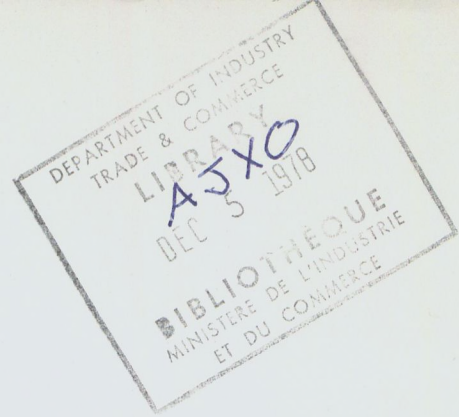


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A REPORT BY *Canada*
THE SECTOR TASK FORCE ON

THE CANADIAN OCEAN INDUSTRY

Chairman T. Nickerson



REPORT
ON
THE OCEAN INDUSTRY
BY
THE CONSULTATIVE TASK FORCE

EXECUTIVE SUMMARY

REPORT ON THE OCEAN INDUSTRY

BY

THE CONSULTATIVE TASK FORCE

The Ocean Industry Consultative Task Force is one of 22 industry sector task forces established by the federal Department of Industry, Trade and Commerce (DIT&C) to recommend to governments appropriate action to improve the economic performance of Canada's industrial economy.

The ocean industry in Canada is composed of those establishments which manufacture equipment or provides services for the exploitation of the ocean resources, with a particular emphasis on offshore oil and gas. Transport vessels and fisheries are excluded. The ocean industry and its associated ocean technology is a relative newcomer to the industrial scene. In 1969, sales were less than \$5 million and in 1976 it had grown to \$176 million with about \$70 million being exported. It employs about 3,200 people.

The objective of this report is to put forward recommendations which, if implemented should:

- (1) Create an environment within which the fledgling Canadian ocean industry and its associated ocean technology can develop to meet the need for goods and services arising from the exploitation of Canada's ocean resources.
- (2) Create by 1990 from 20,000 - 30,000 direct jobs in manufacturing and service industries associated with offshore resource exploitation, together with up to 150,000 indirect jobs elsewhere in the economy.
- (3) Further improve the already strong export performance of the industry.
- (4) Help to ensure that a reasonable level of Canada's future petroleum needs are met from Canadian sources developed with Canadian skills. The alternatives - a mushrooming balance of payments deficit to cover oil imports, or a shortage of petroleum - would severely impact all aspects of the Canadian economy.

The principal conclusions and recommendations are:

- (1) The ocean industry is small, fragmented and under-capitalized but given those circumstances appropriate to an opportunity oriented, high technology, fledgling industry, it has the potential for substantial growth. Therefore governments and the federal Department of Industry, Trade and Commerce (DIT&C) in particular should noticeably and progressively increase the resources allocated towards the industrial development of the ocean industry.

- (2) Substantial growth depends primarily on the establishment of an active and stable program of exploration and development of Canada's offshore petroleum resources. Therefore, governments should create a stable economic and regulatory environment to encourage offshore petroleum activities plus increase the Canadian content of equipment and services utilized. Governments should contract out more of its ocean-oriented scientific and engineering requirements, thereby increasing industrial capabilities. The Department of Industry, Trade and Commerce should provide increased resources towards the industrial development of the ocean industry.
- (3) Export markets have been, and will continue to be an important element particularly for the manufacturing sector. The Department of Industry, Trade and Commerce support of ocean industry export marketing should be continued and strengthened. Consideration should be given to negotiation with other countries to establish reciprocal market access for specific products and services.
- (4) While future growth potential is excellent the short-term rewards are not high and substantial investment is required. Therefore government should allow equity investments in the ocean industry as a tax deduction against taxable income.

There should be established the Canadian Ocean Technology Research Authority to co-fund technology developments in industry to a level of (Can) \$100 million over five years.
- (5) A number of taxation and duty regulations adversely affect small ocean industry companies, therefore duty payment for short-term importations should be waived, permit full tax write-off of equipment in one year, through 100 per cent capital cost allowance, eliminate sales tax on equipment for offshore operations and increase tax loss carry-forward to ten years.
- (6) Projected industry growth will demand increased numbers of ocean oriented professional and skilled people. Therefore people needs should be quantified and action initiated to meet the demand. The Task Force supports the funding of Centres of Excellence.
- (7) There does not exist those supportive institutions which are normally associated with a mature industry. Action therefore has been taken by committee members to establish an Ocean Industry Trade Association.
- (8) The Task Force considered that other industrial activities in the oceans should also be investigated. The supply of equipment and services related to the fisheries is considered worthy of evaluation. Ocean mining will increase in the future.

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1. PREAMBLE

The Ocean Industry Consultative Task Force is one of 22 industry sector task forces established in April, 1978 by the Federal Department of Industry, Trade and Commerce (DIT&C) to recommend to governments appropriate actions to improve the economic performance of Canada's manufacturing economy. Each sector task force, composed mainly of senior industry people, was requested to consider the particular circumstances of its industry, the impact thereon of a wide range of government policies, and to recommend policy changes which would help the industry sector improve its economic performance. The reports of the task forces were to be completed by June 30, 1978.

The membership of the Ocean Industry Task Force is listed in Appendix I. The Task Force met four times. Between meetings a considerable amount of work was carried out by subcommittees appointed to review specific subjects. The Chairman would like to express his appreciation to all Task Force members for their dedicated service in this endeavour.

