Hibernia Development Project

Report

Of the Hibernia

Environmental Assessment Panel

December, 1985

Newfoundland

Canada

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HIBERNIA

ENVIRONMENTAL ASSESSMENT

PANEL

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Hibernia Environmental Assessment Panel Report

In accordance with the terms of reference provided to the Environmental Assessment Panel a review of the proposed Hibernia development project has been completed. We are pleased to submit the Panel Report for your consideration.

As requested, the Panel has recommended measures regarding employment and industrial benefits, addressed direct social effects on communities and offered advice on the means by which the project could proceed in a safe and environmentally acceptable manner.

Further recommendations and observations have been included on matters related to the review process.

Respectfully yours,

Philip J. Paradine

P. J. Paradine

G Ron Peters

G. R. Peters

Co-Chairmen
Hibernia Environmental Assessment Panel

FOREWORD

The Panel dedicates this Report to the numerous interest groups, government agencies and individuals who made significant contributions to the review process by attending the public information sessions and public hearings, and by written submissions to the Panel. The Panel greatly appreciates this participation which was of vital importance in formulation of the conclusions and recommendations in this Report. Given the large numbers of interest groups and individuals who made submissions, specific attributions throughout the Report would not have been practical. A complete listing of participants has, however, been included.

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Executive Summary

This Report conveys the findings of an Environmental Assessment Panel review of a proposal to develop the resources of the Hibernia oil field on the northeast Grand Banks of Newfoundland. The proponent is Mobil Oil Canada Ltd.

The project includes a fixed production system built as a gravity base structure (GBS) and shuttle tankers which would transport the oil to shore. The project is scheduled to begin production in 1992 and could be Canada's first major offshore oil development.

This Report is the result of a five-month public consultation process. Review of the project began with an Environmental Impact Statement (EIS) submitted by the proponent in May and concluded with hearings held in Newfoundland during October 1985. During this process the Panel received over 100 briefs from groups having an interest in the project or having expertise to offer.

Conclusions on major issues raised during the review are included in this summary together with some of the key recommendations. The Panel, in keeping with its mandate, has identified measures which will maximize economic benefits and minimize environmental hazards and social disruption. A full listing of conclusions and recommendations is contained for ease of reference in chapters at the end of this Report.

The project will have considerable economic benefits including a cumulative Gross Domestic Product increase of nearly $14 billion. Means to reach target levels of industrial benefits are suggested in the Report. The Panel has also concluded that the project could provide significant employment opportunities within Newfoundland. A comprehensive training strategy and other measures are recommended to ensure that employment goals are met.

Certain measures will be necessary to avoid disruptive impacts on the distinctive social environment of Newfoundland. In particular the Panel recommends that community impact agreements be developed to address the concerns of those directly affected by the project. This would cover housing, infrastructure, social services and other relevant matters. Funding from the Offshore Development Fund, established under The Atlantic Accord, is proposed.

The climatic extremes at the proposed offshore site pose special challenges to development of the project. The Panel has concluded that the proponent's design concept is capable of withstanding iceberg impacts, waves and other forces to which the GBS will be exposed. However, recommendations have been made to ensure that detailed design includes the factors and knowledge required to protect human life and prevent oil spills.

The Grand Banks is a fishing area of vital importance to the economies of Newfoundland, other parts of Canada and other nations. It is also an "ornithological crossroads" in the North Atlantic. International obligations to protect these resources are an integral part of the right to develop the oil of Hibernia.

In the event of a spill large numbers of birds could be killed and fisheries operations disrupted. The Panel emphasizes the need for prevention given the limited capability for oil spill clean-up under the harsh climatic conditions likely to prevail offshore. Recommendations for tanker design and routing are also included.

The Panel recommends that a comprehensive fisheries compensation policy be developed to address potential economic losses resulting from oil spills, debris, loss of access and other related impacts. The Panel also recommends that the proposed 8 km x 13 km exclusion zone around the GBS be re-examined in light of the possibility of burial of seabed structures and the significance of the zone for fisheries.

Monitoring throughout the life of the project is proposed. Recommendations regarding abandonment of the site, including restoration to a "fishable condition" and disposal of the GBS, have also been made.

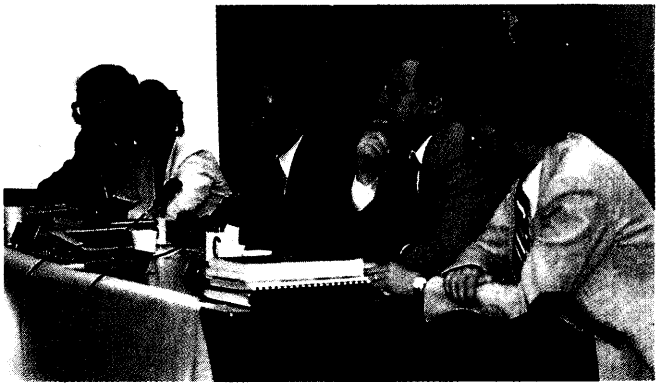
In view of the extensive work conducted by the Ocean Ranger Royal Commission the Panel makes only a limited number of recommendations on the issue of safety. The most important of these is a reiteration of the need for functional evacuation systems.

Finally, a number of recommendations are made on the review process. These address issues of concern that emerged during the review and include the mandate of the Panel, the timing of the review, intervenor funding, and continuing public involvement.

1.0 PROJECT AND REVIEW PERSPECTIVE

1.1 Project Description

The Hibernia development project is a proposal to develop the resources of the Hibernia oil field on the northeast Grand Banks of Newfoundland. It is likely to be the first major Canadian offshore oil production field. Mobil Oil Canada Ltd. is the project proponent, in association with Gulf Canada Resources Inc., Petro-Canada Inc., Chevron Canada Resources Ltd., and Columbia Gas Development of Canada Ltd.



The Hibernia oil field lies 315 km east-southeast of St. John's, Newfoundland, and covers an area of 130 km². It is located on the continental shelf at the northeast corner of the Grand Banks in water approximately 80 m deep (Figure 1).

The Grand Banks area has been surveyed for hydrocarbons since 1965. Mobil and its partners drilled their first exploratory well in 197 1. Following the 1979 Hibernia discovery well Mobil has drilled nine additional wells to delineate the reservoir and prove the reserves. The most likely reserves are now estimated at 83 million m³.

The project includes a preliminary plan for the development of the shallower, overlying Avalon formation. This latter reservoir is of a poorer quality and the preliminary plan will be evaluated during the development of the Hibernia field and may be modified.

The proponent's preferred mode of development, known as the fixed production system, includes a gravity base structure (GBS) with topside facilities for oil production and separation of produced water and gas (Figure 2). Produced oil would be stored in the GBS and transferred through seabed lines and articulated loading platforms to shuttle tankers which would transport the oil to shore.

Detailed engineering work and site development are to begin in 1986 with construction occurring during the period 1987 to 1991. Production is scheduled for 1992. The total estimated cost of the project is over four billion dollars (Figure 3).

An alternative mode of development considered by Mobil was the floating production system. It would use a production platform mounted on a semisubmersible hull. A tanker would be moored nearby to act as a floating storage vessel and loading facility. Mobil rejected this alternative in favour of the fixed production system in August 1985.

Figure 1

HIBERNIA LOCATION

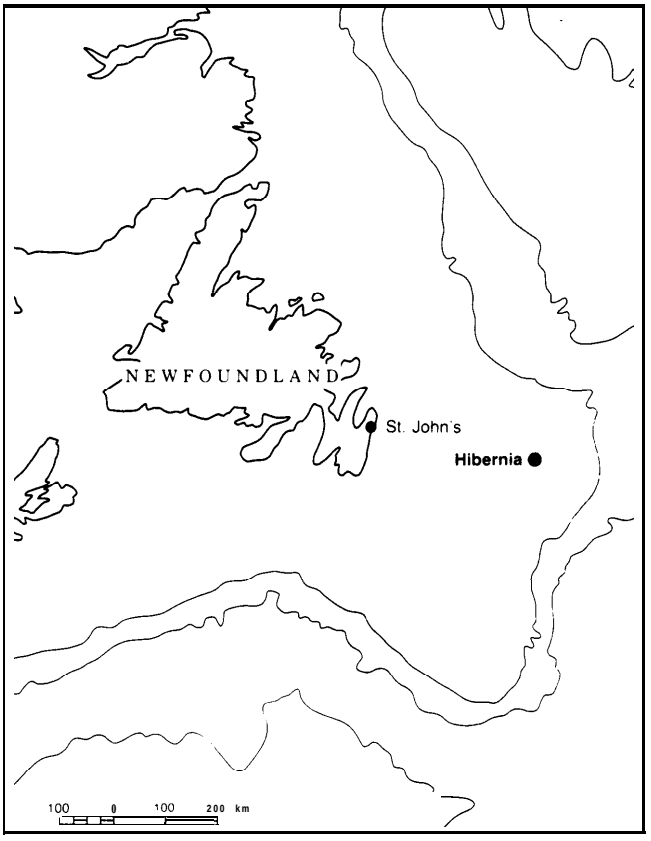


Figure 2
Hibernia Fixed Production System Components

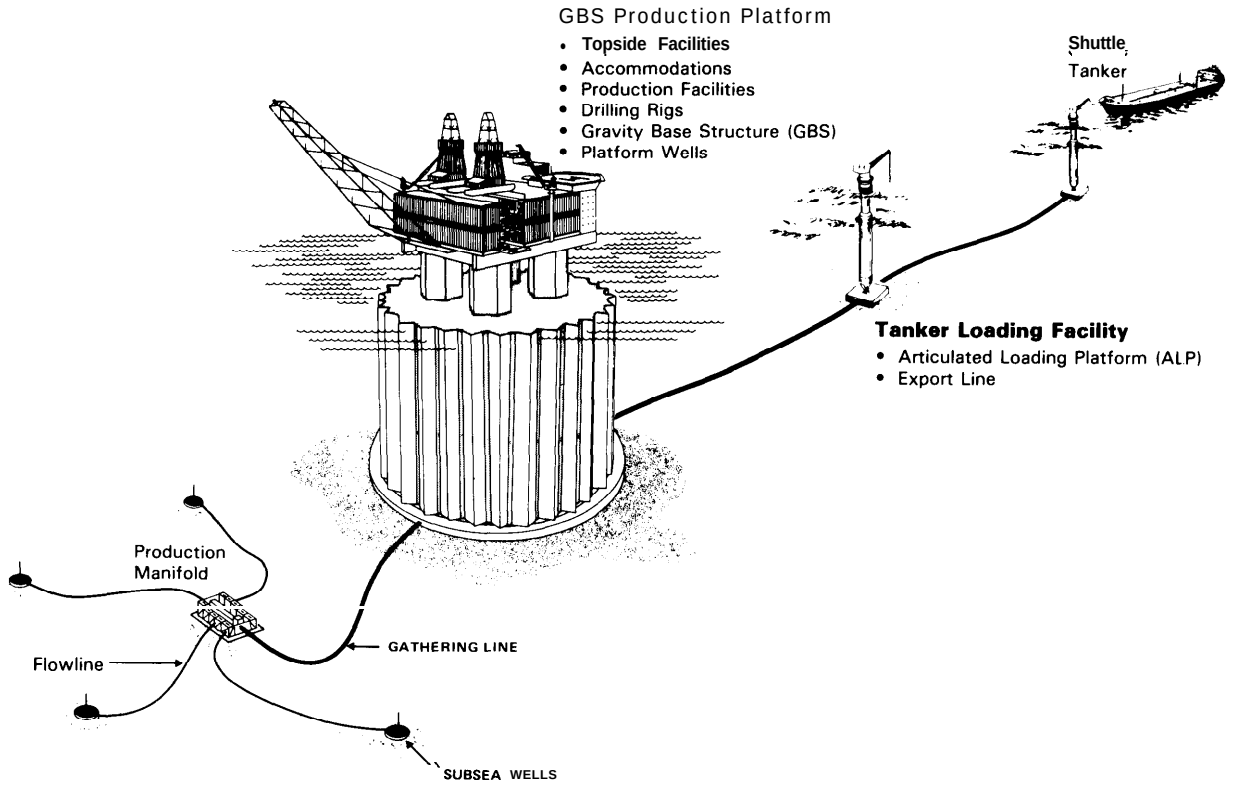
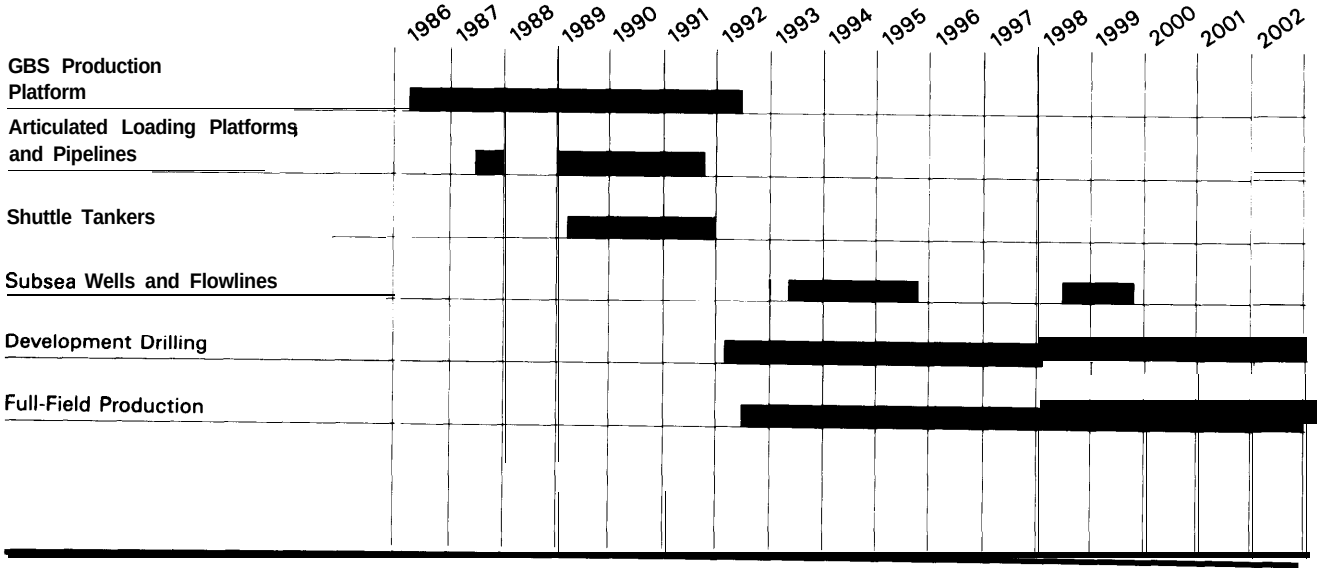


Figure 3
Hibernia Project Schedule, Fixed Production System



1.1.1 Fixed Production Platform

The fixed production platform would be mounted on a 105 m diameter, 85 m high caisson segmented into vertical cells for ballast and oil storage. The GBS would be made of concrete with a heavy outer wall known as an ice belt and four shafts rising approximately 30 m above the caisson to support the topside facilities. The topsides would contain drilling rigs, accommodation for workers and production and separation facilities.

Mobil indicates that the GBS will likely be constructed to a height of 15 to 20 m at a site in the Come By Chance area (Figure 4). The remainder of GBS construction is expected to occur at an inshore deepwater construction site 7 km from Adams Head near Cheese Island between Bread and Long Islands (Figure 5). This relatively protected and ice-free site is also being considered for the mating of the GBS and the topsides. (Mobil identifies the Argentia area as a potential site for topsides assembly.) The completed GBS would then be towed out and positioned on the Hibernia site.

1.1.2 Articulated Loading Platforms

Oil from the production platform would be transferred from the storage cells within the base of the fixed platform through a subsea pipeline to the two articulated loading platforms (ALPs) for tanker loading. Each ALP would consist of a base on the seafloor and a buoyant central column connected to the base by a universal joint. According to Mobil's EIS, facilities to build the ALPs exist in Canada.

1.1.3 Subsea Facilities

Development of the Avalon reservoir would require subsea wells drilled from semisubmersibles with wellheads completed below the seafloor or installed in silos. Flowlines and gathering lines extending between the subsea wells and the production manifolds or headers, and from these to the GBS, would convey fluids to the production platform and water for re-injection into the wells. The flowlines and gathering lines would be located throughout an area measuring approximately 8 km X 13 km from which fishing vessels would be excluded.

Mobil has identified the Argentia area as a potential site for flowline prefabrication and coating. Mobil has also indicated that the Marystown Shipyard has the basic facilities and skilled work force to manufacture production manifolds, but that the actual involvement of the yard will depend on competitive conditions and other commitments of the yard. The installation of subsea equipment and flowlines is not proposed until after the startup of production in 1992 when preliminary information on the Avalon reservoir has been obtained.

I. 1.4 Development Wells

Mobil indicates in the EIS that it plans to drill 80 to 110 development wells, but scaled down that estimate to between 60 and 85 wells in its August EIS Update. Wells for the Hibernia structure would be drilled from the GBS. Those required for the Avalon structure would be drilled from semisubmersibles if preliminary information on the Avalon reservoir indicated that development should proceed.

The majority of the wells would be for oil production and the remainder utilized for gas or water injection into the reservoir to maximize oil production.

1.1.5 Shuttle Tankers

Three shuttle tankers, each with a cargo capacity of 120 000 DWT, would be used to transport oil from Hibernia to refineries. These vessels would have double sides and bottoms, segregated ballast, twin-shaft propulsion, equipment for offshore mooring and loading, and ice-strengthened hulls (Figure 6). Shuttle tankers would use existing shipping lanes when transporting the oil from the Hibernia field to one of four potential delivery points: Quebec City, Quebec; Dartmouth, Nova Scotia; Saint John, New Brunswick; or Portland, Maine. It is assumed in the EIS that fabrication of shuttle tankers will occur outside Canada.

