Flaherty is a member of the Bar of Newfoundland and a Solicitor of the Supreme Court of England and Wales. His areas of practice include marine, insurance, regulatory and international law matters. He has presented and written papers to the Canadian Petroleum Law Foundation on "Effective and Efficient Regulation of the Offshore Industry". He has acted as counsel to the Public Review Commissioner for the White Rose Project.

Bridget Daley, LL.B

Bridget Daley was admitted to the Law Society of Upper Canada in 2002, practicing in Ontario, where her primary focus was insurance defense litigation, before returning to St. John's in 2006 where she was admitted to the Law Society of Newfoundland and Labrador. Her practice is limited to civil litigation, with a particular emphasis on insurance-related matters, including defence of professional liability claims.

Independent Specialists

Luc Chabot, PEng

Luc Chabot is President of L.G. Chabot, Inc. in Houston, Texas. He has 30 years of experience in the design of offshore production and drilling platforms, including gravity-based structures, topsides and marine operations. From 1994-1996 he worked in Newfoundland as Engineering Coordinator, Marine Operations (Norwegian Contractors) for the Hibernia GBS construction. He is a past recipient of the Canadian Consulting Engineers Award of Merit in the field of Engineering Research.

Doug House, CM, PhD

Doug House is an independent sociology consultant (DH Consultants) and Honorary Research Professor at Memorial University. He currently chairs the Strategic Partnership Council of Newfoundland and Labrador, and has previously chaired the Royal Commission on Employment and Unemployment (1985-86), the Economic Recovery Commission (1989-96), the Board of Enterprise Newfoundland and Labrador Corporation (1989-1993), and co-chaired the Task Force on Community Economic Development (1994-95). He has also served as Deputy Minister, Department of Innovation, Trade and Rural Development for the Government of Newfoundland and Labrador.

Wade Locke, PhD

Wade Locke is a Full Professor of Economics at Memorial University. He specializes in the Newfoundland and Labrador economy, resource economics, energy issues, public finance, economic impact assessment, cost-benefit analysis.

John Murray, PhD

John Murray is Director of Technology with FloaTEC, LLC. He holds a PhD in Ocean Engineering from Memorial University. For 12 years he worked in St. John's with the National Research Council and moved to Houston in 1997. He has held various senior technical positions in the oil industry related to offshore drilling and design. He has won numerous awards including the "World Oil Innovative Thinker" in 2009.

Kevin Roche, PEng

Kevin Roche has held senior engineering positions in Newfoundland and Labrador, Norway and the North Sea. He was Division Manager and Vice-President of Noble Drilling Canada, and was Vice-President Technology within the Noble Corporate team. He was directly responsible for daily operations for both drilling rigs of the Hibernia platform, overseeing drilling, drill maintenance services, safety management systems, and financial performance of these drilling units.

Patrick Stamp, MBA

Patrick Stamp is an independent economic consultant (Stamp and Associates). He has held senior positions within the federal government related to economic development. He conducted economic policy research and advised federal ministers in support of negotiations for NAFTA and the Atlantic Accord. He has played a lead role in the planning and implementation of initiatives to maximize local participation in key industrial sectors, and has provided direct support to the C-NLOPB in auditing industrial benefits programs.

David Taylor, MSc

David Taylor is an independent environmental consultant (D.G. Taylor, Inc.) with extensive knowledge of environmental legislation and regulations and practical operational environmental protection experience working with both the public and private sectors. He has over 25 years of experience of the oil and gas sector including consultancy for HMDC, White Rose, Statoil Canada, Suncor, Conocophillips and Chevron Canada. His background also includes experience with Environment Canada in Ottawa and Halifax; as Director of the Province's environmental assessment and pesticide management processes; environmental assessment of private sector subsea pipeline projects in Canada and the United States and more recently management of a program of environmental research in support of offshore oil and gas development for East Coast Canada for the Environmental Studies Research Funds.

Appendix B

Terms of Reference

Commissioner's Terms of Reference for the Proposed Hebron Project Public Review

1. Definitions

In these Terms of Reference,

"Accord Acts" means the *Canada-Newfoundland Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*;

"Benefit Plan Guidelines ", means the Benefit Plan Guidelines dated 2006 as published by the Board and available at the Board's website (www.cnlopb.nl.ca) under "Legislation and Guidelines".

"Board" means The Canada-Newfoundland and Labrador Offshore Petroleum Board;

"Canada-Newfoundland and Labrador Benefits Plan" has the meaning set out in section 45 of the Accord Acts;

"Commissioner" means the individual appointed pursuant to para. 44(2)(b) of the Accord Acts;

"Development Application" means all documentation provided to the Board by the Proponent for the purpose of para. 44 (2)(c) of the Accord Acts, to support approval of the Project

"Development Plan Guidelines" means the Development Plan Guidelines dated 2006 as published by the Board and available at the Board's website (www.cnlopb.nl.com) under "Legislation and Guidelines";

"development plan" has the meaning set out in section 2 of the Accord Acts;

"Participant" means a person other than the Proponent, who makes an oral presentation or files a written submission to the Commissioner pursuant to the Procedures for Public Review;

"Procedures for Public Review" means the procedures as may be implemented by the Commissioner;

"Project" means the proposed development of the Hebron oil field;

"Proponent" means ExxonMobil Canada Ltd.;

"Secretariat" means the Commissioner's support staff obtained pursuant to Paragraph 13;

2. General

Subject to the requirements of these Terms of Reference and the Accord Acts, the Commissioner will conduct a review of the Development Application which will include:

- a. considerations of human safety and environmental protection* incorporated into the proposed design and operation of the Project;
- b. the general approach to the proposed and potential development and exploitation of the petroleum resources within the Hebron Significant Discovery Area; and
- c. the resulting benefits that are expected to accrue to the Province of Newfoundland and Labrador and to Canada, having particular regard to the requirements for a Canada-Newfoundland and Labrador Benefits Plan.

3. Scope of the Review

The Commissioner shall include in his review a consideration of the matters dealt with in the Development Plan Guidelines and the Benefits Plan Guidelines.

4. Limitation

The Commissioner's mandate shall not include an examination of questions of energy policy, jurisdiction, the fiscal or royalty regime of governments, the division of revenues between the Government of Canada and the Government of Newfoundland and Labrador, or matters which go beyond the potential or proposed development of the Hebron Significant Discovery Area.

5. Public Participation

The Commissioner shall conduct the public review sessions in a manner which shall promote and facilitate public participation.

6. Conduct of the Review

The Procedures for Public Review implemented by the Commissioner will be generally consistent with the Development Plan Guidelines and the Benefits Plan Guidelines.

7. Consultation by Commissioner with Board

The Commissioner, the Secretariat, or both may consult the Board for the purposes of clarifying any matters respecting these Terms of Reference or the review process for the Development Application. In no event shall the Commissioner or Secretariat consult the Board for the purposes of discussing any substantive matters or merits respecting the Development Application or Project.

*drafting error corrected 13 September 2011

8. Referral of Documentation to Commissioner

Following the Board's determination that the documentation contained in the Development Application is complete for public review, the Board shall refer the documentation to the Commissioner for public review. As soon as practicable thereafter, the Commissioner shall issue a general notice to the public containing or attaching the following information:

- a. the approximate dates during which the public sessions are expected to take place. (At least 60 days notice will be provided between the date of such notice and the commencement of public sessions);
- b. the Terms of Reference and the Procedures for Public Review; and
- c. relevant information respecting how interested parties may obtain a copy of the Development Application or further information.

9. Request for Additional Information

The following guidance is provided respecting any requirement to obtain information additional to the Development Application documentation filed under paragraph 8 above:

- a. following the referral of the Development Application to the Commissioner, the Commissioner may request any further information from the Proponent which the Commissioner considers necessary for the conduct of the public review, including but not limited to:
 - i. information relevant to the Project;
 - ii. existing technical, environmental or other information relevant to the review;
 - iii. supplementary information including a description of any Proponent-initiated public consultation program, its nature and scope, issues identified, commitments made and outstanding issues; and
 - iv. any proposed work plans, terms of reference or guidelines relating to the Proponent's preparation of its Development Application;

Such additional information gathered for the above purposes will be referred to as "Supplementary Information";

- b. The Commissioner shall ensure that subject to any disclosure restrictions under law, the information provided under the Development Application and the Supplementary Information is made available for public examination;
- c. Following the general notice of public sessions referred to in paragraph 8, but prior to announcing a detailed schedule for public sessions under paragraph 11, the Commissioner will request public comment to determine whether additional information should be provided before convening the public sessions. The time period for receipt of comments shall not exceed thirty (30) days. In consideration of any comments which are received, the Commissioner may request additional information from the Proponent having particular regard for its relevance, material value and reasonableness. Any request for additional information shall be issued no later than fifteen (15) days following the expiry of the thirty (30) day period for comment referred to above;

- d. Once the notice for public review sessions have been given and any Participant makes or files a submission pursuant to the Procedures for Public Review, the Commissioner may also request any additional information from any Participant, which in the Commissioner's opinion is relevant.

10. Location of Sessions

The Commissioner will hold the sessions in St. John's and in other locations as may be determined by the Commissioner.

11. Announcement and Completion of Sessions

The Commissioner will provide notice of the detailed schedule and announce specific dates and locations of the public review sessions respecting the Project once the Commissioner is satisfied with the information provided. This notice will be issued a minimum of thirty (30) days prior to the start of the sessions.

12. Reporting

The Commissioner will prepare and submit to the Board, to the federal Minister of Natural Resources and to the provincial Minister of Natural Resources, having particular regard for the matters considered under the Development Plan Guidelines and Benefits Plan Guidelines, a report on its review of the Project, including:

- a. comments which are received from the public; and
- b. the Commissioner's recommendations.

The report shall be submitted at the earliest possible date but in no event later than one hundred and eighty (180) days following receipt of the information referred to in paragraph 8.

13. Support Staff for Commissioner

The Commissioner may obtain and as needed, request the services of support staff including independent specialists or professionals whose functions would be to provide information on and help interpret information and issues relevant to the public review. The names of any such persons retained by the Commissioner will be made public. Specialists hired by the Commissioner may be requested to appear before the Commissioner. Other support services may also be obtained with respect to any logistical and administrative functions which need to be performed.

14. Powers of the Commissioner

The Commissioner shall be vested with the same powers conferred by the Government of Newfoundland and Labrador to any commissioner appointed pursuant to the *Public Inquiries Act, 2006* and the *Inquiries Act*.

Appendix C

Operational Procedures for the Hebron Development Application Public Review

1. INTRODUCTION

1.0.1. This document outlines operational procedures to be followed in the public review of the Hebron Development Application, including the time frames for stages of the public review and guidelines for written and oral submissions and for the conduct of Public Review Sessions.

1.0.2. The review is being conducted by an independent Commissioner appointed by the Board in accordance with the Accord Acts. Subject to the requirements of the Commissioner's Terms of Reference and the Accord Acts, the Commissioner will conduct a review of the proposed and potential development of the Hebron Significant Discovery Area, to include:

considerations of human safety and environmental protection incorporated into the proposed design and operation of the Project;

the general approach to the proposed and potential development and exploitation of the petroleum resources within the Hebron Significant Discovery Area; and

the resulting benefits that are expected to accrue to the Province of Newfoundland and Labrador and to Canada, having particular regard to the requirements for a Canada-Newfoundland and Labrador Benefits Plan.

1.0.3. The Commissioner shall include in his review a consideration of the matters dealt with in the Development Plan Guidelines and the Benefits Plan Guidelines. The Commissioner's mandate shall not include an examination of questions of energy policy, jurisdiction, the fiscal or royalty regime of governments, the division of revenues between the Government of Canada and the Government of Newfoundland and Labrador, or matters which go beyond the potential or proposed development of the Hebron Significant Discovery Area.

1.0.4. The objective of the public review is to provide opportunities for:

the Proponent to explain the Project and respond to concerns and questions raised by Participants during the hearings;

Participants (including individuals, organizations, and members of the general public) to make known their views and opinions, and to present information on the effects of the Project; and

the Commissioner to receive information to assist him in reaching informed and objective conclusions with regard to the Project, which will form the basis for his recommendations.

1.0.5. A large number of Participants may wish to be present and be heard during the Public Review Sessions. These procedures are intended to promote and facilitate public participation and to ensure that the review takes place in a fair and equitable manner, with maximum cooperation and courtesy. The Commissioner will maintain order and efficiency in a structured, but informal, atmosphere. As the Commissioner's conclusions and recommendations will not have legal force but will be advisory in nature, the public review will not be governed by the strict rules of procedure and evidence required by a court. However, the Commissioner will conduct the public review in a manner which will require accountability, whether experiential or evidential, for statements made by the Proponent and Participants.

1.0.6. The Commissioner has the discretion to modify, add to or waive these operational procedures or any specific provision herein where there are reasons why the objectives of the public review can be better achieved by taking a different approach.

2. REVIEW PROCESS

2.0.1. As of August 25, 2011, the Board has now determined that the documentation contained in the Development Application is complete for public review and has referred it to the Commissioner.

2.0.2. The public can make submissions to the Commissioner during two distinct stages of the Public Review process. The first stage, the Additional Information Review, addresses the issue of whether additional information should be requested by the Commissioner and provided by the Proponent prior to convening the Public Review Sessions. The second stage, the Merits Review, gives Participants (be they individuals, organizations or members of the general public) the opportunity to express their views and opinions on the merits of the information and conclusions contained in the Development Application and to present information on the effects of the Project to the Commissioner during the Public Review Sessions.

2.0.3. During the Public Review Sessions, the Proponent has the opportunity to present information on the Project and to discuss Project-related issues with individuals, organizations and the general public.

2.0.4. The information presented during the public review will assist the Commissioner in reaching informed and objective conclusions with regard to the Project, which will form the basis for his recommendations. The Commissioner's report will be submitted to the Board, the federal Minister of Natural Resources, and the provincial Minister of Natural Resources.

3. ADDITIONAL INFORMATION REVIEW

3.0.1. Early in the process, the Commissioner will request submissions from the public to determine whether additional information should be provided by the Proponent before convening the Public Review Sessions. At this stage, submissions to the Commissioner should not address the merits of the Project, but may be made to request that the Proponent provide additional information to the Commissioner on the following subjects:

information relevant to the Project;

existing technical, environmental or other information relevant to the public review of the Project;

supplementary information including a description of any Proponent-initiated public consultation program, its nature and scope, issues identified, commitments made and outstanding issues; and

any proposed work plans, terms of reference or guidelines relating to the Proponent's preparation of its Development Application.

3.0.2. Anyone wishing to make a submission to the Commissioner regarding requests for additional information must do so in writing within the time period to be set by the Commissioner, not to exceed thirty (30) days.

3.0.3. Submissions should be forwarded in hard copy and in electronic format [as Acrobat or MS-Word files] to the Commissioner's office.

3.0.4. All written submissions for the Additional Information Review must include:

the name and address of the Participant;

the names of all individuals, groups, organizations, or entities on whose behalf the Participant

is acting; and

complete citations of all studies, articles, reports or other documents used in support of the Participant's submission.

3.0.5. The Commissioner will review and consider all written submissions received in accordance with this section in determining whether to request additional information from the Proponent in accordance with section 9 of the Commissioner's Terms of Reference.

3.0.6. All written submissions received in accordance with this section will be made available at the Commissioner's website (www.hebronpublicreview.ca).

4. MERITS REVIEW

4.0.1. The review of the merits of the Project provides for both written submissions to the Commissioner and for oral presentations during Public Review Sessions. This stage of the review allows Participants to make known their views and opinions on the merits of the information and conclusions contained in the Development Application, and to present information on the effects of the Project to the Commissioner during the Public Review Sessions.

4.1. Written Submissions - Guidelines for Participants

4.1.1. Anyone wishing to register a written submission with the Commissioner's office must do so by filing three (3) copies of the entire submission at least ten (10) working days prior to the commencement of the Public Review Session. Submissions should be provided in hard copy and in electronic format (as Acrobat or MS-Word files).

4.1.2. All written submissions must include:

the name and address of the Participant;

the names of all individuals, groups, organizations, or entities on whose behalf the Participant is acting;

if presenting, the name of the person(s) who will present the Participant's submission at the Public Review Sessions;

if presenting, the particular Public Review Session(s) at which the Participant wishes to make the presentation;

complete citations of all studies, articles, reports or other documents used in support of the Participant's submission; and

the Participant's position and recommendations with respect to the Project.

4.1.3. All written submissions received in accordance with this section will be reviewed and considered by the Commissioner and made available at the Public Review Sessions, the Commissioner's office and/or the Commission website (www.hebronpublicreview.ca).

4.2. Oral Presentations - Guidelines for Participants

4.2.1. Anyone wishing to make an oral presentation at any Public Review Session is requested to pre-register as a Participant by notifying the Commissioner's office and submitting three (3) copies of any speaking notes or materials to be presented at least ten (10) working days prior to the commencement of the Session. Any person providing timely notice will be included as a Participant and will be given priority to speak. Unless such information will be included as part of a written presentation pursuant to section 4.1, Participants must provide the following information when registering :

the name and address of the Participant;

the names of all individuals, groups, organizations, or entities on whose behalf the Participant is acting;

the name of the person(s) who will present the Participant's submission at the public review sessions;

the particular Public Review Session(s) at which the Participant wishes to make the presentation;

complete citations of all studies, articles, reports or other documents used in support of the Participant's submission;

what audio-visual support will be required; and

the Participant's position and recommendations with respect to the Project.

4.2.2. Use of audio-visual materials to complement oral presentations is encouraged.

4.2.3. Any oral presentation which refers to written material, including journal articles, studies, reports or a written submission under section 4.1 above, should be limited to highlighting essential features of the material or responding to questions on it.

4.2.4. A schedule listing the order of presentations by Participants will be available at the beginning of each session.

4.2.5. Persons wishing to make a presentation at any session and who are not pre-registered as a Participant may register prior to the start of a session or during intermission. The opportunity to present will depend upon the time remaining after the pre-registered Participants have been heard. The Commissioner may organize further sessions if sufficient interest exists.

4.2.6. A Participant (including any other individual, group, organization or entity on whose behalf it is acting) will be allowed to make one presentation to the Commissioner per session and may present to the Commissioner at more than one session, provided the Participant has registered to do so and the presentations are not repetitious in substance.

4.2.7. Participants shall prepare oral presentations so that they can be concluded within fifteen (15) minutes. A longer period may be granted at the discretion of the Commissioner if such a request for more time is provided to the Commissioner's office at the time of registration.

4.2.8. More than one individual may participate in an oral presentation by a Participant. When a presentation is made on behalf of a Participant by several persons, the collective presentation must take place within the time period assigned for that Participant.

4.2.9. Once the notice for Public Review Sessions has been given and a Participant makes or files a submission in accordance with these Procedures, the Commissioner may also request any additional information from that Participant which, in the Commissioner's opinion, is relevant.

4.2.10. The Commissioner will not accept any information following the completion of the Public Review Sessions.

4.3. Public Review Sessions - Location and Scheduling

4.3.1. Public Review Sessions will be held in St. John's and in any other locations in the Province as may be determined by the Commissioner. Priority will be given to people wishing to participate in the session held in their area.

4.3.2. In addition to general sessions, focus sessions addressing specific topics which form an integral part of the Development Application may be held in St. John's. These topics will be announced before the Public Review Sessions begin.

4.3.3. The Commissioner may exercise discretion to include or limit presentations as time allows.

4.3.4. A notice outlining the schedule, including dates and locations of the public review sessions, will be published by the Commissioner no later than 30 days before the sessions are to commence. This and any other relevant information is available by contacting the Commissioner's office pursuant to section 5.

4.4 Public Review Sessions - Order of Presentations

4.4.1. The normal order of presentations is as set out below.

4.4.2. The Proponent will make a presentation at the start of each Public Review Session to explain the proposed Project. The Proponent will be allotted 30 minutes to make its presentation. At focus sessions, the Proponent's presentation will address the issue designated for that particular session. Each presentation by the Proponent will be followed by a question and answer period of a determined length.

4.4.3. Participants who have pre-registered to make an oral presentation will be next to address the Commissioner, followed by Participants who have not pre-registered, if time permits. Each Participant's

presentation will be expected to conform with the time allotted and will be followed by a similar question and answer period.

4.4.4. The Commissioner will allow a reasonable opportunity for the Proponent to present a reply to any oral presentation or written submission.

4.5 Public Review Sessions - Guidelines for Questioning

4.5.1. Persons making presentations may be subject to questioning for greater clarification by the Commissioner, and where appropriate, by the Proponent and other Participants. The purpose of these questions should always be to elicit information that will help the Commissioner understand more fully the issues which relate directly to his mandate.

4.5.2. The Proponent and Participants should pose their questions in a tone and style that are courteous to, and respectful of, others. Clarity and brevity are encouraged. Questions should be asked in a non-confrontational manner for the purpose of obtaining further information or explanations.

4.5.3. Each presenter may be questioned immediately following his or her presentation. The order of questioning will be determined by the Commissioner but typically will be by the Commissioner and the Proponent/ Participants as appropriate. Should time permit, the Commissioner may also invite members of the general public who have not registered as Participants, to ask pertinent questions. The Commissioner may ask questions at any time during the session.

4.5.4. The following points provide general guidelines for questioning during Public Review Sessions:

Questions should be directed to the Commissioner who may invite the appropriate person(s) to respond to the question;

The Commissioner may limit or exclude questions or comments which, in the Commissioner's opinion, fall outside the mandate of the Commissioner, are needlessly repetitive, irrelevant, confrontational or immaterial; and

The Commissioner may limit discussion that exceeds the time limit allocated.

4.6 Public Review Sessions - Transcripts and Official Documents

4.6.1. The Commissioner will appoint a person to act as Clerk to the Public Review Sessions. The Clerk will receive the written submissions and other documents presented to the Commissioner and will be present at the sessions to receive and mark exhibits.

4.6.2. Written transcripts will be made of all public review sessions, and will be made available for purchase by the public within a reasonable period of time by application to the Commissioner's office. To facilitate the making of transcripts, all speakers during the Public Review Sessions should clearly identify themselves and their organizations as appropriate when addressing the Commissioner.

4.7 Public Review Sessions - Representation by Agent

4.7.1. The Commissioner encourages Participants who wish to make an oral presentation to speak on their own behalf and ask their own questions at the Public Review Sessions, although representation by

an agent such as legal counsel, or technical professionals will be allowed. The sessions will generally be informal in nature and will not have the formality, tone or procedures of a courtroom.

4.8 Public Review Sessions - Interpretation

4.8.1. Public Review Sessions will be conducted in English. The Commissioner's Office will make every effort to accommodate requests for French translation, provided the request is received by the Commissioner in a timely manner as directed by the Commissioner and where translation is required for the proper conduct of the session.

5. REGISTRATION AND INFORMATION

5.0.1. At any time throughout the public review, contact can be made with the Commissioner through the Public Relations Manager. For further information respecting the public review or to register for either an oral presentation or to file a written submission, please contact:

Shannon Lewis-Simpson
Communications Manager
Hebron Public Review Commission
Suite 903, 139 Water Street
St. John's, NL A1B 3T2

Telephone: (709) 778-4255

Fax: (709) 778-4261

Website: www.hebronpublicreview.ca

E-mail: info@hebronpublicreview.ca

6. DEFINITIONS

6.0.1. In these Procedures,

"Accord Acts" means the Canada-Newfoundland Atlantic Accord Implementation Act and the Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act;

"Benefit Plan Guidelines ", means the Benefit Plan Guidelines dated 2006 as published by the Board and available at the Board's website (www.cnlopb.nl.ca) under "Legislation and Guidelines".

"Board" means The Canada-Newfoundland and Labrador Offshore Petroleum Board;

"Canada-Newfoundland and Labrador Benefits Plan" has the meaning set out in section 45 of the Accord Acts;

"Commissioner" means the individual appointed pursuant to paragraph 44(2)(b) of the Accord Acts;

"Development Application" means all documentation provided to the Board by the Proponent for the purpose of paragraph. 44 (2)(c) of the Accord Acts, to support approval of the Project

"Development Plan Guidelines" means the Development Plan Guidelines dated 2006 as published by the Board and available at the Board's website (www.cnlopb.nl.com) under "Legislation and Guidelines";

"Development Plan" has the meaning set out in section 2 of the Accord Acts;

"Participant" means an individual, organization, or member of the general public other than the Proponent who makes an oral presentation or files a written submission to the Commissioner pursuant to paragraphs three and four of these operational procedures;

"Project" means the proposed development of the Hebron oil field;

"Proponent" means ExxonMobil Canada Ltd.;

"Terms of Reference" means the "Commissioner's Terms of Reference for the Proposed Hebron Project Public Review" as published by the Board.

Appendix D

Listing of Initial Review Submissions

Initial Review Submissions

- IR-001 Nature Newfoundland and Labrador Additional Information Request
- IR-002 Dr Gail Fraser Additional Information Request
- IR-003 NL Oil & Gas Industries Associations (NOIA) Additional Info Request
- IR-004 Alder Institute Additional Information Request

Commissioner's Request for Additional

- IR-005 Hebron Public Review Request for Additional Information Request Letter (September 30, 2011)
- IR-006 Hebron Public Review Request for Additional Information Request (September 30, 2011)

Proponent's Response and Supporting Documents

- IR-007 ExxonMobil Canada Properties Response to Additional Information Request Letter (October 14, 2011)
- IR-008 ExxonMobil Canada Properties Response to Additional Information Request (October 14, 2011)

Appendix E

Commissioner's Request for Additional Information

INTRODUCTION

On August 25th, 2011 the C-NLOPB deemed the Hebron Project Development Application in regulatory compliance and released the Development Application to the Hebron Public Review Commission. On that same day, The Commissioner for the public review of the Hebron Development Application announced the start of the review process to the public. The Development Application documents were prepared by ExxonMobil Canada Properties, and consist of:

Part 1

- Development Application Summary
- Development Plan
- Socio-Economic Impact Statement and Sustainable Development Report
- Concept Safety Analysis for The Hebron Installation
- Produced Water Management Strategy
- Canada-Newfoundland and Labrador Benefits Plan April 2011
- Canada-Newfoundland and Labrador Benefits Guidelines for Contractors
- Listing of the C-NLOPB's Additional Information and Items Requiring Clarification Arising from the Completeness Review of the Hebron Development Plan.
- ExxonMobil Canada Properties Response to Completeness Review of the Hebron Development Plan
- Listing of the C-NLOPB's Additional Information and Items Requiring Clarification Arising from the Completeness Review of the Benefits Plan.
- ExxonMobil Canada Properties Response to Completeness Review of the Benefits Plan
- Bull Arm Site Environmental Protection Plan
- KKC_Bull Arm Site Spill Prevention and Response Plan
- Hebron Benefits Agreement

Part 2

- Comprehensive Study Report

On August 31st, 2011 the Commissioner requested public submissions as to whether any additional information is required from the Proponent prior to the start of the public review sessions. Submissions on this subject were to be received by the Commissioner by September 23, 2011.