Given the small size and embryonic nature of the ocean industry, the Task Force concentrated its attention more on specific industry problems than on larger issues which impact the totality of Canadian manufacturing. It should be noted that the ocean industry is a blend of manufacturing, service contracting and consulting companies. There has been an emphasis on the supply of goods and services for the exploitation of offshore oil and gas.

The recommendations contained herein are those of the Task Force and do not necessarily represent the viewpoint of all industry segments.

The report, of necessity, assumes that the reader is familiar with the Ocean Industry Sector Profile and has some knowledge of the ocean industry.

2. OBJECTIVE

Canada's fledgling ocean industry, while facing a number of problems, has the potential for significant growth.

The objective of this report is to put forward recommendations which, if implemented, should:

- (1) Create an environment within which the Canadian ocean industry and its associated ocean technology can develop to meet the need for goods and services arising from the exploitation of Canada's ocean resources.
- (2) Create by 1990 from 20,000 to 30,000 direct jobs in manufacturing and service industries associated with Canadian offshore resource exploitation, together with up to 150,000 indirect jobs elsewhere in the economy.
- (3) Further improve the already strong export performance of the industry.
- (4) Help to ensure that a reasonable level of Canada's future petroleum needs are met from Canadian sources developed with Canadian skills. The alternatives -- a mushrooming balance of payments deficit to cover oil imports, or a shortage of petroleum -- would severely impact all aspects of the Canadian economy.

3. DEFINITION

The ocean industry in Canada, as defined by the sector profile, "is composed of those establishments which manufacture equipment or provide services for all commercial and scientific activities in the oceans. Marine transport vessels and traditional fishing support equipment, however, are generally excluded". The Task Force has worked within this definition with an emphasis on products and services related to the exploration for, and production from offshore petroleum resources.

The Task Force wishes to emphasize most strongly that other ocean activities, particularly fishing, have significant growth potential and that the hardware and service requirements of these industries should be evaluated.

It is recommended that governments establish a separate Task Force to examine manufacturing and service opportunities related to these activities and make recommendations as to how the opportunities can be realized.

4. INDUSTRY SUMMARY

Canada's ocean industry is a newcomer to the Canadian industrial scene. In 1969 industry sales were probably less than \$5 million. In 1976 sales of the "core" companies, those whose activities are principally marine-oriented, totalled \$176 million. Many of the present companies have been created in the past 10 years to meet the evolving technology requirements of ocean activities.

Growing worldwide interest in the oceans, the technological challenges of ocean activity, the prospect of resource development in Canada's offshore, Canada's oceans policy, and the support of the Ocean Industries Division of the Department of Industry, Trade and Commerce have all contributed to the growth of the industry to its present level of some 40 core companies, each involved in its own specialized product or service area. There are about 200 other companies which are also involved, but less directly.

The ocean industry sector profile reasonably reflects the present status and breadth of the industry. Employment in 1976 was 3,200 people with industry sales about equally divided between manufacturing and service activities. Eighty-six per cent (\$70M) of the manufacturing output was exported while almost all of the service activity was related to the domestic market. However in addition a large portion of equipment and services were imported and these imports could increase in the future.

The industry is technology intensive and is characterized by small firms with a high ratio of R&D costs/annual sales and long lead times from product inception to actual sales. These factors, coupled with a currently weak Canadian market and competition in Canada from foreign companies which have their own strong domestic markets, have resulted in financial difficulties for a few firms starting up.

The industry has the potential to grow tenfold in the next decade if Canadian offshore resources are actively explored for, found and developed. The impact of the growth would be noticed across Canada and would be particularly significant in Atlantic Canada. The recommendations of the Task Force are intended to provide the environment within which the industry can achieve its growth potential.

It should be noted that in achieving its potential the ocean industry will contribute to the achievement of both Canada's Ocean Policy and Canada's Energy Policy. The achievement of the latter will have a profound effect on all sectors of the Canadian economy in the coming decades. The industry will also contribute to economic prosperity and improved lifestyle.

5. ASSUMPTIONS

The recommendations contained in this report are based on certain assumptions.

- (1) Canada's Energy Policy, emphasizing self-reliance of supply, will be pursued. The graph in Appendix II, taken from "Canada's Resources and the National Interest"¹, illustrates that the achievement of this policy requires the development of frontier oil.

1

Canada's Resources and the National Interest, a Summary of a Report by an Independent Task Force on the Crisis in the Development of Canada's Mining and Petroleum Resources, The Canada West Foundation, Calgary, 1977. p. 42

- (2) Canada's Ocean Policy, emphasizing Canadian development and control of the essential elements needed to exploit offshore resources, will be pursued. An important element of this policy is that "Canada stimulates development and effective participation of Canadian industry in the plan...".
- (3) There will be a steady but moderate recovery in the world economy.
- (4) Canadian macroeconomic policies will be directed to encourage demand and investment while at the same time working to reduce inflationary pressures.

6. SUMMARY OF FINDINGS

The Task Force examined the industry, its strengths, weaknesses and future potential from three viewpoints:

- markets (domestic and export)
- investment climate and taxation
- infrastructure (education, technology, etc.)