Figure 4

COMMUNITIES OF SOUTHEASTERN NEWFOUNDLAND

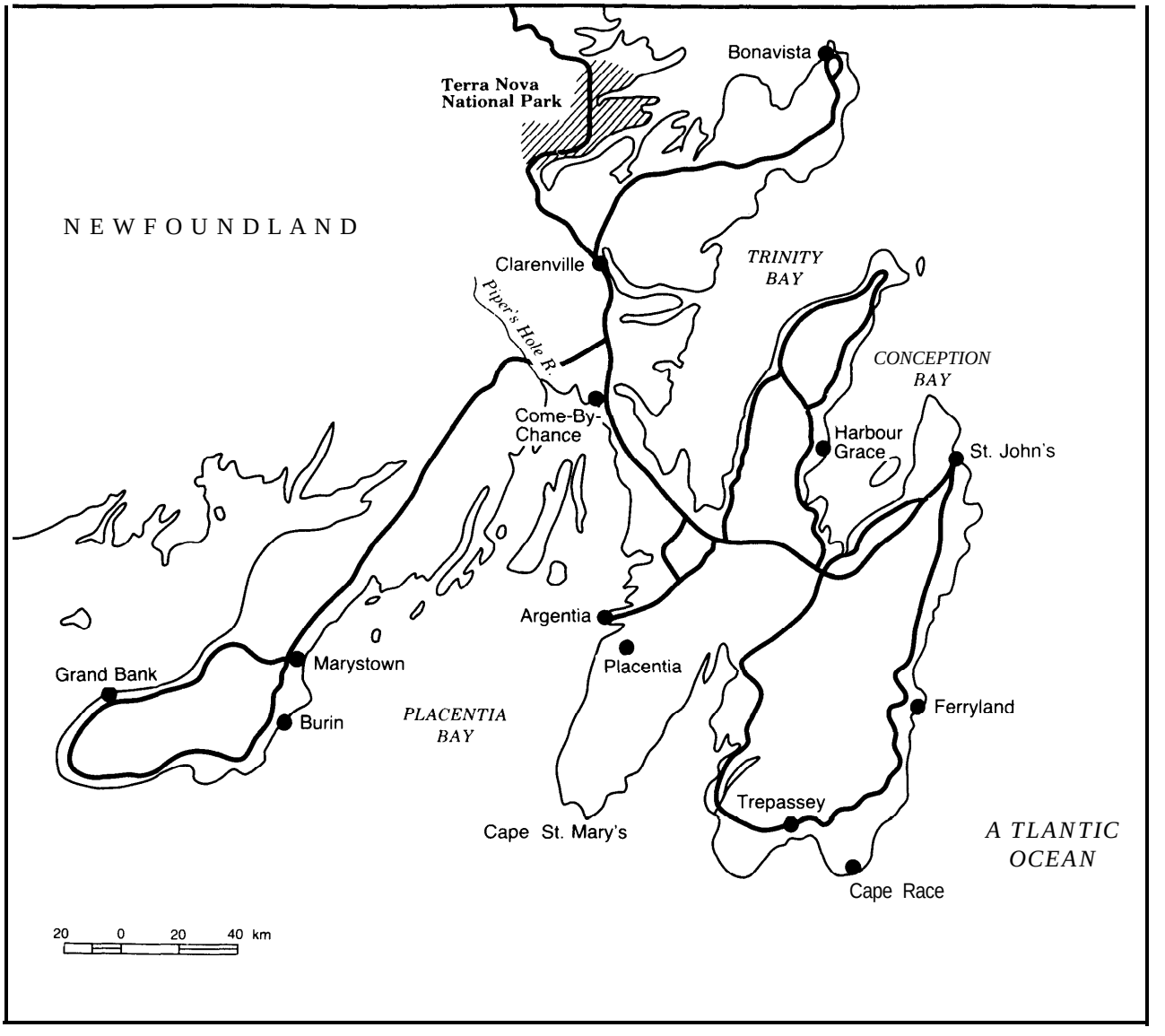


Figure 5
Possible **Dry** Dock and Deepwater Sites in **Placentia Bay**

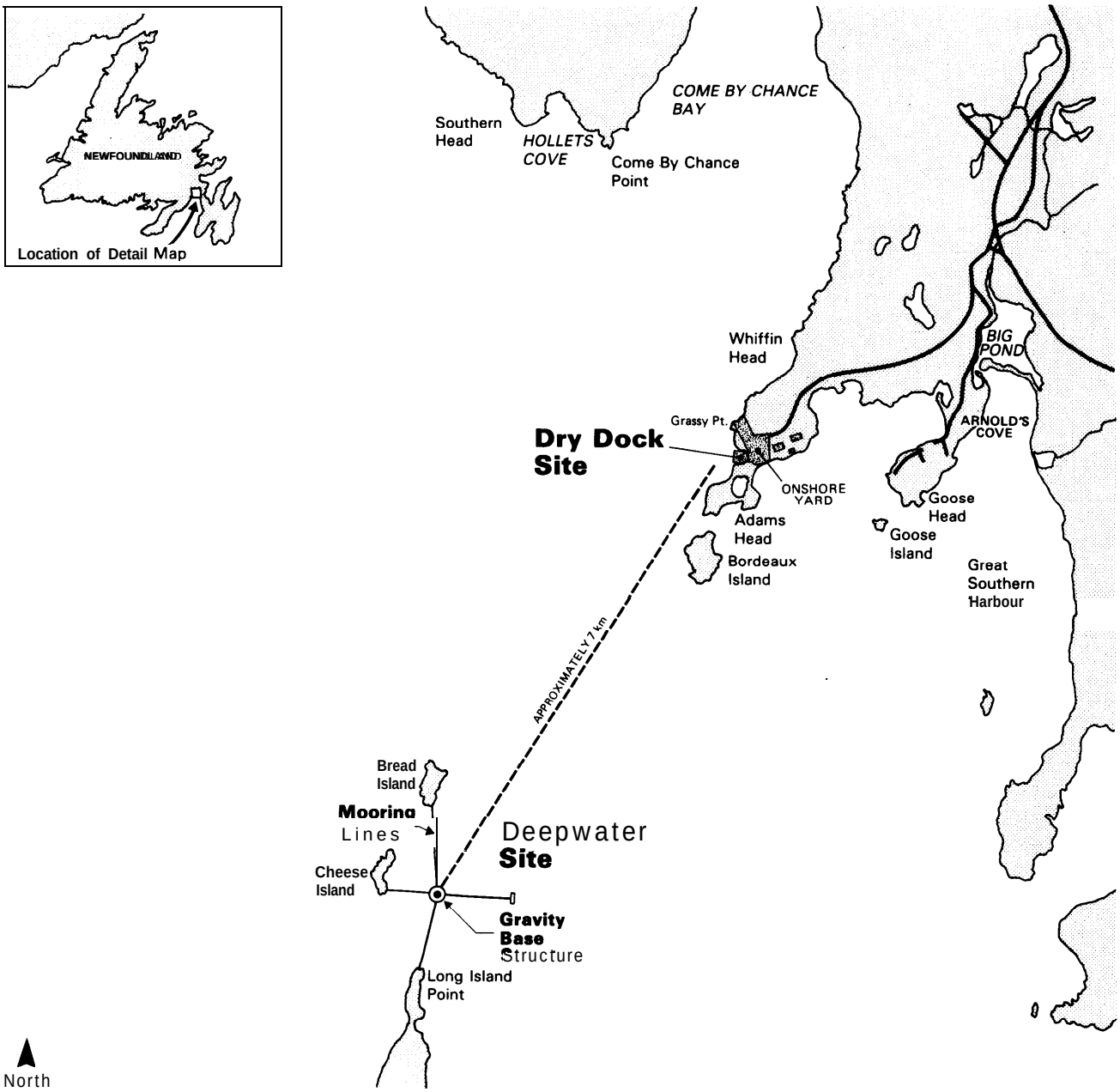
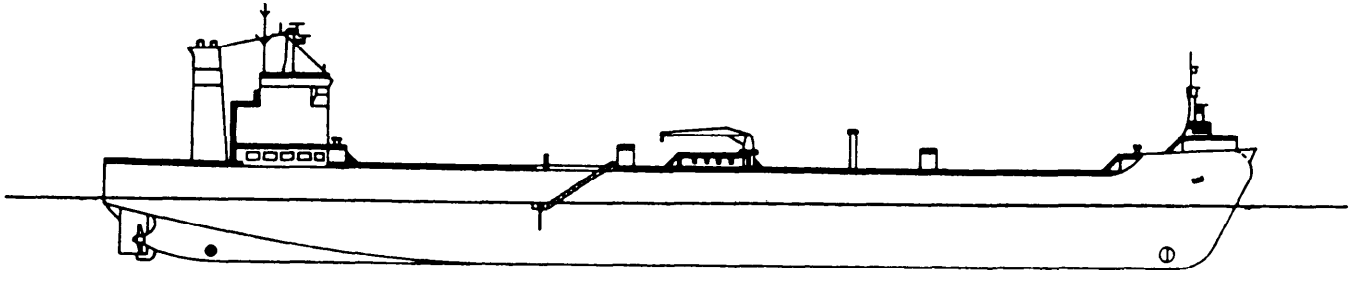
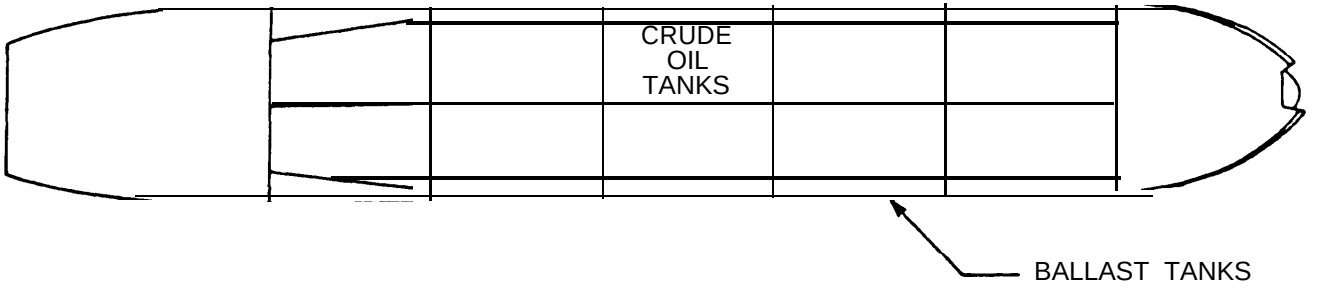


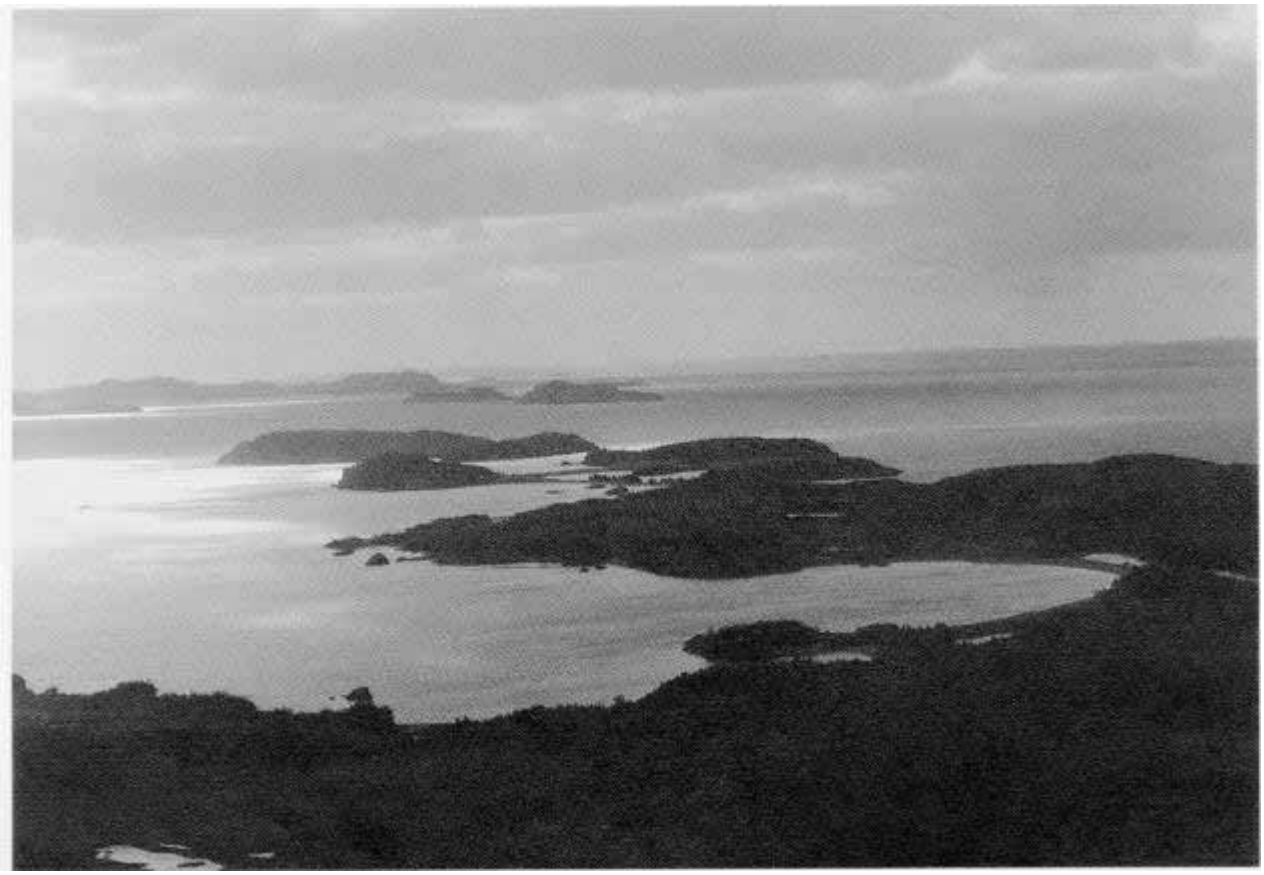
Figure 6
SHUTTLE TANKER - HIBERNIA PROJECT



a) Exterior View



b) View of Oil and Ballast Tanks



1.1.6 Other Project Components

In addition to the GBS construction, land-based operations will be required for housing workers and equipment, materials storage, supply-boat loading and air transport.

St. John's is identified by the Proponent as the centre for project management and as a supply-service base while Marystown is cited as a possible location for construction of ice-clearing vessels and topsides components.

1.2 Environmental Review Process

1.2.1 Environmental Assessment Panel

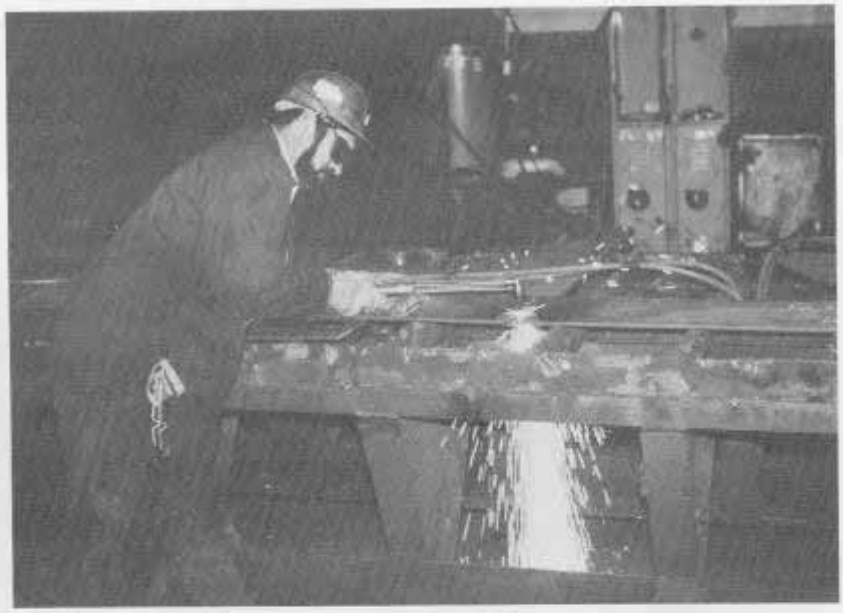
In early 1985, **The Atlantic Accord,** a memorandum of agreement on offshore oil and gas resource management and revenue sharing, was signed by the Government of Canada and the Government of Newfoundland and Labrador. This agreement provided the basis for the establishment of a joint federal-provincial Panel to review the Hibernia Development Project.

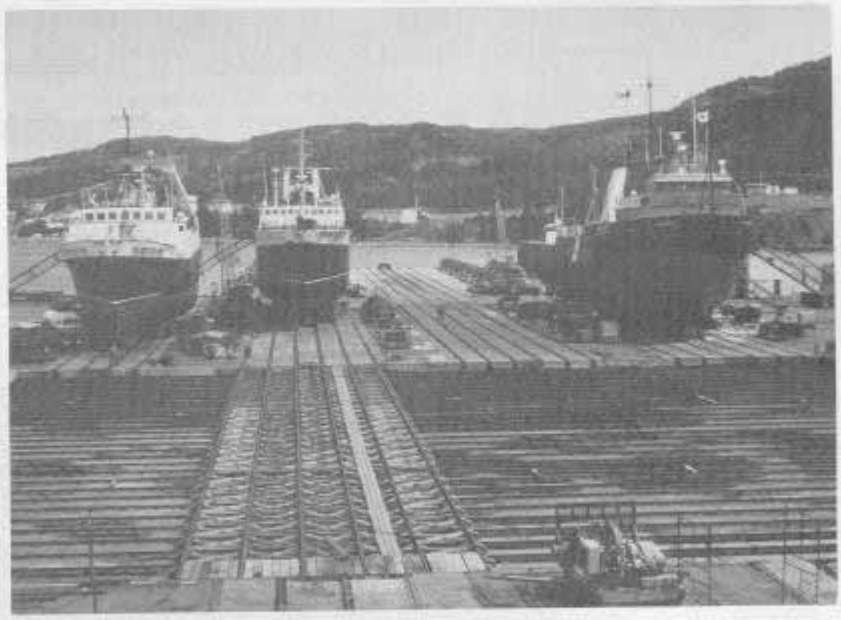
On March 15, 1985 the two governments announced that the Panel would operate under the joint chairmanship of Phil Paradine and Ross Peters. Other Panel members appointed were Alfred Needler, Raoul Andersen, Kevin Molloy, and Winnifred Roebothan-Wells. Biographies of Panel members are contained in Appendix A.

1.2.2 The Panel's Mandate

Under the Terms of Reference (Appendix B) issued to it, the Panel was asked to make recommendations on the terms and conditions under which the project could proceed in a safe and environmentally acceptable manner. The review was to include production and transportation systems and major ancillary facilities associated with the project. Employment and industrial benefits expected from the project were to be examined along with the direct effects on the social and economic infrastructure in the communities. Emphasis was to be placed on the proponent's preferred alternative mode of development. Not included in the Panel's mandate were questions of energy policy, jurisdiction, fiscal and management regimes, project economics or the division of revenues.

Under the Terms of Reference established for the review, the federal guidelines, issued in July 1980, and the provincial guidelines, issued in January 1981, formed the basis for the preparation of the EIS.





1.2.3 The Review

To assist participants in understanding the environmental assessment and review process, the Panel issued operational procedures on April 4, 1985.

Mobil submitted its EIS on May 15, 1985. Copies of the document or its summary were sent to people on the Panel's mailing list and placed in libraries, government offices and other convenient locations to assist members of the public in becoming familiar with the EIS information. Over 1500 copies of the EIS or its summary were distributed. Interested parties were invited to participate in the Panel review by providing written comments on the EIS and Mobil's proposed project by August 1, 1985. Notices were placed in newspapers and with other media in Newfoundland announcing the beginning of the

review of the EIS. Details and dates of public information sessions, and the due date for written comments on the EIS were similarly publicized.

The Panel retained the services of independent advisors to review specific aspects of the EIS and supporting documents, to provide appraisals of the information presented in comparison with that requested in the guidelines, and to provide intervenors with responses to their questions. The technical experts were Dr. William Ford (oceanography), Dr. Richard Haedrich (fisheries), Dr. Ian McLaren (marine birds and mammals), Dr. Derek Muggeridge (ice dynamics), Dr. Douglas Napier (safety), Dr. Douglas May (economics), and Dr. Frank Hawkins and Dr. Paul White (social sciences).

To give people an opportunity to ask questions about the project and to help them prepare comments on the EIS, the Panel held public information sessions between June 10 and June 21, 1985, in Harbour Grace, Marystown, Fortune, Come By Chance, Placentia, Corner Brook, Botwood, St. John's, Ferryland, and Trepassey. At the request of review participants, two additional sessions were held in St. John's on June 26, 1985. Approximately 670 people attended the twelve sessions. Transcripts of the proceedings (1094 pages) were placed in information centres and distributed to participants.

As a result of review of the EIS, the Panel received 22 submissions which were made public in a compendium of comments which was distributed to all review participants in August 1985. The Panel reviewed the comments and on August 15, requested further information from Mobil on icebergs, oil spills, loss of fishing areas, employment estimates and social issues. It also asked for information on waves, shuttle tanker traffic, sea-bed stability, monitoring, construction work camps, and a response to issues raised by review participants. Federal and provincial government departments were also asked to respond to issues raised relating to their responsibilities.

Prior to submission of the EIS, Mobil had agreed to identify its preferred mode of development by August 15, 1985 and, where necessary, update the impact information contained in the EIS. On July 30, 1985, Mobil advised the governments that a fixed production system had been selected as the preferred mode of developing the Hibernia field. On August 15, 1985, Mobil submitted its EIS Update to the Panel. The Update described the preferred mode of development and highlighted the aspects which differed from the description contained in the EIS. The revised information indicated that the majority of the system components had been reduced in size. Revised maximum design production capacity estimates were 24 000 m^3/day, compared with 32 000 m^3/day for the system described in the May 1985 EIS. Other reductions included the number of development wells, the number of shuttle tankers during production and the number of required person-years. The Panel distributed the Update to all review participants.

On September 13, 1985, Mobil submitted a Supplementary Information volume of the EIS (EIS Supplement) which the Panel distributed to all review participants. The Panel announced on September 16, 1985 details concerning the dates and locations of final public hearings, together with topics to be discussed and hearings procedures.

Community sessions were held in Marystown on October 7, Come By Chance on October 8, Placentia on October 9, Harbour Grace on October 10 and Ferryland on October 15. During the following two weeks general and technical sessions were held in St. John's Topics scheduled for discussion in St.

John's were social impacts (work camps, housing, social services, monitoring); economic impacts (training and employment); impacts of the environment on the project (sea ice, icebergs, oceanography); impacts of the project on the environment (seabirds, fisheries); safety; oil spills; and risk assessment. The hearings provided an opportunity for review participants to present their views and opinions on the proposal. Over 1 000 people attended the 11 days of hearings. Transcripts of the proceedings (1 726 pages) were placed in public information centres.

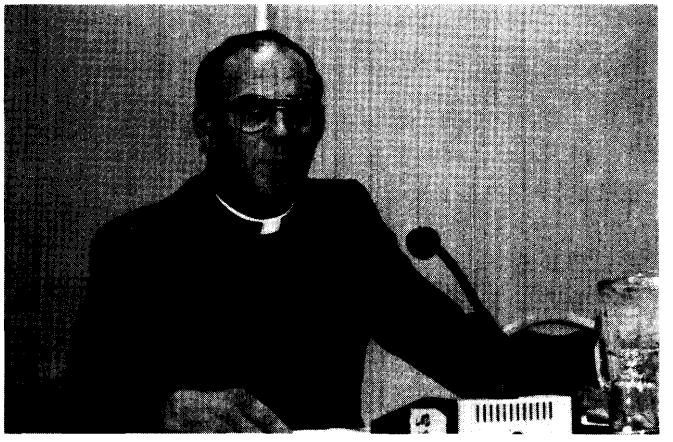
"You folk who drill our ocean floors in hopes of large returns, have your technical advisors really addressed all concerns?"

Mary Hodder
Researcher, Marystown

The Panel heard 66 oral presentations and received 90 written submissions during the hearings (Appendix C). Officials from Mobil, the Government of Newfoundland and Labrador, Environment Canada (DOE), Fisheries and Oceans (DFO) and the Canadian Oil and Gas Lands Administration (COGLA) were present throughout the technical hearings.

Among the other government agencies who submitted briefs, made presentations or participated during the sessions were the Department of Regional Industrial Expansion (DRIE), Energy, Mines and Resources Canada (EMR), and the Canada Employment and Immigration Commission (CEIC).

From written material received and presentations made at the public hearings the Panel acquired an understanding of the range of technical information and public opinion on this project. A list of submissions is provided in Appendix D.



"We have supported the principle that those most directly Impacted by development must be the beneficiaries of the development. Newfoundlanders are the stewards of this offshore resource, and we are obliged to ensure that we exercise thrs responsibility with due care and full consideration of the social and environmental Impacts involved."

Rev. Ralph Billard
Inter-Church Commission on Resource Development

"Oil is still in its prenatal stages to Newfoundlanders. The upcoming generatron will have more know/edge of oil, they will grow with it. We do, however, know more of the sea life and we know it is our responsibility to protect and preserve it for all generations."

Lou Barley
Mayor, Town of Burin

2.0 ECONOMIC IMPACTS

2.1 Employment

2.1.1 The Newfoundland Employment Situation

A major problem facing the province of Newfoundland is its unemployment rate, currently the highest in Canada, and approximately twice the national average. It is not surprising therefore, that many of the submissions heard by the Panel concerned employment opportunities the project would create. Many residents wanted to ensure that training would be available to enable them to participate in this and future similar projects. This was seen as a means to alleviate unemployment in Newfoundland and reduce the number of individuals having to be brought into the Province.

However, numerous groups expressed reservations regarding the impact of the project on unemployment in Newfoundland. Several reviewers were concerned about a public perception of jobs for everyone and stressed that the positions available would reduce the unemployment rate by only a small fraction. Other reviewers warned of a "boom-bust" cycle, noting that once construction is completed, local workers will again be unemployed. Concern was also expressed about the potential for speculative migration into Newfoundland by workers looking for jobs.

> *"Our concern is that when someone doesn't have work and comes to the area. for employment, that if he doesn't find it or if he is lard off for a period of time that he could cause serious problems for the society."*
>
> Rev. *George MacDonald*
> *Avalon Presbytery United Church*
> *in Harbour Grace*

2.1.2 Employment Associated with Hibernia

The EIS guidelines required Mobil to provide information on the distribution and characteristics of existing employment levels and projected increases due to Hibernia-related development. In the EIS Mobil estimates the Newfoundland direct labour demand and supply during the development phase. (see Table 1). Direct, indirect and induced labour demands were estimated at 86 000 person-years (PY) for Newfoundland and 129 000 PY Canada-wide.

In its EIS Update, Mobil provides revised employment estimates for the downsized fixed production system. It states that approximately 21 500 PY of direct employment could be created worldwide during the development phase, with 14 500 PY of direct employment based in Canada. The revised Newfoundland-based estimates are for 9 500 PY as opposed to the original 10 270 PY estimate (see Table 2). Production phase annual employment was scaled down from 1 150 persons to 1 090 persons (see Table 3).

Mobil identifies two potential shortfalls in Newfoundland's labour supply: those that require direct experience in offshore development and those that require skill levels related specifically to GBS construction and topsides assembly and hook up.

TABLE 1

EIS ESTIMATE OF NEWFOUNDLAND LABOUR SUPPLY AND DEMAND
(for fixed production system in person-years)

Impact Area	Activity	Employment (person-years)
St. John's	Project Management, Supply Base Operations, Drilling Support	3 925
Come By Chance	GBS Construction	3 620
Argentia	Flowline Fabrication,	625
	Deck and Topsides Assembly and Hook Up	1 335
Marystown	Fabrication of Ice-Clearing Vessel, Subsea Components, Module for Fixed Platform	765
TOTAL ESTIMATED NFLD. DEMAND		10 270
TOTAL ESTIMATED NFLD. SUPPLY		8 105

For persons lacking skills related to GBS construction and topsides assembly and hook-up, Mobil states that a substantial training effort is required. Mobil notes that shortages will not likely be completely avoided, since training must be supplemented with considerable on-the-job experience in order to meet the skill levels required in certain key trades (e.g., pressure welders, electricians, insulators). For the production phase Mobil states that for persons requiring experience, advance recruitment and special training on other facilities could be carried out so that the number of the positions to be filled by Newfoundland residents would be maximized.

The Panel concludes that the project could provide significant employment opportunities for Newfoundland workers. These opportunities could be realized through training as discussed in detail in section 2.1.5.

TABLE 2

EIS UPDATE ESTIMATE OF HIBERNIA DEVELOPMENT PHASE DIRECT EMPLOYMENT
(For Fixed Production System in Person-Years)

Component	Total Direct Employ-ment	Canada Based	Newfound-land Based
Project Management and Services	4 150	2 530	1 170
Fixed Production Plat-form	10 650	8 720	5 130
Articulated Loading Platform (two)	600	225	225
Subsea Structures and Equipment	225	150	100
Tankers	3 000	0	0
Ice Clearing Vessel	450	450	450
Flowlines and Tie-Ins	625	625	625
Development Drilling	1 650	1 650	1 650
Commissioning and Start-Up	150	150	150
Totals	21500	14 500	9 500

TABLE 3

EIS UPDATE ESTIMATE OF HIBERNIA ANNUAL OPERATING EMPLOYMENT
(For Fixed Production System-number of people)

Platform operations	540
Tanker operations	180
Well workovers	100
Marine and air support	120
Engineering and Administration	150
Total	1 090

The Panel also concludes, however, that certain specialized positions will require skills and experience not now available within the provincial workforce nor readily attainable through training prior to the project proceeding.

The Panel recommends that government should establish, and the proponent be required to meet, realistic goals for Newfoundland employment on the project. Emphasis should be placed on long-term jobs in the production phase and jobs developing skills transferable to future projects.