The Commissioner has now completed his review of the Development Application documents and considered the public comment received. As a result, ExxonMobil Canada Properties is requested to provide additional information on the topics listed below.

Once this “Supplementary Information” is received, it will be made public and a detailed schedule containing specific dates and locations of the public review sessions will be released. It is anticipated that hearings can begin in late November and that sessions will be held in St. John’s, Clarenville and Marystown.

SPECIFIC REQUESTS

ExxonMobil Canada Properties is requested to provide the additional information respecting the subject areas outlined below:

DEVELOPMENT APPROACH

As per the Development Plan Section 1.8, Preferred Concept:

“The Project Proponents evaluated the alternative modes of development, including development drilling options, and determined that the preferred concept is to develop the Hebron Asset using a stand-alone concrete GBS (no pre-drill option) and topsides, and an OLS.”

As the Hebron GBS is the second GBS to be built in NL, the following questions are posed:

1. Foundation Design

1. It is noted that the Hebron GBS requires considerably less solid ballast than the Hibernia GBS. Explain the Hebron foundation design, including footprint, skirt design, grouting and solid ballast quantities in comparison with the Hibernia GBS.
2. Has the potential for seabed subsidence been evaluated, due to different reservoir pressure maintenance scenarios over life of field?

References: Development Plan (DP) 8.3.1, 8.3.2, 10.1

2. GBS Design

For Hibernia, global wave loading was found to be equivalent if not dominant over ice loads. Model testing also revealed wave run-up and slamming underside of the deck became a design issue.

1. EMCP is requested to list the type of model tests that will be performed as part of the Hebron design process, indicating which tests will be performed as part of FEED and detail design, and which shall be accomplished in NL and/or Canada.

2. Local ice contact pressure criteria have significant impact on concrete wall design. Provide a comparison of local ice pressure criteria (pressure versus area curve) that will be used for Hebron versus Hibernia curve, including an explanation and justification of the differences.

References: DP 9.2.3, 9.2.4, 9.2.4.2, 9.2.4.4

3. Project Design and Execution

1. What design approach for the GBS, topsides and utilities processing modules (UPM) will be utilized to maximize the number of specialty skids, major package supply, construction material supply and construction services that can be sourced from local and national companies?
2. Provide a list of candidate facilities considered qualified to undertake the fabrication of the UPM, drilling support module, drilling derrick, living quarters, flare boom, helideck and lifeboat stations.
3. What is the base plan for items to be fabricated at Bull Arm?
4. From where will the materials for the concrete (cement, aggregate, rebar, additives) be supplied?
5. Is the plan to stick build GBS outfitting in place, or fabricate modules, lift, install and interconnect?

References: DP fig. 10.4.1-1, 10.4.1.2, 10.4.1.3, 10.4.1.4, 10.4.2, 10.4.4

4. Project Schedule

1. The overall schedule is shown as 60 months from sanction to first oil. Benchmark and rationalize this duration against similar EPC and industry projects.

Reference: DP 10.2

BENEFITS APPROACH**5. Pool 3**

As per the Hebron Development Plan Section 1.9.5, Subsea Production and Injection Systems: “A full development option of Hebron Pool 3 is as a subsea tie-back to the Hebron GBS (Option 3).”

As per the Hebron Benefits Agreement Section 5.12(C), Agreement on Benefits:

“notwithstanding any other provision in this Agreement, industrial and employment benefits relating to any exploration, development or production of oil or gas from the Lands by any stand-alone development (other than the GBS), subsea development and tie-back to the GBS or by any other infrastructure other than the GBS, will be the subject of a separate development plan and fundamental decision under the Accord Acts, which development plan and fundamental decision under the Accord Acts shall not in any way be affected by this Agreement.”

1. Is EMCP seeking approval to proceed with the Pool 3 option within the Hebron Development Application?
2. Does the Benefits Plan cover Pool 3? If so, specify expected local benefits attributable to Pool 3 including labour/employment, procurement, R&D. If Pool 3 is not covered in the Benefits Plan, provide rationale.
3. Provide the CAPEX and OPEX profiles for the main field development (Pools 1, 4, 5) and Pool 3 under both upside and downside production scenarios.

References: Benefits Agreement (BA) 5.12(C); Canada-Newfoundland Atlantic Accord Implementation Act, (S.C. 1987, c. 3, s. 45)

6. R&D

As per the Benefits Agreement, Section 5.9(A):

"The Proponents shall invest one hundred twenty million dollars (\$120,000,000) in Research and Development during the life of the Hebron Project."

1. What oil prices and production profiles were used to arrive at the number of \$120,000,000?
2. Is this the estimate that would be derived following the C-NLOPB's 2004 Benefits Plan Guidelines? If not, will the full amount of R&D and E&T commitments be spent following the guidelines? In other words, if the amount of R&D and E&T expenditure calculated by following the guidelines exceeds the \$120 million estimate, which will take precedent?

As per the Benefits Plan Section 3.3.5, Research and Development:

"A process for identifying and raising awareness of potential R&D projects, and give priority to undertaking R&D in the Province, where effective and competitive."

3. Clarify that R&D and E&T expenditures will take place in NL as per the Benefits Plan Guidelines Section 3.1, and what is meant by "where effective and competitive"? In order to be eligible, R&D and E&T expenditure must occur in the Province of Newfoundland & Labrador.

References: BA 5.9; Benefits Plan Guidelines (BPG)

7. Employment Percentages

The Benefits Plan contains internal inconsistencies with regard to the absolute value and range of values for local employment. The overt or extrapolative numeric values for local content are variously reported as 11 million work hours, 6-10 million work hours, or (adjusted for accuracy disclaimer) 4.5 - 12.5 million work hours. EMCP also states that the Benefits Plan responds to, and is consistent with, employment undertakings of the Benefits Agreement. The Benefits Agreement prescribes minimum employment values for certain activities, the aggregate of which is 6.35 million work hours, while pledging unspecified levels of local labour for other activities.

1. With the benefit of FEED, procurement planning, and procurement activities completed to date, give an updated base case estimate for local and Canadian employment content and confirm a prospective range of values above and below this estimate.
 2. Confirm or restate the estimated work hours by skills classification and year, and provide an estimate of the local employment content for each topside and GBS related activities.
 3. Do the 30-50 % and 15-25 % employment estimates relate to pre-production CAPEX, total CAPEX, or total project employment (CAPEX and OPEX)?
 4. Clarify the range of benefits with and without +/-25% contingency.
 5. Do these estimates include Pool 3? Provide these estimates with and without Pool 3.
- References: Benefits Plan (BP) 4.2.5, 4.2.6.1, 4.4, Appendix C; BA; Socio-Economic Impact Statement (SEIS) 4.3.1

8. Local Expenditure Content

1. Provide the specific analysis that demonstrates that 35-55% of project expenditure will occur in NL and 15-30% of project expenditure will occur elsewhere in Canada.
 2. Do the 35-55% and 15-30% expenditure estimates relate to pre-production CAPEX, total CAPEX, or total project employment (CAPEX and OPEX)?
 3. Clarify the range of benefits with and without +/-25% contingency.
- References: BP 4.4

9. Procurement and Contracting

The Hebron Construction Sequence provides high-level definition of the project's Work Breakdown Structure. The Benefits Plan discusses aspects of the contracting strategy that are designed to enhance local participation.

1. What minimum targets have been set for the use of local and rural goods and services? How will these quantifiable local benefits targets be tracked and publicized?
2. What approach will be implemented to encourage principal contractors to consider and award to local and national companies? Is a Vendor Development Program under consideration?
3. What steps will be taken to ensure that local enterprises have access to information, such as shop drawings, operations and maintenance manuals, to improve the training of the local supply chain and their ability to service equipment?
4. What specific technology transfer opportunities are being made available for local companies?
5. Elaborate on the prequalification and bidding strategy for the Utilities Processing Module (UPM) and confirm any local opportunities for UPM construction and sub-contracting opportunities for the local service and supply communities.
6. What commitment has been made towards the consistent scalability of bid packages so that smaller local and rural supply and service enterprises can fully participate in the project?
7. Will a preferred supplier be listed in specifications for major contracts? If so, will there be a targeted effort to identify and qualify local and national companies?
8. Will the Project Management Team (PMT) have a procurement function to handle Owner Furnished Equipment (OFE)? If so, what items are expected to be procured directly by PMT and what percentage of project value will OFE represent? Comment on potential opportunities for local and rural procurement of OFE.

References: BA 5.5(D); BPG 3.5, 5.0, 5.1.1; BP 3.2, 4.0, 4.2.4.5

10. Assembly and Fabrication Yards

1. Comment on the support for supplier development initiatives at Marystown and Cowhead and assess the prospect of full utilization of the facilities to meet the needs of the Hebron project.
2. Provide additional detail regarding the planned scope and cost of improvements to the Bull Arm facilities, including accommodations, offices, support and shop spaces, steel fabrication yards, concrete construction capabilities, and a drydock, as well as any further permanent improvements which are planned at Bull Arm to serve as a legacy for NL.
3. What specific steps will be taken to ensure that the drilling support module and the drilling derrick are built at local facilities?

Reference: DP 10.4.2.5, 10.4.4.3; BP 4.2.4.1, 4.2.4.5, 5.2.4; SEIS 4.1.3, Development Plan Guidelines (DPG) 1.3.3

HUMAN SAFETY**11. Safety Management System**

1. In accordance with the proposed 'Step Change in Safety', what initiatives are planned to mitigate risk to human safety in the construction, operations, and removal phases of the project that go beyond regulatory requirements and follow lessons learned from other projects in the C-NL offshore and in other jurisdictions, with regards to:
 - 2.1. choice of transportation vessels (ice-classed) at the deep water site (DWS);
 - 2.2. winter driving conditions faced by off-shift workers at the Bull Arm site;
 - 2.3. changes to working hours and/or provision of transport or onsite accommodations at Bull Arm to mitigate traffic accidents due to fatigue;
 - 2.4. special considerations for safe winter employment;
 - 2.5. construction barge safety management to ensure integrity of support craft and worker safety including size of construction barges, outfitting for mooring, escape routes, use of safe haven barge; and
 - 2.6. criteria to which components and equipment are engineered in relation to deterioration of weather windows during the execution of marine operations at the DWS.
 - 2.7. , will be monitored /audited by and/or reported to EMCP.
3. Will statistics for "offsite" incidents (travel to Bull Arm) be monitored and reported?
4. How will 'near misses' be captured within EMCP's safety program, and what incentives will be offered to achieve safety goals during all phases of the project with all contractors?

References: DP 9.2.4, 10, 10.4.2.2, 12, 14, 14.2; SEIS 5.3.3.3; Newfoundland Offshore Petroleum Installations Regulations (NOPIR) SOR/95-104 s. 43(1); L-HE-CNO-11804-03 EMCP Letter August 14, 2011; Offshore Helicopter Safety Inquiry (OHSI) Implementation Team Advice to C-NLOPB dated August 17, 2011

12. Personnel Transport

1. Discuss the basis for designating helicopter as the primary means of transport to the offshore in terms of the following risk reduction criteria:
 - 1.1. risk assessment for air and marine transport to the offshore;
 - 1.2. the planned number of flights and passengers to the offshore and the percentage of flights that operate on schedule, operate with delay, and are cancelled due to weather and/or sea state (providing statistics of this transport for review);
 - 1.3. the number of trips and passengers carried by marine vessel (providing statistics of this transport for review);
 - 1.4. average cost per person per trip by helicopter or marine vessel;
 - 1.5. environmental and seasonal parameters and constraints, with special consideration of number of fog days per year;
 - 1.6. logistical constraints of each transport method; and
 - 1.7. method of dis/embarkation from transport vessel to platform.

References: DP 1.12.2; OHSI Implementation Team Advice to C-NLOPB May 19-August 17, 2011

13. Safety in Design

1. Clarify what type of H2S detectors will be installed as part of the initial design and at what threshold level will these alarms be set.
2. There is one TSR (Temporary Safe Refuge) and two lifesaving stations/muster points planned. What thought has been given to increasing the firewall rating around these areas to more than the mandated two hours?

References: DP 9.2.4.2, NOPIR SOR/95-104 s. 32(1)

14. Evacuation Fatality Rate

1. It is assessed in the Concept Safety Analysis (CSA) that a 3% fatality rate may result from a precautionary evacuation by lifeboat, including *'fatalities due to failure of the evacuation systems and fatalities whilst rescuing personnel from lifeboats or survivors from the sea'* (CSA 12.2). Please provide clarification on this percentage and a definition of what is meant by precautionary evacuation and the parameters under which one might be ordered.

References: Comprehensive Safety Analysis (CSA) 7.7.5, 8.7.4, 12.2

ENVIRONMENTAL PROTECTION**15. Gas Compression and Flaring**

1. Describe the approach to gas compression design, minimizing the start-up compression time so that flaring is also minimized. What lessons have been learned from other Jeanne d’Arc Basin projects in this regard?
2. Are there any reservoir characteristics that pose issues for rapid introduction of gas injection?
Reference: Comprehensive Study Report (CSR); Air Emissions Modelling Appendix

16. Water ReInjection

1. The CSR states that produced water re-injection is an “unacceptable risk” unless a series of technical issues can be resolved. Assuming that these issues cannot be resolved, what lessons have been learned with respect to produced water treatment arising from incidents experienced by other operators in the Jeanne d’Arc basin and what is planned from a design and operations perspective to account for those lessons?
2. Dispersion modeling for produced water discharge has been presented for a discharge configuration comparable to Hibernia. However, other modeling approaches, i.e., Dream Modeling, have not been addressed. From the perspective of produced water management is the intent to use a similar approach to other Jeanne d’Arc Basin operators to minimize the toxicity of its produced water effluent?

References: CSR & Drill Cuttings, Produced Water & Storage Displacement Water Modeling Appendix; PW Management Strategy CAHE-ED-SRZZZZ-10-684-001 Rev 0 21 Apr 11

17. GBS Storage and Discharge

1. Have studies/testing been done with Hebron oil to confirm that oily discharge from buffer cells will not exceed environmentally acceptable limits?
2. How is the level of expected discharge compare to actual discharge levels experienced at Hibernia?
3. Have studies/testing been done with Hebron oil to see how it will behave in terms of emulsion-layer behaviour, paraffin build up on GSB wall, quantification of sediments etc.
4. Has the additional weight from sedimentation in the storage cells been accounted for in the end of life salvage plan?

Reference: DP 9.1.1.3

18. Hydrocarbon Spill

1. What is the approach to oil spill preparedness for both the construction and operations phases of the project, in light of any lessons learned from recent major spills in other jurisdictions?
2. Provide copies of the spill response plans and the spill environmental effects monitoring plans for current construction and proposed operations activities.
3. Both the Comprehensive Study Report and the Concept Safety Analysis consider spill risks, however, the calculated probabilities of same do not appear to be consistent. Explain how the two documents relate to each other and rationalize the apparent differences and their implications for Target Levels of Safety with regard to spills and the implications of same.

References: CSR 14; SEIS 4.3.3.2; DPG 5.3.3, 5.4; CSA

19. Pipework

1. What is the strategy and plan for preservation of pipe work and minimizing the risk of corrosion issues for project components fabricated elsewhere or in advance of installation on the platform? If preservation chemicals are used, what is the strategy for managing contaminated water?

20. EPM Oversight

1. How will EMCP oversee its contractors at Bull Arm and other construction and installation sites to ensure Environmental Protection measures and policies are implemented and committed to as planned?

References: CSR 16; DP 11.1.7

21. Observation and Monitoring

1. Describe the plans to engage regulatory and other stakeholders in the design and implementation of seabird observation studies including the approach to recruiting and training seabird observers to support these programs. Has any thought been given to establishing a bird monitoring base in close proximity to the seabird colonies?
2. Similarly, what will be the comparable approach for the program proposed to monitor marine mammals during construction operations in Bull Arm particularly during the use of underwater explosives and pile driving operations? Comment on the timing of blasting operations as compared to times of migration of marine mammals.

Reference: CSR 15

DOCUMENTS REQUIRED

1. A complete listing of the Part 2 documentation provided to the C-NLOPB.
2. The capacity studies conducted by Kellogg Brown and Root (2005), and Strategic Concepts Inc. (2005, 2008, and 2010) referenced in Benefits Plan 4.0.
3. CAHE-ED-FPRSK-00-000-0001 Project Risk Assessment Plan
4. As construction activities have commenced at Bull Arm, please provide:
 - 4.1. a copy of the Environmental Audit, Inspection Plan and the organization charts for both EMCP's and its EPC contractors showing the functional and reporting relationships for environmental staff for this facility and
 - 4.2. a copy of both EMCPs and EPC contractor(s) final, approved environmental protection and/or management plan for this facility.

Appendix F

Public Sessions Schedule

Day 1	21-Nov-11	General	Holiday Inn, St. John's NL
Day 2	22-Nov-11	General	Holiday Inn, St. John's NL
Day 3	23-Nov-11	General	Marystown Hotel, Marystown NL
Day 4	24-Nov-11	General	Clareville Inn, Clareville NL
Day 5	28-Nov-11	Development Plan	Holiday Inn, St. John's NL
Day 6	29-Nov-11	Dev. Plan/Benefits	Holiday Inn, St. John's NL
Day 7	30-Nov-11	Human Safety	Holiday Inn, St. John's NL
Day 8	01-Dec-11	Human Safety/Benefits	Holiday Inn, St. John's NL
Day 9	05-Dec-11	Benefits/R&D	Delta Hotel, St. John's NL
Day 10	06-Dec-11	Environmental Protection	Delta Hotel, St. John's NL
Day 11	07-Dec-11	Env.Protect./Summary	Delta Hotel, St. John's NL

Appendix G

Listing of Presenters at Public Sessions

Alder Institute	07-Dec-11	PRS-02
Burin Peninsula Chamber of Commerce	23-Nov-11	PRS-22
Canadian Chapter of the Undersea and Hyperbaric Medical Society (CC-UHMS)	01-Dec-11	PRS-26
Canadian Manufacturers & Exporters Association (CME)	22-Nov-11	PRS-37
Chipman, Wayne	06-Dec-11	PRS-47
City of St. John's	22-Nov-11	PRS-13
Coalition of Persons with Disabilities (COD-NL)	05-Dec-11	PRS-03
Communications Energy Paperworkers Local 2121 (CEP)	30-Nov-11	PRS-16
Eastern Suppliers Development Alliance (ESDA)	29-Nov-11	PRS-25
Fish, Food and Allied Workers Union (FFAW)	06-Dec-11	PRS-07
Gaulton, Bill	05-Dec-11	PRS-45
Isthmus Regional Readiness Advisory Committee	24-Nov-11	PRS-28
Montevecchi, Bill	06-Dec-11	PRS-30
Nature Newfoundland & Labrador	07-Dec-11	PRS-01
Neighbourhood of Friends Family Resource Centre (NFFRC)	24-Nov-11	PRS-14
New Democratic Party of Newfoundland and Labrador (NDP)	30-Nov-11	PRS-36
Newfoundland & Labrador Oil & Gas Industries Association (NOIA) (NOIA)	21 & 29 Nov-11	PRS-27
Newfoundland and Labrador Organization of Women Entrepreneurs (NLOWE)	05-Dec-11	PRS-17
Newfoundland Environmental Association (NLEA)	06-Dec-11	PRS-20

Newfoundland Environmental Industry Association (NEIA)	06-Dec-11	PRS-23
NL Federation of Labour (NLFL)	5 & 7 Dec-11	PRS-11 & 46
Newhook, Charles	28-Nov-11	PRS-06
Ocean Engineering Research Centre	28-Nov-11	PRS-19
Professional Engineers and Geoscientists Newfoundland and Labrador (PEGNL)	28-Nov-11	PRS-12
Provincial Advisory Council on the Status of Women	05-Dec-11	PRS-05
Regional Action Committee on Housing (REACH)	24-Nov-11	PRS-24
Resource Development Trades Council of NL (RDC)	01-Dec-11	PRS-33
St. John's Board of Trade	21-Nov-11	PRS-21
Strong, Rob	28-Nov-11	PRS-29
The Leslie Harris Centre of Regional Policy and Development, Memorial University	05-Dec-11	PRS-32
The Office to Advance Women Apprentices	29-Nov-11	PRS-04
Tilley, Paul	24-Nov-11	PRS-44
Town of Clarenville	24-Nov-11	PRS-08
Town of Marystown	23-Nov-11	PRS-35
Town of Sunnyside	24-Nov-11	PRS-15
United Way of NL	21-Nov-11	PRS-09
Women in Resource Development Committee (WRDC)	29-Nov-11	PRS-10

Appendix H

Listing of Public Review Submissions

PRS-01	Nature Newfoundland & Labrador, Submission and Presentation	Len Zedel
PRS-02	Alder Institute, Submission, Presentation and Addendum	Janet Russell
PRS-03	Coalition of Persons with Disabilities (COD-NL), Submission and Presentation	Kelly White
PRS-04	The Office to Advance Women's Apprentices, Submission	Karen Walsh, Kelly Hickey
PRS-05	Provincial Advisory Council on the Status of Women, Submission and Presentation	Linda Ross
PRS-06	Charles Newhook, Submission	Charles Newhook
PRS-07	Fish, Food and Allied Workers Union (FFAW), Submission	Earle McCurdy
PRS-08	Town of Clarendville	Fred Best
PRS-09	United Way of NL, Submission	Tammy Davis
PRS-10	Women in Resource Development Committee (WRDC), Submission	Charmaine Davidge
PRS-11	NL Federation of Labour (NLFL) Human Safety, Submission	Lana Payne
PRS-12	Professional Engineers and Geoscientists Newfoundland and Labrador (PEGNL), Submission	Geoff Emberley
PRS-13	City of St. John's SubmissionCity of St. John's, Submission and Presentation	Dennis O'Keefe
PRS-14	Neighbourhood of Friends Family Resource Centre (NFFRC), Submission	Louise Newell, Bernice Dyke
PRS-15	Town of Sunnyside, Submission	Robert Snook
PRS-16	Communications Energy Paperworkers Local 2121 (CEP), Submission	Brian J Murphy
PRS-17	Newfoundland and Labrador Organization of Women Entrepreneurs (NLOWE) , Submission and Presentation	Paula Sheppard
PRS-19	Ocean Engineering Research Centre, Memorial University, Submission	Claude Daley
PRS-20	Newfoundland Environmental Association (NLEA), Submission	Ian Goudie
PRS-21	St. John's Board of Trade, Submission	Craig Ennis
PRS-22	Burin Peninsula Chamber of Commerce, Submission	Ian Edwards

PRS-23	Newfoundland Environmental Industry Association (NEIA), Submission	Linda Bartlett
PRS-24	Regional Action Committee on Housing (REACH), Submission	Tracey Coady
PRS-25	Eastern Suppliers Development Alliance (ESDA), Submission	Bob Kennedy
PRS-26	Canadian Chapter of the Undersea and Hyperbaric Medical Society (CC-UHMS), Submission	Kenneth M. LeDez
PRS-27	Newfoundland & Labrador Oil & Gas Industries Association (NOIA) November 21, 2011, Submission	Robert Cadigan, Michael Critch
PRS-28	Isthmus Regional Readiness Advisory Committee, Submission	Susan Khaladkar
PRS-29	Strong, Rob, Submission	Rob Strong
PRS-30	Montevecchi, Bill, Submission	Bill Montevecchi
PRS-31	NA	
PRS-32	The Leslie Harris Centre of Regional Policy and Development, Memorial University, Submission	Robert Greenwood
PRS-33	Resource Development Trades Council of Newfoundland and Labrador (RDC), Submission	Rick Dalton
PRS-34	Gail Fraser, Written Submission	Gail Fraser
PRS-35	Town of Marystown, Submission	Sam Synard
PRS-36	New Democratic Party of Newfoundland and Labrador (NDP) , Submission	Dale Kirby
PRS-37	Canadian Manufacturers & Exporters Association (CME) , Submission	Bob Tetford
PRS-38	The Maritimes Energy Association-OTANS, Written Submission	Barbara Pike
PRS-39	ExxonMobil, Presentation	Geoff Parker
PRS-40	ExxonMobil, Presentation	Geoff Parker
PRS-41	Merv Wiseman, Submission	Merv Wiseman
PRS-42	Sea-Force Hyperbaric, Submission	Phil Towers
PRS-43	NOIA, Submission	Bob Cadigan
PRS-44	Paul Tilley, Submission	Paul Tilley
PRS-45	Bill Gaulton, Submission and Presentation	Bill Gaulton
PRS-46	NL Federation of Labour (NLFL) Human Safety, Submission	Lana Payne
PRS-47	Wayne Chipman, Submission	Wayne Chipman

Appendix I

Summaries of Participant Presentations and Submissions

DAY ONE: GENERAL SESSION, NOVEMBER 21, 2011, ST. JOHN'S

NL Oil and Gas Industries (NOIA): Robert Cadigan and Mike Critch

The Newfoundland & Labrador Oil & Gas Industries Association (NOIA) is Canada's largest offshore oil and gas industries association with more than 560 members. Since 1977 NOIA has represented the supply and service sector in the province's oil and gas industry. NOIA provided a very detailed and thoughtful overview of the proposed development of the Hebron Project in terms of development approach and expected benefits to NL and to Canada. NOIA supports the responsible development of and advancement of local content in the Hebron Project, leading to "more consistent local content/local involvement in the Hebron project and future oil and gas projects", and, furthermore, involvement "that can be measured". NOIA suggested that the Benefits Plan could be more specific in its local benefits commitments. NOIA provided seven recommendations, as follows:

The Proponent and its EPC contractors scale the size of bid packages to meet local capabilities.

To enable full and fair opportunity in Newfoundland & Labrador offshore projects, as envisioned by the Atlantic Accord, local business capability and capacity must be considered in the design and bid packaging stages of development.

The Proponent and its EPC contractors develop a consistent, transparent procurement process with a strong local benefits approach. Such a procurement process should be followed from project to project during both the development and production phases. This requires regular and timely publication of detailed procurement forecasts, EOIs, bidders' lists and contract awards at all contract levels by the Proponent and its EPC contractors. This timely information is critical to local companies preparing bids, partnering with other companies, and becoming part of domestic and international supply and service chains.

Challenge the Proponent to exceed its local benefits benchmarks. NOIA and its members would like to see more project engineering done locally. Front-end engineering and design (FEED) determines how a project will be built and how much it will cost.

The Proponent should submit a separate Benefits Plan for the Pool 3 development and conduct FEED locally as was done for North Amethyst. NOIA believes the development of Pool 3 via a potential subsea tie-back represents an opportunity for significant local participation. Such an oilfield development would be similar to other subsea tiebacks in offshore Newfoundland & Labrador, such as the North Amethyst expansion of the White Rose oilfield.