The principal conclusions and recommendations of the Task Force are:

- (1) The industry is small, fragmented and under-capitalized but, given the right circumstances, has the potential for substantial growth during the next decade. Direct employment in the industry can grow from its 1976 level of 3,200 to 30,000 in the domestic market by 1990 with indirect employment creating an additional 150,000 jobs in the economy. Increased exports will add to these forecasts. The impact will be felt across Canada and will be most significant in Atlantic Canada.

Recommendation -- that the Department of Industry, Trade and Commerce should noticeably and progressively increase the resources allocated towards the industrial development of the Canadian Ocean Industry.

- (2) Substantial growth depends primarily on the establishment of an active program of exploration for and development of Canada's offshore petroleum resources. Such a program will create a significant domestic market for ocean industry goods and services -- a market which has to date been small, variable and uncertain. Canada urgently needs to develop its offshore resources now to avoid future energy shortages and balance of payments deficits.

Recommendation -- governments create a stable economic and regulatory environment which will encourage offshore exploration and development of hydrocarbon resources.

- strong Canadian content regulations be put in place based on technological excellence.
- government contract out more of its scientific and engineering studies plus its marine data collection activities to help develop the industrial expertise needed to serve Canada's needs.

- (3) Export markets have been, and will continue to be, an important element, particularly for the manufacturing sector of the industry. A domestic market will assist export performances. The support of the Department of Industry, Trade and Commerce in export marketing has been invaluable. The increasing trend for countries with offshore resource developments to implement national preferences in purchasing goods and services is understandable but restricts the marketplace.

Recommendation -- the Department of Industry, Trade and Commerce support of ocean industry export marketing be continued and strengthened.

- consideration be given to negotiation with other countries to establish reciprocal market access for specific products and services.
- (4) While future growth potential is excellent the industry is not in the short term, an attractive investment. However, substantial investment is needed now to finance

the long lead times and cost associated with developing the new technologies required to meet the challenge of Canadian offshore resource exploitation.

Recommendations -- allow equity investment in ocean industries as a tax deduction against taxable income.

- establish a Canadian Ocean Technology Research Authority to co-fund, with the private sector, ocean technology developments of national importance. It should be funded to a level of \$100 million over five years.

- (5) A number of taxation and duty regulations particularly affect the financial position of small ocean industry companies and in some instances place them at a disadvantage relative to foreign companies when competing in the Canadian market.

Recommendations -- eliminate duty payment for temporary importations.

- permit full tax write-off of equipment in one year, through 100 per cent capital cost allowance.
- eliminate sales tax on equipment for offshore service operations.
- increase loss carry forward time limit from five to ten years.

- (6) Existing education and training programs in Canada will be unable to meet future needs for ocean-oriented professional and skilled people, if the projected industry growth occurs.

Recommendations -- review potential people needs and initiate action to put the necessary training facilities and centres of excellence in place.

- (7) The industry, composed of small, widely scattered companies, lacks a common voice in dealing with government and the petroleum industry.

Action -- industry is establishing an Ocean Industry Trade Association.

- (8) The Task Force has concentrated its attention on the offshore oil and gas elements of the ocean industry. However, the potential opportunities for hardware products and services particularly related to the fishing industry are substantial.

Recommendation -- establish a Task Force with expertise in these areas to examine the opportunities, identify the potential and recommend action to realize the potential.

The above issues are dealt with in more detail in a subsequent sector of the report.

7. PROJECTED IMPACT OF THE RECOMMENDATIONS

The recommendations of the Task Force, if implemented, represent a positive commitment to ocean industry, the practical implementation of Canada's Oceans Policy, a step towards achievement of Canada's Energy Policy, and a contribution to alleviating regional disparity by building on regional advantages plus contribute to economic prosperity.

The implementation of the recommendations will require the commitment and complementary effort of federal and provincial governments, the petroleum industry, and the ocean industry.

The impact of the recommendations is expected to be large:

- 20,000 to 30,000 direct Canadian ocean industry jobs by 1990 and 150,000 indirect jobs elsewhere in the economy, providing opportunities for professional, skilled and unskilled people.
- The impact of direct and indirect jobs will be noticeable across Canada but of the most consequence in Atlantic Canada.

- A risk/reward ratio which will attract substantial private sector investment by Canadians.
- A strong and viable ocean industry meeting a Canadian need and able to compete effectively in international markets on the basis of Canadian excellence.

It should be noted that the recommendations fit together in a "model" which recognizes the many facets and interactions of an industrial economy. The impact of implementing any single recommendation without the others is likely to be substantially less than the impact noted. For example, if the Canadian market expands but the ocean industry is unable to raise the capital and develop the technology to serve it then the demand will be met from foreign sources.

The Task Forces commends the package of recommendations to industry and governments and requests a balanced consideration of the total package.

8. ISSUES/BACKGROUND/RECOMMENDATIONS

The following sections deal with significant issues affecting ocean industry. Each section states an issue, provides a brief background, and concludes with recommendations which will, in the opinion of the Task Force, most effectively resolve the issue. Because of the interaction between issues the impact of individual recommendations is not directly addressed. The previous section dealt with the expected impact of the total package of recommendations.

8.1 DOMESTIC MARKETS

ISSUES

Substantial growth of the industry depends primarily on the emergence of a domestic market for its products and services. The principal component of this market will be the active exploration for and development of Canada's offshore hydrocarbon resources, an activity which is considered to be urgently needed if Canada is to achieve its objective of sustained self-reliance in energy.