2.1.3 Accuracy of Employment Estimates

At the public information sessions and in written submissions to the Panel, numerous concerns were raised regarding the accuracy of Mobil's employment estimates. Mobil's failure to provide more than one employment forecast was seen as a basic flaw. The Government of Newfoundland and Labrador stated that the project will likely have significantly greater employment implications for Newfoundland than is suggested in the EIS, and that some of the data used to determine Newfoundland labour supply could contain errors of up to 40 percent. Several reviewers questioned assumptions used by Mobil to arrive at the Newfoundland percentage of direct employment and the level of indirect and induced employment.

In its August Information Request, the Panel noted that in addition to employment benefits, the accuracy of labour projections is an important factor in the management and understanding of projected social impacts. Mobil was asked to provide estimates of both upper and lower ranges of expected employment figures as well as a discussion of the social implications. Mobil responded to the Panel's request in its EIS Supplement by examining cases where employment estimates were assumed to be 25 percent higher and 25 percent lower than the estimates provided in the EIS.

At the public hearings, intervenors stated that Mobil's original single forecast method and subsequent dual approach in dealing with project employment still left considerable doubt as to the reliability of the projections. It was suggested that given experience with oil developments elsewhere, absolute upper and lower limits should have been included from the beginning to enable affected municipalities to plan for oil related developments.

The estimated demand for labour due to indirect and induced demands was also disputed by intervenors. It was noted that the number of PY of indirect and induced employment resulting from the project would be much greater than the number of PY of direct employment. The suggestion was made that more emphasis should be placed on opportunities for indirect and induced employment associated with the project.

The Panel concludes that estimates of the number of workers required during developments such as Hibernia may be subject to considerable refinement as the project proceeds. There is therefore a need for the proponent to provide timely information on job opportunities (numbers, types and required training level) as the design and construction schedule becomes more refined.

The Panel recommends that the proponent should regularly provide to government a detailed updated list of projected job opportunities as the planning of the project evolves.

The demand for indirect and induced employment, while not readily controllable by the proponent, could provide significant employment and entrepreneurial opportunities and is dealt with in section 2.2.1.

2.1.4 Local Employment Opportunities

In August 1985, the Panel had requested government agencies to provide information relevant to the employment

concerns identified in the written submissions to the Panel, including the concern for preferential hiring of Newfoundlanders. The CEIC responded by stating that it has no difficulty with the concerns and suggestions that Newfoundland residents should gain maximum benefits from the development. It noted that its operating principle is that employment and training opportunities are offered first to those individuals who are registered locally and regionally before the search for suitable candidates is directed outside the province.

In submissions presented to the Panel prior to and during the public hearings, including all five of the community sessions, one of the dominant areas of concern was the principle of local preference in Mobil's employment policy. Groups representing communities to be directly affected by the project indicated that qualified local residents should be hired first and outside hiring should occur only when it has been determined that qualified local workers are not available. Contrary to this, some reviewers stated that hiring preference should not necessarily be given to residents of the local impact areas, but to Newfoundlanders in general. When asked to elaborate on the geographic boundaries of its preferential hiring policy, Mobil stated that its intent is to maximize employment opportunities for residents of Newfoundland and Labrador.

At the public hearings, several reviewers expressed concern as to how Mobil would ensure its contractors followed local hiring preference policies. Mobil stated that through a Contractor Human Resources Committee, it encourages contractors to carry out policies consistent with those stated in the exploration agreement. A representative of the provincial government stressed that Mobil is accountable for the extent to which it meets the provisions laid down in the Canada Benefits Agreement.

It is obvious that local preference could be a contentious issue. The Panel concludes that a government policy on local hiring will be necessary to avoid problems during the project.

The Panel recommends that a policy on local hiring should be adopted by the government prior to construction. A local hiring office should be established for the benefit of local residents. Hiring for workers outside the local area should occur at centres elsewhere in the province.

A local hiring office would at least ensure equal opportunity for local residents wishing to obtain employment. The requirement for not hiring out of area residents at such an office is discussed in Section 3.0.

There was some discussion during the public hearings concerning a potential need for union membership to qualify for work on the project. Local area residents expressed concern that they might not have an opportunity to obtain work because they were not union members, even though they were qualified or had taken training. The Panel notes that the issue of union membership for the Hibernia project is under study by the Newfoundland government and suggests that this concern be addressed by them.

However, the Panel recommends that any requirement for union membership should not give non-residents preference over qualified Newfoundlanders wishing to work on the project.

2.1.5 Training

The EIS guidelines requested Mobil to provide the levels, numbers and types of skills and the general educational level required. Mobil was also asked to provide an inventory of the educational and training programs in or relevant to the impact areas. In its EIS, Mobil outlines the occupational requirements as well as Newfoundland's training capabilities for each trade to be involved in the project.

Many participants at the public information sessions requested information from Mobil on its training requirements. Some considered that Mobil has not provided sufficient lead time for Newfoundlanders to acquire adequate training. The question of whose responsibility it was to ensure that Newfoundlanders receive training was also raised.

Written submissions to the Panel argued that the EIS lacks information on how long a particular skill will be required for the project, and whether or not there will be a market for the skill on other projects. Technical advisors to the Panel recommended that detailed information on the types and estimated size of the employment categories should be publicly available as early as possible. They also recommended that systematic planning should begin at once to ensure that training programs are preparing Newfoundlanders adequately for jobs that are to become available. The Government of Newfoundland and Labrador stated that information provided by the proponent on occupations in which shortages may occur within Newfoundland appears reasonable. It further stated that with the co-operation of Mobil and sufficient lead time, training programs can be provided for Newfoundlanders to acquire the occupational skills needed for offshore development.

On August 15, 1985, the Panel requested government agencies to provide information relevant to the training concerns identified in the written submissions to the Panel. The CEIC stated that in order for governments and institutions to prepare for appropriate training programs, they will require detailed job descriptions with which to compare existing skill levels with the demand. It emphasized that the ultimate responsibility for the timely provision of information on training opportunities rests with Mobil.

At the public hearings, several reviewers stated concerns and recommendations regarding Mobil's plans for employee training. It was suggested that training facilities should be provided at the construction site to facilitate the development of local skills and improve the employability of local people. Other reviewers suggested that information on job training requirements must be made available for contract and subcontract work as well as for Mobil's own work. It was suggested that the provincial government should institute petroleum-related programs to provide local residents with the skills necessary to enable maximum participation in the development and production phases of Hibernia, and that this education should be supplemented by on-the-job training on production platforms.

The Panel concludes that appropriate training, both on-site and institutional, should maximize long-term employment opportunities for Newfoundlanders.

The Panel recommends that a comprehensive training strategy, including both institutional and on-site components, should be developed for this project and concentrate on areas of greatest long-term benefit.

2.1.6 Labour Force Displacement

Mobil states in the EIS that the demand for marine services and personnel for Hibernia will provide new employment opportunities and may attract a limited number of workers from the fisheries to the oil industry. It believes that there will be little or no loss of inshore fishermen, but some fish plant workers and possibly offshore fishermen may be inclined to transfer.

In a written submission to the Panel, the Government of Newfoundland and Labrador pointed out that Mobil has proposed no offsetting measures for the possible loss of skilled marine personnel from the fisheries to the petroleum industry. DFO stated that even a temporary loss of trawler refit crews would be critical in the short term. DFO also pointed out that the EIS fails to address the issue of possible wage escalation in the fish processing sector.

Similar concerns were voiced at the public hearings. Because of wage differentials, intervenors foresaw the oil industry attracting skilled labour in the maintenance and technical disciplines away from trawler refit centres. Others felt that this dislocation would only be temporary. A study was recommended to identify the potential job skills which could be in short supply because of transfers to offshore petroleum occupations.

Fishing communities noted the importance of skilled workers during this critical period of the fisheries industry and the need for further information to determine the effects of labour force displacement.

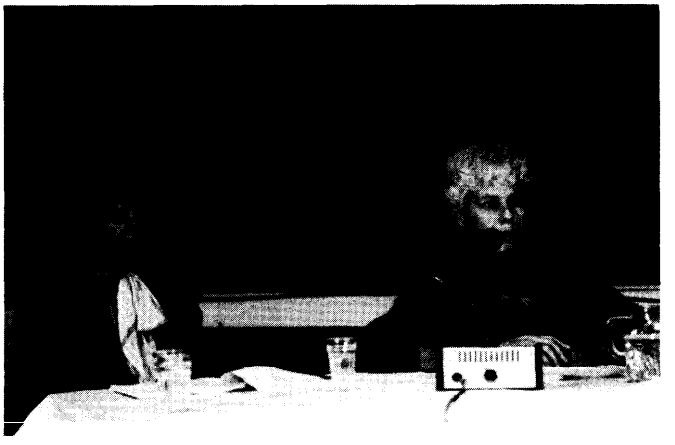
The Panel concludes that it is unlikely that the project will cause undue competition for Newfoundland workers, but limited movement of the workforce from other industries may occur in some specialized sectors.

The Panel recommends that government should take into account the possibility of limited labour force displacement from fisheries and shipbuilding in its training strategy for the project.

2.1.7 Affirmative Action

At the public information sessions, participants requested information from Mobil regarding its hiring policy for women. Mobil maintained throughout the sessions that it is an equal opportunity employer, but that there are not many women sufficiently qualified to work in skilled jobs offshore.

Several submissions to the Panel recommended that Mobil put into place an affirmative action program to ensure that interested and qualified women have a fair chance at the available jobs. The Government of Newfoundland and Labrador stated that Mobil should indicate the measures it intends to take to increase the scope of employment opportunities available to female workers.



"The Provincial Advisory Council recommends that Mobil adopt a comprehensive affirmative action policy which would substantially Improve employment opportunities for women within the company."

Ann Bell
Provincial Advisory Council on the Status of Women

At the request of the Panel, the CEIC provided comments relevant to the employment concerns identified in the written submissions. The CEIC stated that employment equity policy is a matter which has to be developed with the Canada-Newfoundland Offshore Petroleum Board (the Board). It also stated that it is supportive of any views expressed in the submissions to the Panel that would lead to an increase in the participation rate of women.

At the public hearings, groups maintained that by being an equal opportunity employer, Mobil was only meeting its legal obligations under the Charter of Rights. A comprehensive affirmative action policy which would systematically remove barriers for women and include targets was recommended. Groups took exception to Mobil's statement in the EIS that direct employment for women will likely be concentrated in the traditionally female-dominated occupations such as secretarial, administrative and catering services. They noted that there are increasing numbers of women seeking employment in non-traditional occupations.

It is obvious that there are few women currently employed offshore and this fact is of great concern to women's groups. The Panel concludes that this project provides an opportunity to address the issue.

The Panel recommends that opportunities for increased employment of women offshore should be addressed through overall government policy and project-specific employment requirements.

2.2 Industrial Impacts

2.2.1 Benefits

In its EIS, Mobil states that potential Canadian content with the fixed production system is estimated to range from 36 to **52** percent of the total project cost. The upper level assumes that Canadian industry is able to supply goods and services on a generally competitive basis; the lower level reflects greater international competition. For Newfoundland the range given is from 19 to 23 percent.

Mobil outlines several ways in which it plans to enhance industrial benefits within Canada, It states that it will obtain goods and services on the basis of competitive, commercial terms with due regard for the achievement of Newfoundland and Canada Benefits objectives. It also states that it will ensure that contractors are made fully aware of its procurement policies, and that it will encourage contractors to develop and implement a comparable set of policies. Also, Mobil indicates that it will package bids, where practical, to encourage greater participation by medium and smaller Canadian companies.

At the public information sessions, the Government of Newfoundland and Labrador stated that the principles and guidelines describing Mobil's measures to improve industrial impacts are general and do not specify the degree to which these measures will optimize Canadian and Newfoundland content. It stated that the EIS should provide the public with sufficient detail to enable an informed opinion to be developed concerning the adequacy of the measures proposed to increase the spinoff benefits from the development. In written comments on the EIS, DRIE concurred with Mobil that economic benefit from the project could be substantial, but that it is difficult to see the extent and distribution of these benefits.

In its August Information Request the Panel noted Marystown's concern that it had not been included as an impact area. Mobil was asked to provide more detailed information about construction or fabrication (or both) which could occur in Marystown, and the likely social impacts arising from it. In its EIS Supplement, the proponent states that Marystown had not been addressed as an impact area because it was assumed that existing facilities and the workforce would not need to be significantly expanded as a result of Hibernia activities,

At the public hearings, several groups voiced concerns regarding industrial benefits from the project. It was feared that too much emphasis has been placed on large contractors who will be carrying out the bulk of the construction work, and that the potential benefits to the local business sector have not received adequate attention. Intervenors suggested that Mobil should determine the opportunities for the local business sector in order that potential shortfalls in local supplier capability might be identified and acted upon by governments and industry. It was suggested that Mobil identify local business opportunities by listing potential goods and services (localities involved, quantities required, lead times and durations), by conducting seminars and disseminating information and by regularly reviewing and updating requirements.

"Regional Industrial Expansion believes that the Hibernia Development Project (HDP), if properly managed, will generate a number of benefits to Canada and Newfoundland. Specifically, the HDP can foster a climate which will encourage firms to enter info the production of goods and services for offshore oil development and production and will ultimately lead to their International competitiveness."

Gerald Pizarowski
Department of Regional Industrial Expansion

Mobil responded by stating that it is currently conducting supplier development seminars. It stated that a list of potential goods and services is only in the early stages of preparation.

Concern was expressed that Mobil had not given sufficient detail regarding its criteria for choosing supply sources to be used during the construction phase. It was also suggested that, given the many contractors to be employed, Mobil should provide information on how it plans to monitor and ensure that contractors comply with Newfoundland and Canada industrial benefits requirements.

One intervenor stated that in order to obtain maximum benefits, a primary topside fabrication, assembly and outfitting facility should be established in the province. It was noted that experience gained in topside construction could lead to a build-up of participation in inspection, maintenance and repair during the production phase. This would provide opportunities to participate in possible future construction, whether it be for

floating or fixed systems. The same intervenor stressed the desirability of having the project management team located in the province.

"The development of a skilled industrial work force could bring economic benefits long after this project is completed. This area could have the opportunity to build additional platforms in the future, should they be required, and a specially trained work force would certainly be an asset in attracting such projects."

Harvey Thistle
Trinity-Placentia Development Association

A representative of the Government of Newfoundland and Labrador presented an overview of the work being undertaken by the provincial and federal government to ensure that Newfoundland and Canadian businesses are prepared to take advantage of Hibernia economic opportunities. It was stated that a task force, composed of both provincial and federal government representatives, is currently conducting an inventory of Newfoundland and Canadian capability. The Board will have a division in its organizational structure which will deal with benefits.

"There is considerable work going on both in the federal and the provincial government to prepare for the economic growth that is going to occur as a result of this development and to make sure that Canadian and Newfoundland businesses are prepared to take advantage of that economic opportunity and also to see that Newfoundlanders and Labradorians in the first instance, and Canadians, in general, are prepared to avail of the employment opportunities."

Irene Baird
Government of Newfoundland and Labrador

The Panel agrees that a comprehensive agreement between governments and the proponent is necessary to ensure maximization of Canada and Newfoundland industrial benefits.

The Panel recommends that a plan establishing targets for Canada and Newfoundland industrial benefits should be agreed upon by governments and the proponent prior to project commencement and should be closely monitored throughout its life. Among the elements to be included are:

- **the timing and size of the construction contracts should be compatible with industrial capacity**
- **the plan should provide for the adherence to the plan by Mobil's sub-contractors**
- **the plan should emphasite technology transfer for long term benefits (e.g. topsides construction)**
- **there is a requirement for on-going consultation among government, industry and Mobil to ensure awareness of the opportunities arising from this project**

The Panel also concludes that Marystown is likely to experience economic growth resulting from opportunities created by the project.

The Panel recommends that the proponent should continue discussions with Marystown to establish the extent and nature of the town's participation in the project and ensure orderly development.

As noted earlier, the indirect and induced effects of the Hibernia project will provide significant entrepreneurial and employment opportunities in Newfoundland.

The Panel therefore recommends that appropriate training and assistance to small businesses should be provided to maximize benefits from the induced and indirect effects of the project.

2.2.2 The "Boom-Bust" Cycle

The "boom-bust" cycle is a term often used to describe the rapid inflation that can occur during the build up phase of a project ("boom"), and the inactivity following completion ("bust").

In the EIS, Mobil states that the project will not have a significant effect on national inflation. In 1991, the project is expected to add about 0.3 points to the Consumer Price Index (CPI). Concerns were expressed that the effect on the Newfoundland inflation rate was not given.

In its August Information Request, the Panel asked Mobil to provide information on socio-economic impacts, including local inflation. In its EIS Supplement, Mobil states that it is not possible to estimate precisely the impact of the project on local inflation. However, Mobil claims that, based on experience elsewhere, it is possible to accommodate a major project in a small economy without triggering inflationary effects.

The establishment of a disturbance fund was suggested to minimize the adverse effects arising from project completion. It was suggested that the establishment of such a fund must be written into the mandate of the Board if there is no such provision in Mobil's development plan.

The Panel notes that good planning can mitigate the ''boom-bust" cycle resulting from resource development projects and makes some specific suggestions, such as community impact agreements, in the following sections on social impacts..

Such planning for Hibernia should take into account the potential shortages of supply which can cause inflation during the build-up phase and the opportunities for diversification of the economy during project phase-down.

''It is quite conceivable, according to Mobil's projection, that this will be a boom and bust scenario. So be it. However, every effort should be made to allow for social, physical and economic adjustment, not only for the intense activity during the project but the phasedown as well. ''

Bill Hogan
Mayor of Dunville with Mayors of Jerseyside and Freshwater

3.0 SOCIAL IMPACTS

3.1 Population

The EIS guidelines required Mobil to provide population estimates for areas which could be significantly affected by the project. In its EIS, Mobil provides population projections for the St. John's, Argentia and Come By Chance areas (see Table 4). Mobil predicts that project impacts on population will be minimal.

TABLE 4

POPULATION PROJECTIONS
RESULTING FROM
THE HIBERNIA DEVELOPMENT PROJECT

Impact Area	Peak Year	Total Without Hibernia	Cumulative Increase due to Hibernia	Hibernia as a % of the total
St. John's	1995	179 329	1 607	0.9
Come By Chance	1990	17 761	362	2.0
Argentia	1989	9 705	191	1.9

Note: These figures do not include workers housed in camps.

At the public information sessions and in written submissions to the Panel, the dominant concern was the lack of information given by Mobil on potential variations in population. Mobil's conclusions regarding population impacts were questioned on the grounds that the model used is not sensitive to changes in the scale of site operations. Government agencies recommended that the implications of varying levels of population should be addressed in terms of the ability of local areas to absorb the impacts. Many groups noted that the EIS was based on the required number of workers for the project and does not offer any estimates of the possible number of persons moving into an area in search of work.

In the August Information Request, the Panel asked Mobil to provide upper and lower estimates of expected employment and population effects.

Mobil's EIS Supplement provides assumptions of employment estimates 25 percent higher and 25 percent lower than those provided in the EIS. In both cases, Mobil duplicated the demographic assumptions (marital ratios and family size characteristics) that were used in the EIS. When compared with the EIS, major changes in project-related population levels would occur in the Come By Chance area (450) and the Argentia area (240). In terms of percentage of area population increases, these two areas would be impacted to a far greater extent than would the St. John's area.

At the public hearings, the potential impact of unexpected population variations was again an issue of major concern. Several groups stated that the population estimates provided by Mobil still underestimate the growth which will occur. By failing to address this aspect of demographic change, Mobil may have underestimated the predicted impacts in related areas such as housing and social services.

The movement of speculative job seekers was also a major topic of discussion at the hearings. Mobil stated that quantification of demographic changes from this source is not possible at present but is an area where further research is being carried out.

The Panel notes that large resource development projects often involve unpredicted population changes. If not properly managed, such changes can cause or exacerbate social problems. The scale of the Hibernia project in itself, however, is not overwhelmingly large in comparison with projects already experienced in Argentia (U.S. Naval Base) and Come By Chance (oil refinery) or in the St. John's area.

The Panel concludes that the consequences of population increases during the project can be managed provided that appropriate mitigative measures are implemented. These are outlined in the following sections.

The Panel recommends that timely information on expected population influxes should be provided continuously by the proponent and its contractors to appropriate authorities to allow them to provide necessary services.

The Panel considers that the authorities should be prepared to deal with the issue of speculative migration. Measures such as local hiring for area residents and accurate prediction of job estimates will be of assistance. Other suggestions are contained in the following sections. Careful consideration will also need to be given to the question of whether public announcements of job opportunities will be a help or a hindrance. The Panel endorses further research on prediction and management of speculative migration being undertaken by the proponent and encourages all interested parties to participate.

3.2 Housing

The EIS guidelines required Mobil to pay particular attention to impacts on housing and associated mitigative measures. In the EIS, Mobil provides projections of housing needs with and without development of the fixed production system. Mobil states that for St. John's, the demand would increase from 41 households in 1986 to 230 in 1992. In the Come By Chance impact area, the total cumulative effect would be 96 additional family households over the period between 1986 to 1990. In the Argentia impact area, the cumulative requirement for family households would peak at 51 in 1989.

For the three areas outlined, potential impacts were projected to be manageable, provided that work camps are established for single status workers in Come By Chance and Argentia. Mobil also states that it would be possible to use vacant Canada Mortgage and Housing Corporation units in Come By Chance, as well as mobile homes in a nearby subdivision. In Argentia serviced lots are available in the area.

In written submissions to the Panel, concerns were expressed regarding Mobil's housing analysis. In its August Information Request, the Panel asked for estimates of expected upper and lower levels of employment and a description of the expected effects on housing.

In the EIS Supplement, Mobil maintains that by suitable sizing of work camps and provision of mobile homes in Come By Chance and Argentia, housing impacts would remain manageable even with a 25 percent increase in projected employment estimates. However, this would require either additional trailers within the built-up areas or commuting.

At the public hearings, numerous reviewers expressed concerns regarding housing. In terms of owner-occupied housing, intervenors maintained that, although a shortage of supply is unlikely, there could be significant price inflation. Inflation was widespread in many housing markets during North Sea development impacts, and was also evident in the St. John's area in 1980, following the initial Hibernia discovery. It was suggested that the governments monitor and publicize present and future housing demand and that the Newfoundland and Labrador Housing Corporation control residential lot prices and supply.

Mobil stated that owner-occupied housing should not be a problem given that it intends to provide enough advance notice of worker influx. Mobil also stated that based on the projected employment figures for Hibernia, rampant housing speculation and price inflation should not occur.

In the case of the rental market, many reviewers indicated that there are already severe supply problems in St. John's (the April 1985 vacancy rate was 2.9 percent). The current situation, which some described as a crisis, will be further stressed by the project. Intervenors recommended that the provincial government immediately establish a task force to address the current problems of the St. John's rental housing market as well as the prospective impacts of offshore oil development.

Many intervenors noted the particular problems that a tight rental market in St. John's would create for those on low or fixed incomes and suggestions were made for special construction programs to increase the number of units being built by the government to meet these needs. Such programs could address the needs of groups such as single-parent families, the elderly and the long-term unemployed.

It was also noted by several reviewers that in St. John's, temporary accommodations will be needed for transients. It was recommended that the current provision of boarding house and hostel accommodations be reviewed, and that the feasibility of opening a new hostel for transients and others should be investigated.

"The need, then, is for more rental housing of all types. This is a general problem across Canada but is already particularly severe in St. John's and will be made worse by oil-related impacts. The City is also concerned about the provision of boarding house and hostel accommodations for transients and speculative in-migrants."

Shannie Duff
Deputy Mayor
City of St. John's

Mobil stated at the public hearings that both the rental and the public housing situations are areas of concern, but it can do little except be sensitive to the problem and provide realistic information on manpower needs.

Intervenors also commented on housing in the Come By Chance and Argentia areas. Costs and the need for public housing were of concern. Use of mobile homes in serviced lots at Arnold's Cove and nearby areas was considered acceptable but in Argentia there was concern expressed about this approach.

The Panel concludes that the rental housing supply in St. John's is likely to be inadequate to meet the demand during the project and the competition for the available units is expected to induce a severe impact on low or fixed income groups.