The Proponent and its EPC contractor carry out supplier development sessions for NL companies specifically on the Utilities and Process Module that will be built overseas. The better informed the local service and supply community is about the Utility and Process Module, the better its chances of understanding the maintenance requirements during Hebron operations. Such efforts will transfer knowledge – enabling local companies to land support and maintenance contracts and become part of the supply chain for the Hebron project during operations.

The Hebron Proponent provide specific percentages of employment and expenditure goals expected to occur in Newfoundland & Labrador at each stage of the project: FEED, detailed engineering, GBS construction, topsides fabrication, and mechanical outfitting, hook-up and commissioning, and operations and maintenance. NOIA believes the project is at a stage where more accurate estimates can be provided.

The CNLOPB create a mechanism to track, measure, compare and regularly report the detailed local content achievements at each stage of offshore projects – and make those reports publicly available. A detailed comparison of the local benefits achieved from project to project is necessary to see if the bar is raised on local content and participation with each new offshore development, and determining necessary improvements with regards to technology transfer to meet the challenges of the next frontier, Greenland.

St. John's Board of Trade: Sharon Horan and Craig Ennis

The Board of Trade stressed the fact that oil is a non-renewable resource and therefore further discovery and development of other resources is important. The local industry has matured since the first oil and gas project, but companies and services must remain competitive. The Board of Trade recognized the “significant risk” that labour availability poses to the project and to other major projects over the next 5-10 years. Some of this risk can be mitigated by having large multinationals like ExxonMobil help with productivity improvements so businesses can do more with fewer resources. To mitigate the labour shortage, the Board suggested that government make permanent an existing pilot project where one journeyman supervises two apprentices instead of one, and that government should increase immigration quotas.

They also suggested that “Existing skills can be exported to other harsh environments, like the Arctic, which might provide more opportunities in the near future. Experience can be applied to building new

industries that will provide employment and wealth creation after the oil runs out. Improvements can be made in how we do business so that we are a sought after place for future investment and growth.”

United Way of NL: Tammy Davis and Gary Peddle

United Way of Newfoundland and Labrador builds upon the strength of volunteers and voluntary action by engaging the entire community for the benefit of the whole community. Their goal is to encourage all partners of the Hebron Development to ensure that a compassionate lens is given to mitigating any challenges that come with the wealth brought by this development. They closed their presentation by suggesting that “Compassionate and committed corporations make our communities better places to live, and with a dedicated social responsibility plan many of the social issues that will develop or increase over the course of the project can be mitigated and in some cases resolved. The choice of the Hebron co-venturers to Give, Volunteer, Act is one that will make change happen.”

DAY TWO: GENERAL SESSION, NOVEMBER 22, 2011, ST. JOHN'S

City of St. John's: Mayor Dennis O'Keefe and Elizabeth Lawrence

The City welcomed the development of the Hebron Project but stressed the importance of timely information from major developments in order to anticipate needs and shortfalls in infrastructure, housing, labour, and other aspects of community and regional planning. The City will be preparing a socio-economic report about impacts on community from a number of major planned projects. “There may be some pressures on the community, but a better understanding of the issues is necessary to address any challenges.” The City questioned the *Socio-Economic Impact Statement's* minimization of any adverse effects of the Hebron project, and suggested that much more research is required to justify such a statement. Mayor O'Keefe suggested that the greater metropolitan region is well positioned to become a Centre of Excellence in Arctic and Harsh Environments, and existing expertise in Ocean Technologies should be leveraged. The Mayor ended with a call to all local municipalities to work together with industry to facilitate regional planning towards common goals.

Canadian Manufacturers and Exporters (CME): Robert Tetford

The CME requires a commitment from the Operator that every possible and realistic contract and job stays in NL, and that due diligence is exercised concerning the “first and fair consideration”, as mandated in the Atlantic Accord. Mr. Tetford suggested that, concerning the labour shortage, the CME

advocates for Immigration Policy Expedition, and a reversal of the outmigration of the mobile workforce. The CME also wishes to see more of an effort made towards Supply Chain Development Programs, and suggests that Hebron should maximize CME NL's linkage and partnerships.

DAY 3: GENERAL SESSION, NOVEMBER 23, 2011, MARYSTOWN¹⁰

Burin Peninsula Chamber of Commerce (BPCC): Ian Edwards

The BPCC believes that all developments should be undertaken with sustainability in mind, balancing current needs with the needs of future generations. "We encourage all stakeholders of the Hebron Project to exercise due diligence and caution as they set out to place such a massive manmade structure in our fragile marine environment. We are concerned for the safety of our people, the protection of our environment and a traditional way of life that has sustained our province for generations." They discussed what they see as main threats to NL from the project: the GBS will be operating in a hostile marine environment and an oil spill as what happened in the Gulf of Mexico would have a detrimental effect on the region. It is recommended that a "smart bay" collaborative initiative such as that in Placentia Bay be conducted. Human Resource competition with small businesses is a concern, as are companies that create an address of convenience in NL to be able to avail of "first and fair consideration". They stressed the availability of local expertise to work with the project and the importance of a full disclosure regarding the procurement strategy.

Town of Marystown: Mayor Sam Synard

Mayor Synard discussed the positive experiences of Marystown with the White Rose project, with the only major problem being one of a shortage of housing. The town deliberately did not want a "work camp" scenario in the community, but wished for workers to assimilate with the community. Indeed, a small melting pot formed in the middle of rural Newfoundland, which left Marystown the better for it.

Mayor Synard is pleased that the Drilling Support Module will be built in Marystown. However, that 65% of the topsides, the UPM, should be bid for and constructed overseas is a concern. Mayor Synard suggested that the gap between production needs and yard capability needs to be bridged to be able to meet construction challenges down the road. The legacy of White Rose was increased capability and skill transfer at the yard, but what will be the legacy of Hebron? He suggests that better infrastructure is required at the yard: better lifting capacity and a graving dock will enable larger projects to be completed, and allow for the refit of drilling rigs and FPSOs. He estimated \$210 million has been lost in royalty and revenues through retrofits out of province which take a longer amount of time off station. With regards to the question of whether Marystown can find the workers to build the DSM, he

¹⁰ Schooner Development Corporation could not present their scheduled presentation due to unforeseen events. Their written submission is summarized below.

answered in the affirmative. When the GSF Grand Banks came in for retrofit, it took a week and a half for the yard to have enough skilled workers. Mayor Synard dismissed the notion that large ships cannot come into Marystown, as at Cow Head, there is a depth of 17 meters at the dock in an ice-free harbour.

Mayor Synard's raised the concern of apprenticeships, stating the current system is untenable, and that most apprentices need to go to Alberta to attain hours required. This piece of public policy is not discussed, and needs to be.

DAY 4: GENERAL SESSION, NOVEMBER 24, 2011, CLARENVILLE¹¹

Isthmus Research Project: Susan Khaladkar

Susan Khaladkar presented on behalf of the author, Michelle Porter, due to logistical problems of a snowstorm. The Isthmus Research Project represents the Towns of Sunnyside, Come By Chance, Southern Harbour, Arnold's Cove and Clarenville. "Although industry has worked to lighten impacts, these communities nearest the industrial activity are bearing the largest burden of this activity" with regards to infrastructure, childcare, housing, and negative impacts on the environment. "Emissions impact the smell of the air in these communities disproportionately." These five municipalities want to find a process through which benefits can offset the costs they bear. They stress that it is good business to create positive relationships with nearby communities in exchange for what is being removed: the oil. Real, effective consultation that will help these communities prepare for and benefit from industrial activity needs to be ongoing. The plan states that ExxonMobil "has a commitment to developing industrial and human capacity, and creating and delivering sustainable strategic benefits to host nations down to the community level." "The language used in the plan is general is not specific in either obligations or outcomes. As a result, industry representatives can and will, of course, interpret the plan to meet their own interests. These interests may or may not match the interests and/or needs of the communities they are supposed to be obligated to provide benefits for." Community support to be offered by the company needs to be clearly defined. "Real engagement between industry and these communities is required and needs to be explicit in its definitions and outcomes."

¹¹ The Eastern Suppliers Development Alliance was originally to have presented in Clarenville, but were postponed to November 29, 2011, due to weather.

Town of Sunnyside: Mayor Robert Snook

Mayor Snook discussed the “boom and bust cycle” that is felt by his town. Although it is only 2km away from the Bull Arm site, Sunnyside is not specifically mentioned in the SEIS. Mayor Snook suggested that the Town of Sunnyside will feel significant effects from the industrial activity with regards to more people in the area, more traffic and more wear and tear on the infrastructure. The Bull Arm site is outside of the town’s boundaries and thus no taxes are paid to the town for the use of the town’s water supply and fire-fighting capabilities in start-up. Thus, a grant in lieu of taxes has been paid to the town by ExxonMobil. A discussion followed concerning waste management at the site.

Town of Clarendville: Mayor Fred Best

Mayor Best outlined the perceived and actual socio-economic impacts of the project on the Clarendville area, such as the issue of affordable housing. He made an appeal to the Proponent to make conscious and sincere efforts to direct spin-off contracts to suppliers in the area. The existing two-lane highway is totally inadequate for increase in road traffic due to mega projects and it is the position of Council that serious consideration be given to a divided highway from Whitbourne to Clarendville. It is striking that a labour shortage is projected in NL despite the fact that NL has a double-digit unemployment figure. He questions what would be the legacy of Hebron to the immediate area not in terms of royalties but industrial benefits? What will be the legacy to the immediate area?

Roland Hedderson, FFAW Member

Mr. Hedderson wished to draw attention to the negative effect that seismic work is having on shrimp catches in Area 3L with respect to having to give way to seismic vessels while restricted in their ability to manoeuvre. Cooperative work is being done through One Ocean, but that is far from adequate to examine the concerns of fishermen. He stressed that 22, 000 people work in the fishery directly in NL, and more cooperation and collaboration are required between industries. He suggested that NL fish harvesters be engaged as spill response team members and trained in oil spill containment measures throughout the region, as they have the practical and local expertise to be able to deal with such an occurrence. Storing spill response equipment in St. John’s is impractical: the equipment should be stored for ready use in strategic locations where it can be quickly used by fish harvesters and the oil is therefore contained quickly. He also called for more research concerning the possible negative effects of seismic surveys in dispersing stocks in the immediate fishing area.

Paul Tilley, Instructor, College of the North Atlantic (CNA) Clarenville Campus

Mr. Tilley spoke to the current programmes that are offered at the CNA Clarenville Campus, following up his remarks with a written submission afterwards. CNA Clarenville offers nine full-time programmes, and “customized training options from a list of over 100 full-time diploma and certificate programs and a comprehensive range of 300 part-time courses” for business and industry. CNA’s Distance Learning headquarters are located in Clarenville. A great number of students do not know about the opportunities arising from these projects, and there are issues concerning apprenticeships, where students have a hard time being hired in Newfoundland in order to receive the necessary hours to achieve the Red Seal Interprovincial qualification. Another challenge is to find and keep instructors, perhaps a shared arrangement between industry and post-secondary institutions is the answer for long-term benefit. The work force is not as mobile as is thought, most people have lives here and it is a challenge to find a good job here and create a good solid career base.

Mary Clark, Women in Resource Development Council (WRDC)

Ms. Clark, a WRDC member, stressed that female apprentices find it difficult to gain employment necessary to attain accreditation. ExxonMobil should be commended for sponsoring Techsploration and the GETT (Girls Exploring Trades and Technology) programmes, thereby creating a legacy.

Neighbourhood of Friends Family Resource Centre (NFFRC): Louise Newell and Bernice Dyke

The NFFRC is a not-for-profit organization which receives provincial funding under the Early Childhood Development Initiative (ECDI) as administered by the Department of Child, Youth and Family Services (CYFS). The NFFRC currently operates from Clarenville and offers outreach to six other regional sites in Arnold’s Cove, Come By Chance, Swift Current, South West Arm, Random Island and a second location in Clarenville. At time of presentation in November, the NFFRC had 725 clients, growing by 2-4 new families per week. Ms. Newell and Ms. Dyke described the inadequate availability of child care and day care in the region, and expressed their deep concerns about the rising cost of housing in the region and the negative impacts of such costs on their clientele, mostly young families and some single parent families, some of whom have had to leave the area due to exponentially increased housing costs. They described their assumption of a “social worker” role for people who did not wish to turn to official channels for assistance.

Regional Acting Committee on Housing (REACH): Tracey Coady

A newly appointed Housing Social Worker for the Clarendville area, funded by the Supportive Living Community Partnership Program, at time of presentation Ms. Coady has assisted 30 people with housing needs and had an existing caseload of 16. She referenced the Canada Mortgage and Housing Corporation's indicator which states that a family should not pay more than 30% of its net income on shelter or else "they are in a core housing need". The majority of rents in the region far exceed 30% of \$25,000 (a net low income) of \$625.00, and have increased to between \$750 to \$1800/month for a bed-sitting room. In some cases landlords have increased rents on speculation and anticipation of the impending activity at Bull Arm, leading to evictions in some cases and hardships amongst those of low to middle income levels.

DAY 5: DEVELOPMENT APPROACH, NOVEMBER 28, 2011, ST. JOHN'S

Charles Newhook, Master Mariner

Captain Newhook has worked on crude oil tankers for 20 years and shuttle tankers for 15 years in the Canadian offshore and in Brazil, and brings experience and questions concerning the Offshore Loading System and tankering arrangements. He is concerned about the lack of detail in the Development Plan as relates to tankers. He comments that "the Proponents have not given a definition of "suitability" with regards to shuttle tanker requirements." In the Development Plan, it states "The Operator will consider and discuss possible shared services with other Grand Banks operators with a view to optimizing the fleet configurations of all operations and providing the safest and most efficient and effective service." Captain Newhook suggests that the industry has matured enough to know what these minimum standards should be for the Grand Banks, and that it is the operator's responsibility to provide that guidance, not the Board.

Captain Newhook also noted that the issue of heavy weather ballasting is not noted in the ballast plan, where ships must take on more ballast water as a safety precaution in heavy seas. Current tankers operating in the Grand Banks take on ballast in the cargo tanks, meaning that the ballast water is contaminated with oil. If tankers with additional ballast capacity are used, this reduces the necessity or likelihood of tankers to load heavy weather ballast from cargo tanks.

Concerning the Offshore Loading System: the Development Plan states the OLS is designed for 30 years, yet Hibernia's system has lasted for only 15 years. The equipment must be suitable and sufficiently designed for the harsh environment in which it is used. Concerning the Offshore Pipelines Conceptual System, Captain Newhook was concerned about the heavy crude and the gelling of the crude in the

pipelines. Having presented at the session, he followed up with clarifying points in a letter to the Commission.

Ocean Engineering Research Center (OERC): Dr. Claude Daley

Dr. Claude Daley's presentation concerned the possibilities for education and research partnerships with the Hebron Project. He stressed the fact that OERC and other research organizations make St. John's a global centre of excellence for Ocean Engineering. He discussed the amount of applied engineering research and consultancy which occurs at MUN and how students are actively engaged in this research process. Students require work terms as a condition of their education and it is Dr. Daley's hope that Hebron could assist in this. The Faculty of Engineering continues to grow exponentially in terms of undergraduates and the facilities are "bursting at the seams". The Ocean and Naval Architecture Engineering programme is the only one in Canada and the only co-op programme globally, with special strengths in arctic research, small craft, safety and submersibles. He asked that ExxonMobil create more entry-level positions for first- and second-year undergraduate work terms within the Hebron Project. He also stressed the importance of industry partnerships in research projects.

A discussion ensued concerning the co-op programme, switching from 4-5 years, and numbers of students.

Rob Strong

Mr. Strong, a local offshore industry consultant and supplier, suggested that timely communications are key for the Hebron Project. He emphasized Pool 3, representing a significant opportunity for the supply community. He stated that the drilling of 20 wells represents 4-5 years of rig activity, with all the spin-offs associated with it. He sought clarification about the scheduling of Pool 3 development, especially in terms of information to suppliers, and suggested that it required its own Development Application. He discussed the lack of information surrounding contract bidding and what is required for each contract. Concerning the Utilities and Process Module, he requested that the bids should include a list of all contractors who have prequalified, and the scope of work required should be expanded to offer opportunities to the local supplier community.

Professional Engineers and Geoscientists of NL (PEGNL): Geoff Emberley and Leo White

Mr. Geoff Emberley, accompanied by Mr. Leo White, presented on behalf of PEGNL, a self-regulated professional organization which administers the Engineers and Geoscientists Act (2008), issues licences, and disciplines members as required. PEGNL has 3257 members, with 10% of these being geoscientists. They stressed that all work on the Hebron Project should be regulated and undertaken by properly qualified professionals who are licensed to practice in NL. A discussion followed concerning the registration, vetting, supervision and overview of a properly qualified engineer.

DAY 6: DEVELOPMENT AND BENEFITS APPROACH, NOVEMBER 29, 2011, ST. JOHN'S

NOIA: Robert Cadigan

NOIA's second presentation reiterated many of the concerns the organisation raised on the first day of sessions, concerning the flow and timely release of procurement information, and consistent bid process. There have been some improvements in the websites of the major contractors of KKC and Worley-Parsons, but information can still be provided in a more useful way. Beyond the Hebron project, there is an opportunity within the oil and gas industry to make procurement information for all projects more readily accessible for all vendors and suppliers. NOIA proposed to create such a purpose-built site for the benefits of its members and the local business community, and requests the support of industry to do so (www.noia.ca).

Mr. Cadigan discussed the lack of detail of the procurement forecast section of the Hebron Project's website (<http://www.hebronproject.com/procurement.aspx>). He requested that scope of work be included in this procurement site rather than the general information that is currently provided.

Concerning modules, NOIA believes the living quarters, drilling support module and derrick equipment module can all be constructed in the province. This comment was made in response to Hebron Project Manager Geoff Parker's announcement in Marystown that the Marystown yard cannot construct both the DSM and DEM.

In addition, NOIA reiterated the seven recommendations made on Day One.

Women in Resource Development Committee (WRDC): Charmaine Davidge and Daphne Hart

Ms. Davidge gave an overview of the WRDC and its outreach programmes to young female students in the province. She gave the examples of Rio Tinto and Newfoundland Hydro targeting female employees to meet labour shortfalls. WRDC provided detailed recommendations to address the skilled labour shortage in the context of promoting a diverse work force. They advocate for "a pro-active approach to increasing participation of female workers" through collaboration with "government, labour, post-secondary institutions, and community organizations to encourage women to consider and enter training programs and subsequent careers in non-traditional fields related to the oil and gas industry." They stress the importance of supporting early education and information about non-traditional careers for women. They suggest that ExxonMobil should "inform women about the core competencies and

project-specific skills that will be required at each phase of the project, and make this information publicly available to ensure that individuals, and women in particular, obtain the necessary skills to be hired.” ExxonMobil should set “quantifiable targets as well as goals and objectives aimed at raising female participation in a timely manner by including a reasonable and progressive timeline for attaining goals, as well as supporting the achievement of these goals and adherence to the timeline through other initiatives.”

Concerning the recruitment of female workers, they advocate an affirmative action, “when the Proponents of the Hebron Project are faced with two equally qualified individuals of the opposite sex, they should give priority to the female candidate”. They also would like to see the identification of “alternative qualifying characteristics, aside from years of experience, to use as selection criteria in the hiring and promotion process.” Clarity in job advertisements as to the precise amount of travel time is helpful for prospective female employees. Women should also be included on the hiring team or interviewing committee. ExxonMobil should ensure that their corporate culture “is free of gender-related biases, prejudices, and discrimination in relation to hiring and promotion [and ensure] that maternity/paternity and parental leave is not a consideration in either process.”

Concerning the retention of female workers, ExxonMobil should provide gender awareness training to their workforce, offer career counselling by female counsellors, provide an opportunity for women who are interested in training to self-nominate and establish a culture of gender inclusivity by incorporating and adopting gender equity as part of the organization’s corporate strategy and business goals. Mentorship programs could be used to engaged and retaining employees from diverse groups.

Concerning contractors and subcontractors, the WRDC recommended that EMCP include gender-equity provisions in its calls for bids and evaluation criteria for these.

The conclusion was that the workplace must be supportive, with leadership from the top down. “If we put the same degree of diligence in building the social structure as the technological structure, then we will go some way towards meeting the goals.”

Office to Advance Women Apprentices: Karen Walsh and Kelly Hickey

Ms. Karen Walsh and Ms. Kelly Hickey outlined the programmes and services provided by the Office to enhance employment opportunities for female apprentices. The Office to Advance Women Apprentices works collaboratively with government, labour, training institutions, and other stakeholders “to mitigate obstacles and barriers to employment”. They maintain a database of 440 female apprentices developed since their inception in 2008. They recommend that 10% of the apprentices at Hebron be women, and that this minimum target is met, maintained and reviewed by a diversity committee on a quarterly basis. The primary contractors should also be given a time frame to exhaust the local labour market before being able to hire from outside the NL market. Ms. Walsh also outlined problems with some unions not

wishing to accept female apprentices. She made some practical recommendations for a more gender inclusive worksite which have been suggested by current female workers on job sites.

Ms. Hickey outlined certain barriers that female apprentices face, one of the most notable being access to childcare. There are childcare places for only 10% of children aged 0-12 in NL. As a result, employees and employers must be creative. Ms. Hickey suggested that if ExxonMobil created a childcare centre for their employees it would be well received and go some way towards the creation and maintenance of a diverse and open workforce.

Eastern Suppliers Development Alliance (ESDA): Bob Kennedy

Mr. Kennedy outlined the work achieved so far in developing relationships and understanding between local suppliers and Tier 1 contractors and the Proponent. He made 4 key points:

He noted that this is an extremely large project and that ExxonMobil must carry on with their communications and outreach.

The Regulator needs to explicitly ensure that benefits management, procurement, and outreach continue. Too often, this is retrospective and not proactive.

Awards at the Tier II/III level must carry firm guidance with respect to local benefits and ensuring local companies can qualify and bid as appropriate.

EMCP needs to maintain a management system that ensures both internal dialogue between benefits management and procurement.

During discussion period, Mr. Kennedy related his experiences with local businesses and their experiences concerning the last project. The proactive approach proposed by ESDA has given companies the opportunities and knowledge in advance of procurement to enable them to qualify and bid in good time.

DAY 7: HUMAN SAFETY, NOVEMBER 30, 2011, ST. JOHN'S

Communications Energy and Paperworkers (CEP) Union Local 2121: Brian Murphy, President

Mr. Murphy stressed that he was addressing concerns raised by all workers and not just unionized workers. He presented on helicopter safety, especially concerning augmentation of the existing fleet

during peak times of backlog. He found the FAA decision not to demand the exchange of existing S-92A with a 30-minute run-dry MGB technology to be disappointing.

“To achieve [safety] we must all work together.” Mr. Murphy stressed that there should be elected worker representation on the Joint Occupational Health and Safety Committees (JOHSC) and not appointed by Operators. After the Cougar Flight 491 crash the workforce put forward 350 safety points and questions: “Unfettered feedback is invaluable and must be encouraged.”

The quality of life of workers was also addressed by Mr. Murphy. A career offshore extracts a heavy toll on the quality of family life of workers. He cited that the change of rotations in other jurisdictions, for example, to the current 2 on 3 off in the United Kingdom Continental Shelf, provides an improved work-life balance. An unequal rota might also lead to more women in the offshore workforce, who have traditionally been underrepresented in the offshore workforce, with 5-6% being women, most of whom working in the “housing” and not technical or engineering departments. He cited the Benefits Agreement and the setting of long-term goals to hire more women.

New Democratic Party (NDP): Dale Kirby, MHA, Labour Critic

The NDP echoed many of the points raised by the CEP with regards to a change in work schedule rotations, helicopter safety. Mr. Kirby also reiterated the importance of implementing a separate safety authority as was recommended by the Offshore Helicopter Safety Inquiry (OHSI). He also discussed correspondence that NDP has received from offshore workers which suggested there was an unhealthy work environment, whether this is perceived or not.

Mervin Wiseman, Maritime Rescue Sub Centre

Mr. Wiseman discussed the planned closure of the Maritime Rescue Sub Centre in the context of the Hebron Project. He situated the MRSC within the national search and rescue organization and why it is critical to have such a centre in NL in the context of geography and management of SAR work load, stating, for instance, that during peak periods there might be up to 55 SAR cases daily between Halifax, Quebec and St. John’s. He suggested that there is a customization of SAR capabilities within the centre which is co-located with the Ice Centre and the Fleet, recently moved from Halifax. He stressed the extensive local knowledge of the local SAR coordinators which optimize coastal and in-shore search efforts. The nature of the relationship between MRSC and the Hebron project lies in emergency preparedness and training, as well as a unique understanding of the human elements in play during a marine emergency.

Sea-Force Hyperbaric: Phil Towers

Mr. Towers is a commercial saturation diver who outlined his company's plans to operate a hyperbaric reception facility to enable the safe decompression of saturation divers in the event of a marine emergency, to be in compliance with IMCA regulations to be revised by summer 2012. The reception facility is basically a full transportable docking station to hook up with a hyperbaric lifeboat in the event of a marine emergency with the DSV, thereby allowing the saturation divers a place to decompress safely, a process which could take weeks for a therapeutic decompression. He drew attention to the lack of hyperbaric facilities in the province. He commented on the fact that "saturation diving will play a major role in the installation phase in 2015 and 16" and subsequently risks to human safety as a result of saturation diving operations should be assessed in the Concept Safety Analysis. He also stated that the current C-NLOPB diving regulations need to be updated. "All international diving contractors comply with the International Marine Contractors Association (IMCA) guidance and codes, and all operators insist that their diving contractors are compliant, which gives them a level of comfort in their contractor's level of competency and safety." IMCA is a self-regulating body that writes "diving guidance and policy and also [audits] potential member companies and global standards are formulated from global sharing of information."

DAY 8: HUMAN SAFETY, DECEMBER 1, 2011, ST. JOHN'S

Canadian Chapter of the Undersea and Hyperbaric Medical Society: Dr. Ken LeDez, MD

Dr. LeDez is a hyperbaric and offshore medical specialist who drew attention to the opportunities that exist to create a centre of excellence for offshore and diving medicine in NL. Investments in R&D and E&T related to survival need to be made. The C-NLOPB diving regulations urgently need to be updated in keeping with updated international standards.