BACKGROUND

The prospect of a substantial exploration and development activity related to Canada's offshore hydrocarbon resources has always been the carrot which has encouraged Canada's ocean industry.

A number of factors have contributed to a diminishing offshore exploration level. This is viewed with concern not only by the ocean industry but by all who are concerned with Canada's future oil supply/demand. The Task Force supports the statements made in the 1977 report Canada's Resources and the National Interest:

"Governments -- both federal and provincial -- must:

- . Place greater emphasis on the national interest in resource development;
- . Formulate co-ordinated long-term policies for resource development to restore a climate of confidence among investors;
- . Implement a fair tax and royalty system, designed to attract risk capital and encourage exploration and development, particularly in the high risk but vital frontier areas.....".

The table in Appendix III projects Annual Expenditures in Canadian Offshore Oil and Gas Exploration and Development for two scenarios, one conservative and one optimistic. Both assume that present uncertainties will be resolved. From these curves it is noted that:

- Spending during the past five years totalled \$500 million with a 1977 expenditure of \$200 million.

- Spending during the next five years is expected to be \$3 to \$5 billion with increased exploration and the commencement of the development phase. This will result in an annual expenditure of \$1 billion plus by 1983.
- Significantly increased oil and gas production during the following five years would bring the annual expenditure rate to \$2 to \$4 billion by 1988.

Using the conservative spending estimate as represented by curve 2 of Appendix III the following projection of the total Canadian market for offshore oil expenditures is made:

	<u>\$ Millions</u>		
	<u>Total Past 5 Years</u>	<u>Total Coming 5 Years</u>	<u>Total Following 5 Years</u>
Equipment	63	700	2,700
Services	418	2,100	4,600
Consulting	<u>18</u>	<u>200</u>	<u>700</u>
TOTAL	\$ 500	\$ 3,000	\$ 8,000

It is estimated that Canadian industry is at present capturing 30 per cent of the domestic market. Britain in 1976 captured 57 per cent of the United Kingdom offshore market. Assuming that Canadian industry can develop to capture 40 per cent of the Canadian market in the coming five years and 60 per cent in the following five years a projection of the Canadian content of expenditures is:

	<u>\$ Millions</u>	
	<u>Total Coming 5 Years</u>	<u>Total Following 5 Years</u>
Equipment	320	1,980
Services	780	2,220
Design and Consulting	<u>100</u>	<u>600</u>
TOTAL	\$ 1,200	\$ 4,800
Penetration	40 per cent	60 per cent

Converting these to annual figures the growth of the domestic market served from Canadian sources can be projected as:

	<u>\$ Million - Average Per Annum</u>		
	<u>1976</u>	<u>Coming 5 Years</u>	<u>Following 5 Years</u>
Equipment	12	64	396
Services	79	156	444
Design and Consulting	<u>3</u>	<u>20</u>	<u>120</u>
TOTAL	\$ 94	\$ 240	\$ 960

While Canadian content regulations are useful, and are endorsed, the regulations will only be effective if the ocean industry develops the technological expertise to serve the needs. The issue of technology development is dealt with elsewhere in the report.

Using an estimate of 20,000 man-years of work per \$1 billion of expenditures (\$50,000 output/man-years), the total direct employment generated in Canada by domestic offshore expenditures would be:

1978 - 1983	-	\$240 million/year x 20,000 man-years/\$billion = 4,800 jobs
1983 - 1988	-	\$960 million/year x 20,000 man-years/\$billion = 19,200 jobs

These figures assume that expenditure will follow the conservative assumption. If the optimistic assumption were to be realized and the Canadian penetration remained as above the Canadian jobs would be:

1978 - 1983	-	40,000 man-years/5 years = 8,000 jobs
1983 - 1988	-	156,000 man-years/5 years = 31,200 jobs

This estimate is quite conservative because the experience in Scotland in 1977 was that they captured 30,000 direct jobs in Scotland per \$1 billion of investment in the United Kingdom sector of the North Sea.

Another estimate using Statistics Canada data on oil industry capital expenditure and employment concluded that the direct growth in ocean industry employment would be 20,000 jobs with an additional 150,000 indirect jobs created in other areas of the economy.

While these jobs would be created in all parts of the country there will be much greater percentage impact on Atlantic Canada.

In 1976 ocean industry employment was 3,200 supplying to both the domestic and export market. The domestic market represents an opportunity for the industry to grow tenfold during the next ten years.

While this growth is important to the ocean industry the exploration for and development of Canada's offshore oil resources is vital to all Canadians.

RECOMMENDATIONS

- (1) Governments take positive steps to create a stable, long-term, economic and regulatory environment which will encourage the exploration for and development of Canada's offshore petroleum resources.
- (2) The Federal Government implements Canadian content regulations in conjunction with Bill C-20 to provide Canadian industry a fair opportunity to supply the goods and services required by offshore oil and gas activity.
- (3) The Federal Government contracts out more of its offshore scientific, engineering data collection and hardware requirements to the ocean industry. This will help to develop the expertise needed to meet Canada's offshore resource development needs.
- (4) The Department of Industry, Trade and Commerce should provide increased resources of manpower and finances to assist in the development and penetration of the ocean industry into the domestic market.