The Panel recommends that special measures should be taken to increase the supply of rental housing in St. John's with particular emphasis on providing more units for low or fixed income groups. Existing programs should be expanded by use of the Offshore Development Fund.

The Panel also recommends that government should monitor the demand for owner-occupied housing in St. John's to ensure that sufficient lots are available to meet the demand and avoid unnecessary inflation.

The Panel concludes that there may be an increase in demand for housing of transients which could exceed the capacity of existing and presently planned facilities. The proposed research on the speculative migration of workers may be of assistance in defining the extent of this problem.

The Panel recommends that planning should begin on the provision of additional facilities for transients in the St. John's area. For other impact areas, measures should be taken to deter transients by advertising that local hiring will occur only for long-term local residents.

The Panel concludes that temporary accommodation for families in the Come By Chance and Argentia areas can be provided without causing severe local housing shortages.

The Panel recommends that discussions should occur between the proponent and local governments in the Come By Chance and Argentia areas concerning the numbers and types of temporary family housing units that will be required.

3.3 Public Infrastructure

In its EIS, Mobil projects mostly minimal impacts on schools, hospitals, municipal, commercial and industrial services and facilities. However, it suggests that improvements may be required to roads that access the south side of St. John's harbour. Mobil also identifies the need for paved roads to link Adams Head to the Trans Canada Highway and to the Come By Chance refinery road network. Other municipal services suggested for the site at Adams Head include a railway link to the main line, docking facilities, freshwater sources and electric power supply. The proponent also notes that enrollment at schools in the Come By Chance area is now exceeding capacity, and that students coming as a result of the project represent an additional strain. Possible infrastructure improvements in the Argentia Area could include a highway bypass to Dunville, a new electrical power transmission line, water system improvements and a solid waste disposal site.

In written submissions to the Panel, concern was expressed that some of Mobil's projections were based on inappropriate employment and demographic estimates. In its August Information Request, the Panel asked Mobil to address the effects of fluctuating employment levels on public services, commercial and industrial infrastructure. Mobil states in its EIS Supplement that for the St. John's impact area, effects from either a plus or minus 25 percent employment fluctuation would be similar to those outlined in the EIS.

During the public hearings, several reviewers expressed concerns regarding project effects on the overall infrastructure of impact areas. These included matters such as education, hospitals, land and resource use, transportation, water supply, sewage systems and waste disposal.

The Panel was provided with an illustrative account of the experiences that a community can face when the Spanish Room Residents' Committee made a presentation concerning the Cow Head oil rig facility. Although this is not part of Mobil's project, it is useful as an example of impacts that can occur as a result of a development which, according to the Residents' Committee, was inadequately planned.

The Panel concludes that careful planning of the infrastructure requirements of areas affected by the proposed development is required prior to the project proceeding. Full consultation among the proponent, government and local representatives is required.

The "Onshore Petroleum Related Development Sites" predicts an increase in noise pollution will result if additional development occurs on Spanish Room point. The construction and traffic related to the rig repair facility has been significant. Residents are concerned that the peace and tranquility of their community is not recognized as valuable by developers.

Gordon Brake, President, Spanish Room Residents' Committee.

The Panel recommends that full consultation should take place prior to development to identify necessary improvements to impact area infrastructures. Both the proponent and government agencies should involve local representatives in discussions on requirements.

The Panel notes that part of the purpose of the Offshore Development Fund is to defray infrastructure costs and that this fund would be applicable to address requirements identified above.

A further concern raised at the public meetings was that Hibernia would induce redevelopment of the older part of St. John's and possibly result in destruction of areas of architectural and residential heritage. Suggestions were made for control of this situation including the possibility of oil companies' renovating such buildings as offices.

The Panel concludes that induced demands for office space in St. John's could increase existing pressures for redevelopment of areas of architectural heritage.

The Panel recommends that the appropriate authorities should institute adequate controls and, if necessary, provide incentives from the Offshore Development Fund, to encourage preservation and restoration of areas of architectural heritage in St. John's.

The Panel encourages oil companies to undertake a demonstration project which will show leadership in preservation of buildings in the older part of the City.

3.4 Social Services

In its EIS, Mobil states that there are a number of concerns which have been identified by government and social service agencies concerning impacts from oil development. The majority of the concerns are based on what has occurred in the North Sea, and Mobil suggests that many may be overstated. The concerns include family breakdowns, neglected and abandoned children, alcohol and drug abuse, and other mental health and social problems that might result from increased stress related to rapid lifestyle changes.

'A planned, organized approach with a preventative focus is the most effective method of meeting mental health needs associated with the development of Hibernia and should be Implemented ''

Mary Mart/n-Rowe
Canadian Mental Health Association

Mobil has outlined in its EIS the current status of social services in the St. John's, Come By Chance and Argentia areas. Mobil states that in St. John's, government and community-based agencies are already overextended and that many have waiting lists. Mobil predicts that although Hibernia-related population increases will be small compared to the total population of the impact area, any increase could place a burden on the social service system. In the Come By Chance area, Mobil considers that while the incoming workers will not add greatly to the existing caseload, an increased population and change in lifestyle could place particular demands on the existing social services. Mobil gives similar but lesser predictions for the Argentia area.

Of all the issues discussed at the public information sessions and in written submissions to the Panel, the potential for impacts on social services received the most attention. A common concern was the potential for population growth to place a further burden on existing social services and the need for additional financial resources. Government agencies indicated that additional information and analyses should be provided by Mobil to address the effects of varying population levels. The particular problems that could be caused by speculative migrants were emphasized.

In its August Information Request, the Panel asked Mobil to provide updated information on social services. It also requested estimates of upper and lower ranges of expected employment figures and a description of their associated effects on community services. Mobil states in its EIS Supplement that it is impossible to quantify this information and that this type of quantification would not necessarily be informative. Further to this, Mobil states that there remains a lack of data from relevant agencies. Mobil's overall position is that social service needs associated with Hibernia are the responsibility of the government and that the appropriate mitigative measure would be to expand the service base.

At the public hearings, it was further stressed that many social services are presently overextended and that, without proper planning, an increase in users as a result of the project would reduce the ability of those agencies to provide effective services. The need to address these problems immediately was emphasized. Some intervenors stated that Mobil's failure to develop adequate baseline information during EIS preparation was a serious deficiency that should be rectified prior to the project proceeding. Mobil considered that by identifying the potential problems and their resolution rather than concentrating on data collection, they had fulfilled their responsibilities.

The potential solutions suggested by intervenors included (in addition to development of the better data base) the establishment of multi-service centres in rural areas, the direct provision by Mobil of services to its workers, the use of binding contracts between the proponent and the government to provide for new social services, and specific training programs for social workers.

The Panel concludes that the project could exacerbate social problems within Newfoundland unless the social services system, now severely stressed, is adequately funded.

The Panel recommends that the Offshore Development Fund should be used to provide adequate social services in areas affected by the development. Funding should be provided prior to, during and after the life of the project.

In determining needs for provision of social services, the government should make the decision as to whether better baseline information is required. The Panel emphasizes that priority should be placed on having trained personnel in place.

3.5 Management of Social Impacts

In its EIS, Mobil states that many social impact concerns may require regular monitoring, particularly those relating to demographic changes, housing, community services and social infrastructure. Mobil does not present a monitoring program, but indicates that it would support the establishment of a monitoring body whose role would be to respond to the Panel's recommendations, assign responsibility for the monitoring of impacts to the appropriate government department, and liaise with the public, industry and government. Mobil states that it will provide necessary information regarding industrial and labour requirements of the Hibernia develop-

ment, as well as other relevant project information, on a regular basis to the government departments responsible for monitoring.

In its August Information Request, the Panel asked Mobil to provide further information on the structure and means of monitoring the socio-economic project-related impacts which the company would consider within its area of responsibility.

Mobil states in its EIS Supplement that it is neither possible nor appropriate for the company to specify or assign responsibilities for all socio-economic monitoring tasks at this time. It indicates that what should be monitored, where, when, how and by whom are issues for future discussion between all interested parties, and that specific responsibility will eventually be determined on the basis of what needs to be done. Mobil reiterates its support for the concept of a monitoring body and pledges cooperation in the provision of timely information.

At the public hearings, many specific concerns and suggestions were voiced regarding the management of social impacts. It was a general view that a monitoring body should be established but reviewers had varying suggestions as to the details of such a body. One group considered that while monitoring is necessary, it should be only one element of a larger planning process referred to as a "growth management system".

"The Community Services Council believes that the best mechanism for preventing or minimizing the problems, **and** *maximizing the benefits from offshore development is an autonomous and community based growth management system."*

Penelope Rowe
Community Services Council

The Panel concludes that there is a need for a social impact management system that will be responsive to local concerns and capable of responding quickly. Such a system would serve as an identified channel of communication between concerned groups. The Panel considers that the best way to achieve this is to have specific agreements. Such agreements would provide a written understanding of the division of responsibilities among senior levels of government, the proponent and local authorities. They would also establish the basis for funding, monitoring and data collection and provide for arbitration of disputes that may arise during the project. The provision of timely information by the proponent will be an essential element of such a system.

The Panel recommends that community impact agreements should be developed for areas directly affected by the project. These should address issues such as housing, infrastructure and social services requirements.

The Panel notes that for such a system to work effectively, local representatives will need to be organized and be prepared to cooperate fully with nearby communities. The Panel is aware that there is not a history of strong local community organization in rural areas of Newfoundland, but during the review witnessed instances of highly effective cooperation and organizational development.

3.6 Work Camps

In its EIS, Mobil states that the GBS construction site at Adams Head is expected to include a self-contained work camp to house about 1 500 workers. It also states that the camp would provide amenities required by construction workers, be located at a distance from the town, and be operated in such a manner that interaction between the camp and town is minimized, if local communities so desire. Mobil has indicated that the Argentia work camp would house from 500 to 1 000 persons.

Numerous concerns were raised at the public information sessions and in written submissions to the Panel regarding work camps and their potential impacts. Several reviewers were concerned with the lack of detail provided in the EIS. In its August Information Request, the Panel asked Mobil to provide more details on the work camps. In late August, 1985, Mobil provided the Panel with a paper outlining work camp operations run by its contractors in Norway. The paper also provides an overview of problems to be overcome for successfully operating camps.

In its EIS Supplement, Mobil provides only a preliminary description of the possible types of construction camp to be

used, and states that the most likely scenario would be for the construction contractor(s) to own and operate the camp in keeping with standard industry practice.

At the public hearings, several groups made suggestions as to how the camps should be operated. These included: isolation of the work camps to minimize conflicts between workers and local community residents; provision of medical, counselling, day care and transportation services; provision of facilities for women workers; provision of alcohol within designated areas of the camp; regular and frequent exchange of information between Mobil, its contractors, labour and local communities.

It was also claimed that social isolation and work related stresses accompanying work camps can lead to alcohol and drug abuse, promiscuity, depression, loneliness and other related health factors. It was suggested that facilities equipped to deal with these potential effects be provided either in the camps or nearby.

At the hearings, Mobil stated that detailed aspects about work camps cannot yet be provided, given that no contracts have been awarded, no construction sites have been finally selected and only limited discussions have been held with communities located near possible construction sites. Mobil did provide a preliminary description of the possible types of work camps.

The Panel concludes that although construction and operation of work camps could potentially have a significant social impact on nearby communities, well designed and well run camps can minimize potential problems.

The Panel recommends that work camp location and access should be discussed with local communities prior to site work commencing. Work camps should provide recreation facilities, medical and counselling services and other requirements determined following consultation with the workforce and local communities.

4.0 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

4.1 Sea Ice and Icebergs

4.1.1 Threat to Production Systems

The EIS guidelines required Mobil to provide information on the potential stresses to be placed upon production and transportation systems by sea ice and icebergs, one of the most significant environmental features of the Hibernia region.

Mobil states that a GBS production platform would withstand all forces from sea ice and icebergs, but that loading or unloading of supply ships and shuttle tankers may be interrupted when heavy sea ice prevails. ALPs would be designed to withstand normal sea-ice conditions and impacts by bergy bits. Extreme sea-ice conditions or icebergs could damage an ALP. Mobil states that if this unlikely event were to occur, the ALP would need to be repaired or replaced. Studies of icebergs have been used to predict the maximum size and draft that could be expected at the Hibernia site. Water depth would limit iceberg draft to approximately 80 m and the extreme mass is estimated at six million tonnes.

At the public information sessions and in written submissions, a variety of concerns were raised regarding Mobil's assessment of the hazards from sea ice and icebergs. Concern was expressed regarding Mobil's interpretation of environmental data which might lead to inadequate design criteria. A major prerequisite was thought to be an engineering risk analysis which was not included in the EIS.

Where technical data were presented (e.g., maximum kinetic energy of an iceberg, the rate of ice accretion, the return period for iceberg collision) intervenors frequently found that their interpretation and calculation did not agree with Mobil's. DFO calculated a conservative estimate of 1.3 probable collisions between an iceberg and a fixed structure during a 20 year period. DOE recommended that the likely hazards from sea ice and icebergs should be carefully re-examined by Mobil.

In its August Information Request, the Panel asked about actions to be taken on the GBS in the event of an imminent collision, the probability of a collision, and the potential for substantial damage to the structure.

In the EIS Supplement, Mobil estimates that (without ice management) the GBS could experience an iceberg impact about once in a 15-year period. It states that the Hibernia GBS is designed to resist forces from an iceberg corresponding to a 500-year return period without structural damage. The design of the GBS is stated to be such as to protect it from iceberg damage. Mobil states that if an iceberg were to strike a GBS, its energy would be absorbed due to crushing from the star-shaped icebelt. Mobil calculates that the return period of an iceberg event which could potentially create even localized structural damage to the GBS is an order of magnitude greater than the 500-year return event. It is therefore maintained by Mobil that the integrity of the platform for the safety of personnel or for stored oil is assured.

In terms of actions to be taken on the GBS in the event of an imminent collision, Mobil states that platform evacuation will not be considered as a normal course of action, but that procedures to evacuate will be in place commensurate with contingency plans developed for the field. It also states that a set of criteria will establish when ice and weather events would cause tankers to be disconnected and flowlines flushed with seawater.

At the public hearings, several review participants raised the issue of potential structural damage from sea ice and iceberg impacts on the offshore structures. DFO questioned the impact of growlers and bergy bits with the structure under storm conditions, while another intervenor questioned the ability of the GBS to withstand a worst case collision. Mobil responded to these concerns, noting that design calculations and methodology are based on a probabilistic method and will be verified by regulatory agencies.

The Panel concludes that, although it is probable that an iceberg will collide with the GBS during the life of the project, it is satisfied that the design concept presented by the proponent is capable of withstanding such an event. However, it is reasonable to expect that the ALPs could be seriously damaged by extreme ice conditions.

The Panel recommends that the ALPs should be designed to ensure that oil spills are avoided in the event of failure of system components or the structure itself.

The need for ice forecasting and management systems to reduce the risk of oil spills or damage to structures is discussed in detail in section 4.1.3.

4.1.2 Iceberg Scour and Threat to Pipelines

Icebergs drift into the project area and scour the seabed on occasion and thus may possibly damage subsea equipment. The EIS guidelines required Mobil to provide information on ice scouring with particular reference to the frequency and depth of scours.

In the EIS, Mobil presents information on the width, length, depth and locations of iceberg scours on the Grand Banks. It states that the greatest scour depth documented for the Grand Banks is 7.0 m, in water 160 m deep, approximately 90 km north of Hibernia's P-15 wellsite. Mobil states that the threat of icebergs damaging subsea equipment could be mitigated by installing wellhead control valves below maximum scour depth and possibly burying or including safety connections in the flowlines and gathering lines. However, decisions as to the exact measures have not been made, and the possibility of sacrificial structures and quick purging of oil is still under consideration.

In a written submission, EMR indicated that present scour depths may be less than the depth of the scour at the time of formation, due to a variety of factors, such as infilling. Because of this, recent observations could underestimate the original depth of a scour. Further study was recommended. The Government of Newfoundland and Labrador noted that pits caused by icebergs are not mentioned in the EIS nor is the existence of a pit 7 nautical miles east of Hibernia which measures over 10 m deep and 150 m wide. It indicated that more discussion of the formation and extent of pitting would be useful.

At the public hearings, DFO stated that while it recognizes the cost in protecting seabed components of the project from iceberg scour and resulting damage leading to loss of fluids, cost should not be the only factor in deciding whether or not to protect the components. It recommended that protection of seabed components be a condition of project approval.

The underlying concern from intervenors with respect to possible iceberg damage to seafloor installation revolves around the possibility of an oilspill. The proponent has indicated that two courses are possible: one passive, the other active. One approach is to design for possible iceberg contact and to prevent a spill even though there is damage to equipment. The more active route is to protect the pipelines and other installations by burying or similar procedure.

The Panel concludes that, since it is likely that an unprotected pipeline, production manifold or well-head would be subject to damage from iceberg impact, a conservative protective approach (such as burial) should be taken in order to prevent oil spills.

The Panel recommends that complete protection of subsea components, by measures such as burial, should be considered for protection against iceberg impact.

4.1.3 Ice Forecasting and Management

The Hibernia area lies near the southern limit of sea ice and most of the ice encountered is carried down from the north by the Labrador Current. Mobil informs us that sea ice came within 50 km of the Hibernia site in 12 of the 25 years between 1960 and 1984. The most severe period for sea ice conditions was between 1972 and 1977 when ice reached the site every year. The International Ice Patrol estimates that 1 348 icebergs drifted south of 48°N in 1983, and 2 100 in 1984. It is estimated that approximately 13 percent of the icebergs crossing 48°N latitude pass through the Hibernia area.

In its EIS, Mobil outlines a management program for sea ice and icebergs. The program identifies a series of alert zones surrounding the field facilities and defines specific responses to ice encroachment into these zones. Mobil notes that towing, propeller washing using support ships, and other techniques for controlling iceberg movement are components of its ice management program, and that research work is ongoing to improve these techniques. It notes that for sea ice, support and standby vessels will be ice-strengthened for clearing ice as well as monitoring activities involving sea ice.

Mobil states that surveillance of sea ice and icebergs is being conducted from drilling vessels, ships, and aircraft, and that trained observers on each rig monitor ice conditions on a regular basis using visual methods and radar. It states that additional ice data are available from Atmospheric Environment Service ice surveillance flights, the International Ice Patrol and the Department of National Defence.

In a written submission, a Panel technical expert indicated that improved techniques should be developed to enable iceberg towing in all weather conditions. DOE and DFO noted that under conditions of poor visibility and high sea states, bergy-bits, growlers and ice floes are not detectable with high confidence using present day remote sensing techniques.

In its August Information Request the Panel inquired about ice management techniques that will be used. Mobil's EIS Supplement again describes the ice management system outlined in the EIS and adds that it is likely that the joint ice management network now in place will be continued.

At the hearings DOE recommended that Mobil should provide details on the operation of a real time ice forecasting system for the Hibernia area. Mobil indicated that it is committed to providing such a system. DOE noted that it can provide advice and assistance to Mobil by reviewing the detailed plans for such a system, and stressed that it is essential that a system is agreed upon prior to development plan approval.

The Panel concludes that an effective ice management system will reduce the risk of significant pollution incidents or loss of human life resulting from damage to the ALPs, seabed installations or shuttle tankers. A major weakness in the present system is in the detection and management of ice under adverse weather conditions.

The Panel recommends that an effective ice management system should be an integral component of the project. Research and development to improve the ability to detect and manage ice under adverse weather conditions should be undertaken.

4.2 Waves

The EIS guidelines required Mobil to provide information on the wave climate in the project area, including extreme values as they relate to structural integrity of the GBS, disruption of operations, and contingency planning.

In its EIS, Mobil's environmental design parameters for a 100-year return period are a maximum wave height of 30.5 m, a significant wave height of 14.9 m, and a peak wave period of 16 seconds. Mobil states that high waves associated with severe winter storms will limit supply boat and other vessel travel and loading of shuttle tankers.

DFO recommended that Mobil reassess its studies on wave heights taking into account severe storms which have occurred since 1980. The Government of Newfoundland and Labrador also noted that several storms have occurred since 1980 which have had wave heights larger than those selected

for Mobil's analysis, It indicated that some discussion of the effect that these observed storms could have on the extreme condition should be provided.

In response to a request from the Panel, Mobil indicates that analyses of rig wave data from 1980 to 1984 have been undertaken, and that a background document referenced in the EIS has been updated to include storms from 1980 to 1984. Mobil states that this additional information indicates no need to alter design parameters given in the EIS.

At the public hearings, several reviewers questioned the wave climate information provided by Mobil. Extreme wave parameters were considered invalid by one intervenor, because too few storms were used, and the most severe storms were not included. The extent to which episodic waves should be taken into account was also debated.

DFO stated that the effects of breaking waves are inadequately addressed by Mobil. It considered this to be an important deficiency when taken with concerns about the behaviour of growlers and bergy bits. It therefore recommended that Mobil should be required to address the subject of breaking waves more fully prior to the completion of structure design.

"I would like to draw attention to the fact that *maybe there are large waves at the Hibernia site, and I don't think they should be overlooked . . I'd like to see some allowance made in your environmental wave parameters for episodic waves. "*

Judith Bobbitt
Oceans Ltd.

While discussion on this subject at the hearings became quite technical at times, Mobil stood by its estimates of maximum wave height, and pointed out that an allowance or "factor of safety" would be included in the design for unforeseen events. The Panel's technical expert stated that wave climate deficiences which may have been present in the EIS had been satisfactorily addressed in the EIS Supplement.

The panel concludes that there remains concern that the offshore wave climate may be underestimated in the GBS design. Chapter 7.0 refers to the question of design verification.

The Panel recommends that the structure should be built to ensure human safety and structural integrity from wave forces. In particular, the topsides and supporting structures should be conservatively designed to allow for the possibility of episodic waves.

4.3 Seabed Stability and Seismicity

The EIS guidelines required Mobil to provide information on the tectonic history and hazards of the project area with particular reference to foundation instabilities. In its EIS Mobil outlines the bedrock geology and seismicity of the Hibernia area but no reference is made to hazards arising from potential foundation instabilities.

In a written submission to the Panel, EMR raised several concerns regarding the stability of the seabed that would support bottom-founded installations. EMR recommended that Mobil should undertake a geotechnical survey to characterize the foundation sediments when a development site has been chosen and specify measures to mitigate possible sediment failure under a GBS.

EMR noted that recent evidence from the Ekofisk field in the North Sea indicates that significant unexpected subsidence of the seabed has occurred around offshore structures. Oilfield subsidence is the surface depression which can result from compression of the reservoir rock due to withdrawal of reservoir fluids. EMR recommended that a research program be set up to assess this possibility for Hibernia. It was also suggested that the long term effects of sediment transport should be investigated.

A final concern raised by EMR involves Mobil's assessment of the seismicity of the Hibernia area. It stated that since the preparation of the 1981 seismic report used by Mobil, there have been a number of developments pertinent to assessment of seismic hazards in the eastern Canadian offshore. EMR thus recommended a reassessment of the seismicity of the Hibernia area.

In its August Information Request, the Panel asked for more information on seabed stability and the possibility of the subsidence of the GBS.

Mobil provided additional information in its EIS Supplement. Regarding seabed stability, Mobil states that further geotechnical, site specific investigations will be carried out to confirm existing data for final design, once the location of the GBS and associated facilities has been chosen. Mobil states that the potential for subsidence is low due to the competent sandstone reservoirs and the early pressure maintenance program planned. It is currently performing subsidence estimates for the Hibernia GBS and will incorporate the results in GBS design as warranted. Regarding sediment transport, Mobil states that the rate and volume will be slight, due largely to the presence of stable sands and gravels and the low bottom currents at the Hibernia site. Mobil states that long term effects will be assessed, but that it is not anticipated to affect facilities design. Mobil also stated that it is familiar with the recent seismological technical developments, and that the developments together with continuing studies and evaluations form the basis for further refinement and detailing of the design process for the Hibernia structures.