He also brought to the attention the state of the current hyperbaric facilities in the province. Dr. LeDez proposed that a new multi-place hyperbaric chamber is required for the Health Sciences Centre as one chamber is currently inoperable and the one in service is located in a hospital parking lot and not inside the hospital itself. A reception facility can be thought of in terms of emergency medical care or first aid, but a new hyperbaric facility within a hospital setting is required for critical care. Dr. LeDez foresees the need for more medical intervention in the future since many saturation divers are older, and increased age brings increased medical problems. Along with advances in hyperbaric equipment, the use of telemedicine might mitigate any offshore medical problem or emergency, but most of the DSVs do not have the proper telecommunications equipment as there is currently no requirement for this. He suggested that the communications and audio-visual equipment for safe diving operations need to be updated for optimum safety of saturation divers. He discussed work towards the development of physician standards of medical practitioners locally and nationally. He informed the Commission of a multidisciplinary programme entitled the "Extreme Environments" initiative: ongoing work at Memorial

University concerning the study of medicine and human safety in offshore and harsh environments. The Wells inquiry recommended that R&D be conducted into harsh environments and he asked that the Hebron project heed this call.

Dr Ledez also suggested that the current survival and HUET training at the Offshore Safety Research Centre needs to be made more realistic. He recommended training in a cold water pool with updated helicopter simulators, where vital-signs and exposure to depth would be monitored, but conceded that not all workers would be fit for this type of training.

Resource Development Trades Council of NL (RDC): Rick Dalton

Mr. Dalton described the formation of the RDC and named the sixteen trades which comprise it. The RDC described the role the RDC will play in the construction phase of the project. They stressed that early information is key, especially in order to train and provide the workers required. The RDC Diversity Programme in the past unions did not stop women from becoming tradesmen but so too did they not actively seek out a diverse work force. Additional comments concerned attracting skilled trades workers to return home to work on the project; the need to meet with stakeholders to discuss best method of attracting and retaining the best work force.

The second half of the presentation addressed the potential loss of provincial opportunities from the mega-projects and the need to create a proactive agency of labour, government and industry to plan best approaches for maximization of benefits to the province prior to negotiation of a Benefits Agreement.

DAY 9: HUMAN SAFETY AND BENEFITS, DECEMBER 5, 2011, ST. JOHN'S

Newfoundland and Labrador Federation of Labour (NLFL): Lana Payne

Ms. Payne described the NLFL and its role to advance the rights of workers in the province. She asked what lessons had been learned from the Cougar Flight 491 crash, especially with regards to the specific type of helicopter used and workers participating in a meaningful way in the safety management system. The Development Application documents and especially the Concept Safety Analysis should reflect any lessons learned in keeping with the spirit of the Wells Inquiry recommendations. OIMS, she suggests, can work effectively only with communication across all the different levels of the workforce and "high-level multi-party input in safety". "Risk assessments and Safety Management Systems by and of themselves are not enough." She stressed that there needs to be an "inclusive safety culture", citing Commissioner Wells who stated that "unless such a leadership role for the regulator is instituted and developed, industry perhaps will not achieve the safety systems of which we are capable." "Safety is too

important to be adversarial” and thus workers and unions need to be actively engaged in the safety process.

Although she did not wish to Emphasize the technical aspects of safety, she stressed the importance of the 30-minute main gear box run dry capability and the fallacy of the FAA/EASA “remote provision” for the S-92A. She argued that helicopter operations in extreme operating environments like the North Atlantic may need more than a 30-minute run dry capability.

The NLFL supported CEP’s call for a change in rotations, or shift schedules to a 2 on, 3 off, augmentation of existing helicopter fleet to create a surge capacity, and for enhanced search and rescue capabilities.

Provincial Advisory Council on the Status of Women (PACSW): Linda Ross

Although she spoke of women’s issues, Ms. Ross recognised that any issues categorized as women’s issues do in fact concern everyone in the province. Mindful of ExxonMobil being a leader in diversity issues, PACSW submits the following detailed recommendations:

The construction and operational phases should have specific goals and measures meeting needs and challenges of each phase;

A minimum target of women in trade related positions arising within the short-term (i.e. construction phase of the project);

Increased and enumerated targets for women’s participation in historically under-represented occupational categories for the long-term operations and supply of the project; and

These targets should be aspirational employment targets, coupled with aggressive measures to ensure women are trained, recruited, hired and retained, over and above targets set on Statistics Canada data, which is out of date when released.

Concerning recruitment:

- Proactive measures to ensure women are trained and qualified to fill these positions (i.e. support for apprentices);
- Strong promotional efforts and training supports need to be targeted at and available to women;
- Culturally sensitive promotional and educational opportunities;
- A specific effort is made to raise opportunity awareness amongst older women who are already in the workforce and perhaps considering a career change; and

- Scholarships and other educational supports are needed need to include the private colleges and apply more generally to also respond to the business, trade and technology needs of the Project.

Concerning a supportive work environment, the Proponent should provide:

- Gender specific clothing and safety equipment to be readily available to all employees;
- Use of workplace training as a means instilling a deeper diversity culture amongst employees, contractors and partners;
- Accommodation for female employees;
- Collective agreements and union partnership;
- On site “diversity officers”;
- Child and family care; and
- Flexibility in scheduling work is critical.

Concerning monitoring, the Proponent should

- Report annually to the Minister Responsible for the Status of Women; and
- Consult with community organizations annually.

Concerning business access, the Proponent should:

- Provide women in business the opportunity to self-identify as women owned businesses;
- Determine the Project’s definition of “women owned business”;
- Perhaps in line with national certification programs such as “We Connect Canada”;
- 51% owned, managed, controlled and operated by women;
- Identify and communicate information on supply and procurement opportunities for designated groups;
- Identify possible barriers in the procurement program that limit the participation of designated group members; and
- A business access and procurement strategy that includes proactive measures and targets to ensure women owned/ controlled/managed businesses are participating in the Project’s supply chain.

Coalition of Persons with Disabilities NL (COD-NL): Michelle Murdoch

COD-NL advocate for the disabled community, who are all present in the greater community. Ms. Murdoch discussed the fluidity of disability, and the fact that it is difficult to identify and thus define. Disability is situational, and is more of a barrier for those of a lower socio-economic status, dependent on the circumstances in which one finds oneself. Early intervention is required to engage youth in the province to be informed of energy-sector jobs and potential scholarships. She identified a deficiency in the endowment fund in that persons with disabilities are unlikely to feel as though they can tap into this resource and that they have options in the energy sector. Ms. Murdoch suggested that community-based research is required in order to offer quantitative and qualitative solution-based options. Ms. Murdoch does not suggest that unqualified disabled persons should be employed, but rather that employers be open to meeting the needs of disabled persons to join the workforce. A working group should be established to engage disability leaders and thus promote varying perspectives in management, creating a framework of best practices.

NL Organization of Women Entrepreneurs (NLOWE): Paula Sheppard

Ms. Sheppard discussed the fact that, traditionally, the opportunities for small- and medium-sized businesses have been limited with regards to the energy sector. She argued that the Hebron expenditures should surpass the Hibernia expenditures and one way in which to do this is to tap into supplier diversity networks. She advocates that Hebron adapt a Supplier Diversity Programme to assist in corporate diversity. She discussed WEConnect, which is a network of women-owned businesses. She also suggested that the Hebron project should be collecting baseline data in its initial years to track supply and procurement and asked what tangible procedures are being put in place to appropriately scale bid packages for small companies to be able to bid. Clearly define criteria for women-owned businesses; include diversity component in vendor registration database; set targets and goals; monitor and report results; make smaller scale contract opportunities available.

The Harris Centre: Dr. Rob Greenwood, Director

The Harris Centre facilitates, communicates and serves as a bridge between the university, government, industry and the wider community as an “honest broker”. They track research projects that are taking place in the province. If interests can be aligned to a common purpose, they act as facilitator, and make people aware of common issues and concerns and the possibilities that exist to solve these problems. “We need to develop a culture of informed public debate to create a sense of democratic efficacy.” Mobilizing knowledge is the key. Dr. Greenwood stressed the importance of reporting research and

transparency. He gave an overview of some examples of how “honest brokering” by the Harris Centre has led to positive results.

William (Bill) Gaulton, Retired Union Leader

With 52 years of experience in the construction and oil and gas industries, Mr. Gaulton registered to speak at the end of the day. He lamented the current labour shortage in the face of such high unemployment figures. He asked two women in the audience to stand and questioned their training and current employment, which was not in their trade. He suggested that, collectively, we have all failed these “diamonds in the rough”. He proposed SETI (Skilled Experience Training Initiative), an accelerated, specialized, individualized training plan for those who are stalled in their apprenticeships and are unable to advance or find employment. He stressed that all must get serious about the promotion of Newfoundlanders and Labradorians to work in the province, and get serious about advancing women in the skilled trades. There are many experienced, often overlooked, men and women who will work on this project, and indeed other mega-projects.

DAY 10: ENVIRONMENTAL PROTECTION, DECEMBER 6, 2011, ST. JOHN'S

NL Environmental Industries Association (NEIA): Linda Bartlett, Executive Director

Ms. Bartlett discussed the composition of NEIA and what experience lies within it. NEIA looks upon environmental challenges as business opportunities to create win-win solutions. They have internationally Recognized local expertise working in harsh environments, conducting environmental assessments, effluent monitoring, and environmental effects monitoring. She stressed the importance of application of safeguards and best practices for a major project and the importance of leading by example. The organization is designed to bring together commercial involvement with the environment, to build the business of the environment, encouraging corporate social responsibility, thereby enhancing the bottom line through good environmental stewardship.

Taking off her NEIA hat, Ms. Bartlett then presented her own thoughts that may resonate about environmental protection, discussing sustainability and looking to the future in the context of NL culture and the Hebron project. With regards to sustainability, we discuss the planet, society and the economy. The economy is dependent on the environment and the environment is not dependent on the economy. Sustainability is about living within the earth's limits. In natural systems waste does not exist. The oil and gas industry is not sustainable. Once fossil fuels are gone, they are gone forever.

She proposed a possibility to ExxonMobil: use the environment to inform all aspects of operations, not as an adjunct but an integral part, from the infrastructure erected to support the project, to what type of carpets are used, right through the supply and contracting chain. She stressed the value of doing business in an environmentally informed manner.

Alder Institute: Janet Russell

Founded in 1998, the Alder Institute exists to provide an ecological point of view in common discourse. Ms. Russell's main concerns were with the methodology of the research of environmental effects of oil on the environment and how data is used by the industry to support their claims. She suggested that as a part of the Hebron Project, being the fourth major oil project, the recommendations of each Public Review and each Environmental Assessment should be reviewed for completion to ask whether they have been addressed and previous questions answered. "No data does not equal no effects. The Precautionary Principle must be applied in this context." She is concerned about the promotion of free and critical thought by design. She asked how are the data in the NL offshore concerning seabirds and discharges? She reminded the Commission that science is a great intellectual tool, but it is subject to contamination. She discussed the importance of transparency and "opening the information flow". She remarked that the null hypothesis that oil sheens do not kill seabirds needs to be tested. She advocates that the CNLOPB needs to be relieved of its conflict as both regulator and facilitator of oil and gas. As Janet Russell stated, there is a clear conflict of interest on the part of the C-NLOPB as it is a government organization and the government is part Proponent in this process.

Fish, Food and Allied Workers (FFAW): Earle McCurdy, President

Mr. McCurdy prefaced his presentation by describing the experience of going to the Gulf of Mexico to meet with people affected by the *Deep Water Horizon* blow-out and spill. He reiterated the importance of the fishery to NL's economy, society and culture, especially in rural NL. He discussed the fluidity of the fishing grounds on the Grand Banks, and specified that some areas are key to the fishery, like Area 3L where all of the offshore installations are situated. He made the point that the required Environmental Assessments are project specific and therefore do not address the cumulative effects of decades of industry activity. Like the Alder Institute, he recommends the precautionary approach, that is, to err on the side of caution concerning environmental effects. He maintained that access to fishing grounds is being eroded through oil and gas activity in 3L, specifically. Mr. McCurdy stressed that not enough R&D is being done to address environmental or fishery concerns.

He suggested that fish harvesters bear a lot of the risk of oil and gas development for little of the benefits. Compensation to fishers arising from the Macondo spill has yet to be settled. Spills devastate the area in which they occur and would be devastating to the fishery as, economically, any product which tried to be harvested post-spill would not be viable. He was also concerned about the plan for the next generation, the legacy post-oil.

William Montevecchi, Memorial University

Dr. Montevecchi suggested that it is important to extend the study area of the Comprehensive Study Report because of the oil spill trajectories. The study area needs to include the entire amount of water affected by a potential oil spill including the area transited by tankers.

Concerning data deficiencies, access and transparencies, he would like to have some knowledge of the protocols for data collection from existing installations. He questioned the ability to capture data from episodic occurrences.

He showed some very compelling videos of oiled birds at the Hibernia platform, describing the process of a small amount of oil leading to bird mortality. He suggested that self-assessment is insufficient with regards to the potential effects of oil spills and slicks on seabird populations.

Dr. Montevecchi made a plea that things need to be done differently with regards to the management and oversight of the C-NL offshore. During exploration and development, there is a lot of environmental risk taking in the beginning with little apparent regard for any predetermined areas that are off limits to exploration, including any known fishing grounds or areas of sensitivity. Through the bidding process, the C-NLOPB gives industry quite a lot of latitude as to where and under what terms exploration occurs. The land bidding process favours the needs of industry over any environmental or socio-economic concerns.

Dr. Montevecchi suggested that “The greater the transparency for environmental protection the greater the safety for people who work in the industry.”

Newfoundland and Labrador Environmental Association (NLEA): Ian Goudie

Dr. Goudie discussed the insufficient collection of data, especially in terms of seabirds and reiterated much of what had been said by the Alder Institute and Dr. Montevecchi. He moved to a discussion of NL culture, especially rural culture and how it is tied indelibly to the environment, the land and sea. His focus was on corporate ethics and development. He suggested the need to move towards a precautionary approach that can sustain the environment in the long run. He suggested that a healthy ecosystem means a healthy economy and this should be the goal of a sustainable development.

Wayne Chipman, Reservoir Engineer, Retired

Mr. Chipman has long ties in the industry and with the regulation of industry, lately as Chief Conservation Officer and Reservoir Engineer with the C-NLOPB and as part of the negotiating team with NALCOR for Hebron and Hibernia South. He wished to discuss recommendations towards resource management, environment, benefits, and safety.

In his opinion, the development approach of the resource is reasonable, but a plan to develop all resources needs to be put in place as soon as possible, including Pool 3. In his opinion, the GBS is the best plan for maximum recovery. Access needs to be provided for potential resource development by operators outside the development area, e.g. J-tubes, as a result of any new discoveries of oil (e.g. Pool 3) and gas. He discussed commercial arrangements and the need for timely and constant information flow from the EPC contractors to the local supply community. A plan needs to be put in place to minimize flaring and to conserve gas.

Concerning spills, there has been a lot of cooperation with spills of any magnitude reported to the C-NLOPB, and he suggested that self-regulation worked well in this regard.

For this particular project, there will be more produced water than any other project, with 2 billion barrels of water produced. This needs to be examined carefully concerning threat to reservoir, but reinjection is the preferred method of disposal. Concerning training of fish harvesters in oil spill response, Mr. Chipman suggested there should be an industry-wide approach to this which is proactive rather than reactive. The fish harvesters have a lot of local knowledge which can be leveraged to assist in spill response.

Concerning benefits, he suggested that more emphasis needs to be placed on the E&T piece for the project and more emphasis on the encouragement of female workers on the platform and in the industry.

Mr. Chipman stated there is a need to engage workforce in development of safety legislation, and a need to resolve the helicopter run-dry time.

DAY 11: ENVIRONMENTAL PROTECTION AND BENEFITS, DECEMBER 7, 2011, ST. JOHN'S

NL Federation of Labour: Lana Payne

The second presentation from the NLFL considered the expected benefits from the project. Ms. Payne stressed that, in many respects, government and society view the recent prosperity with traditional lenses. She argued that we need to rethink and broaden our definition of benefits, and we need to correct public policy opportunities to grow and prosper. One of the main concerns of the Atlantic Accord is that “the pace and manner of development optimize the social and economic benefits flow to Canada as a whole and to Newfoundland and Labrador in particular.” It is the main concern of the NLFL to “encourage that the maximum practical economic and social benefits from a project the size of Hebron flow to the citizens of our province as mandated under the terms of the Accord.”

The NL government's equity stake in the Hebron project goes some way to improving the local benefits situation, but Ms. Payne would argue this is still not enough. NALCOR has been tasked with "exercising appropriate control over the development of our resources to ensure they are managed and used in the best interest of the people." Ms. Payne recognised that the Commissioner cannot make recommendations with respect to the current fiscal regime, nevertheless she made the following suggestions:

- ensure maximum benefits in terms of employment and contracting;
- maximize minimum to long-term benefits for technological transfer and training regime;
- ensure diffusion and diversion of benefits;
- encourage social dialogue with respect to industrial relations and human resource development amongst all stakeholders to minimize adverse effects of the project;
- establish maximum performance targets and minimum thresholds with respect to objectives outlined in the Benefits Plan; and
- promote the transparent and timely annual public dissemination of information as relating to specific targets in the Benefits Plan.

Ms. Payne recognises that the non-specific nature of the Benefits Plan "is suitably abstract enough to allow for creative innovation in finding ways to maximize the economic and social benefits" of the project, and leaves plenty of scope for change. The present interpretation of benefits must change, she stated, due to changes in demography. The Labour 2020 report was outdated as soon as it was released. Demographic trends have widespread implications, including increasing tax burdens for working people, and escalating health costs.

Ms. Payne drew attention to the fact that, although the oil and gas industry accounted for 40% of the GDP, the industry only accounted for 4% of employment. "It is imperative that every single possibility of local employment be exploited with respect to contracting employment."

Citing the lack of specific E&T commitments in the Benefits Plan, she recommended a coordinated approach and a net positive expansion in an endowment fund of \$250 million for future needs and projects to come, only 1.25% of the total value of the Hebron Project.

She cited the fact that, although "rural NL is often the site of resource extraction, [it is] a minor beneficiary". There is no mention of secondary processing in the Benefits Plan but she recommends that the Proponents should indicate if secondary processing is suitable to take place in the province. She also recommends that ExxonMobil mitigate some of the adverse secondary impacts of the project by providing \$50 million to provide housing in low/fixed income and cooperative housing projects.

To achieve maximum transparency and dissemination of information, she recommends the formation of an annual Hebron public accountability forum. She hoped that her recommendations are received "within the spirit of enlightened self-interest".

Nature Newfoundland and Labrador (Nature NL): Len Zedel

Dr. Zedel brought experience as an oceanographer and professor of physics to the proceedings. He suggested that the organization of the CSR was very good, but the fact that some details were deferred until after FEED made evaluating the development of the project difficult. He sees the main justification of need for the project as put forward in the CSR to be the economic benefit of NL, and not to meet global energy needs. He stressed that the volume of produced water for the project will be 30 times the volume of St. John's harbour, and that 80,000 barrels of oil cannot be removed from this PW. He stressed that the environmental impact must be assessed as a worse-case scenario, assuming that PW cannot be re-injected into the field. Currently, the allowable rate for marine discharge is 15 ppm, but the C-NLOPB regulations allow for 30 ppm. Monitoring content at source should be part of the environmental measures used.

The effects of seismic activity on the project were considered in the CSR, but Dr. Zedel argued that tsunamis must be considered over the entire Atlantic and not a specific area of such. Currently, all operators conduct their own seismic surveys and Dr. Zedel discussed noise pollution as a result of constant seismic surveys. He enabled the Commission to hear audio evidence of a seismic pulse which is transmitted at the same 100Hz frequency that is used by whales. This is not fatal to the animals, but the chronic noise is an irritant. He asked that industry avoid making these discretionary noises when marine mammals are migrating. Light pollution is also of concern with regards to seabirds.

Concerning observation and monitoring, Len Zedel suggested that an independent observer can act as a check and balance. "If there is a culture of environmental sensitivity, you should welcome the independent observer the same as you would welcome a safety officer." To this, Mr. Parker suggested that the current notion is to share experiences: if one likens the potential role of an independent environmental observer to that of the safety officer, the role has changed in the last twenty years. The safety officer, for example, has moved from being the safety police to working with the Operators for continuous improvement. To have an independent environmental observer in a policing role is redundant, in his opinion, and poses a safety hazard to have untrained personnel on the platform.

ADDITIONAL PUBLIC REVIEW SUBMISSIONS RECEIVED

Schooner Regional Development Corporation (SRDC)

The Schooner Regional Development Corporation (SRDC) is the regional economic development organization for Zone 16, the Burin Peninsula. The mandate of the SRDC is to increase economic growth and diversification through opportunity identification, regional promotion, investment attraction and

business development. This is achieved through partnership development, collaboration with industry, government line departments, regional stakeholders, municipalities and community-based organizations. SRDC provided some detailed recommendations concerning the proposed project that are worth citing here. Certain commitments are laid out in the Benefits Plan and, although SRDC has no control over whether recommendations are followed, this process is important for monitoring local benefits. It is worth citing SRDC's recommendations here as they did not have the opportunity to present due to unforeseen circumstances.

Concerning the impending labour shortage and training:

"It is imperative that the Building Trades Union, industry and government seriously become engaged in developing a protocol to engage first and second year skill trades students on these job sites."

"It is suggested that industry, unions and educational institutions work together to implement a mechanism to identify those students [who have completed their training but not completed their hours] so they can refresh their training and be included in the skilled workforce which will be required to meet the demands of industry."

"The Department of Education, specifically the Provincial Certification Apprenticeship Board (PCAB) should enter into negotiations with industry to identify the needs of the industry relevant to the life of the project to ensure the labour force is available for the project. The PCAB is making great strides in addressing issues relevant to the craft trades, however, much work is still required especially for the first year students."

"ExxonMobil with the support of regional organizations...should implement activities to enhance the awareness of the importance of a Healthy, Safe Work Environment Campaign through the local media, local schools, and post-secondary institutions and throughout the overall region/province.... An awareness campaign has the potential to have a very positive impact with changing attitudes and adding to a "safer work environment", similar to the attitude being implemented by kids today regarding the Recycling Program in the primary school system."

Concerning procurement and contracting:

"Education and awareness is very important with respects to the procurement and contracting opportunities and how to go about bidding on these opportunities. Supplier development procurement information sessions should be held throughout the region in effort to reach the local business community; Expressions of Interest and Request for Proposals should be advertised in the local media and on the provincial job line at jobinnl.ca."

"when companies from outside the province are bidding on contracts, it should be critical that these companies hire from within the local labour force, when the qualifications are met, as opposed to bringing in their own respective crews."

Concerning labour relations:

“With respect to having the labour force required on time, it is imperative that ExxonMobil be prepared to forecast the timing of project components which will enable residents living and working abroad to plan on relocating to this province. Individuals and families that plan on relocating to the province for employment will require a commitment from the employer on a timeline of employment, people will not relocate based on a call in for 6-8 weeks, former employees working in Alberta will not give up long term employment for a 6-8 week call in, individuals will need to have long-term commitments from the employer.”

“To ensure this province is positioned to meet the labour requirements, ExxonMobil will have to ensure the equality of benefits to the employee as with the rest of Canada.”

Concerning Research and Development, SRDC called for the Proponent that ExxonMobil recognize the capabilities of the CNA and ensure the funds for R&D is spent in rural NL.

The Maritimes Energy Association (OTANS)

OTANS made a written submission to the Commission. Its mandate is “to maximize Atlantic Canadian participation in the supply of both goods and services to meet the needs of the energy industry. The association’s purpose is to identify, promote and support the development of opportunities in the energy industry for our members and our region.” OTANS discussed the full and fair consideration as referred to in the Atlantic Accord.

“Our association appreciates the efforts made by the operators in both offshore jurisdictions to encourage supplier development and technology transfer....However, there are still cases where bid packages are so large, that local businesses do not have a ‘fair’ opportunity to compete. This includes the sheer size of the package, or financial requirements that effectively restrict the bidding strategy of a local company. The local supply community may very well have the ‘full’ opportunity to compete through notification of Expressions of Interest (EOIs), but the caveats placed on the EOIs or the Request for Proposals (RFPs) effectively eliminate the ‘fair’ part of the equation.”

It noted, too, that the authors of the Atlantic Accord fully intended for the Benefits Plan to move towards economic sustainability as a result of oil and gas. “The true strength and importance of a Benefits Plan is to provide the opportunity for the local supply industry to outlive the non-renewable resource....France does not have an offshore petroleum sector, yet it is home to some of the largest supply companies for the global industry.”

OTANS concluded the submission with four key recommendations:

1. a Benefits Plan be directed for Pool 3 taking into account the lessons learned from the initial development;
2. bid packages be designed and scaled to provide full and fair opportunity for local, regional and Canadian companies to realistically compete;

3. technology transfer enables local companies to gain experience to expand their expertise to be globally competitive;
4. supplier development activities assist companies in addressing prerequisites including such areas as health, safety and environment, and quality control.

Gail Fraser, York University

Dr. Fraser offered a written submission. She questioned how oil sheens as opposed to spills are reported and the requirements of reporting. Dr. Fraser took issue with the Proponent's statement that there is no significant effect on seabirds from small spills when there has been no research undertaken concerning the percentage of mortality of seabirds resulting from a sheen. She raised the issue of a change to the CEAA format between White Rose and this, moving to an EA which, to her mind, is less transparent.

Appendix J

Glossary of Terms

Abandonment - The decommissioning of facilities, including the plugging of wells and removal of offshore structures following production of reserves.

Accord Acts - means the *Canada-Newfoundland Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*.

Acts - When capitalized in this document, refers to the *Canada-Newfoundland Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*.

API - American Petroleum Institute.

Ballast - (a) A relatively heavy material such as lead, iron or water, placed in a ship to ensure stability or maintain the proper draft or trim; (b) To pump seawater into empty fuel tanks of a ship to ensure its stability or suitable draft and trim for seaworthiness.

Benefit Plan Guidelines - Means the Benefit Plan Guidelines dated 2006 as published by the Board and available at the Board's website (www.cnlopb.nl.ca) under "Legislation and Guidelines".

Benefits Agreement - The Agreement reached between EMCP, the Partners and the Province in 2008 which requires that certain expenditures and activities associated with the Project occur in the Province, and specifies plans, processes and mechanisms for delivering these benefits.

Blowout - A change in the gas or oil pressure of the well, that cannot be handled by the well's control system, resulting in uncontrolled flow.

Caisson - A large-diameter pipe that houses a submudline wellhead.

Canada-NL Benefits Plan - Has the meaning set out in section 45 of the Accord Acts.

Capacity Assessment - An assessment of the potential for Canadian workers and companies, and in particular Newfoundland and Labrador workers, facilities and companies, to participate in Project activities.

CAPEX - Capital expenditure.

CAPP - Canadian Association of Petroleum Producers.

Casing - Steel pipe used in oil and gas wells to seal off fluids from the borehole and to prevent the walls of the hole from sloughing or caving. There may be several strings of casing in a well, one inside the other.

CEAA - Canadian Environmental Assessment Act.

CNA - College of the North Atlantic.