8.2 EXPORT MARKETS

ISSUE

The manufacturing sector of the industry has, in the absence of a domestic market, relied heavily on the export market. This export orientation should continue and be encouraged. As noted in the ocean industry sector profile, the world market is estimated to be \$6 billion per year.

BACKGROUND

Eighty per cent of the output of the manufacturing segment of the Canadian Ocean Industry goes to the export market. This is remarkable in an industry where it is generally considered that a domestic market is necessary both as a proving ground to technology and a base load for manufacturing.

However, necessity is the mother of invention. The pioneers in the industry, while always anticipating a significant domestic market, have had to penetrate the export market to survive. This export orientation will continue. The emergence of a strong domestic market will provide an improved base from which to increase foreign market penetration.

Major factors in the export performance of the industry have been the strong leadership and encouragement provided by the Ocean Industries Division (Industry, Trade and Commerce), Fairs and Missions Branch (Industry, Trade and Commerce), Trade Commissioner Service (Industry, Trade and Commerce) and the Export Market Development Program (Industry, Trade and Commerce). Continued support of ocean industry exports by these groups is important to the future success of the industry.

There have been suggestions that the budget for some of these activities, in particular support of Canadian participation at foreign trade exhibitions, may be reduced. This is viewed with great concern.

A further aspect of international marketing is the growing trend for countries with offshore resource developments to implement national preferences in purchasing goods and services. This trend, while understandable and indeed proposed for Canada, is potentially restrictive and could lead to excessive constraints in the market. It is suggested that consideration be given to negotiating reciprocal market access with other countries preferably on the basis of each country supplying international markets for specific technologies or product areas. If this could be achieved each country could benefit by having a world market for specific technologies rather than a limited market for a wide range of expensive technologies.

RECOMMENDATIONS

- (1) Industry, Trade and Commerce support of ocean industry export marketing be continued and strengthened in conjunction with the proposed ocean industry trade association.
- (2) Consideration be given to negotiation with other countries to establish reciprocal market access on an equitable basis and preferably for specific products and services.

8.3 INCENTIVES FOR EQUITY INVESTMENT

ISSUE

The Canadian Ocean Industry is composed principally of young, high technology companies. The current uncertainties of the domestic marketplace and the long lead time/high cost of technology development make this industry a distinctly high risk investment but with an excellent probability of an associated high return in the medium to long term.

As a result the ocean industry, while requiring substantial investment if it is to develop Canadian capability to exploit Canada's offshore resources is not attracting sufficient risk funds under present conditions.

BACKGROUND

The sector profile emphasizes the substantial technological achievements of Canada's fledgling ocean industry in the past decade. While no financial performance statistics are available for the industry the profile does note that ocean industry companies "have a high ratio of R & D costs/annual sales and long lead time from product inception to actual sales. This often results in significant financing problems".

Analysis of some Canadian companies in the ocean industry, indicates that few, if any, have yet achieved a positive balance in accumulated earnings.

While the future potential is very positive when offshore resource development takes place, the short-term financial rewards are not high. As a result it is difficult to attract equity or debt financing. This picture is consistent with that of all emerging industries in high technology fields.

A mechanism is needed to make high risk equity investment in ocean industry attractive to Canadian corporations and individuals. This could be achieved by providing equity investors with a tax deduction against their taxable income, a concept which follows established precedents. Investment in a Canadian exploratory oil well is now eligible for a deduction against taxable income of up to 166 per cent depending on well location. Investment in a Canadian film is also eligible as a deduction against taxable income.

The analogy of investment in the Canadian Ocean Industry to investment in an offshore exploratory oil well is particularly close. Both investments are highly speculative, the return, if any, will be many years in the future, and the return in most cases depends on finding and marketing Canadian offshore oil and gas.

This form of incentive to investment has been a positive tool in both the movie and oil exploration industry. It is suggested that it can be equally effective in generating the equity investment needed to finance the growth of the fledgling ocean industry so that it can fulfill its role in Canada's offshore development.

RECOMMENDATION

It is proposed that resident Canadian corporations engaged in high technology, high risk ocean industry be allowed to offer equity investors the following tax incentives:

- (a) A 150 per cent tax deduction against ordinary income of equity investment in ocean industry made by Canadian corporations or individuals.
- (b) Such investments, when sold, should be subject to capital gains (25 per cent) tax on the entire value received upon such sales.

Appendix IV provides examples of the impact of such regulations on both individual and corporate investors.

8.4 TAXATION

ISSUE

The ocean industry is composed of small manufacturing/service companies struggling to compete internationally and domestically against foreign companies which have the benefit of a home market and strong support from their national governments. A number of measures in the taxation and duty regulations create particular financial difficulties for Canadian Ocean Industry companies and, in some cases, place them at a disadvantage relative to their foreign competition in competing for the Canadian market.

BACKGROUND/RECOMMENDATIONS

(a) Duty Drawback

Ocean industry manufacturing companies are engaged in development and construction

of systems utilizing a wide variety of components, a proportion of which must be imported. Eighty per cent of the finished products are exported. The period between import of components and export of completed systems is often in excess of one year.

Present regulations require the companies to pay duty on components at time of import with a drawback (rebate) of those amounts when the completed system is exported. Processing of a drawback claim can take up to six months. As a result the company is forced to tie up a proportion of its working capital in an area which yields no return.