The Panel recommends that the results of ongoing studies on seismicity, seabed stability and possible subsidence should be incorporated into the design of the GBS and other offshore components.

4.4 Weather

The EIS Guidelines required climatological information related to design and safety of the project. Mobil has provided written, statistical and graphical climatological data in the EIS and Supplementary Information documents.

Intervenors were concerned that data supplied by Mobil were understated and not properly interpreted and might lead to inadequate design criteria for the GBS and other offshore structures. Ice accretion from sea spray and wind forces were particular concerns. It was claimed that the simultaneous occurrence of strong winds, high seas, poor visibility and the presence of ice had not been considered. In response Mobil suggested that the GBS will be designed to take all environmental loads including extra loading from ice accretion.

DOE stated that the safe operation of a production platform, supply ships, helicopters and tankers require a dedicated staff of knowledgeable forecasters and technicians.

The Panel recognizes that complete and timely information on weather conditions will be of utmost importance to the safe and effective operation of the project.

The Panel therefore recommends that a dedicated weather forecasting system should be incorporated as an integral part of the project.

5.0 IMPACTS OF THE PROJECT ON THE ENVIRONMENT

5.1 Oil Pollution

The EIS guidelines required Mobil to provide an analysis of the risks associated with the development of Hibernia, including the probability of episodic and chronic spills and measures to minimize their occurrence. Oil spills were to be discussed in terms of their expected characteristics; existing and future capability for tracking, containment and clean-up; likely impacts on the environment and on resource use; mitigative measures proposed by Mobil; and expected residual impacts.

5.1.1 Oil Spills at the Production Site

In the EIS, Mobil discusses the possibility of oil spills which might occur as a result of major accidents during production, e.g., blowouts, storage and transfer operations or tanker accidents.

Mobil estimates that in a worst-case scenario either a subsea or surface blowout would release approximately 4 800 m^3 of oil per day for a period extending possibly to 90 days. In an average-case situation, such a blowout would discharge approximately 300 m^3 per day for five days. A worst-case batch spill from the GBS or a tanker would release 30 000 m^3 over a period of one hour, while an average-case batch spill would discharge 9 000 m^3 during a 24-hour period. The EIS states further that a typical oil spill from a ruptured pipeline would release about 300 m^3 in a one-hour period, while a spill during an oil transfer operation might discharge 800 m^3.

A worst-case oil slick, resulting from a surface blowout, is predicted to survive for 40 days in summer (approximately half that time in winter), and would move over large portions of the Grand Banks during that period. Mobil predicts that the direction of movement of a slick resulting from an oil spill at Hibernia would generally be offshore toward the east and south except in the months from November to March, when there would be a slight chance (less than one percent) of contact with the shoreline of Newfoundland.

Having discussed the expected characteristics of such spills, their predicted trajectories and the factors which determine their fate, Mobil concludes that there could be a major impact on certain seabirds but only minor or negligible impacts elsewhere. Concerns for the fishery were concentrated on interference rather than stock damage, except in localized inshore areas.

The subject of oil spills and their possible effects on the environment was raised by several participants in the public information meetings and in many of the written submissions to the Panel.

The August Information Request sought further data on the properties of Hibernia crude, expected emulsification, stratification in the water column and possible subsurface migration.

In its EIS Supplement Mobil states that the description of the properties of "fresh" Hibernia crude as used in carrying out the environmental assessment for the Hibernia project is valid and in keeping with Mobil's "worst-case" approach.

Regarding emulsification, Mobil clarifies its earlier presentation in the EIS by stating that spilled crude oils will indeed form relatively stable emulsions and that the reported characteristics of those emulsions were used in developing the oil survival time curves for the various spill scenarios and in generating the predicted trajectories presented in the EIS. Mobil claims there is no evidence to support intervenors' concerns that the emulsified oil will sink below the water surface and move as a coherent mass.

At the public hearings, DOE continued to express concern about the need to relate spill trajectories to important resource locations and the methods by which the oil would disperse. DFO was concerned that Mobil's oil spill scenarios were optimistic, particularly with regard to the time required to drill a relief well and the size of a spill from a tanker.

DOE stated that Mobil has not adequately addressed the risk of a major oil spill. In a report based on its own analysis using data from the United States Department of the Interior, DOE estimated that there will be one or two major oil spills (i.e., greater than 1 500 m^3) during the lifetime of the project. Mobil replied that DOE's use of global data (based on results from both "good" and "bad" operators) is not applicable to this particular development.

The Panel concludes that there is a significant chance of a blow-out during the life of the project. However, there is a greater likelihood of batch spills during storage or transfer, due to the difficult climatic conditions of the site, and this may constitute a more serious ongoing threat to the environment.

The Panel also concludes that while the exact mechanics of the movement of an oil spill from the Hibernia site is a subject of debate, dispersion offshore is likely in most instances.

5.1.2 Oil Spills from Shuttle Tankers

The guidelines for the preparation of the EIS required the proponent to address the issue of oil spills from tankers. In the EIS, Mobil states that shuttle tankers will enter regular shipping lanes shortly after leaving Hibernia and consequently, only the effects of a tanker spill at Hibernia were considered. This approach to the subject resulted in critical comments from many groups who attended the public information sessions and was also questioned in written submissions to the Panel.

The Panel requested further information from Mobil concerning routing and frequency of shuttle tanker traffic, special design considerations for shuttle tankers, and the probability of cargo tank rupture and associated risks to the environment.

In its EIS Supplement Mobil reiterates that the crude oil to be shipped to eastern Canada from Hibernia will not increase the total volume being shipped across the Grand Banks but will only displace an equal volume of overseas imports. Three tankers will make one or two trips per week. Mobil provides a diagram showing the routes most frequently used by east coast shipping. To demonstrate that shipment of oil across the Grand Banks is not new, Mobil points out that in 1984 an average of 85 000 tonnes of crude per month were tankered through the area.

The EIS Supplement goes on to states that the shuttle tankers will be specially built for Hibernia, will have complete segregation of cargo and ballast tanks and will be ice-strengthened. Dimensions and specifications are outlined, together with information on machinery arrangement and bow loading equipment.

Mobil states that it is not possible to predict meaningfully the outcomes of accident scenarios because existing tanker accident data are not applicable to the Hibernia situation. However, Mobil says that the proposed double hull design will be a major feature in prevention of discharges of oil due to tank rupture.

Intervenors at the public hearings continued to express concern about shuttle tanker routing and believed that an environmental and risk assessment should have been provided by Mobil. The major concern was that a catastrophic spill could affect the Newfoundland coast.

The Panel notes that in order to reach the main shipping lanes, Hibernia tankers would have to traverse large portions of the Grand Banks, whereas existing vessel traffic is routed farther south at certain times of the year when weather conditions are severe.

The Panel concludes that the tanker transport of Hibernia oil would create increased traffic in environmentally sensitive areas. Even with the special tankers to be built for the project, the risk of an oil spill may be increased above that which now exists.

The Panel recommends that the design of tankers should incorporate all necessary features for Hibernia conditions including double hulls and ice-strengthening.

The Panel further recommends that a mechanism should be established to ensure the safe routing of tankers in shipping oil from the Hibernia site. This must take into account the safety of the tanker and the environmental sensitivity of the area traversed, and should be done through consultation with resource managers and shipping authorities.

51.3 Oil Spill Clean-up

In the EIS, Mobil commits itself to a detailed oil spill contingency plan designed to provide a rapid and effective response to a spill if one should occur. At the same time, Mobil acknowledges that the present level of effectiveness of oil spill countermeasures offshore is limited by the harsh environmental conditions on the Grand Banks. Response effectiveness is estimated at 20 percent in summer and less than five percent in winter. Sea state conditions are a major limiting factor but ice-infested water poses an even greater limitation. It was readily admitted that there are not yet any practical methods to clean up an oil spill in an ice-covered sea. All parties at the hearings agreed, therefore, that prevention rather than cure is the only solution to this problem. It was also noted that research on oil containment and clean-up is under way.

"We still have serious concerns about the environmental safety of high tanker traffic volume along the Newfoundland coast, particularly the Avalon Peninsula, and particularly the months when seabirds are breeding and the inshore fishery is active. Even a small spill then could have serious environmental consequences."

Jake Rice
Wilderness Society of Newfoundland and Labrador

The Panel recognizes that present capabilities for oil spill clean-up offshore are severely limited by the harsh environmental conditions at the Hibernia site.

The Panel recommends that in view of the limited capability for offshore cleanup, special emphasis should be placed on prevention of offshore spills. Contingency plans should take into account both inshore and offshore

impacts. In addition, research to develop effective countermeasures should be accelerated by industry and government.

51.4 Operational Discharges

The use of oil-base muds in drilling deviated wells, such as will be required at Hibernia, produces oily cuttings which Mobil intends to discharge onto the sea-floor. In addition, produced water and storage displacement water containing small concentrations of hydrocarbons may be discharged. Mobil predicts the impacts of these oily wastes to be minor to negligible.

In their presentations to the public hearings, several intervenors addressed this topic. DFO and DOE recommended that Mobil consider various mitigative measures. These included the injection of wastes into the reservoir structure and the discharge of fluids below the summer thermocline. Mobil responded that the discharge of wastes below the summer thermocline is feasible, and that re-injection of produced water into the structure is under consideration. Mobil also stated that storage water will be treated before discharge.

The Panel concludes that effective technology exists to treat operational discharges during the life of the project.

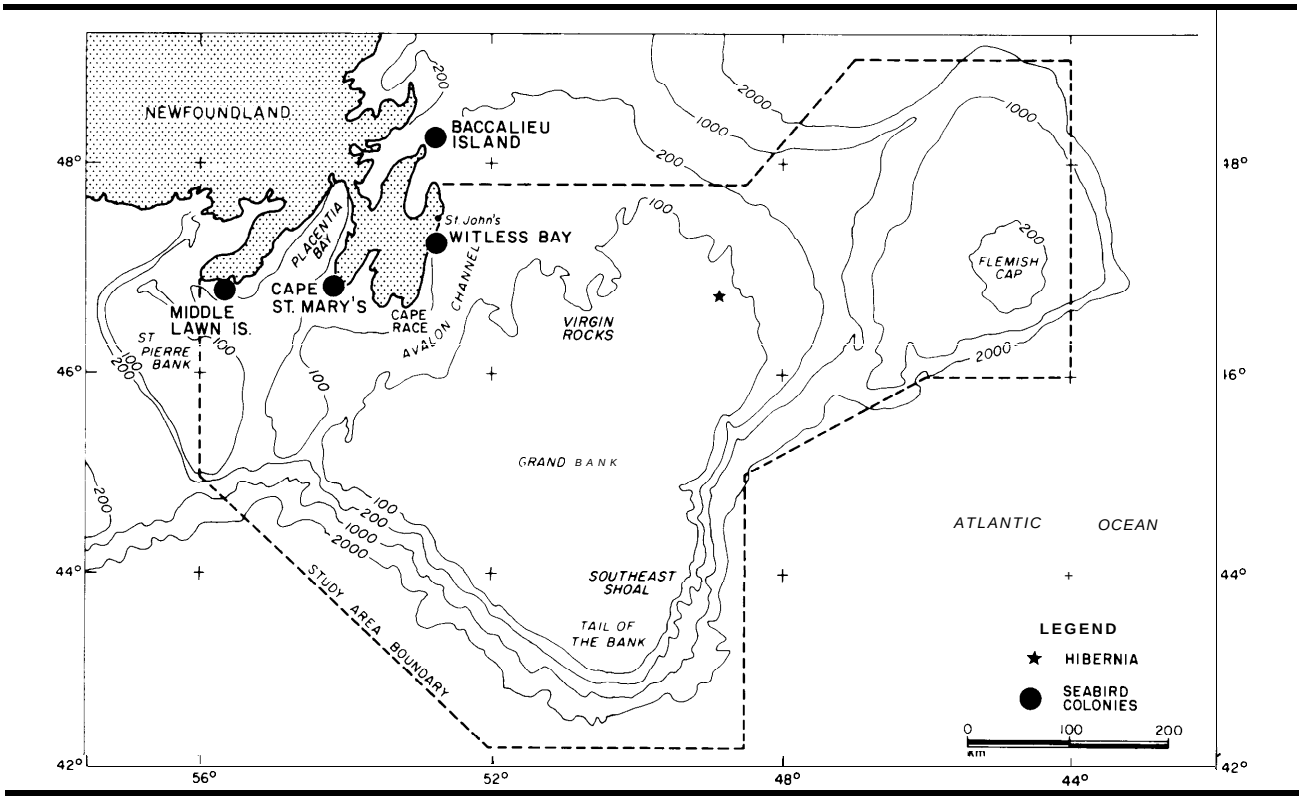
The Panel recommends that mitigative measures such as reinjection of produced water, treatment and discharge of storage water below the summer thermocline, and the use of low toxicity drilling muds should be implemented during the project.

5.2 Seabirds

The EIS identifies seabirds as the most sensitive group of animals at risk from the Hibernia project. At least 50 species of birds have been recorded in the areas of the Grand Banks and the east coast of Newfoundland. It has been estimated that "several tens of millions" of birds occupy the Grand Banks area during the course of a year. The EIS states that several large colonies located on the east coast provide nesting sites for 17 species, and the coastal and offshore waters are feeding areas for many of these birds. Mobil describes the feeding habits and geographic distribution of these seabirds.

Mobil acknowledges that an oil spill resulting from a major accident offshore could cause impacts on seabirds ranging in seriousness from negligible to major, depending on several factors. These factors include the time of year, the type of spill, and the direction and movement of the oil. The birds would be affected mainly by oiling of feathers and to a lesser extent the ingestion of oil during preening or through feeding.

Figure 7
Seabird Colonies on the Southeast Coast of Newfoundland



Source: CWS PIROP Surveys; Williams et al. (1981).

The proponent's definition of a major impact is one causing a decline of a whole species such that it would not return to its former level within several generations. Mobil does not propose any specific mitigative measures for seabirds and intends to rely on prevention of oil spills.

In written comments, DOE characterized the Grand Banks as an "ornithological crossroads" in the northwest Atlantic and noted that Canada has an international obligation to protect the seabird species using this area, in accordance with the Migratory Birds Convention. DOE found fault with Mobil's approach to assessing the impact of oil spills on seabirds, stating that there is a need to integrate seabird distribution data with predicted spill trajectories in order to add a predictive component to the assessment. DOE considers that information from past oil spills clearly shows that the degree of harm to seabirds is not directly related to the amount of oil spilled. DOE also criticized Mobil's failure to discuss the risk to seabird colonies and near-shore populations posed by large or small spills which might originate from the activity of tankers outside of the Hibernia development area.

At the public hearings, DOE presented the results of its own studies to demonstrate that there is a high risk to seabirds from both chronic and catastrophic spills and that bird populations could be reduced even beyond the life of the Hibernia project. DOE supported prevention of spills as the best option to deal with the potential impacts.

The Panel concludes that large numbers of seabirds could be killed in the event of an oil spill and prevention is the best option to deal with this possibility.

"CWS believes that the only real counter to the oiling of seabirds is prevention."

Richard Brown
Environment Canada/Canadian Wildlife Service

5.3 Fisheries

The fisheries have been the backbone of the Newfoundland economy for more than 400 years. During this period the Grand Banks has been an important fishery area for many nations. Since 1977, when Canada declared its 200 mile economic zone, it has had control over most of the fish stocks of the Grand Banks. On extending its jurisdiction, Canada undertook an international responsibility for protective regulation and conservation of resources.

"The challenge facing DFO, and government generally, is to ensure that new economic opportunity, resulting from offshore hydrocarbon development on the Grand Banks, is not exploited at the expense of an industry that has been the economic and social mainstay of the region for generations"

Bob Wiseman
Fisheries and Oceans

Fishing continues to be extremely important to the Newfoundland way of life. Several hundred small coastal communities depend for their very existence on fishing and associated activities. Fishing and processing provide approximately 43 000 jobs, out of a total provincial labour force of 235 000. Canada is the world's largest exporter of fish and Newfoundland contributes over one-quarter of Canada's total catch.

If properly managed, there is good prospect of maintaining abundant fishery resources for the foreseeable future. The introduction of oil development as a new major industry is, therefore, a special charge to Canada's responsibility for the Grand Banks.

5.3.1 Impacts of Oil Spills

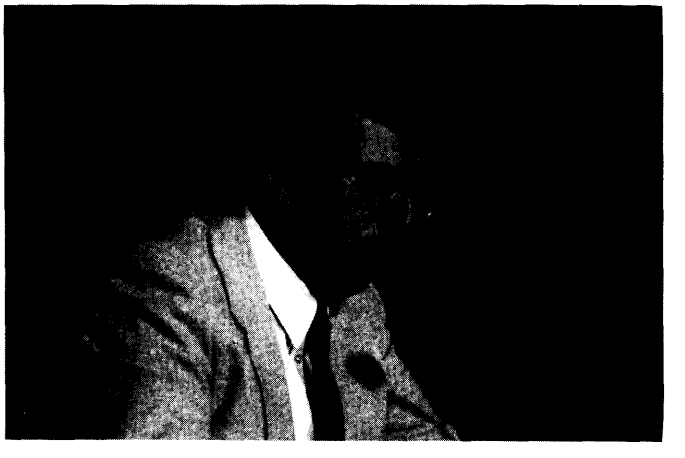
Mobil states in the EIS that an oil spill at the Hibernia site might cause some contamination of fish catches and might also result in fouling of fishing vessels and damage to fishing gear. Mobil also states that there might be temporary loss of access if a fishing fleet had to be displaced from an area affected by an oil spill. In that event Mobil would monitor the progress of the slick and provide the information to governments and the fishing industry.

In its submission to the Panel, DFO noted that it may be difficult for fishing vessels to relocate to other areas in the event of an oil spill because of the system of company quotas and the shifting of fish populations. DFO stated that the impact of such disruptions on fish processing companies (especially operators of seasonal plants) had not been addressed.

"Given the present system of "enterprise allocations" (i.e., *company quotas), relocation of vessels to other grounds is not feasible. We feel that Mobil Oil has failed to address this concern in the EIS, e.g. by neglecting to specify the resulting impact of spills on the fishery in our area, and particularly its effect upon the seasonal processing plants which represent the backbone of employment in our region."*

Geraldine Kavanagh
Southern Shore Development Association

At the public hearings, DFO and several municipal and fisheries-related organizations expressed concern that the EIS is optimistic on the subject of oil spills and understates the seriousness of their potential impacts on the commercial fisheries. DFO said that the possibility of tainting of the catch is a real issue and recommended that Mobil be required to reassess the potential impacts and to make a specific commitment to compensation in this regard. Similar concerns



The spill may cause little or no damages, but the damage may be inflicted by market perceptions about the quality of the product. Since the Newfoundland fishery is currently engaged in breaking new ground in marketing quality and new product lines, a large spill could spell disaster. Declining market shares could be accompanied by lower prices, which will affect the viability of boats and plants, causing lay-offs and eventually bankruptcies."

Earle McCurdy
Newfoundland Fishermen Food and Allied Workers Union

about tainting were voiced by municipal authorities and fishery interests. Fears were also expressed over possible loss of markets caused by tainting or by public apprehension about tainting which might follow a spill.

In response, Mobil disagreed with DFO's opinion on the seriousness of the impacts of a major spill. Mobil stated that it believes that tainting of the fish catch will not be a widespread problem. There is no record, said Mobil, of significant tainting from any offshore blow-out. At the same time, Mobil noted that there are no established standards for fish tainting although some studies are being conducted through the Environmental Studies Revolving Fund (ESRF).

Several intervenors noted comments which DFO had made regarding possible impacts on larval fish and benthic organisms and called for reassessment of the over-all impacts on the fish resource. However, the majority of intervenors felt that disruption of fishing activity would be a more serious concern than stock damage.

The Panel concludes that the major impact resulting from an oil spill would be disruption of fishing rather than effects on fish stocks. Delineation of the area from which fishing would be excluded in the event of a spill will be a difficult task, given that the present knowledge of the exposure required for fish tainting is limited and that the oil spill may extend in an irregular manner over large areas,

In the event that an oil spill were to occur in the inshore area, severe localized damage to fish populations, especially shellfish, might result. A further concern is the question of processing plants which could be affected through interruption of fish supply resulting from either an inshore or offshore spill. Methods of dealing with these possibilities are further addressed in Section 5.3.4.

The Panel notes that rapid adjustment of the fishery may be necessary to minimize damage in the event of an oil spill. The full co-operation of the oil industry and government agencies having the capability to track oil spills will be absolutely essential. Failure to have a plan of action ready will lead to over-reaction given public sensitivity on this matter.

The Panel recommends that DFO should develop a contingency plan for the administration of selected temporary fishery closures in the event of an oil spill. Accurate tracking of the spill together with consultation with the fishing industry will be required.

5.3.2 Loss of Access to Fishing Areas

Mobil proposes that an offshore exclusion zone be established within which only project-related vessels will be permitted. The official exclusion area would measure approximately 8 km x 13 km, but Mobil predicts that the effective unfished area would probably measure approximately 18 km x 23 km due to voluntary avoidance of the official exclusion zone. The region of the development is an important plaice-fishing ground. According to Mobil, the plaice which might normally be caught in this effective exclusion area would represent about one per cent of the Canadian quota for this species from the Grand Banks. Fishing activity would be displaced rather than lost, in the proponent's opinion.

During the public hearings, fisheries interests expressed concern about potential loss of access to offshore fishing grounds. Mobil's figures on the use of the Hibernia area by trawlers were thought to be based on inadequate data. The precedent that would be created for additional offshore developments was also an issue and the feasibility of displacement of fishermen to other areas was questioned. Further study and compensation were suggested to deal with the loss of access issue.

The Panel notes that existing safety regulations require vessels to stay 500 m away from a rig's anchor pattern and that some written information provided to communities during the Hibernia review indicated that the exclusion zone for Hibernia production would be of this order. However, the exclusion area now requested in the EIS is much larger to provide for facilities to develop the Avalon reservoir.

"F P I. considers that it is of utmost importance to agree to the principles of exclusion at the outset of planning the development of Hibernia. We see the prospect of even larger exclusion zones, consequently we are extremely concerned that this will further hamper us from harvesting economically.

Hibernia is positioned in N.A. F.O. sub-area 3LT/327. This area, over the past five years, has contributed 5% to 11% of total flatfish catch annually. It yields the highest quality flatfish in area 3L and, consequently, is strategic to our operating and marketing programs. "

Vic Young
Fisheries Products International

The Panel concludes that the size of the offshore exclusion zone is of concern because of its significance to the fishing industry.

Burial of flowlines, production manifolds and wellheads has been suggested in a previous section. The Panel notes that

burial could permit fishing within at least part of the proposed exclusion zone.

The Panel recommends that further examination should be undertaken of the 8 km x 13 km exclusion area by the Canada-Newfoundland Offshore Petroleum Board in consultation with the fishing industry.

Mobil also acknowledged that some fishing activity might be excluded inshore due to construction of the GBS. Inshore fishermen maintained that it would be very difficult or impossible to relocate as alternate locations are not generally available. The fishing industry claimed prior right to the areas of fishing grounds and challenged Mobil to present meaningful mechanisms to deal with this situation.

An alternative to the recommendation regarding offshore loss of access, and perhaps the only option for inshore loss of access, would be to prepare a compensation scheme. This is discussed further under Section 53.4.

5.3.3 Debris

Much of the offshore fishery on the Grand Banks and some of the inshore fishery use bottom trawling gear. The presence of debris on the sea-floor could seriously interfere with these activities. Mobil claims that since fishing vessels will be excluded from the drilling area and there is very little loss of materials from supply vessels, the incidence of such gear damage is likely to be low. The EIS states that recent observations confirm that oil industry housekeeping practices have improved. With regard to inshore areas, Mobil says that the loss of deck cargo from vessels moving materials between rigs and shore bases has been minimal.

During the public hearings, the Panel heard from a number of intervenors concerned with the potential hazard to trawlers from debris. It was noted that debris had been a problem in the North Sea and suggestions were made for strict regulations and enforcement together with notification where debris was present.