C-NLOPB Canada-Newfoundland and Labrador Offshore Petroleum Board, was known as C-NOPB.

Commissioner - Means the individual appointed pursuant to para. 44(2)(b) of the Accord Acts.

Compliance - Observance of official requirements.

Comprehensive Study Report (CSR) - A level of environmental assessment required pursuant to CEAA Sections 16(1)(2).

Continental Shelf - Gently sloping, shallowly submerged marginal zone of the continents extending from the shore to an abrupt increase in bottom inclination; greatest average depth less than 183 m, slope generally less than 1 to 1,000, local relief less than 18.3 m, width ranging from very narrow to more than 320 km.

Co-venturers - Hebron asset owners that are sharing in the predevelopment costs and that have authorized EMCP to prepare a Development Application in its capacity as Operator.

Crude Oil - Unrefined petroleum.

CSA - Concept Safety Analysis.

Cumulative Effects - Occur when impacts on the natural and social environments take place so frequently in time, or so densely in space, that the effects of the individual events cannot be differentiated; or when the impacts of one activity combine with those of another in either an additive or synergistic manner.

Cuttings - Chips and small fragments of rock that are brought to the surface by the drilling mud as it circulates.

CVA - Certifying Vessel Authority.

DA - Development Application.

Development Application - means all documentation provided to the Board by the Proponent for the purpose of para. 44 (2)(c) of the Accord Acts, to support approval of the Project .

Development Plan Guidelines - Means the Development Plan Guidelines dated 2006 as published by the Board and available at the Board's website (www.cnlopb.nl.com) under "Legislation and Guidelines".

Development Plan - Has the meaning set out in section 2 of the Accord Acts.

Diversity Plan - Plan to deliver increased employment and business opportunities to women, visible minorities, Aboriginal people, and persons with disabilities and companies they own or operate.

DNV - Det Norske Veritas is an autonomous, independent Foundation with the objective of safeguarding life, property and the environment. DNV establishes rules for the construction of ships and mobile offshore platforms.

Drilling Rig - A ship-shaped or semisubmersible vessel, or a jackup platform, with equipment suitable for offshore drilling.

Dry Dock - A dock that can be kept dry for use during the construction or repair of ships.

DSM - Drilling Support Module.

DWS - Deep Water Site .

E&T - Education and Training.

EMCP - ExxonMobil Canada Properties.

EOI - Expression of Interest.

EOR - Enhanced Oil Recovery .

EPC - Engineering, procurement and construction.

Expenditures - Money paid out; an amount spent.

Fault - A fracture or fracture zone along which there has been displacement of the sides relative to each other parallel to the fracture. The displacement may be a few millimetres or many kilometres.

FEED - Front-End Engineering and Design.

FFAW - Fish, Food and Allied Workers Union.

First Oil - Milestone achieved when the first shuttle tanker has been filled with oil from the Hebron production system and the shuttle tanker disconnects from the offloading system. The entire production system is handed over to operations personnel at this point. This is the first quantity of oil to be delivered from the reservoir through the complete production and offloading system, including fiscal metering.

Flare - An arrangement of piping and burners used to burn combustible vapours - a part of emergency pressure relief system.

Flaring - Disposal of surplus combustible vapours by burning at the discharge of the flare tower.

Flowline - (a) A pipeline that takes fluids from a single well or a series of wells to a gathering centre. (b) Seabed piping that connects field components such as wells, manifolds and riser bases.

Formation Water - See produced water.

FPSO - Floating production storage and offloading – floating vessel used by the offshore industry for the processing and storage of oil and gas.

GBS - Gravity base structure – the base of an offshore drilling and production platform, usually made of concrete, that is held securely on the ocean bottom without the need for piling or anchors.

H₂S - Hydrogen Sulphide Gas.

Habitat - The place where an animal or plant lives, often characterized by some physical condition (e.g., stream habitat).

Hebron Peak Demand - This figure estimates the peak demand for workers in the specified category, based on SCI's estimates and profile of demand.

Hebron Asset – Contains the four SDLs: Hebron SDL 1006, Hebron SDL 1007, Ben Nevis SDL 1009 and West Ben Nevis SDL 1010.

HMDC - Hibernia Management and Development Company.

Infrastructure - Facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions .

KKC - Kiewit Kvaerner Contractors.

Labour Force - The number of people either employed or actively seeking work.

LQ - Living Quarters w/ Control Room .

MBO - Million barrels of oil.

MUN - Memorial University of Newfoundland

NARRT - North American Regional Response Team.

Near shore - The project jurisdiction defined by the area within the Nalcor Bull Arm Facility.

NOIA - Newfoundland and Labrador Oil and Gas Industries Association.

Offshore - For the purposes of this document "Offshore" will refer to any ocean waters outside the Near shore area.

Oil - Hydrocarbons includes all "oils" and other petroleum-derived liquids, such as crude oil, condensate, gasoline, diesel fuel, petroleum-derived solvents [toluene, xylene, etc.], lubricating or hydraulic oil, asphalt, or any material defined as oil by a regulatory agency.

OIMS - Operations Integrity Management System.

OLS - Offshore loading system – crude oil loading facilities.

Operations Phase - The period following First Oil until cessation of all oil production from the Hebron Field, includes post-First Oil development drilling, offshore installation activities, production, operations, maintenance, well abandonment, decommissioning and removal from the Hebron Field of all facilities, equipment and vessels used in the production system.

Operator - When capitalized in this document, refers to ExxonMobil Canada Properties (EMCP).

OWTG - Offshore Waste Treatment Guidelines .

Participant - Means an individual, organization, or member of the general public other than the Proponent who makes an oral presentation or files a written submission to the Commissioner pursuant to paragraphs three and four of these operational procedures.

Petroleum - Oil and natural gas.

Platform - A large structure used during the development and production phases to support such facilities as the drilling rigs, living quarters, production equipment and helipads.

Plume - A column of one fluid or gas moving through another.

POB - Personnel on board.

Pool - A unique accumulation of petroleum whose limits are established by subsurface geologic factors.

Porosity - The volume of the pore space expressed as a percentage of the total volume of the rock mass.

Produced Water - Water brought up from hydrocarbon bearing strata during the extraction of oil and/or gas and can include formation water, injection water, small volumes of condensed water and trace amounts of treatment chemicals.

Production Platform - An offshore structure equipped to receive oil or gas from offshore wells where primary processing, compression and pumping are carried out before transportation of the oil or gas to shore.

Project - refers to Hebron Offshore Oilfield Project.

Proponent –ExxonMobil Canada Properties (EMCP), as Operator, on behalf of the Hebron Project proponents.

Proponents- ExxonMobil Canada Properties, Chevron Canada Limited, Petro-Canada Hebron Partnership through its managing partner Suncor Energy Inc., Statoil Canada Ltd. and Nalcor Energy – Oil and Gas Inc.

PW - Produced Water.

PWRI - Produced Water Re-injection.

QRA - Quantified Risk Assessment.

R&D - Research and Development.

Recruitment - The addition of individuals to a population through reproduction and immigration.

Reserves - That part of an identified resource from which a usable mineral or energy commodity can be economically and legally extracted at the time of determination.

Reservoir - A subsurface, porous, permeable rock body in which oil or gas has accumulated; most reservoir rocks are limestones, dolomites, sandstones, or a combination of these.

Residual Effects - Those effects remaining after enhancement and mitigative measures have been applied.

Resource - An initial volume of oil and gas that is estimated to be contained in a reservoir.

Rig - Refers to the combination of equipment used to drill wells.

Satellite - In this document, satellite refers to a remote facility or installation that cannot operate entirely independently of a central facility.

Sea Ice - Any ice floating in the sea.

Secretariat - Means the Commissioner's support staff obtained pursuant to Paragraph 13.

SEIS - Socio-Economic Impact Statement.

Seismic - Pertaining to, characteristic of or produced by earthquakes or Earth's vibration.

Shuttle Tanker - A ship with large tanks in the hull for carrying oil or water back and forth over a short route.

Significant Discovery License (SDL) - The document of title by which lands are held within a Significant Discovery Area. Ownership of a Significant Discovery License must be homogeneous; therefore, there may be several Significant Discovery Licenses comprising a Significant Discovery Area if ownership of the Significant Discovery Area is multi-partied.

St John's area - St. John's Census Metropolitan Area.

Stakeholder - A party that affects or can be affected by the Hebron Project.

STOOIP - Stock Tank Original Oil In Place

Sustainable - Capable of being continued with minimal long-term effect on the environment.

Template - Template in this context refers to the subsea structure designed to support a collection of wells.

Terms of Reference - Means the "Commissioner's Terms of Reference for the Proposed Hebron Project Public Review" as published by the Board.

Topside Facilities - All the oil and gas separation, treatment and production equipment and related equipment such as compressors, flares and accommodations located on top of an offshore facility.

Topsides - The oil and gas producing and support equipment located on top of an offshore structure.

TSR - Temporary Safe Refuge.

Turret - A low, tower-like structure capable of revolving horizontally within the hull of a ship and connected to a number of mooring lines and risers. It allows the ship to rotate with the weather while maintaining a fixed mooring system.

Umbilical - A conduit or group of conduits providing communications for the purposes of power and control from a floating production facility to a facility located on the seafloor.

UPM - Utility and process module – structure located on the topsides of an offshore platform, containing the well bay process and utility systems.

VEC - Valued Environmental Component.

Viscosity - The measure of the resistance of a fluid to flow; the lower the viscosity number, the more readily the fluid will flow.

Water Column - The vertical dimension of a body of water (i.e., the water between a reference point or area on the surface and one located directly below it on the bottom).

Appendix K

Acknowledgements

The Commissioner thanks the Participants who submitted documents and appeared at the Public Hearings. Their thoughtful and considered contributions to improving our offshore industry represent many hours of in depth work.

In addition, the Commissioner thanks ExxonMobil representatives Mr. Geoff Parker and Mr. Dave McCurdy and their large team of advisors and experts. The public hearings can only be successful if the proponent is helpful and cooperative in assisting the process.

The Commissioner wishes to offer thanks to the Commission staff. Claudine Murray, Executive Assistant, for ensuring control of all of the documents and internal materials and Shannon Lewis-Simpson who in addition to her role as Communications Manager took responsibility for the research and analysis of the Safety Chapter. Shannon's most valued contribution was as the writer and editor of the final report not only coordinating the outline but also assuring consistency for the reader of the material contributed by Commissioner, the Project Manager and the team of experts.

The Commissioner wants to express his special thanks to Ed Foran, Project Manager, who used his considerable consulting experience to ensure the project stayed on time, on budget and on point. He took ownership of the project at all levels of detail. The contribution this report makes to the long run success of the provincial offshore industry is greatly to his credit.

The experts contributing to the report have been listed elsewhere but the Commissioner wants to recognize the interest and care they took in providing advice. The level of their knowledge, experience and wisdom reflects on the degree to which the province is now in a position to manage its own destiny in developing the offshore.

Finally, the Commissioner wishes to thank the staff of the C-NLOPB for the provision of administrative assistance throughout the duration of the Commission. They were always available and quick to respond.

Appendix L

Economic Analysis

Assessing the Economic Impacts of the Hebron Offshore Oil Project

A report prepared for the Commissioner of the
Hebron Public Review Commission

Wade Locke, PhD

Wade Locke Economic Consulting

November 2, 2011

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Executive Summary

The Hebron Field is the next major oil producing project in the Newfoundland and Labrador offshore Jeanne d'Arc Basin region. The Hebron Development Application is currently under review by the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB).

The C-NLOPB has appointed Commissioner Miller Ayre to conduct an independent Public Review of the Hebron Development Application.

This report to the Commissioner assesses the economic impacts of the Hebron Project and utilizes the information contained in the Hebron Development Plan as submitted by ExxonMobil, and C-NLOPB statistics for past production and forecasts for all producing oil fields in the Newfoundland and Labrador offshore.

Based upon the Hebron Development Plan project schedule and best-estimate for production, the project would account for 55% of oil production between 2016 – 2037, royalties and taxes would be \$20 billion over the life of the project, during its peak years of production government revenues would be \$850 million annually, and Research & Development / Education and Training contributions would be in excess of \$200 million.

As outlined in the analysis contained in this report, the following observations are made:

- Offshore production from the existing projects, excluding Hebron, is expected to fall from 82 million barrels in 2016 to 33 million by 2021
- Hebron project, assuming first oil in late 2016, will account for more than 50% of the offshore production by 2019 and is expected to account for 55.6% of total production during the period of 2016-2037
- The internal rate of return for the Hebron project remains viable between 12% to 20% even with sensitivity analysis for variances in price of oil from \$70 to \$130 per barrel
- The provincial royalties and taxes based on the same sensitivity analysis for the price of oil will vary from \$10.8 billion to \$34.2 billion over the life of the project
- The Research and Development / Education and Training estimates, based on the same sensitivity analysis, range from \$134 million to \$288 million over the life of the project
- As the price of oil is in US dollars, the above calculations remain unchanged if the Canadian dollar remains at par; if the Canadian dollar ranges from \$0.90 to \$1.10, the net return will diminish if the Canadian dollar exceeds par. However, the project remains viable and contributes significantly to the provincial treasury
- Comparing Hebron to the Hibernia project for expenditures and employment:
 - Hibernia had a cumulative expenditure of 47% for local and 25% for other Canadian suppliers for a total of 72%
 - Hibernia had a cumulative employment of 66% for local and 12% for other Canadian residents for a total of 78%

- Hebron, based on the Benefits Plan, has a planned expenditure of 44% for local and 23.5% for other Canadian for a total of 67.5%, plus/minus 25%
 - Hebron, based on the Benefits Plan, has a planned employment of 40% local and 20% other Canadian for a total of 60%, plus/minus 25%
- Comparing Hebron to the Hibernia project for construction cost per barrel of recoverable reserve estimate and adjusted for 2009 dollars:
 - The Hibernia pre-production capital cost is \$13.43 per barrel (with a recoverable reserve base of 666 million barrels)
 - The Hebron pre-production capital cost, as outlined in the Development Plan, is \$9.89 per barrel (with a recoverable reserve of 769 million barrels which includes Pools 1, 4, and 5 and Pool 3).
- The Hebron project, most importantly, will contribute between 60-70% of the offshore royalties to the province during its peak production period from 2021-2035. By comparison, within 10 years of commencing production, the average royalties received by the province from existing projects is expected to fall to \$580 million per year but, with the impact of the Hebron project included, provincial royalties are expected to be nearly \$1.6 billion per year.

1. Introduction

As per the requirements specified in the Atlantic Accord, the Hebron project is currently the subject of a public review being undertaken by the Hebron Public Review Commission. This public review is a normal part of the approval process specified in the Atlantic Accord for a project that comes under the purview of the Canada–Newfoundland and Labrador Offshore Petroleum Board’s (C-NLOPB). As part of this public review of the Hebron project, this report to the Commissioner, utilizing the information described in the Hebron Development Plan and associated documents, assesses the financial viability of the Hebron project. In addition to this financial assessment, the economic implications to the various stakeholders are evaluated – this includes the equity holders as a group, NALCOR equity, the provincial treasury and the level of research and development required under the C-NLOPB 2004 guidelines. As well, sensitivity analyses assesses how sensitive the key economic parameters are to variations in output prices, exchange rates, capital costs and production profiles (i.e., Hebron Main Field development with and without Pool 3). Finally, the Hebron project is compared to the Hibernia project in terms of (1) the costs per barrel at a comparable point in time when the decision to proceed was made, (2) the local expenditure benefits and (3) the employment impacts.

There are eight sections to this report:

- Section one is the introduction.
- Section two considers the contribution of Hebron to the continuity of oil production in the Newfoundland and Labrador offshore.
- Section three provides a detailed economic assessment of the Hebron project from the perspective of various stakeholders. This section also includes estimates of the Research and Development/Education and Training (R&D/E&T) expenditures implied by the price and output profiles utilized in this assessment.
- Section four analyzes the sensitivity of the economic impacts to variations in output prices, exchange rates and capital costs.
- Section five evaluates the local benefits associated with the Hebron project and compares them to those achieved by the Hibernia project.
- Section six compares the pre-production cost per barrel oil of Hebron and Hibernia.
- Section seven describes the relative contribution that the Hebron project makes to provincial royalties.
- Section eight contains the conclusion.

2. Contribution to Offshore Production

There are at least three production profiles for the Hebron project. One was released as part of the C-NLOPB's August 2011 annual forecast of offshore production¹² and the two other production profiles were released as part of the Hebron Development Plan – one for the main field development (i.e., Pools 1, 4, and 5) and the other for the development of Pool 3.¹³ While the C-NLOPB forecast is based on annual production for the three existing projects and the Hebron project, and the production profiles in the Hebron Development Plan are based on daily production levels, there are other significant differences that merit further consideration.

Specifically, the C-NLOPB August 2011 annual forecast assumed production from Hebron would total 581 million barrels, while the Hebron Development Plan indicates that the production from the main field development (Pools 1, 4 and 5) is anticipated to reach total 645 million barrels. Production from the Pool 3 development is expected to equal 124 million barrels with a combined full field production estimated to be 769 million barrels. In other words, the expected production in the Hebron Development Plan exceeds the C-NLOPB estimate by 187 million barrels, which is 32% higher than the C-NLOPB August 2011 estimate. This is explained, in part, by the fact that the C-NLOPB estimate does not include production from the West Ben Nevis (Pool 2) or Ben Nevis (Pool 3) fields. Other differences in the production profiles are: (1) the C-NLOPB forecast assumes that production commences in 2017, instead of the 2016 start date indicated in the Hebron Development Plan and (2) the C-NLOPB estimate assumes that Hebron production reaches a plateau level of production and remains at the production plateau for six years before declining, while the Hebron Development Plan envisions oil production from the main field development ascending to a peak before declining. That is, there is no plateau. As well, Pool 3 production is modelled separately in the Hebron Development Plan and has not been integrated with the main field development. For the purpose of the analysis undertaken in this report, it is assumed that production from Pool 3 commences in 2020. While the actual start date will become known as information about the project evolves, 2020 was assumed for this analysis in order to ensure that the 150,000 barrel per day capacity of the GBS facility was not violated when Pool 3 production is added to the main field development.

The similarities and differences between each forecast are illustrated in Figures 1 and 2 below. While both profiles are reasonably similar, it is obvious that the production profiles in the Hebron Development Plan involve greater recoverable reserves and a longer period of production. Adding the production from Pool 3 further increases the cumulative level of production and the time horizon over which the Hebron field is expected to operate.

¹² In response to my request to Max Ruelokke for a copy of the production profile he utilized in an August 8, 2011 presentation to Minister Penashue, this forecast was provided in an email dated August 15, 2011 from Jeff O'Keefe of the C-NLOPB.

¹³ The Development Plan also includes production profiles for high and low cases for both the main field development and for the Pool 3 development. They were not considered further in this report because no cost profiles were associated with them in the Hebron Development Plan.

Figure 0-1: A Comparison of the C-NLOPB 2011 Estimate for Hebron and the Main Field Estimate from the Hebron Development Plan

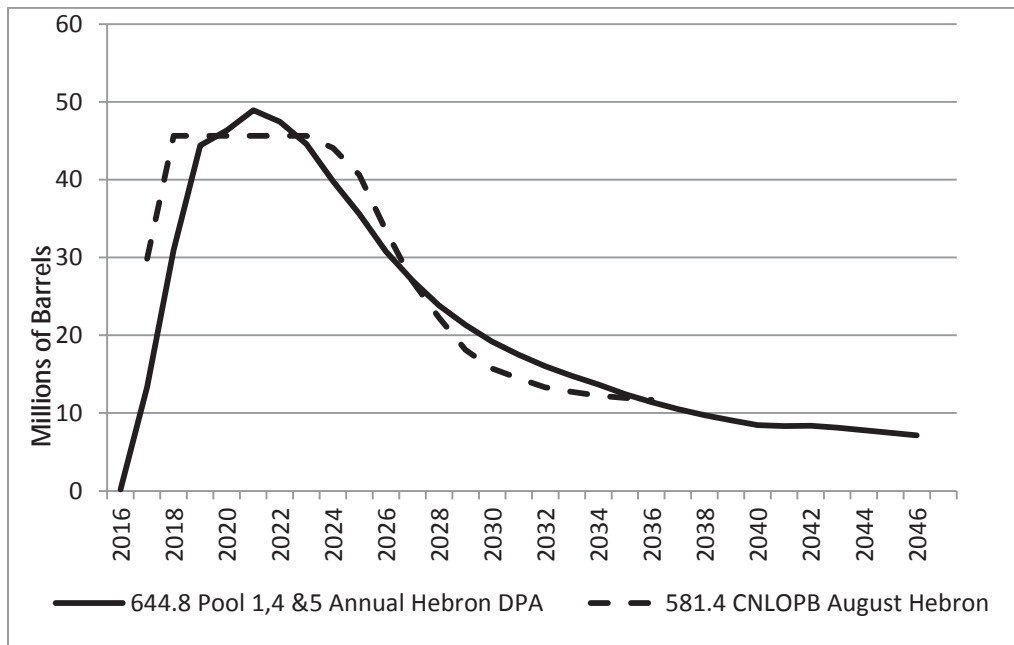
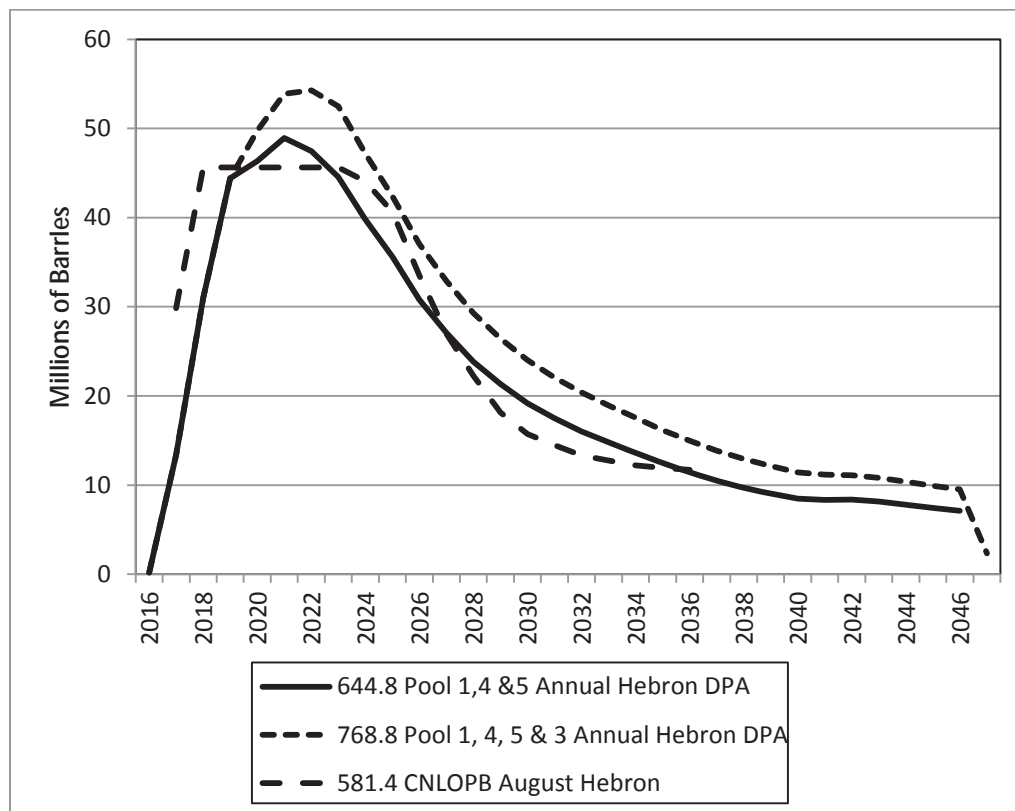


Figure 0-2: A Comparison of the C-NLOPB 2011 Estimate for Hebron, the Main Field Estimate from the Hebron Development Plan and the Main Field Including the Pool 3 Estimate from the Hebron Development Plan



2.1 C-NLOPB August Forecast of Production

Table 1 and Figure 3 show the production profiles available in the C-NLOPB August 2011 annual forecast. In interpreting the C-NLOPB August forecast, it is important to recognize that the C-NLOPB bases this forecast on the following assumptions:

1. The Hibernia total production profile is based on 1) the existing Hibernia field approved 1991, 2) the 2008 Development Plan Application (DPA) for AA Blocks and 3) the approval of the DPA for the Hibernia South Unit in 2010, with development beginning in 2011.
2. Terra Nova production profile is based on C-NLOPB forecast and reserve estimate (419 million barrels) in 2009.
3. Total White Rose Oil production numbers are based on the South Avalon Pool (207 million barrels), the North Avalon Pool (14.6 million barrels), the West White Rose Pool (40.4 million barrels) and the Hibernia formations (21 million barrels).
4. The White Rose forecast assumes development in the West Pool beginning in 2011, with additional wells online in 2013 and 2014. It also assumes development of the Hibernia formation

in 2015 and development of the North Avalon Pool in 2023. However, the development of all these pools has yet to be approved by the C-NLOPB.

5. The forecast for the South White Rose Extension is based on the 2006 White Rose DPA concerning the South Extension and assumes development beginning in 2015.
6. The forecast for North Amethyst is based on the approved 2007 Development Plan.
7. The Hebron Field is assumed to commence production in 2017 for purposes of this forecast and does not include the West Ben Nevis (Pool 2) or Ben Nevis (Pool 3) fields.