For some companies the funds tied up in duty drawback represents 15 per cent of available working capital. The financing of a line of credit for this and the paperwork associated with maintaining documentation and preparing drawback claims represent additional costs for the small company.

RECOMMENDATION

That appropriate government departments devise a system for handling temporary importations without requiring payment and subsequent drawback of duty, while still maintaining the necessary controls to ensure compliance with tariff regulations.

(b) Loss-Carry Forward

Existing tax credits and allowances are only useful if a company is currently profitable or will be profitable within the present five-year limitation on loss carry forward provisions. The financial situation of the ocean industry, the long lead times associated with technology development, and the uncertain timing of the Canadian market for ocean products, all suggest that the ocean industry will not qualify.

RECOMMENDATION

The five-year limitation on loss-carry forward be extended to a minimum of 10 years with provision for further extension depending on the state of the industry as a whole.

(c) Federal Sales Tax

The ocean industry, particularly the service sector, must compete in the domestic and foreign markets against foreign competitors who have substantial domestic markets. As a result it is relatively easy for them to expand their operations into Canada and to offer services at rates which are based on utilization factors far in excess of that possible for a Canadian company which must, in the domestic market, contend with: the following:

- (a) The offshore operating season in Canada is limited to about four months.
- (b) The market is at present very small.
- (c) Prime offshore prospects are located in geographically and environmentally hostile areas.

A foreign supplier of offshore services can frequently bring his goods in the country for short-term use in offshore operations tax and duty free against an exempt certificate supplied by the Canadian client. A Canadian company which buys similar equipment for use offshore, or on other similar resource operations, must pay duty plus 12 per cent federal sales tax unless it can prove it has a firm requirement for the continuous use of such equipment in an appropriate tax exempt operation for 12 months.

This restriction acts against Canadian companies in our domestic market.

RECOMMENDATION

Equipment purchased by a Canadian corporation primarily for leasing to companies

engaged in offshore operations should be exempt from payment of federal sales tax at time of acquisition regardless of the length of the equipment's initial offshore use.

(d) Capital Cost Allowances

It was noted earlier that the short domestic field season and the small market create difficulties for the ocean industry service companies. At the same time they must compete against foreign competition whose prices are based on better utilization rates. Many Canadian service companies are striving to develop foreign markets to improve utilization rates and profits.

An effective way to enable the Canadian company to combat the advantages held by foreign competitors is through the Capital Cost Allowance (CCA) schedules. An incentive in the form of an increased CCA would reduce the taxation burden during the development phase of a new or expanding company and defer payment of tax until a later date when the companies and the market have matured.

RECOMMENDATION

Equipment purchased for primary use in offshore operations or for use in the manufacture or development of offshore hardware be included in Class 12 or other appropriate classification having a minimum prescribed rate of 100 per cent.

(e) R&D Incentive

The ocean industry is technology intensive with a high ratio of R&D costs/annual sales. The Task Force supports the recent budgetary measures to promote R&D in Canada and encourages the government to move even further. The recently announced target of Canadian R&D expenditure of 1.5 per cent of GDP by 1983, with increased emphasis on R&D performed by industry, is commendable. The Task Force considers it essential for governments to put in place the mechanisms to achieve this target.

For the ocean industry, the Canadian Ocean Technology Research Authority (COTRA) proposed in this report will both increase R&D expenditure and ensure that the R&D is performed in industry.

RECOMMENDATION

Governments should encourage increased industrial R&D and that COTRA be the principal vehicle to achieve this in the ocean industry.

8.5 TECHNOLOGY DEVELOPMENT

ISSUE

The exploitation of resources underlying Canada's continental shelf and slope - much of which is covered by ice or infested with icebergs, and subject to harsh climatic conditions -- is a formidable technological challenge.

The development of the necessary technologies to meet the challenge of our "last frontier" will require the combined efforts of industry and government. A mechanism to stimulate private sector investment in ocean industry has already been suggested.

A national "Canadian Ocean Technology Research Authority" (COTRA) is suggested to provide a focal point for government stimulus.

BACKGROUND

The technological challenge of resource recovery from Canada's continental shelf and the need to establish this challenge as a national priority has been recognized in a number of studies and policies.

Steward and Dickie in the 1971 Science Council Report Number 17 "Canada-Ad Mare" recommended the establishment of a crown corporation - as a means of stimulating and funding the development of appropriate technologies.

Canada's Ocean Policy enunciated in 1973, stated that "Canada within 5 years achieves world recognized excellence in operating on a below ice covered waters".

Pallister Resource Management Limited in a 1977 study for the National Research Council entitled "Steering a Course to Excellence" recommends that "a strong focus be placed on developing ice technology in Canada with a priority to exploiting Canadian resources, stressing new concepts.....".

The Pallister study also notes that "governments of nations which have a strong presence in ocean technology have universally played an essential role in assisting local service companies to gain leadership in chosen technologies, through direct and indirect research and development support. Technological excellence has been found to be the only effective means of achieving national content".

The European Economic Community (EEC) has, in the past two years, provided \$80 million to fund 55 offshore technology development projects, with matching funds provided by participating European companies.

Canada, if it believes in its ocean resource potential and the desirability of developing same with maximum Canadian content, must be prepared to invest in the development of appropriate technologies to be applied by Canadian industry.