The Panel concludes that damage to fishing gear could result from debris during construction and operation of the project unless effective preventive measures are implemented.

The Panel recommends that preventive measures be rigorously enforced by government and the proponent during the life of the project in order to minimize damage to fishing gear by debris. If, in spite of the preventive measures, regular damage still occurs, inspection and clean-up might be necessary.

The issue of handling of claims for damage caused by debris is discussed in Section 5.3.4.

5.3.4 Compensation

In the EIS Mobil discusses the subject of compensation to fishermen under two headings. In the case of petroleum-related damages such as those caused by debris where the responsibility is unattributable (i.e., the company cannot be identified), compensation will be from a fund operated voluntarily under. a policy adopted by the petroleum industry. Where damage from either oil spills or debris is attributable to a particular company, compensation will be paid by the offending operator as required by legislation. Mobil states that it is developing a company compensation policy to comply with the legislation and foresees procedures similar to those provided for unattributable damage.

DFO noted that Mobil's commitment to compensation is too general and several fishery-related organizations agreed with DFO that there must be a comprehensive compensation/liability plan to cover loss or damage to livelihood, income or property of individuals and businesses. A fisheries group suggested that one agency be established to deal with claims related to any and all damage, whether attributable or not, as this would be a simpler system for fishermen.

"We believe that 'fish and oil can work side by side'. We would again affirm our pledge to work cooperatively with the fishing Industry as we have done in the past in sharing the resources of the Sea. There are still issues surrounding the fisheries compensation policy that need to be settled. Mobil, through the Industry Fishery Advisory Committee, will take the initiative in opening further discussion on these matters with the fishing industry."

Wes Abel
Mobil Oil Canada Ltd.

Many intervenors asked for clarification regarding compensation for loss of access to fishing grounds whether at the Hibernia site or at an inshore location. In response Mobil stated that there has been no provision in Scotland or Norway for compensation to the fishing industry for damages due to loss of access to fishing grounds. Mobil said that if it cannot arrange mutual avoidance with inshore fishermen it will consider compensation for lost fishing time or lost fishing opportunity.

Another item of lively discussion was the question of compensation for induced damages which might be suffered by the fish processing sector. It was pointed out that there is a direct link between fish harvesting and the viability of the fish

"Most of the fishermen will be affected, to some degree, by this project, especially by the restriction of the Bread and Cheese Islands site since it is the most lucrative fishing ground in the area. We feel that if we are interfered with in any way that would prevent us from pursuing the fishery in the usual and traditional manner, we should be compensated."

Earle Johnson
Fishermen of the Come By Chance area

processing plants, though the EIS does not discuss losses to the processing sector. Intervenors proposed that compensation be paid to plant operators and workers for loss of income.

Mobil responded that the matter of compensation to plant owners for induced damages is being discussed with fishing interests. It went on to say that it would be willing to consider compensation even to an independent plant operator. In summarizing its approach to compensation, Mobil stated that it would be willing to consider compensation where there was demonstrated economic loss.

The Panel notes that under The Atlantic Accord a compensation scheme is to be established for damage caused by attributable oil spills and debris. The Canada-Newfoundland Offshore Petroleum Board is also to monitor industry compensation schemes for damages of a non-attributable nature.

The Panel concludes that compensation schemes are presently limited to dealing with specific oil spill and debris damages. No comprehensive scheme exists to address the full range of potential economic damage under all circumstances, including loss of access and induced effects on the processing sector.

The Panel recommends that the government should establish a comprehensive policy of compensation for various types of potential economic damage to fisheries interests prior to project commencement. This should establish simple standardized procedures for all types of potential economic damage including matters such as induced effects on the processing sector and loss of access to fishing grounds.

5.3.5 Interaction of Vessel Traffic

In the EIS, while no effects were predicted in St. John's and limited traffic interference at Argentia, a direct concern in the Come By Chance area was noted. There was also discussion about possible vessel traffic problems offshore.

Fishermen in the Come By Chance area expressed anxiety about the possibility of having their fishing activities near Bread and Cheese Islands restricted by the movements of Hibernia-related vessel traffic. The fishermen recommended that all marine traffic lanes should be clearly marked and their use enforced. The importance of vessel traffic control in Placentia Bay was highlighted in other presentations which noted the value of retaining the Vessel Traffic Services centre at Argentia.

Intervenors also noted the possibility of problems offshore and stated that consultation with the fishing industry is essential in the proper planning of vessel traffic management.

The Panel concludes that vessel traffic conflicts in Placentia Bay could be minimized by the use of the Vessel Traffic Services facility located at Argentia.

The Panel recommends that the government should maintain the Vessel Traffic Services facility at Argentia throughout the construction phase of the project and the petroleum industry should consult with fisheries interests on the establishment of vessel traffic lanes in Placentia Bay and offshore.

5.3.6 Aggregate Sources

Mobil is considering use of an aggregate deposit located at Piper's Hole River just west of Swift Current. Mobil would use the aggregate for construction of the GBS at Adams Head.

Concern was expressed over the possible barging of the aggregate from Piper's Hole to Adams Head and associated dredging in the river mouth. Possible harm to the shellfish resources of the area and to the salmon run were cited. The alternative of trucking was of concern to the community of

Swift Current unless a road was built to avoid the community. Mobil stated that Piper's Hole was only one of several aggregate sources being examined.

The Panel **recommends that examination of potential sources of aggregate for GBS construction should take into account possible environmental effects and that any quarry operation should include appropriate environmental protection measures.**

5.4 Abandonment

The EIS guidelines required Mobil to discuss its plans for abandonment of the project including the proposed disposition of facilities, equipment and any contaminants stored or contained in the area, as well as the reclamation and stabilization of the area.

In the EIS Mobil outlined its plans for abandonment of the production area in order to leave it in a "fishable" condition. The most notable items are: removal of useful equipment from the GBS which would be left in place with navigation aids installed; removal of the ALP column and head assembly, leaving the ALP base on the sea bottom; and the flushing and sealing of seabed pipelines. Mobil predicts that biophysical impacts will be mostly negligible or non-existent during and after abandonment.

In its written submission DFO was concerned that the seabed within the fishery exclusion zone may not be fully restored. It was noted that there appears to be no commitment to recover all components, to restore the topography, or to consider the removal of the GBS.

At the public hearings many groups agreed with the concerns expressed above. These intervenors felt that the seabed topography should be restored to a condition resembling the natural pre-development state as closely as possible and that all sub-sea components should be removed. It was suggested that the latter should include serious consideration of removal of the entire production platform as it could create a serious hazard to shipping if not properly maintained. It was claimed that a permanent loss of the fishing grounds within the exclusion area, because of the possibility of snagging of fishing gear, would not be acceptable to the fishing industry and would create a dangerous precedent for future developments.

The Panel recommends that the entire development area should be restored to a "fishable" condition upon abandonment of the project.

The Panel concludes that there may be temporary advantages to the use of the GBS for navigation, rescue or other purposes after completion of the Hibernia project, but long-term deterioration of the structure may require continuous maintenance or eventual removal if it is not to become a hazard.

The Panel recommends that the GBS should be designed in such a way that it could be refloated and removed if necessary.

5.5 Monitoring

The EIS guidelines required the proponent to provide information and baseline data prior to construction and to monitor during and after construction and start-up, any potential environmental effects within certain specified categories.

The EIS outlines world experience in environmental monitoring. Mobil states that the key elements for monitoring at Hibernia are a list of contaminants or disturbances of concern, a list of the most important or most at-risk components of the ecosystem, and the probable "zone of influence" in time and space. The wastes which may cause greater than negligible impact, according to Mobil, are produced water, storage displacement water and oil-base mud cuttings. The potential contaminants contained in these wastes are petroleum hydrocarbons and persistent and synthetic chemicals.

Mobil feels that the important receptors of contaminants are in the sediments and the sessile biota, so monitoring efforts should be concentrated there. The design of the monitoring program will be influenced by the outcome of studies planned by governments and industry, several of which are now in progress, e.g., under the ESRF.

Several written submissions to the Panel severely criticized Mobil's approach to the subject of effects monitoring, stating that the plans should have been more specific. The intervenors considered that sub-lethal effects should be monitored, that fish and birds should be included in the studies, and that effects of episodic events should be addressed as well as long-term impacts.

In its August Information Request, the Panel asked Mobil to discuss the structure and means of monitoring environmental project-related impacts which the company would consider within its area of responsibility.

'Effects monitoring programs should be sensitive enough to measure not only mortalities, but also the increasing stress that is placed on the environment. ''

Jim Osborne
Environment Canada

In its response, Mobil cites a recent ESRF report on monitoring. The company states that it supports the findings of the report and that it will seriously consider the suggested monitoring strategies. The proponent states that the final design of the monitoring program will follow final facility and engineering design and the monitoring design will be developed in consultation with the appropriate government agencies. Mobil adds that an effects monitoring program can and will be implemented promptly if a spill or blowout occurs.

Government agencies, noting that the ecosystem of the Grand Banks is poorly understood, advocated the preparation of an effects monitoring plan to address the uncertainty associated with Mobil's impact predictions. This plan should make it possible to verify impact predictions, detect changes, evaluate the adequacy of regulated discharge requirements, and define corrective measures. DOE felt that the continued collection of baseline information prior to development would be an essential element in this process.

A number of groups supported the government agencies' approach and expressed a desire to be involved in the monitoring process.

The Panel recommends that a monitoring plan should be developed taking into account the viewpoints of the responsible government agencies and allowing for publication of results. The government agencies should consult with interested public groups concerning the monitoring program.

6.0 WORKER SAFETY

Mobil indicates in its EIS that it intends to complete a comprehensive safety program prior to commencement of construction activities. The program will be intended to prevent or mitigate all forms of accidental losses, including damage to physical property, bodily injury, and illness or fatality. Mobil states that accident prevention and mitigation will be directed towards all persons who could be affected, including Mobil employees, contractor personnel, and the general public. Mobil also indicates that its offshore contingency plan will monitor potential problems and mitigate potential harmful effects.

Although the Panel received few submissions about worker safety a number of important issues were raised. These included regulatory regimes and reporting systems for worker safety, the need for a functional emergency evacuation system, and search and rescue capabilities.

At the public hearings, COGLA stated that safety is a high priority for both the federal and the provincial governments. It indicated that a government task force is studying the recommendations of the Ocean Ranger Royal Commission and has received a mandate from the government to implement every recommendation that is feasible. It also stated that funds are being allocated to further research efforts on offshore safety. COGLA stressed that safety will be emphasized in the design and operation of the project, with state-of-the-art technology and thorough training and supervision for all personnel.

'Surely, safety is the responsibility of all concerned Safety cannot be the monopoly of one, single, interest group. It is to be shared by all, from the highest politician n the land to the lowliest of workers, within a regime which clearly delineates the boundaries of responsibilities for the various interest groups. ''

Cle Newhook
Ocean Ranger Foundation

The Panel notes that the issue of worker safety offshore has been extensively examined by the Ocean Ranger Royal Commission. The Panel therefore believes that it would be redundant to advise government in any degree of detail on this issue. The installation of a GBS structure will result, however, in a change in operational circumstances which should be taken into account.

The Panel considers that the GBS could be of assistance to search and rescue operations in the area and that the need for evacuation due to environmental forces will be rendered unlikely by appropriate design. However, the possibility of a blowout or a fire still exists. The Panel also notes the need to provide for evacuation from moored storage vessels.

The Panel therefore recommends that functional project evacuation systems should be provided prior to production commencment.

The Panel notes that while offshore safety is of great public concern, there will also be a large number of workers exposed to risk of industrial accident during the construction phase of the project.

The Panel concludes that an equal degree of attention should be paid to safety during production offshore and construction onshore.

The Panel recommends that measures for prevention of accidents and prompt medical treatment of workers both onshore and offshore should be an integral part of project planning.

The Panel further recommends that measures should be taken to ensure that it is clear which regulatory regime applies during the different phases of the construction and operation of the project and that workers are aware and encouraged to use procedures for reporting poor safety conditions.

7.0 PROCESS RELATED COMMENTS

The Environmental Assessment Review Process itself was the subject of some discussion at both the information meetings and during the public hearings. Review participants pointed to a number of areas of concern where the process could have been enhanced and made more comprehensive. The primary issues were: the mandate of the Panel; the timing of review activities; intervenor funding; and the availability of information and continuing public involvement.

The Panel's mandate and the scope of its review were the subject of concerns expressed by a number of intervenors who felt that relevant issues could not be thoroughly explored during the review. Questions of cumulative impact assessment, project economics and a meaningful analysis of costs and benefits were cited as examples.

In contrast to these broad issues some participants in the process requested more information than was available through the EIS review. In some cases this was information that would be contained in the development plan which was not publicly available.

Under the terms of The Atlantic Accord there is a provision for the Board to appoint a panel to hold public hearings which would deal with a development plan submitted by a proponent. The Panel notes that in such a case the terms of reference to be established will permit a comprehensive review of the project, including aspects which fall within the jurisdictions of both the federal and provincial governments. The development plan would also provide additional detailed information that was not available through the EIS review.

The Panel concludes that The Atlantic Accord provides for a review more extensive in scope than was permitted under the terms of reference for the Hibernia Environmental Assessment Panel.

The Panel recommends that governments should consider establishing terms of reference of future panels which would permit a more comprehensive review of further off shore developments, including aspects falling within the jurisdictions of the governments.

Many review participants stated that they felt effective participation in the review was limited by the tight review schedule. On the other hand, the governments wished to have the Panel's report in time for consideration in its decision with respect to the proponent's development plan. Under the terms of The Atlantic Accord the Board must render a decision within 270 days from the receipt of the plan.

The Panel notes that the short time allowed for the review of this project imposed significant constraints both on the Panel and review participants.

The Panel recommends that a one-year time frame (not including any time required to obtain any new information from the proponents) should be allowed for the review of projects of this magnitude and importance.

The question of intervenor funding and complaints about the allocation of funds was an issue raised frequently during the review process. Shortly after the information meetings the province provided a total of $50 000 to thirteen groups to enable them to intervene before the Panel. The Secretary of State made money available to assist with transportation and communications costs related to community issues. Through this program $78 750 was given to six volunteer organizations over the past year. While not directly related to the review process additional funds were made available to organizations to hold workshops and provide information directly related to Hibernia issues.

Although the Panel did not have authority for intervenor funding, it sought other ways to assist the public in reviewing and understanding the often complex and voluminous quantity of data submitted by the proponent. To this end the Panel organized information meetings in ten Newfoundland communities in June, issued a newsletter, developed an extensive mailing list of over 1 100 names, and made available the expertise of eight technical advisers.

The general level of knowledge about the project and the number and quality of presentations received by the Panel appear to reflect the value that funding of intervenors, information programs and workshops have contributed to the review. The participation in this review appeared to be far greater than that of other reviews of this nature for which funding is not normally provided.

The Panel concludes that funding of public participation in this review materially benefitted the process by increasing the number and quality of presentations and the general level of knowledge.

The Panel recommends that intervenor funding should be provided for future offshore projects but that an impartial committee should establish criteria for funding eligibility and decide on its allocation.

Now that the Panel review process is complete the question of what happens next must be addressed. During the public review a considerable amount of information was exchanged by participants, many of whom recommended that public, government and industry dialogue continue prior to and during the project. In preparation for the review the proponent participated in a number of community consultations and made a commitment to continue to do so after the review.

Government agencies and interest groups expressed the ongoing need for further review of this project. In addition the need for strategic planning for the Grand Banks area was noted as a means to minimize resource development conflicts and facilitate decision-making in an area subject to multiple use and increasing development. The need for planning, monitoring and a comprehensive system to enable proper and controlled development at Hibernia was frequently expressed. Thus, on one hand, intervenors wished to be provided with more information on the Hibernia Project as it became

available while, on the other hand, they were also interested in a process that would be forward-looking and anticipatory.

The review of this individual development project does not permit conclusions to be made on the possible cumulative impacts that may occur if further offshore developments are proposed. However, review of future developments should take into account that effects will be additive to those occurring due to Hibernia.

The Panel recommends that research under the Environmental Studies Revolving Fund should be carried out to assist government in examining strategic issues for area-wide planning of offshore development.

The Panel also concludes that it would be of considerable value for the proponent, government and the public to continue the discussions which occurred during this review.

The Panel recommends that the Offshore Petroleum Board should establish suitable mechanisms to ensure a continuing exchange of views between itself, government agencies, the proponent and the public during the life of the project.

The Panel further concludes that although regulators must be satisfied with the project design, the input of appropriate agencies such as DFO and DOE would be desirable because of their special knowledge of the hazards of this particular environment.

The Panel therefore recommends that the Offshore Petroleum Board should consider means by which agencies having related mandates are permitted to examine relevant technical data and design criteria.

The Panel has not considered it appropriate to enter into a detailed discussion of the mechanisms, such as environmental protection plans and committees, by which its recommendations should be implemented. The Panel believes that such matters can be most effectively addressed between the parties through the ongoing leadership of the Board.

However, the Panel recommends that government should develop an overall strategy for implementation of these recommendations with appropriate funding levels and sources, such as the Offshore Development Fund.

Under its mandate the Panel's role was to examine alternative development proposals contained in the proponent's EIS with emphasis on the preferred alternative. However, while participants wished to extend the scope of the review in many areas, they did not offer any comments on the floating production system during the public hearing nor did the proponent offer additional information to that contained in the EIS.

In view of the lack of information and discussion of this option the Panel is unable to offer any recommendation to government on how the project might proceed using a floating production system. If such a proposal is submitted to government in the future it would have to be considered as a separate project.

8.0 SUMMARY OF CONCLUSIONS

The Panel concluded that:

1. the project could provide significant employment opportunities for Newfoundland workers;

2. certain specialized positions will require skills and experience not now available within the provincial workforce nor readily attainable through training prior to the project proceeding:

3. estimates of the number of workers required during developments such as Hibernia may be subject to considerable refinement as the project proceeds. There is a need for the proponent to provide timely information on job opportunities (numbers, types and required training level) as the design and construction schedule becomes more refined;

4. local preference could be a contentious issue and a government policy on local hiring will be necessary to avoid problems during the project;

5. appropriate training, both on-site and institutional, should maximize long-term employment opportunities for Newfoundlanders;

6. it is unlikely that the project will cause undue competition for Newfoundland workers, but limited movement of the workforce from other industries may occur in some specialized sectors;

7. there are few women currently employed offshore and this fact is of great concern to women's groups. This project provides an opportunity to address the issue;

8. a comprehensive agreement between governments and the proponent is necessary to ensure maximization of Canada and Newfoundland industrial benefits;

9. Marystown is likely to experience economic growth resulting from opportunities created by the project;

10. the indirect and induced effects of the project will provide significant entrepreneurial and employment opportunities in Newfoundland;

11. the consequences of population increases during the project can be managed provided that appropriate mitigative measures are implemented:

12. the rental housing supply in St. John's is likely to be inadequate to meet the demand during the project and the competition for the available units is expected to induce a severe impact on low or fixed income groups;

13. there may be an increase in demand for housing of transients which could exceed the capacity of existing and presently planned facilities;

14. temporary accommodation for families in the Come By Chance and Argentia areas can be provided without causing severe local housing shortages;

15. careful planning of the infrastructure requirements of areas affected by the proposed development is required prior to the project proceeding. Full consultation among the proponent, government and local representatives is required;

16. induced demands for office space in St. John's could increase existing pressures for redevelopment of areas of architectural heritage;

17. the project could exacerbate social problems within Newfoundland unless the social services system, now severely stressed, is adequately funded;

18. there is a need for a social impact management system that will be responsive to local concerns and capable of responding quickly. The provision of timely information by the proponent will be an essential element of such a system;

19. although construction and operation of work camps could potentially have a significant social impact on nearby communities, well designed and well run camps can minimize potential problems;

20. it is probable that an iceberg will collide with the GBS during the life of the project. The Panel is satisfied that the design concept presented by the proponent is capable of withstanding such an event. However, it is reasonable to expect that the articulated loading platforms could be seriously damaged by extreme ice conditions;

21. since it is likely that an unprotected pipeline, production manifold or well-head would be subject to damage from iceberg impact, a conservative protective approach (such as burial) should be taken in order to prevent oil spills;

22. an effective ice management system will reduce the risk of significant pollution incidents or loss of human life resulting from damage to the articulated loading platforms, seabed installation or shuttle tankers. A major weakness in the present system is in the detection and management of ice under adverse weather conditions;

23. there remains concern that the offshore wave climate may be underestimated in the GBS design;

24. complete and timely information on weather conditions will be of utmost importance to the safe and effective operation of the project;

25. there is a significant chance of a blow-out during the life of the project. However, there is a greater likelihood of batch spills during storage or transfer, due to the difficult climatic conditions of the site, and this may constitute a more serious ongoing threat to the environment;

26. while the exact mechanics of the movement of an oil spill from the Hibernia site is a subject of debate, dispersion offshore is likely in most instances;

27. the tanker transport of Hibernia oil would create increased traffic in environmentally sensitive areas. Even with the special tankers to be built for the project, the risk of an oil spill may be increased above that which now exists;

28. present capabilities for oil spill clean-up offshore are severely limited by the harsh environmental conditions at the Hibernia site:

29. effective technology exists to treat operational discharges during the life of the project;

30. large numbers of seabirds could be killed in the event of an oil spill and prevention is the best option to deal with this possibility;

31. the major impact resulting from an oil spill would be disruption of fishing rather than effects on fish stocks. Delineation of the area from which fishing would be excluded in the event of a spill will be a difficult task, given that the present knowledge of the exposure required for fish tainting is limited and that the oil spill may extend in an irregular manner over large areas;

32. the size of the offshore exclusion zone is of concern because of its significance to the fishing industry;

33. damage to fishing gear could result from debris during construction and operation of the project unless effective preventative measures are implemented;

34. compensation schemes are presently limited to dealing with specific oil spill and debris damages. No comprehensive scheme exists to address the full range of potential economic damage under all circumstances, including loss of access and induced effects on the processing sector;

35. vessel traffic conflicts in Placentia Bay could be minimized by the use of the Vessel Traffic Services facility located at Argentia;

36. there may be temporary advantages to the use of the GBS for navigation, rescue or other purposes after completion of the project but long-term deterioration of the structure may require continuous maintenance or eventual removal if it is not to become a hazard;

37. an equal degree of attention should be paid to safety during production offshore and construction onshore;

38. The Atlantic Accord provides for a review more extensive in scope than was permitted under the terms of reference for the Hibernia Environmental Assessment Panel;

39 the short time allowed for the review of this project imposed significant constraints both on the Panel and review participants;

40. funding of public participation in this review materially benefitted the process by increasing the number and quality of presentations and the general level of knowledge;

41 it would be of considerable value for the proponent, government and the public to continue the discussions which occurred during this review;

42 although regulators must be satisfied with the project design, the input of appropriate agencies such as DFO and DOE would be desirable because of their special knowledge of the hazards of this particular environment.