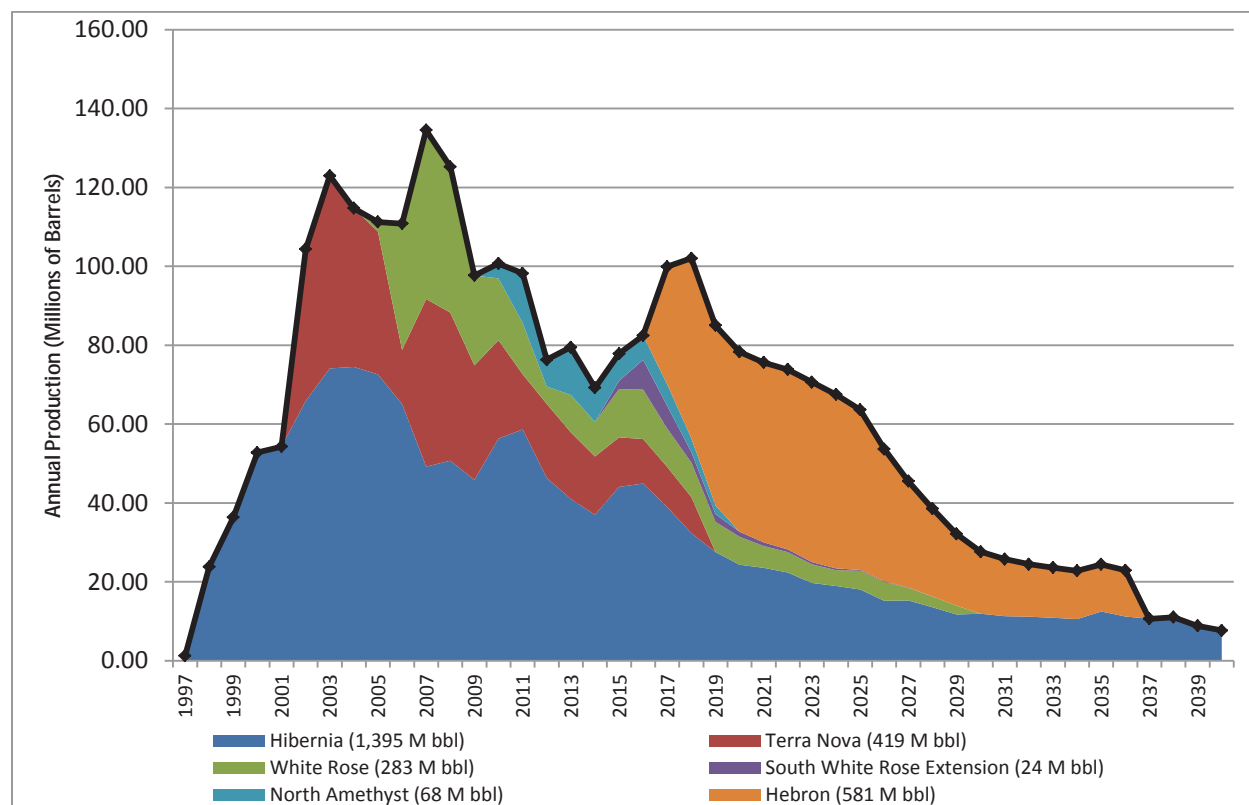
As Table 1 and Figure 3 illustrate, by the time that Hebron starts producing in 2017, the C-NLOPB August 2011 annual forecast indicates that production from the existing fields are in decline.

Table O-1: Actual and Forecast Production Profiles for Newfoundland and Labrador Offshore Oil Projects
– C-NLOPB's August 2011 Forecast (Millions of Barrels)

	Hibernia	Terra Nova	White Rose	South White Rose Extension	North Amethyst	Hebron	Total
1997	1.27						1.27
1998	23.80						23.80
1999	36.39						36.39
2000	52.79						52.79
2001	54.29						54.29
2002	65.87	38.47					104.33
2003	74.13	48.84					122.96
2004	74.50	40.22					114.72
2005	72.59	36.22	2.47				111.27
2006	65.10	13.69	32.05				110.84
2007	49.22	42.50	42.81				134.53
2008	50.73	37.55	36.96				125.24
2009	45.85	29.04	22.80				97.69
2010	56.34	24.93	15.67		3.75		100.69
2011	58.65	14.01	13.00		12.56		98.22
2012	46.37	18.76	4.40		6.80		76.33
2013	41.01	16.88	9.50		12.11		79.50
2014	37.02	14.77	8.78		8.65		69.23
2015	44.08	12.56	12.26	2.08	6.87		77.85
2016	44.93	11.30	12.51	7.58	6.13		82.45
2017	38.96	10.17	9.72	5.75	5.48	29.85	99.93
2018	32.36	9.15	8.74	2.65	3.50	45.63	102.03
2019	27.57		7.64	1.95	2.25	45.63	85.04
2020	24.35		7.09	1.26		45.63	78.32
2021	23.56		5.54	0.92		45.63	75.65
2022	22.38		5.16	0.69		45.63	73.85
2023	19.73		4.72	0.57		45.62	70.65
2024	18.97		4.00	0.46		44.08	67.51
2025	18.07		4.73	0.23		40.64	63.67
2026	15.21		4.78	0.16		33.52	53.67
2027	15.30		3.16	0.11		26.98	45.55
2028	13.58		2.74			22.27	38.59
2029	11.74		2.26			18.14	32.13
2030	11.93					15.73	27.65
2031	11.30					14.46	25.77
2032	11.18					13.32	24.49
2033	10.90					12.74	23.64
2034	10.57					12.23	22.80
2035	12.50					11.94	24.44
2036	11.22					11.71	22.93
2037	10.64						10.64
2038	11.04						11.04
2039	8.85						8.85
2040	7.69						7.69
Total	1,395	419	283	24	68	581	2,771

Source: C-NLOPB August 2011

Figure 0-3: Actual and Forecast Production Profiles for Newfoundland and Labrador Offshore Oil Project
– C-NLOPB August 2011 Forecast (Millions of Barrels)



2.2 The Significance of Hebron for Offshore Oil Production in Newfoundland and Labrador

As Tables 2, 3 and 4 and Figures 4 and 5 demonstrate, Hebron, over its productive life and assuming no new projects come on stream during that time period, is expected to account for 55.6% of total offshore production during the period of 2016-2037. At its peak, in 2024, the Hebron project will produce more than 65% of annual offshore production in 2024. Hence, on a go-forward basis, the Hebron project is an extremely important project in ensuring continuity of production in Newfoundland and Labrador's offshore. As Figure 5 clearly illustrates, if Hebron does not come on stream in 2016 as anticipated, then offshore production will fall off dramatically. In particular, within five years of Hebron's assumed start, output from the existing fields would have fallen by more than half. That is, offshore production from the existing projects is expected to fall from 82 million barrels in 2016 to 33 million by 2021.

Over the expected productive life of Hibernia, Terra Nova, White Rose (including North Amethyst) and Hebron, the expected shares of output to come from each project are:

- Hibernia is expected to account for between 47.1% and 50.3% of total production;
- Terra Nova is expected to account for between 14.2% and 15.1% of total production;
- White Rose and North Amethyst are expected to account for between 12.7% and 13.6% of total production; and
- Hebron is expected to account for between 21.0% and 26.0% of total production.

Table 0-2: Expected Production as a Percent of Forecast Total Offshore Oil Production by Project –
C-NLOPB August 2011 Forecast

Year	Hibernia as a Percent of Total Offshore Production	Terra Nova as a Percent of Total Offshore Production	White Rose & North Amethyst as a Percent of Total Offshore Production	Hebron as a Percent of Total Offshore Production
1997	100.0%			
1998	100.0%			
1999	100.0%			
2000	100.0%			
2001	100.0%			
2002	63.1%	36.9%		
2003	60.3%	39.7%		
2004	64.9%	35.1%		
2005	65.2%	32.5%	2.2%	
2006	58.7%	12.4%	28.9%	
2007	36.6%	31.6%	31.8%	
2008	40.5%	30.0%	29.5%	
2009	46.9%	29.7%	23.3%	
2010	56.0%	24.8%	19.3%	
2011	59.7%	14.3%	26.0%	
2012	60.7%	24.6%	14.7%	
2013	51.6%	21.2%	27.2%	
2014	53.5%	21.3%	25.2%	
2015	56.6%	16.1%	27.2%	
2016	54.5%	13.7%	31.8%	
2017	39.0%	10.2%	21.0%	29.9%
2018	31.7%	9.0%	14.6%	44.7%
2019	32.4%		13.9%	53.7%
2020	31.1%		10.7%	58.3%
2021	31.1%		8.5%	60.3%
2022	30.3%		7.9%	61.8%
2023	27.9%		7.5%	64.6%
2024	28.1%		6.6%	65.3%
2025	28.4%		7.8%	63.8%
2026	28.3%		9.2%	62.4%
2027	33.6%		7.2%	59.2%
2028	35.2%		7.1%	57.7%
2029	36.5%		7.0%	56.4%
2030	43.1%			56.9%
2031	43.9%			56.1%
2032	45.6%			54.4%
2033	46.1%			53.9%
2034	46.4%			53.6%
2035	51.2%			48.8%
2036	48.9%			51.1%
2037	100.0%			
2038	100.0%			
2039	100.0%			
2040	100.0%			
Share of Total	50.3%	15.1%	13.6%	21.0%

Table 0-3: Expected Production as a Percent of Forecast Total Offshore Oil Production by Project –
C-NLOPB August 2011 Forecast and Hebron Main Field Estimate – Hebron Development Plan

Year	Hibernia as a Percent of Total Production	Terra Nova as a Percent of Total Production	White Rose & North Amethyst as a Percent of Total Production	Hebron as a Percent of Total Production
1997	100.0%			
1998	100.0%			
1999	100.0%			
2000	100.0%			
2001	100.0%			
2002	63.1%	36.9%		
2003	60.3%	39.7%		
2004	64.9%	35.1%		
2005	65.2%	32.5%	2.2%	
2006	58.7%	12.4%	28.9%	
2007	36.6%	31.6%	31.8%	
2008	40.5%	30.0%	29.5%	
2009	46.9%	29.7%	23.3%	
2010	56.0%	24.8%	19.3%	
2011	59.7%	14.3%	26.0%	
2012	60.7%	24.6%	14.7%	
2013	51.6%	21.2%	27.2%	
2014	53.5%	21.3%	25.2%	
2015	56.6%	16.1%	27.2%	
2016	54.4%	13.7%	31.7%	0.2%
2017	46.7%	12.2%	25.1%	16.0%
2018	37.0%	10.5%	17.0%	35.5%
2019	32.9%		14.1%	53.0%
2020	30.8%		10.6%	58.6%
2021	29.8%		8.2%	62.0%
2022	29.6%		7.7%	62.7%
2023	28.4%		7.6%	64.0%
2024	30.0%		7.0%	63.0%
2025	30.8%		8.5%	60.7%
2026	29.9%		9.7%	60.4%
2027	33.5%		7.2%	59.3%
2028	33.8%		6.8%	59.4%
2029	33.2%		6.4%	60.4%
2030	38.3%			61.7%
2031	39.3%			60.7%
2032	41.1%			58.9%
2033	42.4%			57.6%
2034	43.6%			56.4%
2035	50.1%			49.9%
2036	49.5%			50.5%
2037	50.3%			49.7%
2038	53.2%			46.8%
2039	49.4%			50.6%
2040	47.6%			52.4%
2041				100.0%
2042				100.0%
2043				100.0%
2044				100.0%
2045				100.0%
Share of	49.2%	14.8%	13.3%	22.7%

Table 0-4: Expected Production as a Percent of Forecast Total Offshore Oil Production by Project –
C-NLOPB August 2011 Forecast and Hebron with Pool 3 Estimate – Hebron Development Plan

Year	Hibernia as a Percent of Total Production	Terra Nova as a Percent of Total Production	White Rose & North Amethyst as a Percent of Total Production	Hebron as a Percent of Total Production
1997	100.0%			
1998	100.0%			
1999	100.0%			
2000	100.0%			
2001	100.0%			
2002	63.1%	36.9%		
2003	60.3%	39.7%		
2004	64.9%	35.1%		
2005	65.2%	32.5%	2.2%	
2006	58.7%	12.4%	28.9%	
2007	36.6%	31.6%	31.8%	
2008	40.5%	30.0%	29.5%	
2009	46.9%	29.7%	23.3%	
2010	56.0%	24.8%	19.3%	
2011	59.7%	14.3%	26.0%	
2012	60.7%	24.6%	14.7%	
2013	51.6%	21.2%	27.2%	
2014	53.5%	21.3%	25.2%	
2015	56.6%	16.1%	27.2%	
2016	54.4%	13.7%	31.7%	0.2%
2017	46.7%	12.2%	25.1%	16.0%
2018	37.0%	10.5%	17.0%	35.5%
2019	32.9%	0.0%	14.1%	53.0%
2020	29.5%	0.0%	10.1%	60.3%
2021	28.1%	0.0%	7.7%	64.2%
2022	27.1%	0.0%	7.1%	65.8%
2023	25.5%	0.0%	6.8%	67.7%
2024	26.9%	0.0%	6.3%	66.8%
2025	27.6%	0.0%	7.6%	64.8%
2026	26.6%	0.0%	8.6%	64.8%
2027	29.7%	0.0%	6.4%	63.9%
2028	29.8%		6.0%	64.2%
2029	29.0%		5.6%	65.4%
2030	33.2%			66.8%
2031	33.9%			66.1%
2032	35.4%			64.6%
2033	36.6%			63.4%
2034	37.6%			62.4%
2035	43.6%			56.4%
2036	42.8%			57.2%
2037	43.4%			56.6%
2038	46.1%			53.9%
2039	42.2%			57.8%
2040	40.2%			59.8%
2041				100.0%
2042				100.0%
2043				100.0%
2044				100.0%
2045				100.0%
2046				100.0%
2047				100.0%
2048				100.0%
2049				100.0%
Share of Total	47.1%	14.2%	12.7%	26.0%

Figure 0-4: Expected Hebron Production as a Percent of Forecast Total Offshore Oil Production – A Comparison of C-NLOPB August 2011 Forecast, Hebron Development Plan Main Field Estimate and Hebron Development Plan with Pool 3 Estimate

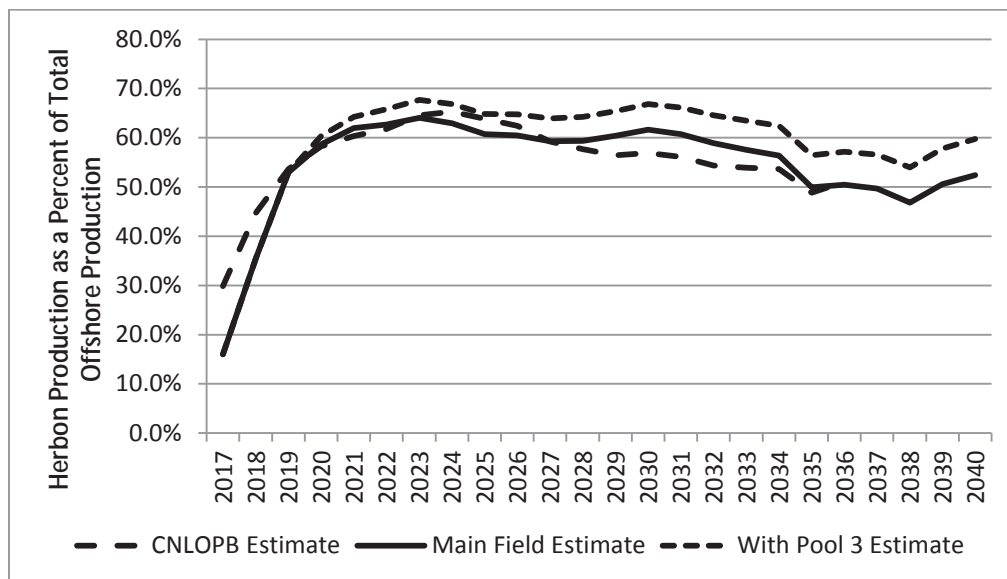
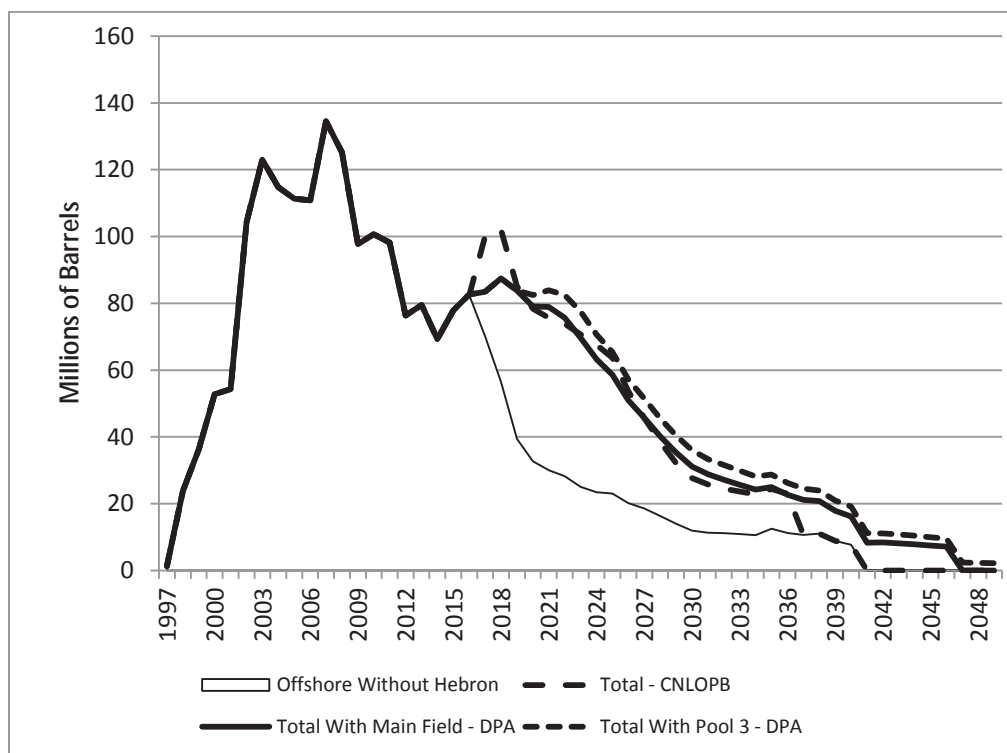


Figure 0-5: Offshore Production With and Without Hebron – C-NLOPB Estimate, Hebron Development Plan Main Field Estimate and With Pool 3 Estimate



3. Economic Analysis of the Hebron Project

The base case economic analysis undertaken for this report invokes the following assumptions:

1. The production profile for the main field development is equivalent to that provided in Table 6.6-3, p. 6.47 of the Hebron Development Plan;¹⁴
2. The production profile for Pool 3 development is equivalent to that provided in Table 6.6-5, p. 6-50 of the Hebron Development Plan;¹⁵
3. In order to ensure that the 150,000 barrel per day production capacity of the GBS facility (Hebron Development Plan p. 1-23) is not exceeded, Pool 3 production is assumed to commence in 2020;¹⁶
4. The historic expenditures for the Hebron project, as per the Hebron Development Application Summary p. 1-37, total \$538.5 million as-spent dollars
5. Given that operating costs are expected to increase by 1 to 3% (Hebron Development Application Summary p. 1-41) when Pool 3 production occurs, the operating costs for the Hebron main field are increased by 2% in those years in which Pool 3 production occurs;
6. The capital and operating costs profiles for the main field development are taken from Table 1.16-2, p. 1-42 of the Hebron Development Application Summary;
7. The last year of operating costs includes an estimated \$430 million (2009 dollars) in abandonment cost;
8. Since no transshipment and transportation costs are included in the costs estimates provided in the Hebron Development Plan, a combined cost of \$2.00 Cdn (2011 dollars) per barrel are assumed;
9. The capital costs for the Pool 3 development are taken from Table 1.16-3 of the Hebron Development Application Summary;
10. As per the Hebron Development Application Summary (p. 1-42, p. 1-43), capital costs are assumed to be provided in mid-2009 prices. These are converted to mid-2011 costs estimates by adding 4% inflation to the estimates provided in the development plan;

¹⁴ Table 6.6-11, p. 6-60 of the Hebron Development Plan provide best (645 million barrels), downside (503 million barrels) and upside (786 million barrels) estimates for the production profiles associated with the main field development. Only the best estimates were utilized in the economic analysis undertaken in this report because there were no corresponding cost estimates for the upside and downside production profiles.

¹⁵ Table 6.6-14, p. 6-64 of the Hebron development Plan have best (124 million barrels), downside (75 million barrels) and upside (203 million barrels) estimates for Pool 3 production.

¹⁶ While the Proponent does indicate that, with de-bottlenecking the capacity of the GBS facility could reach 180,000 barrels per day, for the purposes of this analysis, it was decided to stick with more conservative 150,000 barrel per day capacity estimate. Also, on page 6-45 of the Hebron Development Application Summary, the Proponent does indicate that "The optimal start-up timing for Pool 3 and the sizing/scope of the topside process equipment that may be required for Pool 3 development are also currently being studied."

11. Independent of the \$120 million estimate provided in the Benefits Agreement with the Government of Newfoundland and Labrador and reiterated in the Hebron Socio-Economic Impact Statement and Sustainable Development Report p. 7-18, the Hebron's R&D/E&T requirements should be determined by the 2004 R&D Guidelines established by the C-NLOPB;
12. The offshore generic royalty will apply to the Hebron project with the following modifications:
(1) a super royalty of 6.5% on top of the existing net royalties after both the net royalty payout is achieved and the price of oil (WTI) exceeds \$50 US/bbl; and (2) the basic royalty rate will remain at 1% until simple payout is achieved;
13. The assumed long-term bond rate for calculating net royalty payout is 4.5%;
14. The assumed rate of inflation is 2%;
15. The assumed exchange rate is \$1.00 US/CDN;
16. The 2011 price of oil is \$100 WTI and is assumed to grow with inflation; and
17. The WTI and Brent price gap is assumed to disappear before production commences from Hebron;¹⁷
18. The R&D benchmark is assumed to be 0.40% of the value of production; and
19. The long-term oil price is assumed to be the Brent crude price less 15%.

Based upon these assumptions, the economic impacts are presented in Table 5. At real prices of \$100 per barrel, the main field development is expected to yield a 17% internal rate of return to the Proponent. When the cost and the production profiles associated with Pool 3 are added, the internal rate of return for the combined project falls to 16%. The royalties expected to flow to the provincial treasury from the main field development are \$13.5 billion, which when added to corporation income taxes and NALCOR equity total \$16.6 billion. The corresponding impacts when Pool 3 is included are: \$16.3 billion for royalties for a total of \$20.0 billion in combined provincial revenue.

Finally, from the base-case parameters and in accordance with the C-NLOPB's guidelines, the R&D/E&T expenditure for the main field development would be \$211 million, after adjusting for the development credit. The R&D/E&T expenditure when Pool 3 is added would be \$244 million, after the development.

¹⁷ The WTI/Brent oil price gap is assumed to disappear by the time Hebron production commences. Hence, in this analysis Brent and WTI prices can be used interchangeably.

Table 0-5: Oil Price Sensitivity for Main Field Development – Key Parameters

Parameter	Main Field	Main Field Plus Pool 3
Assumed Price	\$100	\$100
Quality Adjustment on WTI Price	85%	85%
Exchange Rate (\$US/\$CDN)	\$1.00	\$1.00
Inflation Rate	2%	2%
Nominal Pre-Production Capex (\$M)	\$7,016	\$8,995
Pre-Production Capex (\$M 2009)	\$6,448	\$8,178
Nominal Drilling Capex (\$M)	\$2,313	\$4,559
Drilling Capex (\$M 2009)	\$1,887	\$3,667
Historic Costs (\$M)	\$538	\$538
Nominal Opex (\$M)	\$9,525	\$10,811
Opex (\$M 2009)	\$5,833	
Production (M barrels)	644.8	768.8
Revenue (\$M)	\$75,704	\$91,761
IRR (%)	17.0%	16.0%
Royalties (\$M)	\$10,312	\$12,534
Super Royalties (\$M)	\$3,167	\$3,785
Provincial CIT (\$M)	\$1,758	\$2,072
Provincial Revenue (\$M)	\$15,237	\$18,391
R&D Requirement (\$M)	\$211	\$244
NALCOR Equity (\$M)	\$1,351	\$1,612
NPV NALCOR @10% (\$M)	\$46	\$47

4. Sensitivity Analyses

Three distinct sensitivity analyses were performed for this report. The first involved evaluating how sensitive key parameters were to variations in output prices. This was followed by a sensitivity analysis with respect to exchange rates. The final sensitivity analysis related to changes in the capital costs of developing the Hebron project.

4.1 Sensitivity Analysis – Output Prices

A series of oil price sensitivities were undertaken. Specifically, oil prices per barrel were allowed to vary from \$70 to \$130 in \$10 per barrel increments to determine the implication of price variations on key economic parameters. The results of these analyses are presented in Tables 6 and 7 and Figure 6, 7, 8 and 9.

While the internal rates of return for the main field development range from 12.7% to 20.0% and from 11.6% to 19.2% for the main field and Pool 3 development combined, the project remains viable throughout this range. Moreover, given that prices are expected to exceed \$80 per barrel in the longer term, the Hebron project should be economic to develop and produce for all reasonable price assumptions.

Obviously, the royalties flowing to the provincial treasury are directly correlated with the assumed oil price. For the range of sensitivities considered in this analysis, provincial royalties will range from \$7.3 billion to \$24.6 billion for the main field development and from \$8.7 billion to \$29.4 billion for the combined Pool 3 development.

Provincial Treasury revenues range from \$9.2 billion to \$28.6 billion for the main field development and from \$10.8 billion to \$34.2 billion for the full field development. Clearly, the Hebron project has a significant potential impact on the provincial treasury.

Finally, the R&D/E&T expenditure ranges from \$134 million to \$288 million for the main field development and from \$151 million to \$338 million for the full field development.