The oil industry investment in offshore technology development in Canada, while significant, has been constrained by the uncertainty as to the pace of offshore development and uncertainty as to the technologies needed to develop specific sites. The ocean industry, while it has invested heavily relative to its size, is not in a position to provide the financing needed to support technology development on the required scale.

Governments have, through the Enterprise Development Program (EDP) and unsolicited proposals under the Make-or-Buy Policy, provided financial support to manufacturing companies for specific projects. However, the scope of the funding in relation to the technological needs of Canadian resource development is small. Furthermore the service companies, which must be an integral part of any technological development, are not eligible for financial support from EDP.

It is the opinion of the Task Force that a more direct and positive approach is needed to address the development of Canadian technology for Canadian offshore resources. The proposition has been made that the economic opportunities and technological barriers in the development of offshore hydrocarbons is analogous to the Alberta oil sands. This latter opportunity is being stimulated through co-funding by public and private funds in conducting the research and technological development projects leading to the establishment of domestic capabilities under the Alberta Oil Sands Technology and Research Authority (AOSTRA). A similar program to tackle the technical challenges of bringing offshore resources to market would provide a means of developing the embryonic talents of the Canadian ocean industry during the period prior to the potential rapid expansion of the domestic market. Examples of some specific R&D projects can be obtained from the study, "Research and Development for Ocean Engineering in Cold Regions" being prepared by Pallister Resource Management Limited for the National Research Council.

While the analogy between oil sands and offshore hydrocarbons is considered valid, the source of funding is different. AOSTRA has the heritage fund royalty revenues of the Alberta Government as its source. In the offshore situation it would be federal funding and it is suggested that funding in excess of \$100 million over a five-year period needs to be made available to support technology development. The return on the investment could come from future federal oil royalties and the industrial benefits of the ocean industry.

RECOMMENDATIONS

- (1) It is recommended that governments establish a Canadian Ocean Technology

Research Authority (COTRA) to support Canadian development of technologies needed to develop Canada's frontier resources. It should be funded to a level of \$100 million over five years.

- (2) It is recommended that guidelines be established to make Canadian Ocean Industry service activities eligible to participate in the Enterprise Development Program. There should also be investigated, the need for a government loan repayment guarantee for service companies to purchase Canadian-built equipment.

8.6 EDUCATION AND TRAINING

ISSUE

Seventy per cent of the people employed in Ocean Industry are in the professional and skilled category. The possible tenfold growth in the industry during the coming decade will create a substantial demand for additional professional and skilled people with relevant ocean experience. How is this demand to be met?

BACKGROUND

A striking characteristic of the Ocean Industry is its high percentage employment of professional and highly trained people -- many of them engineers. Harvesting resources from beneath the ocean is "frontier engineering" both in a geographical and technical sense. The single most important resource which the nation can have in order to be master of these frontiers is developed expertise. If the appropriate supply of trained people are available, and are given the opportunity to gain experience and knowledge, Canada's offshore resources can be developed with Canadian expertise. The price for not doing this properly will be to lose the opportunity to already well advanced foreign competition. If hydrocarbon development were to occur rapidly -- and sudden expansion is its salient characteristic -- an "expertise vacuum" will be created. The minimum response time of education institutions is of the order of five years. It would seem clear that in this situation there is no question of being able to wait for the job before we produce the people. If we wait we won't need them -- the rewards will have been taken by others.

How does a fledgling ocean industry find work for all the trained manpower developed in anticipation? The answer is not simple, but it would appear to be necessary for the nation to make some investments in its own future by doing some of the "Frontier engineering" work now (COTRA) and also arranging for Canadian graduates to obtain expertise in other parts of the world and be available to return to Canada, with developed expertise, when the demand arises.

Canada has no undergraduate program in ocean engineering. However programs in naval architecture/marine engineering or shipbuilding engineering have been started or proposed at the University of British Columbia, Memorial and at Nova Scotia Technical College. Ocean engineering activity at the graduate and research level at Memorial involves about 25 graduate students.

Although this is a nucleus, this scale of ocean engineering educational facility will not meet the potential demand.

It is also necessary to consider carefully the need for trades and technical training. A new breed of technician with a double specialization -- his usual skill plus the ability to apply it in the ocean environment -- is probably required.

An increased level of ocean technology will contribute to ensuring that the environmental impact is minimized in offshore operations.

RECOMMENDATIONS

- (1) Department of Industry, Trade and Commerce examines and attempts to quantify Canadian Ocean Industry requirements for manpower over the next five to ten years.
- (2) Governments consider these needs in relation to existing professional and technical ocean engineering training facilities and be prepared to adapt and/or expand training facilities as needed.
- (3) Governments and industry examine the possibility of arranging foreign assignments for newly trained people pending the development of Canadian needs.
- (4) The Task Force endorses the funding of Centres of Excellence.
- (5) Industry makes increased use of personnel transfer programs between universities and industry.

8.7 TRADE ASSOCIATION

ISSUE

The ocean industry, composed of small specialist companies spread across Canada, does not have a mechanism to speak with a unified voice on behalf of the industry.

BACKGROUND

The rapid growth of the industry in the past decade has resulted in the emergence of numerous small, specialist firms each providing their own product or service. Their small size, geographic distribution and inevitable concentration on survival and growth has tended to limit communication. The Ocean Industries Division of the Department of Industry, Trade and Commerce has provided an invaluable service in acting as a focal point and clearing house for the industry. However, it is recognized that the Department of Industry, Trade and Commerce cannot be expected to act as an industry spokesman nor can it be expected to continue to provide all of the services normally associated with an industrial trade association.