9.0 SUMMARY OF RECOMMENDATIONS

The Panel recommends that:

1. government should establish, and the proponent be required to meet, realistic goals for Newfoundland employment on the project. Emphasis should be placed on long-term jobs in the production phase and jobs developing skills transferable to future projects;

2. the proponent should regularly provide to government a detailed updated list of projected job opportunities as the planning of the project evolves;

3. a policy on local hiring should be adopted by the government prior to construction. A local hiring office should be established for the benefit of local residents. Hiring for workers outside the local area should occur at centres elsewhere in the province;

4. any requirement for union membership should not give non-residents preference over qualified Newfoundlanders wishing to work on the project;

5. a comprehensive training strategy, including both institutional and on-site components, should be developed for this project and concentrate on areas of greatest long-term benefit;

6. government should take into account the possibility of limited labour force displacement from fisheries and shipbuilding in its training strategy for the project;

7. opportunities for increased employment of women offshore should be addressed through overall government policy and project-specific employment requirements:

8. a plan establishing targets for Canada and Newfoundland industrial benefits should be agreed upon by governments and the proponent prior to project commencement and should be closely monitored throughout its life. Critical elements which should be included are the timing and size of contracts, technology transfer, application to sub-contractors and the need for on-going consultation to ensure awareness of project opportunities;

9 the proponent should continue discussions with Marystown to establish the extent and nature of the town's participation in the project and ensure orderly development;

10 appropriate training and assistance to small businesses should be provided to maximize benefits from the induced and indirect effects of the project;

11 timely information on expected population influxes should be provided continuously by the proponent and its contractors to appropriate authorities to allow them to provide necessary services;

12. special measures should be taken to increase the supply of rental housing in St. John's with particular emphasis on providing more units for low or fixed income groups. Existing programs should be expanded by use of the Offshore Development Fund;

13. government should monitor the demand for owner-occupied housing in St. John's to ensure that sufficient lots are available to meet the demand and avoid unnecessary inflation;

14. planning should begin on the provision of additional facilities for transients in the St. John's area;

15. discussions should occur between the proponent and local governments in the Come By Chance and Argentia areas concerning the numbers and types of temporary family housing units that will be required;

16. full consultation should take place prior to development to identify necessary improvements to Impact area infrastructures. Both the proponent and government agencies should involve local representatives in discussions on requirements;

17. appropriate authorities should institute adequate controls and, if necessary, provide incentives from the Offshore Development Fund, to encourage preservation and restoration of areas of architectural heritage in St. John's;

18. the Offshore Development Fund should be used to provide adequate social services in areas affected by the development. Funding should be provided prior to, during and after the life of the project;

19. community impact agreements should be developed for areas directly affected by the project. These should address housing, infrastructure and social services requirements. Such agreements would provide a written understanding of the division of responsibilities among senior levels of government, the proponent and local authorities. They would also establish the basis for funding monitoring and data collection and provide for arbitration of disputes that may arise during the project;

20. work camp location and access should be discussed with local communities prior to site work commencing;

21. work camps should provide recreation facilities, medical and counselling services and other requirements determined following consultation with the workforce and local communities;

22. the ALPs should be designed to ensure that oil spills are avoided in the event of failure of system components or the structure itself:

23. complete protection of subsea components, by measures such as burial, should be considered for protection against iceberg impact;

24. an effective ice management system should be an integral component of the project. Research and development to improve the ability to detect and manage ice under adverse weather conditions should be undertaken;

25. the structure should be built to ensure human safety and structural integrity from wave forces. In particular, the topsides and supporting structures should be conservatively designed to allow for the possibility of episodic waves;

26. the results of ongoing studies on seismicity, seabed stability and possible subsidence should be incorporated into the design of the GBS and other offshore components;

27. a dedicated weather forecasting system should be incorporated as an integral part of the project;

28. the design of tankers should incorporate all necessary features for Hibernia conditions including double hulls and ice-strengthening;

29. a mechanism should be established to ensure the safe routing of tankers in shipping oil from the Hibernia site. This must take into account the safety of the tanker and the environmental sensitivity of the area traversed, and should be done through consultation with resource managers and shipping authorities;

30. in view of the limited capability for offshore cleanup, special emphasis should be placed on prevention of offshore spills. Contingency plans should take into account both inshore and offshore impacts. In addition, research to develop effective countermeasures should be accelerated by the industry and government;

31. mitigative measures such as reinjection of produced water, treatment and discharge of storage water below the summer thermocline, and the use of low toxicity drilling muds should be implemented during the project;

32. DFO should develop a contingency plan for the administration of selected temporary fishery closures in the event of an oil spill. Accurate tracking of the spill together with consultation with the fishing industry will be required;

33. further examination should be undertaken of the 8 km x 13 km exclusion area by the Canada-Newfoundland Offshore Petroleum Board in consultation with the fishing industry;

34. preventative measures should be rigorously enforced by government and the proponent during the life of the project in order to minimize damage to fishing gear by debris;

35. the government should establish a comprehensive policy of compensation for various types of potential economic damage to fisheries interests, prior to project commencement. This should establish simple standardized procedures for all types of economic damage including matters such as induced effects on the processing sector and loss of access to fishing grounds;

36. the government should maintain the Vessel Traffic Services facility at Argentia throughout the construction phase of the project and the petroleum industry should consult with fisheries interests on the establishment of vessel traffic lanes in Placentia Bay and offshore;

37. examination of potential sources of aggregate for GBS construction should take into account possible environmental effects and any quarry operation should include appropriate environmental protection measures;

38 the entire development area should be restored to a fishable condition upon abandonment of the project;

39 the GBS should be designed in such a way that it could be refloated and removed if necessary:

40. a monitoring plan should be developed taking into account the viewpoints of the responsible government agencies and allowing for publication of results. The government agencies should consult with interested public groups concerning the monitoring program;

41. functional project evacuation systems should be provided prior to production commencement;

42. measures for prevention of accidents and prompt medical treatment of workers both onshore and offshore should be an integral part of project planning;

43. measures should be taken to ensure that it is clear which regulatory regime applies during the different phases of the construction and operation of the project and that workers are aware and encouraged to use procedures for reporting poor safety conditions.

The Panel further recommends that:

44. governments should consider establishing terms of reference of future panels which would permit a more comprehensive review of further offshore developments, including aspects falling within the jurisdictions of the governments;

45 a one-year time frame (not including any time required to obtain any new information from the proponents) should be allowed for the review of projects of this magnitude and importance;

46 intervenor funding should be provided for future offshore projects but that an impartial committee should establish criteria for funding eligibility and decide on its allocation;

47. research under the Environmental Studies Revolving Fund should be carried out to assist government in examining strategic issues for area-wide planning of offshore development;

48. the Offshore Petroleum Board should establish suitable mechanisms to ensure a continuing exchange of views between itself, government agencies, the proponent and the public during the life of the project;

49. the Offshore Petroleum Board should consider means by which agencies having related mandates are permitted to examine relevant technical data and design criteria;

50. government should develop an overall strategy for implementation of these recommendations with appropriate funding levels and sources, such as the Offshore Development Fund.

The Hibernia Development Project
Environmental Assessment Panel

Philip J. Paradine,
Co-chairman

G. Ross Peters,
Co-chairman

Raoul Andersen

Kevin J. Molloy

Alfred W.H. Needler

Winnifred Roebothan-Wells

Appendices

APPENDIX A

BIOGRAPHIES OF PANEL MEMBERS

Philip J. Paradine, Co-Chairman

Mr. Paradine graduated with a BSc (Civil Engineering) and later completed an MEng (Water Resources) at the University of Ottawa.

He joined the Public Service of Canada in 1967 and has held positions as a professional engineer with Transport Canada, the National Capital Commission and Environment Canada.

In 1978, Mr. Paradine joined the Federal Environmental Assessment Review Office (FEARO) and until mid 1985 he was Director of FEARO's Atlantic Region. Included among the Panels he has chaired are the Lower Churchill Hydro Project in Labrador and the Sable island Gas Project in Nova Scotia. He is currently a senior manager with the Ministry of State for Science and Technology, specializing in government and university research issues.

G. Ross Peters, Co-Chairman

Born in Springdale, Newfoundland, Dr. Peters received a BSc and Engineering Diploma from Memorial University of Newfoundland (1960), a BASc from the University of Toronto (1962) and a PhD from Aberdeen University, Scotland (1971).

Dr. Peters is a professor and Dean of the Faculty of Engineering and Applied Science at Memorial University. He was chairman of the Ocean Engineering Research Group from 1975 to 1980, and Associate Dean of Engineering from 1976 to 1982.

During the 1960s he conducted fish handling and processing research at the Torry Research Station (Aberdeen) and various locations in Newfoundland, continuing fisheries equipment research at Memorial up to 1975. He has participated in ocean engineering sea trials and has published papers on icebergs, sea ice and fisheries.

Dr. Peters is a former president of the Association of Professional Engineers of Newfoundland, and has served on many faculty and professional committees.

Raoul Andersen

Dr. Andersen graduated with a BA from Knox College in 1958, completed an MA (Sociology) at Emory University in 1964 and obtained a PhD (Anthropology) from the University of Missouri in 1968.

From 1959 to 1967 Dr. Andersen held positions as an instructor in anthropology and sociology at various universities in Canada and the United States. Since 1967 he has been a consultant and researcher in social studies of Newfoundland and other east-coast fisheries.

During 1976-77 Dr. Andersen served as a science advisor to the chairman of the Fisheries Research Board of Canada. He is currently a professor and department head (Anthropology) at Memorial University of Newfoundland, specializing in studies of the fishing workforce and communities.

Dr. Andersen has written numerous papers relating to the social aspect of the fisheries industry.

Kevin J. Molloy

Father Molloy was born in St. John's and received a BA (English) from Iona College, New Rochelle, New York, an MA (English) from St. Francis Xavier University in Antigonish, Nova Scotia, an MA (Theology) from Gonzaga University in Spokane, Washington, and has completed studies towards a PhD at St. Louis University in St. Louis, Missouri.

Father Molloy was a teacher for 20 years and is past principal of St. Louis College, Victoria, British Columbia and Brother Rice High School in St. John's, Newfoundland. He is the immediate past president of the Newfoundland and Labrador School Trustees Association and former director of the Canadian School Trustees Association and is a lecturer in medical ethics at the St. Clare's Hospital School of Nursing in St. John's.

For the past 13 years he has served in parishes at St. John's and St. Lawrence, and is currently pastor at Holy Trinity Parish in Ferryland, Newfoundland.

Winnifred Roebothan-Wells

Mrs. Roebothan-Wells was born in Joe Batt's Arm, Newfoundland. She received her early education at Joe Batt's Arm, at Gander Amalgamated School and at Memorial University.

She taught school in Badger's Quay and at the Gander Amalgamated School.

Mrs. Roebothan-Wells has lived in Gander for most of her adult life and has been deeply involved in community activities. She has been a volunteer at the Vera Perlin School, and has been

active with the Girl Guide and Boy Scout movements, the Canadian Red Cross Society, the Women's Institute and other civic organizations. For a number of years she has been active in the Fraser Road United Church in Gander.

Mrs. Roebothan-Wells is the mother of three children and brings to the panel an extensive knowledge and experience of life in rural and urban Newfoundland.

Alfred W.H. Needler, CM, OBE

Born in Huntsville, Ontario, Dr. Needler completed his post-secondary education at the University of Toronto, receiving a BA (Honours) in Biology in 1926 and a PhD in 1930.

He held a number of positions as a biologist with the federal government until he retired as Deputy Minister, Department of Fisheries and Forestry, in 1971. From 1971 to 1976 he was executive director of the Huntsman Marine Laboratory, St. Andrews.

Dr. Needler was chairman of the Food and Agriculture Organization (FAO) Technical Conference on Marine Pollution and its Effects on Fisheries, in Rome (1970).

Since his retirement he has continued numerous assignments as a Canadian delegate to the FAO and the International Commission for the Northwest Atlantic Fisheries (ICNAF).

Dr. Needler holds honorary doctorates from the universities of New Brunswick and British Columbia and is a Fellow of the Royal Society of Canada.

APPENDIX B

TERMS OF REFERENCE

HIBERNIA ENVIRONMENTAL ASSESSMENT PANEL

Introduction

A joint Canada-Newfoundland Review Panel has been constituted within the spirit of the Atlantic Accord to conduct a formal review of a proposal to develop the hydrocarbon resources of the Hibernia oil field on the northeast Grand Banks.

Mobil Oil Canada Ltd. has been designated proponent for the project and is required to submit the complete text of an Environmental Impact Statement (EIS) on May 15, 1985. A published version of the document will be distributed to the public shortly thereafter.

Mobil's EIS is to be prepared in accordance with guidelines issued in July 1980 through the Federal Environmental Assessment Review Office and guidelines issued in January 1981 through the Newfoundland and Labrador Petroleum Directorate.

The Panel shall operate under a joint framework of review procedures established by the governments of Canada and Newfoundland and Labrador.

Mobil Oil Canada, Ltd. is required to identify its preferred development alternative by August 15, 1985.

Purpose

The purpose of this document is to outline the mandate of the Hibernia Environmental Assessment Review Panel and the review process it will follow.

Panel Mandate

The Panel's role will be to examine the alternative development proposals contained in the proponent's Environmental Impact Statement with particular emphasis on the preferred alternative which is to be indicated by the proponent before the hearings and to make recommendations related to the environmental and socioeconomic aspects of the proposed development. The Panel may also offer advice as to the environmental and socioeconomic information necessary to assist the proponent and governments in making decisions concerning the project.

In fulfilling its mandate, the Panel shall provide opportunity for public review of the proposed project to ensure that environmental and socioeconomic considerations are taken into account. The Panel should offer recommendations as to the terms and conditions under which the project could proceed in a safe and environmentally acceptable manner.

The review by the Panel shall be carried out in a manner consistent with the spirit of The Atlantic Accord.

The mandate of the Panel shall not include examination of questions of energy policy, jurisdiction, the fiscal and management regime, project economics, or the division of revenues between governments.

The Panel will examine the major employment and industrial benefits that are expected to result from the project and the general measures that are proposed or could be undertaken by the proponent to optimize those benefits, particularly in the local and regional economies.

The Panel is to prepare a report of its findings and recommendations for submission to the responsible federal and provincial ministers and the Canada-Newfoundland Offshore Petroleum Board.

Scope of the Review

The review should include matters relating to the development of the Hibernia oil field including production and transportation systems and major ancillary facilities associated with the project. The proponent's preferred development alternative and the major alternatives that have received consideration are considered to be part of the review and should be assessed.

Specifically, the Panel should address:

the potential effects of the project on the coastal and marine environments and the uses thereof;

the potential effects of the marine environment on the development project;

the direct effects of the development project on the social and economic infrastructure in communities expected to be affected by the project and on existing economic activity in the province;

the significance of predicted effects and the measures to mitigate adverse effects and optimize positive effects.

Panel Review Process

1. The proponent shall submit the Environmental Impact Statement by May 15 in a number of copies to be determined by the Panel. This statement shall have been prepared taking into account the guidelines issued in July 1980 and January 1981.

2. Upon receipt of Mobil's EIS the Panel shall arrange for its prompt distribution to the public and to government departments and agencies.

3. Following receipt of the EIS the Panel will conduct Public Information Sessions at which the proponent will be required to explain the project alternatives and their implications and during which the public may identify areas where additional information is necessary. The Panel will, during the EIS review period, accept written comment from any party wishing to submit such comment. Concurrently, government agencies will review the EIS and provide written comment to the Panel.

4. Not later than mid-August, the proponent will identify its preferred development alternative, and provide the rationale for the choice and an update of the information submitted in the EIS as to the manner in which the proponent intends to implement the project and the expected benefits to be derived therefrom. This information will be widely distributed by the Panel.

5. Subsequently, the Panel will conduct formal Public Hearings to review the implications of the project.

During the public review process, it is intended that information sessions and public hearings will be conducted in a nonjudicial but structured manner to permit examination of information presented to the Panel.

The Panel will publish detailed procedures for the conduct of the Public Review.

Reporting

The Panel shall submit a final report of its finding and recommendations to the responsible federal and provincial ministers and to the Canada-Newfoundland Offshore Petroleum Board by December 31, 1985 (within 230 days of the submission of the published EIS).

APPENDIX C

PARTICIPANTS IN THE PUBLIC REVIEW

1. PARTICIPANTS AT THE PUBLIC INFORMATION SESSIONS

The following representatives from Mobil Oil Canada Ltd. attended the public information sessions:

W. Abel
M. Gardner
R. Mann
D. Rahal
J. Ransom
c. Ross
N. Ryan
S. Sherk

Harbour Grace, June IO, 1985

B. Barrett	
J. Barrett	
R. Bastarache	Harbour Grace Board of Trade
D. Cook	
S. Crummey	
L. Edison	
R. Goodwin	
M. Jewer	
G. MacDonald	United Church of Canada
D. Moores	
P. Moriarty	Mayor of Harbour Grace
R. Murray	
C. Payne	
P. Rowe	Community Services Council

Marystown, June 11, 1985

L. Bailey	Mayor, Town of Burin
G. Crocker	
F. Ellis	
G. Fitzpatrick	
M. Hedderson	Community Services Council
F. Kennedy	
M. McCarthy	
B. Moores	
R. Picco	
M. Pickett	
S. Shallow	Spanish Room Residents' Committee
J. Walsh	Mortier Bay Impact Committee
T. Whelan	

Fortune, June 12, 1985

G. Wood

Come By Chance, June 13, 1985

R. Benson	
R. Carter	
R. Curtis	
B. Gilbert	Mayor of Come By Chance
G. Gilbert	Trinity-Placentia Development Assoc.
P. Hann	
M. Hedderson	Community Services Council
C. Newhook	Ocean Ranger Foundation
L. Norman	Community Services Council
H. Thistle	Trinity-Placentia Development Assoc.

Placentia, June 14, 1985

B. Wright	Community Services Council
J. Burn	
C. Canning	Placentia Area Development Association
N. Careen	Placentia Area Development Association
F. Collins	Mayor of Placentia
L. Edison	
J. Hart	
M. Hedderson	Community Services Council
R. Hussey	
P. O'Keefe	
K. Power	
E. Williams	

Corner Brook, June 17, 1985

C. Greenwood	
P. Griffin	
S. Hoffman	Corner Brook Status of Women Council
G. Hutchings	
L. Edison	
A. Lundrigan	
R. Newhook	
B. Sexton	
B. Woolridge	CBC Radio

Botwood, June 18, 1985

A. Barker	Grand Falls Town Council
H. Bartlett	
E. Bersey	Botwood Industrial Development Committee
W. Hammond	Botwood Anglican Church
B. Huxter	
R. Ledrew	Botwood Town Manager
C. Snow	Mayor of Lewisporte

St. John's, June 19, 1985

W. Baker	MHA (Gander)
A. Bell	Advisory Council on the Status of Women
J. Bobbitt	Oceans Ltd.
R. Bouzanne	Newfoundland-Labrador Wildlife Federation
C. Brookes	
M. Brown	
J. Cag	Inter-Church Commission
S. Duff	City of St. John's
M. Hedderson	Community Services Council
T. Hickey	MHA (St. John's East Extern)
B. Hopkins	Association of Professional Engineers
B. LeDrew	
J. Lien	Wilderness Society
E. McCurdy	
L. Michaels	Roman Catholic Office of Social Action
C. Newhook	Ocean Ranger Foundation
L. Norman	Community Services Council
D. Oliver	
J. Pinsent	Councillor, Town of Wabana
J. Rice	Wilderness Society
D. Scott	
C. Sharpe	
G. Squires	
B. Strong	Ocean Industries Association
J. Tooton	St. John's Board of Trade
E. Walsh	
M. Youden	National Sea Products

Ferryland, June 20, 1985

B. Agriesti
K. Condon
G. Etchegary
W. Mishkin
L. Ryan
G. Snow

Trepassey, June 2 1, 1985

J. Callahan	
J. Cheater	
M. Follett	Fisheries Products International
M. Waddleton	Mayor of Trepassey

St. John's, June 26, 1985, 1:30 p.m.

R. Billard	Inter-Church Commission
J. Cag	Inter-Church Commission
P. Hamel	Anglican Church of Canada
M. Hedderson	Community Services Council
H. Hodder	Mayor of Mount Pearl
B. Lacey	Advisory Council on the Status of Women
C. Newhook	Ocean Ranger Foundation
L. Norman	Community Services Council
G. Pizarowski	Department of Regional Industrial Expansion
J. Robinson	
P. Rowe	Community Services Council
M. Shrimpton	Community Services Council

St. John's, June 26, 1985, 7:00 p.m.

J. Bobbitt	Oceans Ltd.
J. Cag	Inter-Church Commission
P. Hamel	Anglican Church of Canada
M. Hedderson	Community Services Council
L. Norman	Community Services Council
P. Nugent	
J. Rice	Wilderness Society
P. Rowe	Community Services Council

2. PARTICIPANTS AT THE PUBLIC HEARINGS

The following representatives from Mobil Oil Canada Ltd. attended the public hearings:

W. Abel
L. Grattan
M. Gardner
R. Mann
D. Rahal
J. Ransom
C. Ross
N. Ryan
S. Sherk

Marystown, Oct. 7, 1985

L. Bailey	Mayor, Town of Burin
G. Brake	Spanish Room Residents' Committee
E. Devereaux	Spanish Room Residents' Committee
M. Hodder	Mortier Bay Impact Committee
A. Hooper	
R. Kavanagh	Mortier Bay Impact Committee
J. Mayo	Mortier Bay Impact Committee
A. Mclver	Environment Canada
J. Osborne	Environment Canada
S. Pittman	Environment Canada
S. Shallow	Spanish Room Residents' Committee
M. Trask	Mortier Bay Impact Committee
B. Vincent	Mortier Bay Impact Committee
J. Walsh	Mortier Bay Impact Committee

Come By Chance, Oct. 8, 1985

R. Beck	Swift Current Community Service Club
G. Gilbert	Trinity-Placentia Development Assoc.
S. Gosse	
E. Johnson	Fishermen of the Come By Chance Area
J. Osborne	Environment Canada
T. Pinsent	Isthmus Area Regional Development Assoc.
D. Stacey	Trinity-Placentia Development Assoc.
H. Thistle	Trinity-Placentia Development Assoc.

Placentia, Oct. 9, 1985

I. Baird	Government of Newfoundland & Labrador
C. Canning	Placentia Area Development Association
N. Careen	Placentia Area Development Association
J. Dunne	Placentia Area Development Association
B. Hogan	Mayor of Dunville
J. Maher	Mayor of Freshwater
A. Mclver	Environment Canada
P. Murphy	Chairman, Placentia Fishermen's Committee
J. Osborne	Environment Canada
W. Patterson	MHA, Placentia
C. Power	Mayor of Jerseyside
K. Power	
I. Walsh	
J. Whalen	

Harbour Grace, Oct. 10, 1985

I. Baird	Government of Newfoundland & Labrador
R. Goodwin	
N. Hurley	Citizens' Committee on Regional Development
W. Locke	Citizens' Committee on Regional Development
G. MacDonald	United Church of Canada

P. Moriarity	Mayor of Harbour Grace
J. Osborne	Environment Canada

Ferryland, Oct. 15, 1985

I. Baird	Government of Newfoundland & Labrador
J. Bobbitt	Oceans Ltd.
J. Brennock	
E. Condon	
K. Condon	
D. Graham	independent Fish Producers Association of Newfoundland & Labrador
M. Hayes	Southern Shore Development Association
G. Kavanagh	Southern Shore Development Association
W. Morry	Southern Shore Development Association
T. Murphy	Southern Shore Development Association
J. Osborne	Environment Canada

St. John's, Oct. 16, 1985, 1:30 P.M.

I. Baird	Government of Newfoundland & Labrador
R. Billard	Inter-Church Commission
S. Duff	City of St. John's
C. Newhook	Ocean Ranger Foundation
F. Power	City of St. John's
M. Ruel	Canadian Oil and Gas Lands Administration
B. Tilley	City of St. John's

St. John's, Oct. 16, 1985, 7:00 P.M.

I. Baird	Government of Newfoundland & Labrador
J. Cag	Inter-Church Commission
V. Ember	Dept. of Veterans' Affairs
S. Jewczyk	St. John's Metropolitan Area Board
P. LeBlanc	Environment Canada
A. McIver	Environment Canada
M. Mercer	Fisheries and Oceans
B. Nichols	
J. O'Dea	St. John's Metropolitan Area Board
J. Osborne	Environment Canada
P. Rowe	Community Services Council
M. Shrimpton	Community Services Council
R. Wiseman	Fisheries and Oceans

St. John's, Oct. 17, 1985, 1:30 P.M.

R. Bray	Inter-Church Commission
T. Carlson	John Howard Society
L. Edison	Community Housing & Support Services
S. Finlay	
R. Goldie	Hospital Social Worker
M. Hedderson	Community Services Council
H. Hiscock	Inter-Church Commission
R. Lawrence	John Howard Society
T. Mills	Inter-Church Commission
S. Pottle	St. John's Status of Women Council
P. Rowe	Community Services Council
D. Scott	Community Services Council
V. Swift	John Howard Society
P. White	Technical Expert

St. John's, Oct. 17, 1985, 7:00 P.M.