Table 0-6: Oil Price Sensitivity for Main Field Development – Key Parameters

Assumed Oil Price	\$70	\$80	\$90	\$100	\$110	\$120	\$130
Quality Adjustment on WTI Price	85%	85%	85%	85%	85%	85%	85%
Exchange Rate (\$US/\$CDN)	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Inflation Rate	2%	2%	2%	2%	2%	2%	2%
Nominal Pre-Production Capex (\$M)	\$7,016	\$7,016	\$7,016	\$7,016	\$7,016	\$7,016	\$7,016
Pre-Production Capex (\$M 2009)	\$6,448	\$6,448	\$6,448	\$6,448	\$6,448	\$6,448	\$6,448
Nominal Drilling Capex (\$M)	\$2,313	\$2,313	\$2,313	\$2,313	\$2,313	\$2,313	\$2,313
Drilling Capex (\$M 2009)	\$1,887	\$1,887	\$1,887	\$1,887	\$1,887	\$1,887	\$1,887
Historic Costs (\$M)	\$538	\$538	\$538	\$538	\$538	\$538	\$538
Nominal Opex (\$M)	\$9,525	\$9,525	\$9,525	\$9,525	\$9,525	\$9,525	\$9,525
Opex (\$M 2009)	\$5,833	\$5,833	\$5,833	\$5,833	\$5,833	\$5,833	\$5,833
Production (M barrels)	644.8	644.8	644.8	644.8	644.8	644.8	644.8
Revenue (\$M)	\$52,992	\$60,563	\$68,133	\$75,704	\$83,274	\$90,844	\$98,415
IRR (%)	12.7%	14.2%	15.7%	17.0%	18.1%	19.1%	20.0%
Royalties (\$M)	\$5,728	\$7,310	\$8,804	\$10,312	\$14,320	\$17,309	\$19,952
Super Royalties (\$M)	\$1,591	\$2,126	\$2,653	\$3,167	\$3,667	\$4,171	\$4,680
Provincial CIT (\$M)	\$1,062	\$1,291	\$1,525	\$1,758	\$1,884	\$2,054	\$2,240
Provincial Revenue (\$M)	\$8,381	\$10,727	\$12,982	\$15,237	\$19,871	\$23,535	\$26,871
R&D Expenditure (\$M)	\$134	\$159	\$185	\$211	\$236	\$262	\$288
NALCOR Equity (\$M)	\$779	\$967	\$1,159	\$1,351	\$1,457	\$1,598	\$1,750
NPV NALCOR @10% (\$M)	-\$56	-\$22	\$12	\$46	\$73	\$100	\$127

Table 0-7: Oil Price Sensitivity for Main Field plus Pool 3 Development – Key Parameters

Assumed Oil Price	\$70	\$80	\$90	\$100	\$110	\$120	\$130
Quality Adjustment on WTI Price	85%	85%	85%	85%	85%	85%	85%
Exchange Rate (\$US/\$CDN)	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Inflation Rate	2%	2%	2%	2%	2%	2%	2%
Nominal Pre-Production Capex (\$M)	\$8,995	\$8,995	\$8,995	\$8,995	\$8,995	\$8,995	\$8,995
Pre-Production Capex (\$M 2009)	\$8,178	\$8,178	\$8,178	\$8,178	\$8,178	\$8,178	\$8,178
Nominal Drilling Capex (\$M)	\$4,559	\$4,559	\$4,559	\$4,559	\$4,559	\$4,559	\$4,559
Drilling Capex (\$M 2009)	\$3,667	\$3,667	\$3,667	\$3,667	\$3,667	\$3,667	\$3,667
Historic Costs (\$M)	\$538	\$538	\$538	\$538	\$538	\$538	\$538
Opex (\$M)	\$10,811	\$10,811	\$10,811	\$10,811	\$10,811	\$10,811	\$10,811
Production (M barrels)	768.8	768.8	768.8	768.8	768.8	768.8	768.8
Revenue (\$M)	\$64,233	\$73,409	\$82,585	\$91,761	\$100,937	\$110,113	\$119,289
IRR (%)	11.6%	13.2%	14.7%	16.0%	17.3%	18.2%	19.2%
Royalties (\$M)	\$6,852	\$8,834	\$10,611	\$12,534	\$14,310	\$20,292	\$23,757
Super Royalties (\$M)	\$1,815	\$2,496	\$3,157	\$3,785	\$4,414	\$5,040	\$5,653
Provincial CIT (\$M)	\$1,238	\$1,512	\$1,795	\$2,072	\$2,356	\$2,464	\$2,678
Provincial Revenue (\$M)	\$9,905	\$12,842	\$15,564	\$18,391	\$21,080	\$27,796	\$32,089
R&D Requirement (\$M)	\$151	\$182	\$213	\$244	\$275	\$307	\$338
NALCOR Equity (\$M)	\$924	\$1,149	\$1,382	\$1,612	\$1,846	\$1,933	\$2,109
NPV NALCOR @10% (\$M)	-\$70	-\$31	\$9	\$47	\$86	\$114	\$145

Figure 0-6: The Sensitivity of the Internal Rate of Return to Variations in Oil Prices for Main Field Development and Including Pool 3 Development

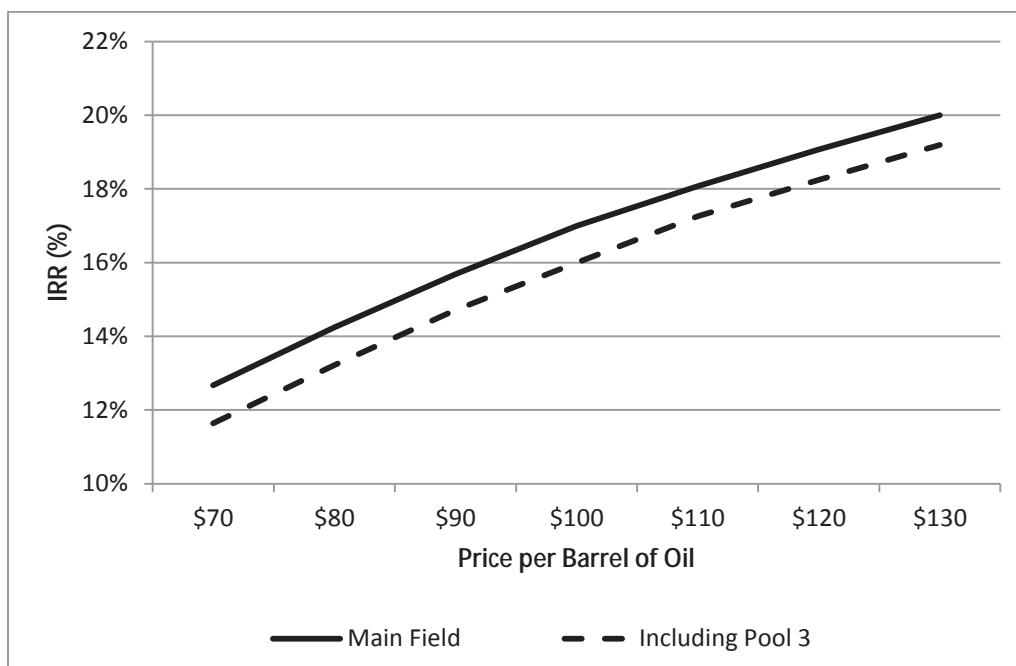


Figure 0-7: The Sensitivity of Provincial Royalties to Variations in Oil Prices for Main Field Development and Including Pool 3 Development

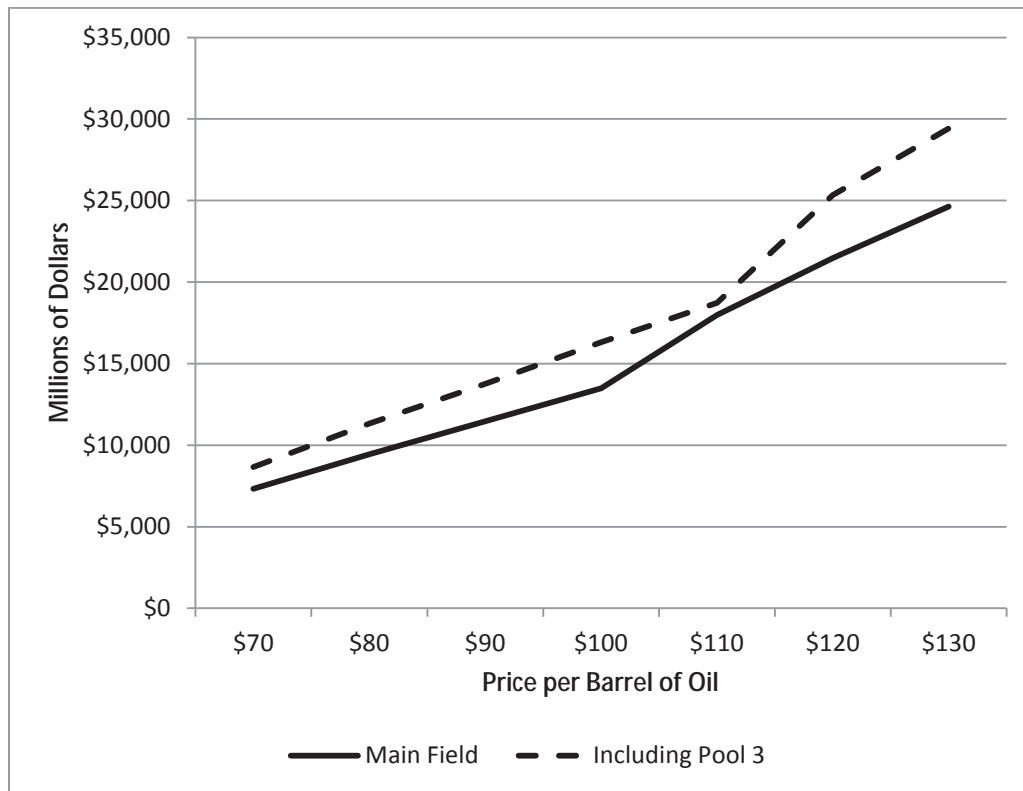


Figure 0-8: The Sensitivity of Provincial Revenues (including Equity) to Variations in Oil Prices for Main Field Development and Including Pool 3 Development

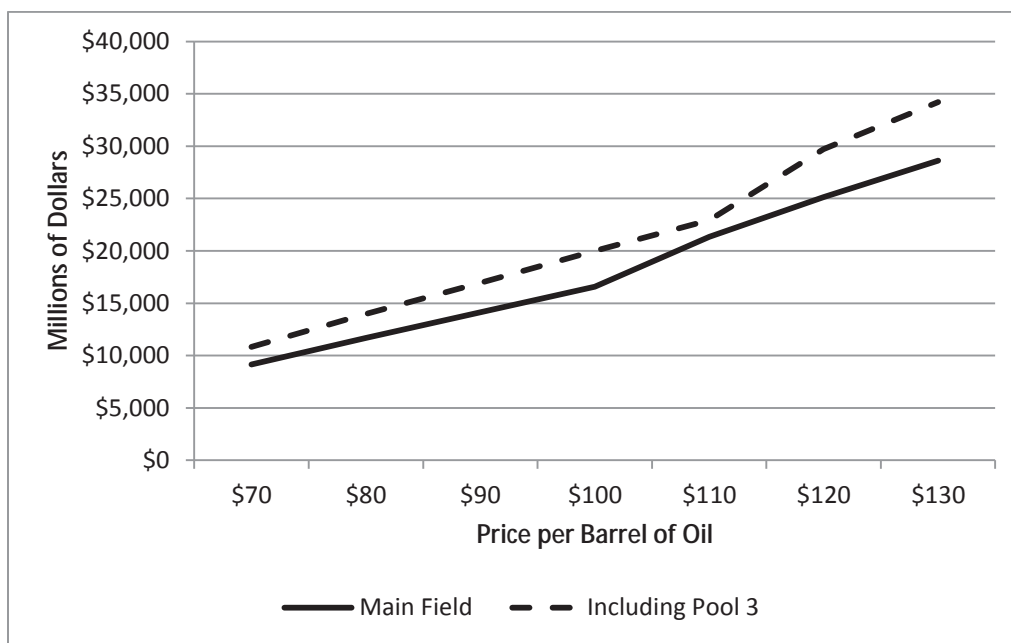
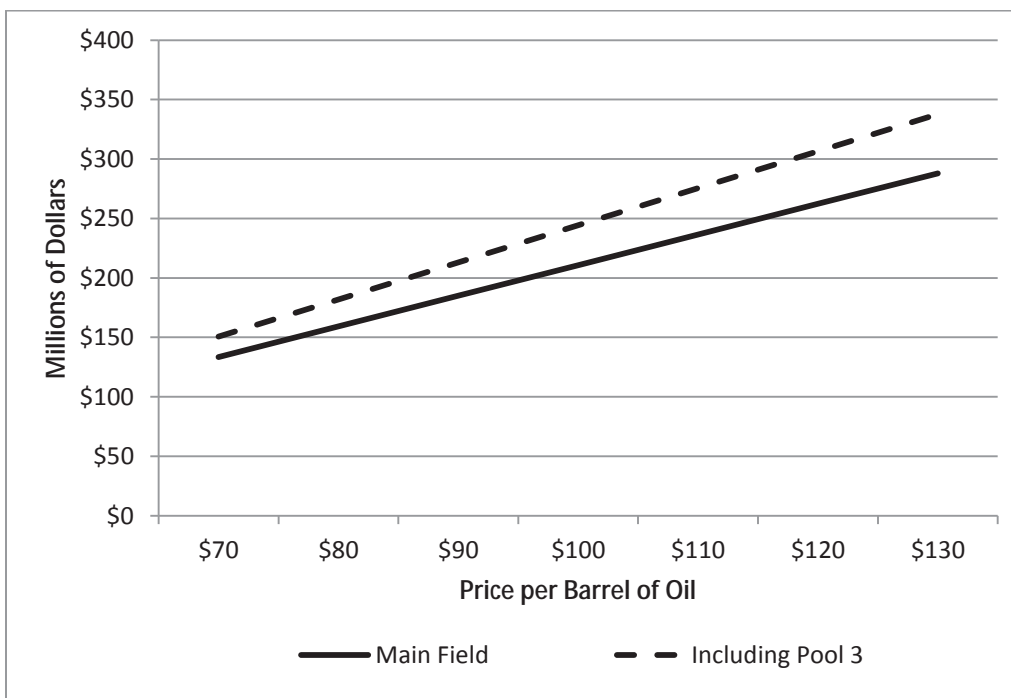


Figure 0-9: The Sensitivity of R&D/E&T Commitments to Variations in Oil Prices for Main Field Development and Including Pool 3 Development



4.2 Sensitivity Analysis – Exchange Rates

Tables 8 and 9 and Figures 10, 11 and 12 demonstrate the impacts of variations in the exchange rate on Hebron's internal rate of return, government royalties and R&D/E&T expenditures. For the purposes of illustration, the exchange is allowed to vary from \$0.90 US/CDN to \$1.10 US/CDN in increments of \$0.05.

The higher the value of the Canadian dollar relative to its US counterpart, the lower is the internal rate of return because prices are denominated in US dollars per barrel and costs are specified in Canadian dollars. Consequently, the higher the value of the Canadian dollar, the lower is the Canadian-dollar-equivalent revenue earned for any oil price. It is as if the price of oil has fallen.

Over the range of exchange rate sensitivities, the internal rate of return on the project falls from 17.4% to 14.8% for the main field development and from 18.2% to 15.8% for the full field development. Even at the lowest value, the project remains viable. Similarly, provincial royalties are inversely tied to the exchange rates. The value of royalties estimated for the project falls from \$18.4 billion to 11.6 billion for the main field development and from \$9 billion to \$14 billion for the full field development. Lastly, the R&D/E&T expenditures are reduced from \$239 million to \$187 million for the main field development and these expenditures are reduced from \$279 million to \$216 million when Pool 3 is added to the main field development.

Table 0-8: Exchange Rate Sensitivity for Main Field Development – Key Parameters

Assumed Exchange Rate	\$0.90	\$0.95	\$1.00	\$1.05	\$1.10
IRR (%)	18.2%	17.6%	17.0%	16.4%	15.8%
Royalties (\$M)	\$14,695	\$12,228	\$10,312	\$9,582	\$8,938
Super Royalties (\$M)	\$3,723	\$3,434	\$3,167	\$2,923	\$2,700
R&D Expenditures (\$M)	\$239	\$224	\$211	\$198	\$187

Table 0-9: Exchange Rate Sensitivity for Main Field plus Pool 3 Development – Key Parameters

Assumed Exchange Rate	\$0.90	\$0.95	\$1.00	\$1.05	\$1.10
IRR (%)	17.4%	16.7%	16.0%	15.4%	14.8%
Royalties (\$M)	\$14,514	\$13,471	\$12,534	\$11,680	\$10,771
Super Royalties (\$M)	\$4,484	\$4,118	\$3,785	\$3,479	\$3,215
R&D Expenditures (\$M)	\$279	\$261	\$244	\$229	\$216

Figure 0-10: The Sensitivity of the Internal Rate of Return to Variations in Exchange Rates for Main Field Development and Including Pool 3 Development

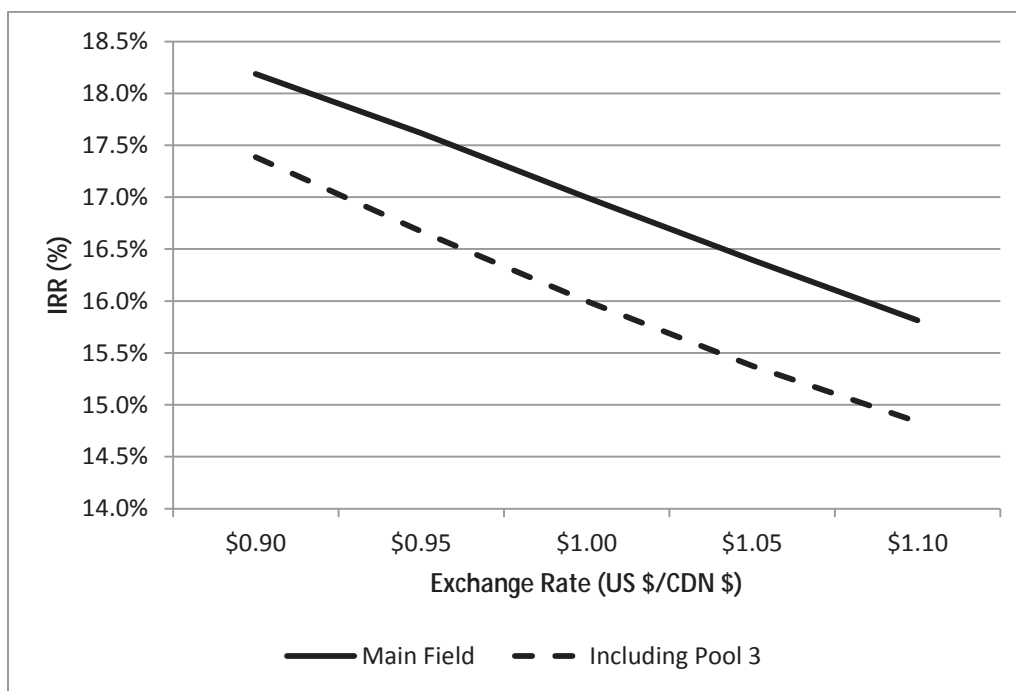


Figure 0-11: The Sensitivity of the Provincial Royalties to Variations in Exchange Rates for Main Field Development and Including Pool 3 Development

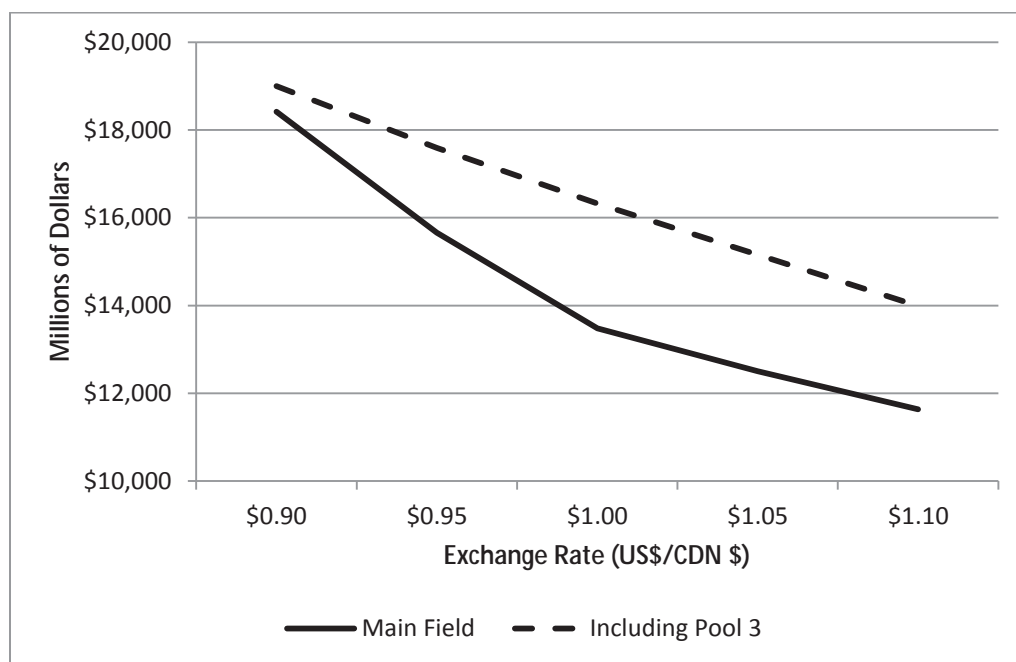
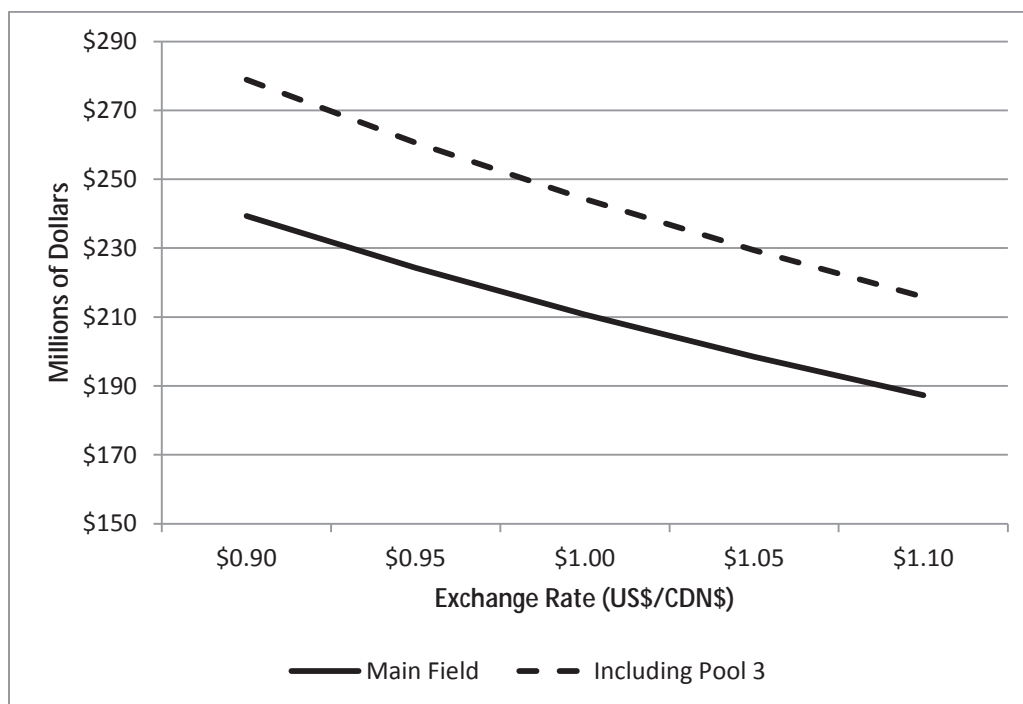


Figure O-12: The Sensitivity of R&D/E&T Expenditures to Variations in Exchange Rates for Main Field Development and Including Pool 3 Development



4.3 Sensitivity Analysis – Cost Variations

In order to appreciate the implication of cost variation on key parameters, a sensitivity analysis was undertaken in which capital costs were varied from their base case values. Although drilling and facilities costs were allowed to vary, no changes were assumed to historic costs. The impacts associated with this sensitivity analysis are reported in Tables 10 and 11 and Figures 13, 14 and 15. A 10% increase in costs will lower the rate of return on the main field and full development by one percentage point. For example, the internal rate of return on the main field development falls from 17% to 16% and the internal rate of return on the full field development is reduced from 16% to 15%.

On the other hand, a 10% increase in capital costs will reduce provincial royalties by nearly \$650 million for the full field development. This implies that local benefits obtained through an increase in capital cost will have a significant impact on provincial royalties.

The impact on R&D/E&T expenditures is small because these impacts are felt only through their effect on the development credit. For instance, an increase in cost of \$100 million will only reduce the development credit for R&D/E&T by \$5 million.

Table 0-10: Exchange Rate Sensitivity for Main Field Development – Key Parameters

Assumed Variation in CAPEX	85%	90%	95%	100%	105%	110%	115%
IRR (%)	18.6%	18.0%	17.5%	17.0%	16.5%	16.0%	15.5%
Royalties (\$M)	\$16,710	\$15,846	\$13,682	\$13,479	\$13,273	\$13,078	\$12,895
R&D Expenditure(\$M)	\$218	\$215	\$213	\$211	\$208	\$206	\$204

Table 0-11: Exchange Rate Sensitivity for Main Field plus Pool 3 Development – Key Parameters

Assumed Variation in CAPEX	85%	90%	95%	100%	105%	110%	115%
IRR (%)	17.8%	17.2%	16.6%	16.0%	15.5%	15.0%	14.5%
Royalties (\$M)	\$19,272	\$16,797	\$16,563	\$16,320	\$16,067	\$15,677	\$15,431
R&D Expenditure (\$M)	\$218	\$215	\$213	\$211	\$208	\$206	\$204

Figure 0-13: The Sensitivity of the Internal Rate of Return to Variations in Costs for Main Field Development and Including Pool 3 Development

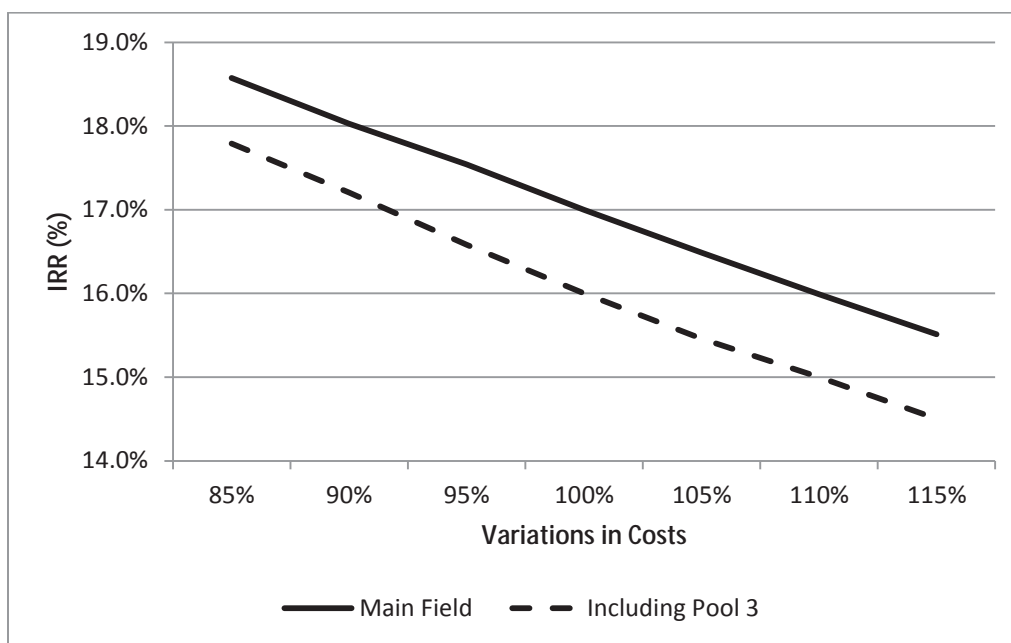


Figure 0-14: The Sensitivity of the Provincial Royalties to Variations in Costs for Main Field Development and Including Pool 3 Development

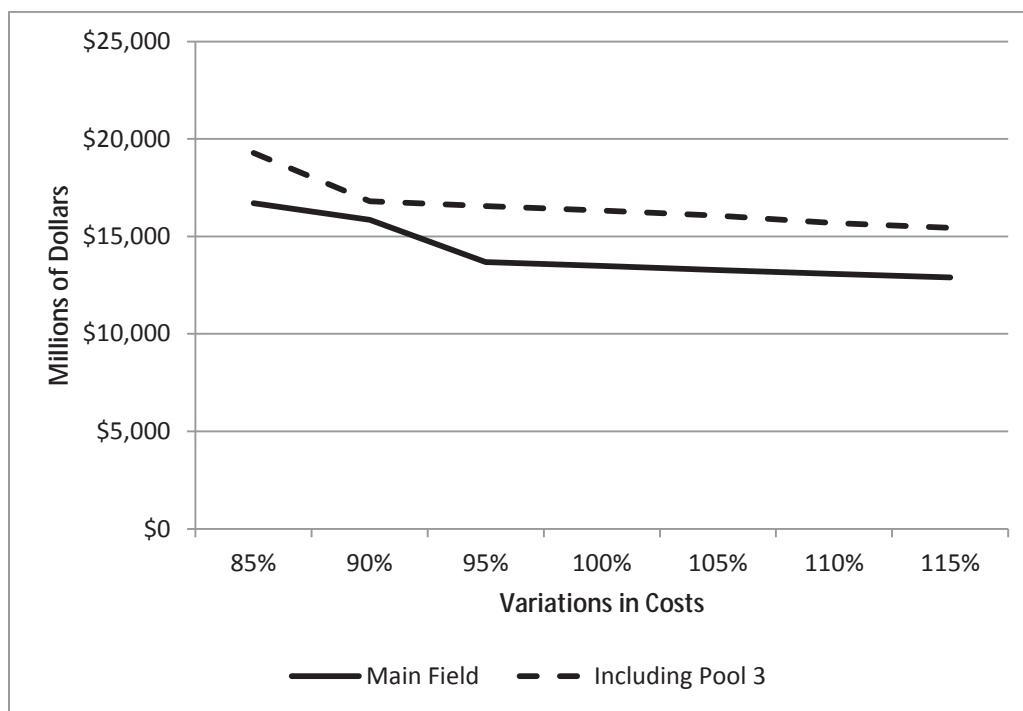
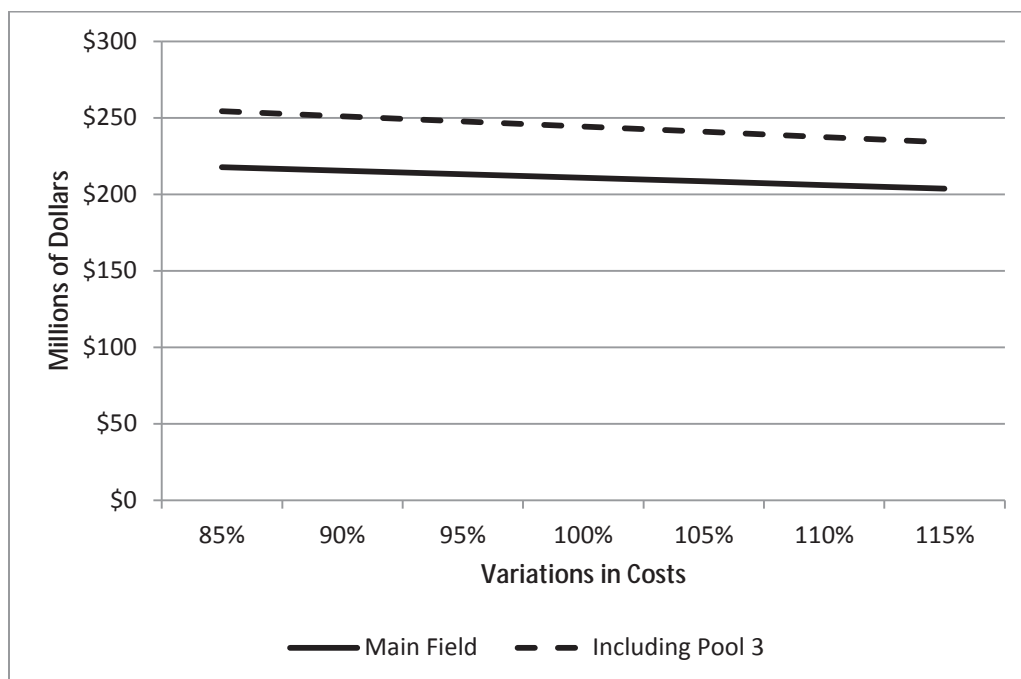


Figure 0-15: The Sensitivity of the R&D/E&D Expenditures to Variations in Costs for Main Field Development and Including Pool 3 Development



5. Local Benefit Comparison – Hebron to Hibernia

Although no specific analysis is provided,¹⁸ the Hebron Benefits Plan (p. 4-27) suggests that “A preliminary calculation of the expenditure and employment content for the construction phase of Hebron has been prepared based on the latest budgetary estimates as of the time of writing, which are expected to be accurate to plus/minus 25 percent. Of the total Project cost, it is estimated that 35 to 55 percent will occur in Newfoundland and Labrador, 15 to 30 percent will occur elsewhere in Canada, and 25 to 40 percent will occur outside of Canada.” While it is not clear whether this relates to total project costs or all capital costs or all capital costs to first oil, for the purpose of comparison with publicly available data for the Hibernia it is assumed that this estimate refers to expenditure benefits from capital expenditures up to first oil.¹⁹ This assumption is also consistent with the Proponent’s response to question 7.2 in the Hebron Public Review Additional Information Request.²⁰

Figure 16 profiles the Hibernia local expenditures captured by jurisdiction as reported in the C-NLOPB annual reports. The local expenditure captured by Newfoundland and Labrador to first oil was 47%. The corresponding estimate for other Canada was 25%, for a total Canadian benefit capture of 72%.

While the 44% reported for Hebron falls short of the 47% local content achieved for Hibernia, the range of expenditure captured by Newfoundland and Labrador would exceed this Hibernia estimate if the top of the range is achieved and fall short of it if the lower part of the range is manifested. Without further analysis than that which is provided in the Hebron Benefits Plan or in the Response to Hebron Public Review Additional Information Request, it is not possible to be more precise. Similarly, the same caveat applied to the other Canadian expenditure benefits capture estimates for the Hebron project. The range of benefits suggested by the Proponent is wide enough to be consistent with a very low level of benefits captured (15%) and with an impressive level of benefit capture (30%), but the 23.5% estimate for the other Canadian estimate (23.5%) is very close to the Hibernia estimate (25%).

Although no specific analysis is provided,²¹ the Hebron Benefits Plan (p. 4-27) suggests that “Of the total Project employment, it is estimated that 30 to 50 percent will occur in Newfoundland and Labrador, 15 to 25 percent will occur elsewhere in Canada, and 30 to 50 percent will occur outside of Canada.” While it is not clear whether this relates to total project costs or all capital costs or all capital costs to first oil, for the purpose of comparison with publicly available data for the Hibernia it is assumed that this

¹⁸ In response to the Additional Information Request, the Proponent indicated that the expected the Newfoundland and Labrador expenditure content is 44%, with a range of 35 to 55% and Canadian expenditure content is 23.5%, with a range of 15 to 30%.

¹⁹ Local expenditure capture by jurisdiction for Hibernia is available from the C-NLOPB’s annual reports (various years).

²⁰ In their response to whether the expenditure estimates relate to pre-production capital expenditure, the response from the Hebron Proponent is that “These refer to the pre-production CAPEX (i.e., the construction phase.”

²¹ In response to the Additional Information Request, the Proponent indicated that the expected the Newfoundland and Labrador employment content is 40%, with a range of 30 to 50% and Canadian employment content is 20%, with a range of 15 to 25%.

estimate refers to employment benefits from capital expenditures up to first oil. This assumption is also consistent with the Proponent's response to question 8.2 in the Hebron Public Review Additional Information Request.²²

Figure 17 profiles the local employment captured by jurisdiction as reported in the C-NLOPB annual reports. The local Hibernia employment captured by Newfoundland and Labrador to first oil was 66%. The corresponding estimate for other Canada was 12%, for a total Canadian benefit capture of 78%.

While the 40% local employment estimate for the Hebron is below the 66% achieved for Hibernia, the range of Hebron employment captured by Newfoundland and Labrador would fall short of the Hibernia estimate, even if the top of the range (50%) is achieved. The other Canadian employment estimate for Hebron of 20% and the range of 15% to 25% exceeds the 12% achieved for Hibernia.

²² In their response to whether the expenditure estimates relate to pre-production capital employment, the response from the Hebron Proponent is that "These expenditures relate to the pre-production CAPEX."

Figure 0-16: Local Expenditure Benefits for Hibernia

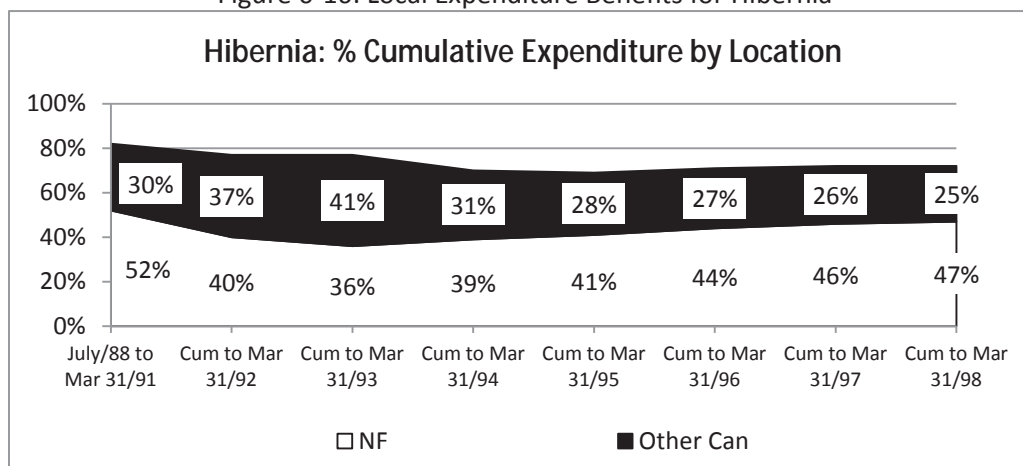
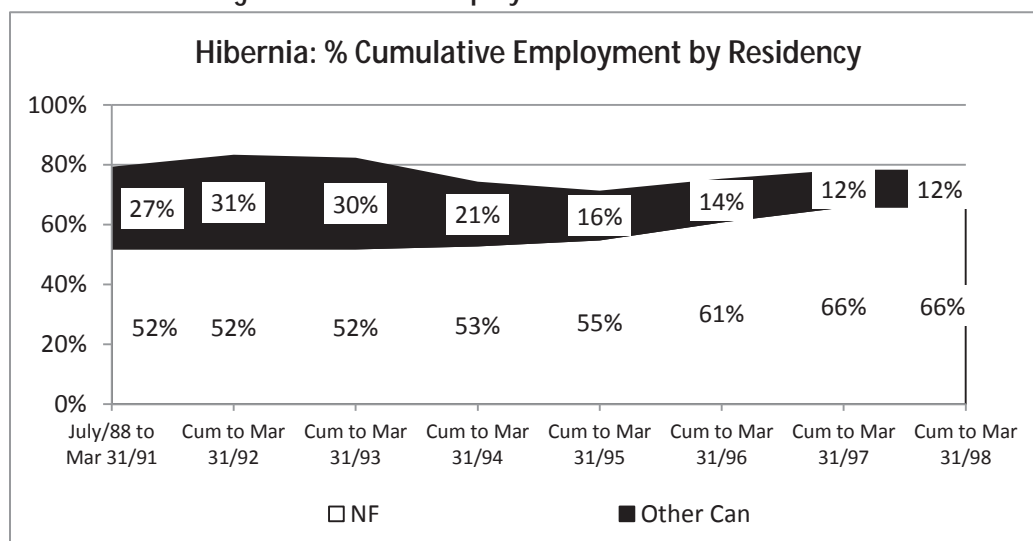


Figure 0-17: Local Employment Benefits for Hibernia



6. Cost Comparison – Hebron to Hibernia

As part of comparing Hibernia to Hebron, this analysis examines the capital costs to first oil that was assumed to be relevant at the time of deciding whether to proceed with each project. The Hibernia project has evolved and grown over time in terms of both cost and recoverable reserves. For example, recoverable reserves were reported as greater than 500 million barrels in the C-NLOPB's 1985-86 annual report. This had increased to 666 million barrels in the 1988-89 C-NLOPB annual report; had increased again to 884 million barrels in the 1999-2000 annual report, was revised down to 865 million barrels in the 2002-03 annual report; increased to 1,244 million barrels in the 2005-06 annual report; and to 1,395 million barrels in the 2010-11 annual report. Similarly, the 1988-89 report put pre-production capital cost at \$5.2 billion, which was raised to \$5.6 B in the 1989-90 annual report and to \$5.8 billion in the 1994-95 annual report.

For the purpose of this comparison, \$5.6 Hibernia billion pre-production capital cost estimate was combined with the 666 million barrels of recoverable reserve estimate to yield a cost per barrel of \$8.41 (1988 dollars). Adjusting this estimate for inflation that has occurred requires multiplying the estimate by 1.5793 (based on the change in the Canadian Consumer Price Index). Carrying out this adjustment yields a pre-production capital cost of \$13.43 per barrel (2009 dollars).

The Hebron pre-production capital cost for the main field development is \$6,705 million and the recoverable reserves without Pool 3 would be 645 million barrels. This implies that the pre-production capital cost is \$10.40 per barrel (2009 dollars). The pre-production capital costs for the full field development (i.e., including Pool 3) is \$7,604 million and the recoverable reserves are 769 million barrels, for a pre-production capital cost of \$9.89 per barrel (2009 dollars).

While Hibernia's relative financial attractiveness has increased since the first decision to proceed, Hebron appears more attractive currently than Hibernia was in 1990 when the decision to proceed was taken.

7. Royalty Comparison – The Importance of Hebron

Not only will Hebron be important for the continuation of offshore production, as Table 12 and Figure 18 show, it will have a substantial and significant impact on provincial royalties at a time when the revenues expected to flow for the three existing projects are in decline. In particular, when Hebron's contribution is at its peak, it will represent between 60 and 70% of all oil royalties flowing to the provincial treasury. By way of further illustration, within 10 years of commencing production, the average royalties received by Newfoundland and Labrador from the existing projects is expected to fall to \$580 million per year, but with the impact of the Hebron project included, provincial royalties are expected to be nearly \$1.6 billion per year.

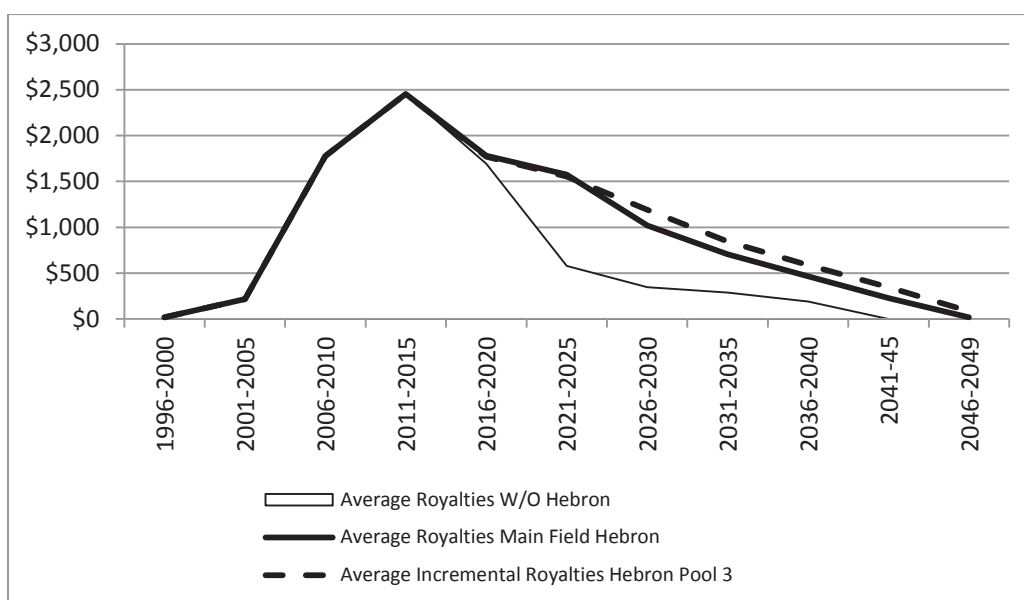
In other words, having Hebron continue to production is crucial to the long term fiscal health of Newfoundland and Labrador.

Table 0-12: Provincial Royalties With and Without Hebron

	Average Royalties W/O Hebron	Average Royalties Main Field Hebron	Average Incremental Royalties Hebron Pool 3	Royalties W/O Hebron	Royalties Main Field Hebron	Incremental Royalties Hebron Pool 3	Combined Hebron as a Percent of Total Royalties
1996-2000	\$18			\$72			
2001-2005	\$218			\$1,092			
2006-2010	\$1,777			\$8,885			
2011-2015	\$2,452			\$12,262			
2016-2020	\$1,693	\$88	-\$12	\$8,466	\$442	-\$60	4.3%
2021-2025	\$579	\$997	-\$23	\$2,894	\$4,986	-\$113	62.7%

	Average Royalties W/O Hebron	Average Royalties Main Field Hebron	Average Incremental Royalties Hebron Pool 3	Royalties W/O Hebron	Royalties Main Field Hebron	Incremental Royalties Hebron Pool 3	Combined Hebron as a Percent of Total Royalties
2026-2030	\$347	\$674	\$170	\$1,736	\$3,370	\$848	70.8%
2031-2035	\$288	\$417	\$141	\$1,442	\$2,087	\$704	65.9%
2036-2040	\$191	\$276	\$121	\$954	\$1,379	\$606	67.5%
2041-45	\$0	\$230	\$117	\$0	\$1,148	\$585	100.0%
2046-2049	\$0	\$17	\$68	\$0	\$68	\$271	100.0%
Total				\$37,803	\$13,479	\$2,840	30.2%

Figure 0-18: Provincial Royalties With and Without Hebron



8. Conclusion

The Hebron project will make a significant contribution to the continuity of offshore production in Newfoundland and Labrador; to provincial royalties; to R&D activities within the province and to employment and business activities located within the province. At prices that are expected to prevail in the future, this project should continue to be viable and it can sustain small increases in costs, but if those costs are as a result of benefits requirements, it is important to recognize that they come at a trade-off. Specifically, higher cost will be associated with lower royalties.

Appendix M

Legal summary

TO: Hebron Project – Public Review Commissioner

Mr. Miller Ayre

FROM: Peter O’Flaherty and Bridget Daley, Goodland O’Flaherty

DATE: February 10, 2012

SUMMARY OF LEGAL OPINION

OVERVIEW

In December, 2011 you requested that we provide the Commissioner with our legal opinion concerning the extent of the Canada-Newfoundland and Labrador Offshore Petroleum Board's ("Board") authority under the *Atlantic Accord* and the federal and provincial Implementation Acts (the "Accord Acts") specifically in the review and approval of Canada-Newfoundland and Labrador benefits plans, and in its subsequent monitoring and reporting procedures. We also conducted legal research and analysis of the term "first consideration" as contained in Section 45(3) of the *Canada-Newfoundland Atlantic Accord Implementation Act*, R.S.N. 1990, c. C-2, (Provincial Act) and a review of Section 119 of the *Canada-Newfoundland Atlantic Accord Implementation Act* (Federal Act), S.C. 1987, c. 3.

This foregoing is a Summary of our main legal opinion dated February 10, 2012. This Summary provides an overview of the basic conclusions arising from our review of all authorities and case law regarding the *Atlantic Accord* and the legislative scheme enacted by the Accord Acts in respect of the extent of the Board’s legislative authority over benefits issues, the term "first consideration" in Section 45 and the privilege provided for under Section 119 of the Accord Acts.

THE BOARD'S LEGISLATIVE AUTHORITY

You have requested that we provide our opinion regarding the extent of the legislative authority of the Board in relation to benefits and Canada-Newfoundland and Labrador benefits plans. The authorities we have reviewed and summarized in our main opinion are relevant for their discussion of the proper interpretative approach to the *Accord* and the Accord Acts, the purpose and object of the *Accord* and legislation, and how the Board should conduct itself in terms of benefits and Canada-Newfoundland benefits plans. In our opinion these authorities confirm, as a matter of settled law in this province, that:

- a) the proper approach to interpretation of the *Accord* and the Accord Acts is to give the plain words of those instruments a broad and "purposive" interpretation in order to best ensure that their objects and purposes of the instruments are attained and to avoid a literal and technocratic interpretation which would frustrate or impede their objects and purposes (see: *Mobil Oil Canada*, supra);
- b) the object and purpose of the Accord Acts, insofar as economic development policy was concerned, is to "optimize" or "maximize" (these terms are used interchangeably by the Courts) the benefits accruing to Newfoundland in particular and Canada as a whole (see: *Hibernia Management and Development Company Limited and Petro-Canada v. CNOBP*, supra);
- c) in accordance with Section 17(1) of the Accord Acts in dealing with matters relating to benefits and Canada-Newfoundland and Labrador benefits plans, the Board must conduct itself with the purposes and object of the *Accord* in mind (see: *Hibernia Management and Development Company Limited and Petro-Canada v. CNOBP*, supra);
- d) the Board is entitled to take into account the purposes and object of the *Accord* in interpreting both the benefits plan provisions of the *Accord* and the Accord Acts and the words in provisions of the Accord Acts should be interpreted in light of the purposes and object of the *Accord* rather than to limit or "prescribe" its authority regarding benefits (see: *Hibernia Management and Development Company Limited and Petro-Canada v. CNOBP*, supra);
- e) the Board has the legal authority to issue guidelines and to enforce the imposition of appropriate and reasonable levels of expenditures with respect to certain categories of benefits, in particular research and development and likely for education and training through the issuance of authorizations (see: *Hibernia Management and Development Company Limited and Petro-Canada v. CNOBP*, supra);
- f) the Board has the legal authority to determine through its ongoing monitoring function whether or not the benefits commitments of a proponent are being met (see: *Hibernia Management and Development Company Limited and Petro-Canada v. CNOBP*, supra);

- g) the Board has the legal authority to approve benefits plans that incorporate principles that it determines are generally consistent with the "first consideration" provisions of the legislation for goods and services such as "best value" and "internationally competitive bidding" (see: *St. John's (City) v. Canada-Newfoundland Offshore Petroleum Board*); and,
- h) the issuance of benefits guidelines and the making of decisions by the Board regarding benefits and Canada-Newfoundland and Labrador benefits plans will be treated with considerable deference by the judiciary and will be extremely difficult to successfully challenge in court proceedings (see: *Hibernia Management and Development Company Limited and Petro-Canada v. CNOPB*, supra).

FIRST CONSIDERATION

While there is a requirement for the Proponent and its contractors to give "first consideration" to Newfoundland and Labrador participants, it is a matter of settled law in this province, that:

- a) whatever "first consideration" duty is imposed by a benefits plan, it only applies when the goods and services in question "are competitive in terms of fair market price, quality and delivery" (*AMO Containers Limited v. The Attorney General of Canada et al.* (1999) 185 Nfld. & P.E.I.R. 51) ; and'
- b) the Accord Acts do not place a duty on the province to give first consideration to Newfoundland suppliers or to ensure compliance with a benefit plan (*AMO Containers Limited*, supra).

In terms of bid pricing, the reference to "competitive" in the *Accord* and the Accord Acts should not necessarily be interpreted in a purposive and reasonable manner to mean competitive in terms of "at least equal" to foreign bids or competitive in terms of the "best price tendered by qualified vendors". The statutory threshold for "first consideration" is for goods and services to be competitive in terms of "fair market price, quality and delivery". In our opinion, "fair" market prices are not necessarily the lowest prices, they are the prices usual and general under the circumstances of the market, prices that are not in excess of those charged in the general course of a business or trade or such as to leave an unreasonable profit. If the intention of the legislation was to provide "first consideration" to Newfoundland and Labrador suppliers where they provide the "lowest price" then the reference to "fair" market price is superfluous and the Accord Acts could have simply described competitiveness in terms of "market price, quality and delivery".

Having regard to the jurisprudence, it would also appear reasonable to conclude that if the experience, performance and qualifications of a Newfoundland resident is "relatively equal" when compared to an individual who resides outside of this jurisdiction then "first consideration" should be given to the Newfoundland resident for employment opportunities at Hebron (*H.S.A.A. v. Provincial Health Authorities of Alberta* (2004) ABCA 185 (Alta. C.A.); *Capital Regional District and Canadian Union of Public Employees, Local 1978* (1990) 8 L.A.C. (4th), 307 (B.C. Arb. Bd.) cited in *Saskatchewan Telecommunications v. C.E.P.* (2000) CarswellSask 918 (Sask. Arb. Bd.). The standard applied by the Board in the Benefits Guidelines (i.e. a

Newfoundland and Labrador resident who meets the requirements for a position must be given employment preference) clearly meets or exceeds this standard.

SECTION 119 OF THE ACCORD ACT

The statutory privilege provided for in section 119 of the federal Accord Act applies to information and/or documentation provided for the purposes of management of petroleum resources, administration and enforcement of the statutory scheme and the prudent conduct of petroleum operations. While section 119 of the *Accord Act* may preclude the public distribution or disclosure to third parties of information supplied to the Board without the prior consent of its originator, the following general principles emerge from our review of the authorities:

- a) there does exist an important policy reason for the statutory privilege created by this section, being the objectives of the *Accord Act* depend upon a regime that facilitates full and frank disclosure by resource companies seeking exploration and production rights (*Canadian Forest Oil Ltd. v. Chevron Canada Resources* (2000) CarswellNat 1346 (Fed. C.A.);
- b) notwithstanding section 119 of the *Accord Act*, the public does have recourse to the *Access to Information Act*, R.S.C. 1985, c. A-1 (“*Access Act*”). The general principles arising from the *Access Act* codify the public’s right of access and the basic premise that the public should have access to government records, and exceptions to the right of access should be limited and specific (*Geophysical Service Inc. v. Canada-Newfoundland Offshore Petroleum Board* (2003) CarswellNat 1084 (Fed. T.D.); *Oceans Ltd. v. Canada-Newfoundland & Labrador Offshore Petroleum Board* (2009) CarswellNat 2997 (Fed. Ct.); and
- c) the burden of demonstrating that access to documents should be denied rests on the party opposing disclosure (*Geophysical Service Inc. v. Canada-Newfoundland Offshore Petroleum Board* (2003) CarswellNat 1084 (Fed. T.D.); *Oceans Ltd. v. Canada-Newfoundland & Labrador Offshore Petroleum Board* (2009) CarswellNat 2997 (Fed. Ct.).

In summary, it is our opinion the privilege provided for in section 119 of the federal Accord Act is probably in accordance with the industry standard as reflected in the federal legislation and comparable Nova Scotia legislation for the treatment of privileged information. The case law suggests that the interplay between the *Access Act* and section 119 of the Accord Acts allows the courts to strike an appropriate balance between the public right of access to government information and the commercial interests of the operators.