M. Brown	Newfoundland Association of Social Workers
J. Cag	Inter-Church Commission
P. Dixon	
M. Hedderson	Community Services Council
H. Hiscock	Inter-Church Commission
F. Ennis	Inter-Church Commission
N. Lucas	Newfoundland Federation of Indians
W. Lundrigan	Newfoundland Association of Social Workers
T. Mills	Canadian Mental Health Association
S. Pottle	St. John's Status of Women Council
M. Martin-Rowe	Canadian Mental Health Association
P. Rowe	Community Services Council
B. Stack	Canadian Mental Health Association
R. Tilley	Avalon Consolidated School Board
P. White	Technical Expert

St. John's, Oct. 18, 1985, 9:00 A.M.

I. Baird	Government of Newfoundland & Labrador
A. Bell	Provincial Advisory Council of the Status of Women
J. Cag	Inter-Church Commission
R. Dempster	Association of Professional Engineers of Newfoundland
A. Greene	Association of Professional Engineers of Newfoundland
W. Haynes	Association of Professional Engineers of Newfoundland
N. Hurley	Citizens' Committee on Regional Development, Bay Roberts
D. May	Technical Expert
P. Murray	
G. Pizarowski	Department of Regional Industrial Expansion
D. Robbins	Provincial Advisory Council on the Status of Women
R. Will	

St. John's, Oct. 18, 1985, 1:30 P.M.

J. Cag	Inter-Church Commission
J. Collins	Fisheries and Oceans
W. Davis	
F. Ennis	Inter-Church Commission
H. Hiscock	Inter-Church Commission
D. Kulka	Fisheries and Oceans
B. Lacey	St. John's Status of Women Council
H. Lear	Fisheries and Oceans

W. Locke	Citizens' Committee on Regional Development
D. May	Technical Expert
P. Murray	
S. Pottle	St. John's Status of Women Council
R. Wiseman	Fisheries and Oceans

St. John's, Oct. 22, 1985, 1:30 P.M.

J. Benoit	Mobil Oil Canada Ltd.
J. Bobbitt	Oceans Ltd.
F. Dello Stritto	Mobil Oil Canada Ltd.
W. Ford	Technical Expert
A. McIver	Environment Canada
D. Muggeridge	Technical Expert
C. Newhook	Ocean Ranger Foundation
J. Osborne	Environment Canada
C. Parsons	Ocean Ranger Foundation
B. Petrie	Fisheries and Oceans
S. Porter	Environment Canada
R. Wilson	Fisheries and Oceans
R. Wiseman	Fisheries and Oceans

St. John's, Oct. 22, 1985, 7:00 P.M.

P. Cohen	Environment Canada
W. Ford	Technical Expert
P. Finlay	Environment Canada
E. Leavy	Fisheries and Ocans
D. Napier	Technical Expert
C. Newhook	Ocean Ranger Foundation
J. Osborne	Environment Canada
G. Payne	Fisheries and Oceans
R. Percy	Environment Canada
R. Wiseman	Fisheries and Oceans

St. John's, Oct. 23, 1985, 1:30 P.M.

R. Brown	Environment Canada
J. Cag	Inter-Church Commission
P. Cohen	Environment Canada
W. Ford	Technical Expert
P. Lane	Consultant to Environment Canada
I. MacLaren	Technical Expert
A. McIver	Environment Canada
S. O'Dea	Newfoundland Historic Trust
J. Osborne	Environment Canada
R. Parker	Environment Canada
J. Parsons	
J. Piatt	
J. Rice	Wilderness Society of Newfoundland & Labrador

St. John's, Oct. 23, 1985, 7:00 P.M.

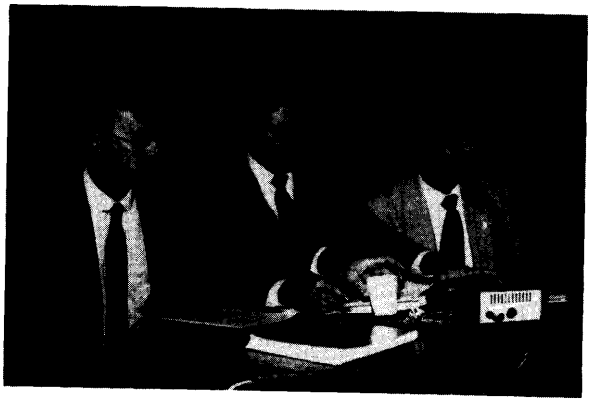
I. Baird	Government of Newfoundland & Labrador
A. Etchegary	Fishery Products International
G. Etchegary	Fishery Products International
E. Johnson	Fishermen of Come By Chance Area
H. Lear	Fisheries and Oceans
B. Martin	Petty Harbour-Maddox Cove Fishermen's Committee
E. McCurdy	Newfoundland Fishermen, Food & Allied
M. Mueller	Workers Union
G. Payne	Fisheries and Oceans
K. Riddervold	
B. Riley	Atlantic Fishing Vessel Association
R. Wiseman	Fisheries and Oceans
V. Young	Fishery Products International

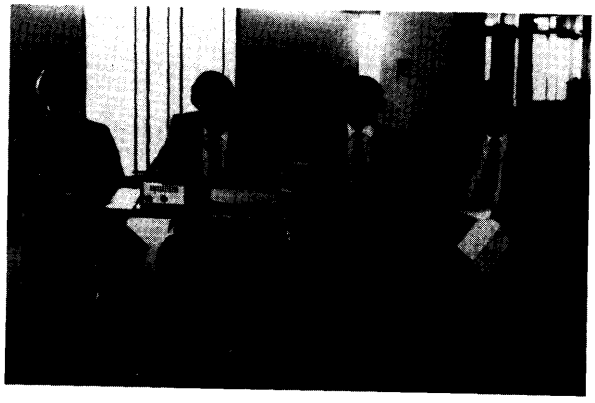
St. John's, Oct. 24, 1985, 1:30 P.M.

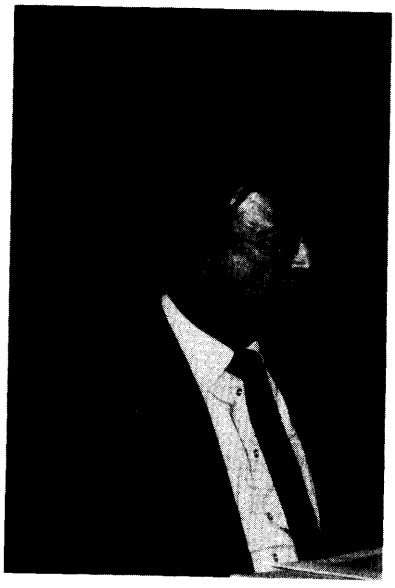
J. Adams	Energy, Mines and Resources Canada
I. Baird	Government of Newfoundland & Labrador
A. Bell	Provincial Advisory Council on the Status of Women
J. Bobbitt	Oceans Ltd.
M. Brown	Newfoundland Ocean Industries Assoc.
J. Capps	Newfoundland Ocean Industries Assoc.
W. Davis	
R. Edwards	Energy, Mines and Resources Canada
G. Fader	Energy, Mines and Resources Canada
M. Hedderson	Community Services Council
M. Lewis	Energy, Mines and Resources Canada
J. Lidderdale	Newfoundland Ocean Industries Assoc.
J. Mayo	Mortier Bay Impact Committee
M. McCarthy	Mortier Bay Impact Commission
L. Murphy	Mortier Bay Impact Commission
C. Newhook	Ocean Ranger Foundation
B. Nichols	Fisheries and Oceans
S. Novak	Department of Geography, MUN
F. O'Keefe	Newfoundland Ocean Industries Assoc.
J. Osborne	Environment Canada
D. Robbins	Provincial Advisory Council on the Status of Women
P. Rowe	Community Services Council
F. Taylor	Newfoundland Federation of Labour
M. Trask	Mortier Bay Impact Commission
J. Walsh	Mortier Bay Impact Commission
R. Wiseman	Fisheries and Oceans

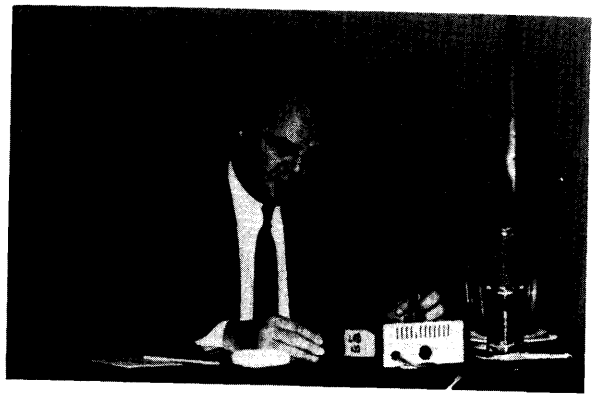
St. John's, Oct. 24, 1985, 7:00 P.M.

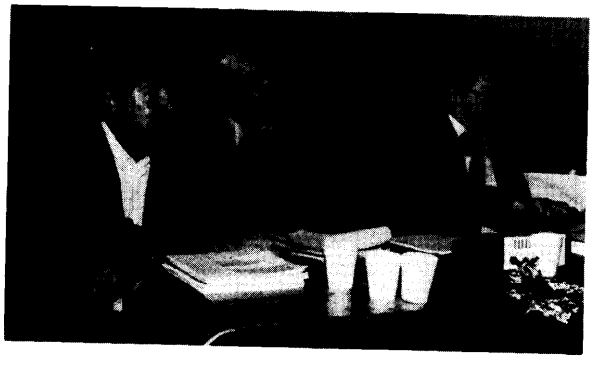
J. Bobbitt	Oceans Ltd.
M. Hedderson	Community Services Council
C. Newhook	Ocean Ranger Foundation
P. Rowe	Community Services Council
M. Saunders	Canadian Labour Congress
F. Taylor	Newfoundland Federation of Labour

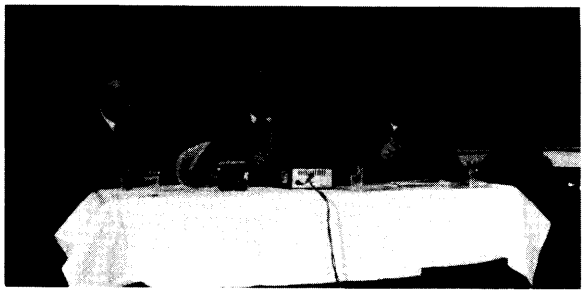


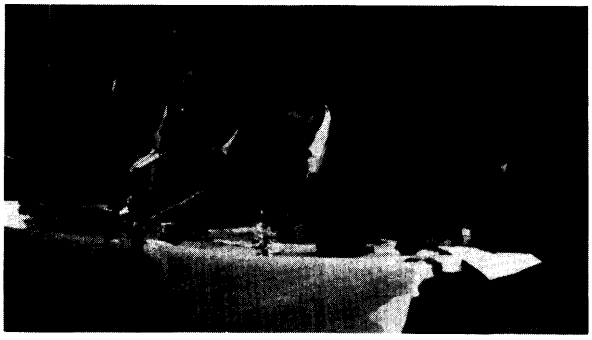


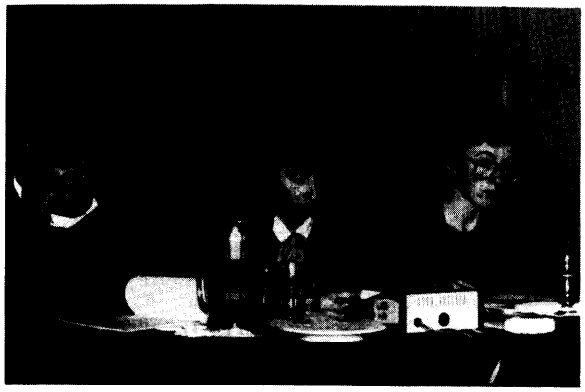


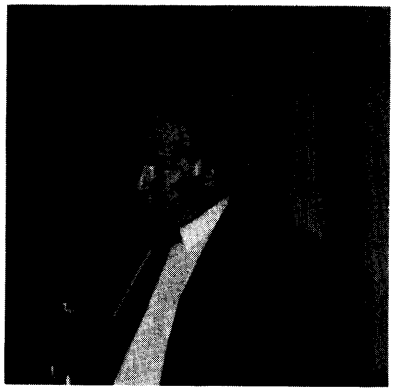


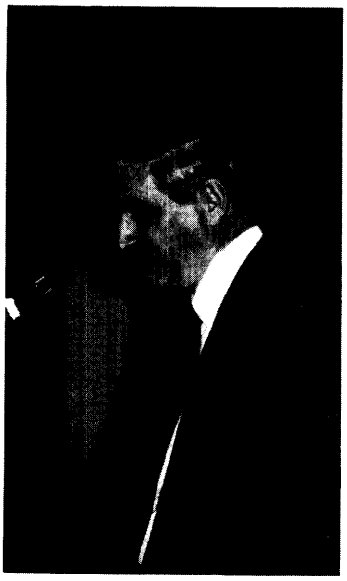












APPENDIX D

BRIEFS & DOCUMENTS

SUBMITTED TO THE ENVIRONMENTAL ASSESSMENT PANEL DURING THE PUBLIC HEARINGS PHASE

1. Trinity-Placentia Development Association
2. Fishermen of the Come By Chance Area
3. Avalon Presbytery of the United Church of Canada and The Citizen's Committee on Regional Development, Bay Roberts
4. The Association of Professional Engineers
5. Spanish Room Residents' Committee
6. St. John's Status of Women Council
7. Swift Current Service Club
8. Isthmus Area Regional Development Association
9. Position Statement, Environment Canada Review of the Hibernia Development Project (EIS)
10. Newfoundland Association of Social Workers
11. Mortier Bay Impact Committee
12. Burin Town Council
13. S. M. Gosse, Sunnyside
14. DFO Position Statement on Hibernia Development Project
15. Placentia Area Development Association
16. Provincial Advisory Council on the Status of Women
17. Southern Shore Development Association Brief
18. City of St. John's Brief
19. Department of Regional Industrial Expansion
20. Ocean Ranger Foundation — Oceanography
21. Atlantic Fishing Vessel Association
22. Wilderness Society of Newfoundland/Labrador
23. Canada Oil and Gas Lands Administration
24. Community Services Council — Construction Camps
25. Community Services Council — General /Opening Remarks
26. Community Services Council — Housing
27. Ocean Ranger Foundation — Safety
28. Ocean Ranger Foundation — General Statement
29. Environment Canada — General/Opening Statement
30. Inter-Church Commission (Opening Statement)
31. St. John's Metropolitan Area Board
32. St. John's Status of Women Council: Social Impacts of Oil Development on Women and their Families
33. John Howard Society — Social Impacts of Hibernia: The Question of Crime
34. Inter-Church Commission — Impacts Monitoring
35. Mobil Presentation on Construction Camps
36. Mobil Presentation on Housing
37. Canadian Mental Health Association
    Comments re: — Deficiencies, Hibernia EIS
    — Mental Health Implications of Resource Development
38. Day Care Advocates Association
39. Community Services Council — Social Services
40. Federation of Newfoundland Indians
41. Avalon Consolidated School Board
42. Department of Regional Industrial Expansion — Oral Presentation to Accompany Document H- 19
43. Inter-Church Commission — Employment and Training
44. Newfoundland and Labrador Federation of Labour
45. Atmospheric Environment Service
46. Mobil Opening Statement — Social Services
47. Mobil Opening Statement — Socio-Economic Monitoring
48. Environment Canada, Preventive Practices for Platform Wastes
49. Newfoundland Historic Trust
50. Environment Canada, Outline of Presentation: Risk of Oil Spill
51. Environment Canada, Summary
52. Fishery Products International
53. Environment Canada, Indirect Effects at the Ecosystem Level
54. Environment Canada, Effects of Oil on Marine Organisms
55. Environment Canada, Ecological Risk Analysis at the Population Level
56. Environment Canada, Environmental Effects Monitoring
57. Environment Canada (Canadian Wildlife Service) Review of Mobil Oil Canada Ltd., Hibernia Development Project, EIS
58. Fisheries Association of Newfoundland and Labrador Ltd.: Response to Mobil's EIS
59. Fisheries and Oceans Closing Statement

60. Nfld. Fisherman, Food & Allied Workers Union: Impact of Offshore Oil & Gas Development
61. Environment Canada — Ecological Risk Analysis in Regard to Offshore Development at Hibernia
62. Terms of Reference: Environmental Advisory Committee on Nfld. & Labrador Marine Transportation (Submitted by Mobil Oil Canada Ltd.)
63. Ocean Ranger Foundation: Closing Comments
64. Impact of Oil Pollution on Seabirds (Submitted by Mobil Oil Canada Ltd.)
65. Community Services Council: Closing Comments
66. Energy Mines and Resources Canada: Technical Review of the Hibernia Development Project EIS
67. Environment Canada: Closing Statement
68. Newfoundland Ocean Industries Association
69. Proceedings Workshop on Strategic Planning for the Coastal & Marine Environment March 26-28, 1985, Vol II (Submitted by Environment Canada)
70. Workshop on Strategic Planning for the Coastal & Marine Environment Vol I — Summary (Submitted by Environment Canada)
71. Mechanism to Facilitate Resource Management and Environmental Protection in the Grand Banks (Submitted by Environment Canada)
72. Mortier Bay Impact Committee: Submission no. 2
73. Inter-Church Commission — Marine Birds and Hibernia Hydrocarbon Production
74. Spanish Room Residents' Committee
75. EIS — Safety: Submission by D.H. Napier, Professor of Industrial Hazard Control, University of Toronto
76. An Overview of Oceanographic Factors: WM. L. Ford
77. Summary of Action Taken by the Government of Canada in relation to the Recommendations of the Royal Commission on the Ocean Ranger Marine Disaster
78. Brief submitted by the Fisherman's Committee
79. Presentation by St. John's Metropolitan Area Board
80. The Ocean Ranger Foundation: Presentation on the Physical Marine Environment at Hibernia
81. Presentation on Behalf of the Towns of Placentia, Dunville, Jerseyside and Freshwater
82. Fisheries and Oceans/ Environment Canada, Baseline Data Acquisition/ Quantitative Risk Assessment
83. Environment Canada, Response to Questions Raised by Panel Co-chairmen
84. Michael Warren, Comments and Recommendations
85. Mobil Oil Canada Ltd., Closing Statement
86. Mobil Oil Canada Ltd., Response to Brief H- 16
87. Fisheries and Oceans, Offshore Oil and Gas Operations and Fishing Industry Compensation
88. Wilderness Society of Newfoundland and Labrador
89. Petroleum Directorate, Local Employment Preference Policy Newfoundland and Labrador Hydro, Land Freeze (Mortier Bay), Site-Specific Environmental Impact Statements, and Intervenor Funding
90. Newfoundland and Labrador Wildlife Federation

APPENDIX E

BIBLIOGRAPHY

Guidelines for the Preparation of an Environmental Impact Statement for Potential Oil Production on the Northeast Grand Banks, July, 1980, issued by the Environmental Assessment Panel.

Guidelines for the Approval of a Hibernia Development Program, July, 1981, issued by the Government of Newfoundland and Labrador.

Hibernia Development Project Environmental Impact Statement, May 1985, submitted to the Hibernia Environmental Assessment Panel by Mobil Oil Canada Ltd.

Volume I — Summary

Volume II — Project Description

Volume III (a and b) — Biophysical Assessment

Volume IV — Socio-Economic Assemment

EIS Supporting Documents:

-Acute Toxicity of Hibernia Crude Oils to Selected Marine Invertebrates and Fish from Newfoundland Waters, Atlantic Biological Services Ltd., September, 1980.

-Grand Banks Oceanographic Studies, Volumes l-4, MacLaren Plansearch, July, 198 1.

-Grand Banks Wildlife Study, MacLaren Plansearch, July, 1981.

-Microbiological Observations on the Grand Banks of Newfoundland, C. Bédard and J.N. Bunch, October, 1983.

-The Newfoundland Fishery and an Assessment of Possible Impacts Associated with the Hibernia Development, Nordco Ltd., April, 1984.

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-National and Provincial Macroeconomic Impacts of the Hibernia Development Project, Peter E. Gunther, May 3, 1985.

-Hibernia Socio-Economic Impact Statement, Land and Resource Use Study, CBCL Ltd. and D.W. Knight Associates Ltd., May 8, 1985.

-Hibernia Demographic Impacts, Community Resources Services Ltd., May 10, 1985.

-The Impact of the Development of the Hibernia Oilfield on Newfoundland's Social and Economic Fabric, IDP Consultants Ltd., May, 1985.

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-Hibernia Development, Volume 3 — Industrial Impact Assessment, Atlantic Consulting Economists Ltd., May, 1985.

-Hibernia Development, Volume 4 — Labour Impact Assessment, Atlantic Consulting Economists Ltd., May, 1985.

-Background Report — Impact of the Hibernia Development on Community Services and Social Infrastructure in Newfoundland, Volumes 1 and 2, IDP Consultants Ltd., May, 1985.

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Transcripts of public information sessions held in Newfoundland from June 10, 1985 to June 26, 1985, 11 volumes.

Compendium of Comments Received on Technical Review of the Hibernia Development Project EIS, August, 1985, issued by the Hibernia Environmental Assessment Panel.

EIS Update, August 15, 1985, submitted to the Hibernia Environmental Assessment Panel by Mobil Oil Canada Ltd.

Panel letter to Mobil Oil Canada Ltd., dated August 15, 1985, requesting additional information.

Hibernia Development Project Environmental Impact Statement Supplementary Information, September 15, 1985, submitted to the Hibernia Environmental Assessment Panel by Mobil Oil Canada Ltd.

Transcripts of Public Hearing held in Newfoundland October 7, 1985 to October 24, 1985, 11 volumes.

Briefs and Documents Submitted to the Environmental Assessment Panel prior to, during and after public hearings (see Appendix D for listing).

APPENDIX F

GLOSSARY

Batch spill — oil spilled in batches as opposed to a blowout. A rupture of a compartment of the floating storage vessel, a rupture of a storage cell of the GBS, a crude oil transfer accident, or a shuttle tanker accident while loading are examples of batch spills.

Bergy bit — a piece of floating glacier ice having a sail greater than 1.5 m but less than 5 m and a water plane area greater than 20 m^2 but less than 300 m^2. Size approximates that of a small house and mass is between 120 and 5400 tonnes.

Completed submudline — a well completion for the production of oil and gas with wellhead components installed below the sea floor.

Growler — the smallest category of iceberg size, with a sail extending less than 1.5 m above sea level and a waterplane area of around 20 m^2. Comparable in size to a car and having a mass of less than 120 tonnes.

Person-year — the equivalent of one person working for one year. For example, this could apply to two persons working for six months each.

Produced water — water produced with oil and gas; also referred to as formation water or brine effluent.

Production manifold — a multiple piping arrangement containing the valving to divide a flow into several parts, combine several flows, or reroute a flow to one of several possible destinations.

Return period — the time interval between events of a given magnitude (e.g. 100 years return period).

Segregated ballast — water carried in tanks on vessels to maintain sea-going stability but segregated from the oil cargo. This prevents release of oil in water that is discharged during deballasting.

APPENDIX G

ACKNOWLEDGEMENTS

The Panel wishes to express its thanks to all those who participated in the review of the Hibernia Development Project. This includes individuals and groups and representatives of federal, provincial and local government agencies who spent considerable time and effort in preparing briefs and presenting them to the Panel. The Panel appreciates the cooperation of Mobil Oil Canada Ltd. staff and its consultants throughout the process. The Panel also wishes to thank its advisors for technical advice given to the Panel and the public.

The Panel also wishes to extend special thanks to its secretariat and support staff who assisted in the review and the completion of its report. They are: Brian Adams, David Barnes, Jim Clarke, Bob Greyell, Bonnie Hill, Carole Langevin, Suzanne Latour, Douglas Parkinson, Guy Riverin, and Paulette Smith.