The establishment of an industry trade association, actively supported by the member companies, would help to draw the industry together, provide common services such as statistics and provide the industry with a common voice in discussions with the petroleum industry and governments.

RECOMMENDATION

Companies in the industry have established a committee to create a Canadian Ocean Industry Trade Association. It is requested that the Department of Industry, Trade and Commerce provide assistance to the association during its formation.

8.8 OTHER OCEAN INDUSTRY OPPORTUNITIES

ISSUE

The Task Force, in line with the definition of ocean industry stated in the sector profile and the expertise of Task Force members, has concentrated on industry opportunities related to offshore non-renewable resources.

The Task Force is however strongly of the opinion that Canada's 200-mile limit and inevitable development of the fishing fleet offer substantial opportunities that should be pursued and which fit within a logical definition of ocean industry. Ocean mining will increase in importance.

BACKGROUND

Canada's 200-mile limit declaration provides the opportunity to significantly increase

the Canadian fishery. In 1975 the total catch for the Continental Shelf off of Atlantic Canada was 3.8 million metric tons, of which 2 million, slightly more than half, was taken by foreign vessels. Canada has the potential to considerably expand its fleet by displacing the foreign fleet.

Presuming some recovery in fish stocks, it is reasonably forecast that within the next 10 to 15 years Canadian Atlantic Coast landings of ground-fish will be two to three times present Canadian levels. Assuming 50 per cent improvement in catch per unit of effort Canada will require a doubling of its fishing power to catch three times the quantity of fish.

There are at present more than 200 Canadian vessels exceeding 100 feet in length fishing the Gulf of St. Lawrence and Atlantic areas. The long-term Canadian Atlantic fleet is estimated at 400 to 500 equivalent vessels. Allowing for the fact that existing vessels will be replaced with larger vessels with increased catching capacity the probable future fleet size will be 350 to 400 vessels. Assuming a 20-year vessel life there will be an ongoing requirement for 20 new vessels per year.

At a current cost of \$5 million per vessel this is \$100 million per year. Approximately 35 per cent of the total cost of a vessel is for the equipment (engines, deck gear, fish processing hardware, electronics, etc.) installed on the vessel. Most of this is now imported from outside Canada. The potential Canadian market for fishing hardware installed on vessels represents \$35 million per year.

Nets and associated over-the-side fishing gear are a consumable item. It is estimated that gear replacements represent a cost equivalent to 2 cents per pound of groundfish landed with a lesser cost for pelagic fishes. The total gear costs for the Northwest Atlantic fishing effort (Canadian and foreign) is estimated at \$50 million per year.

These two market areas represent at least \$85 million annually, a portion of which could be served by Canadian industry.

Other fishing related hardware and service opportunities include shore based processing equipment, ocean surveillance and fisheries management. Military requirements represent another market opportunity.

There is considerable concern that these and other opportunities for Canadian industry are not being actively encouraged, particularly fisheries related opportunities.

RECOMMENDATIONS

Government appoint a Task Force to examine the hardware manufacturing and service opportunities related to the Canadian fishing industry and recommend actions which can be taken to capitalize on these opportunities.

APPENDIX I

OCEAN INDUSTRY CONSULTATIVE TASK FORCE

T.B. Nickerson (Chairman)
Vice-President
Nova Scotia Research Foundation Corporation

R.A. McLean
Principal Consultant
The Dalcors Group

A.E. Pallister
President
Pallister Resource Management Limited

W.L. Weber
President
Lockheed Petroleum Services Limited

H. McDonald
President
McDonald Research Associates Limited

Dr. A.A. Bruneau
Vice-President
Memorial University

J. Furst
President
NORDCO Limited

R.L.I. Fjarlie
President
Fathom Oceanology Limited

R.B. Oldaker
Past-President
International Hydrodynamics Company Limited

Dr. H.R. Kivisild
Vice-President
Fenco Consultants Limited

D. Binney
Senior Vice-President
Bow Valley Resource Services Limited

G. Thompson
Marketing Manager
Marine and Land Communication Division
Canadian Marconi Limited

OCEAN INDUSTRY CONSULTATIVE TASK FORCE (Continued)

A.H. Green
President
Marinav Corporation

Dr. J.H. Allen
President
McLaren Atlantic Limited

G. Smith
Manager, Ocean Data Systems
Hermes Electronics Limited

LABOUR UNION ATTENDEES

R.T. Philp
OCAW

E.P. Himes
Seafarers International Union of Canada

D.T. McGrath
Canada Food and Allied Food Workers

SECRETARIAT

M. Brennan
Industry, Trade and Commerce

M.J. Colpitts
Industry, Trade and Commerce

OBSERVERS AND ALTERNATES

R.J. Mephram
Atlantic Region
DREE

R. Domokos
Department of Finance

V.J. Chapin
Labour Canada

G.E. Hughes-Adams
D.R. Kerluke
P. Woolford
Department of Industry, Trade and Commerce

A.J. Roche
P. Furlong
Department of Industrial Development, Newfoundland

F.N. Wood
K.L. Farquharson
Department of Development, Nova Scotia

C.L. Bernier
Ministère de l'Industrie et du Commerce, Quebec

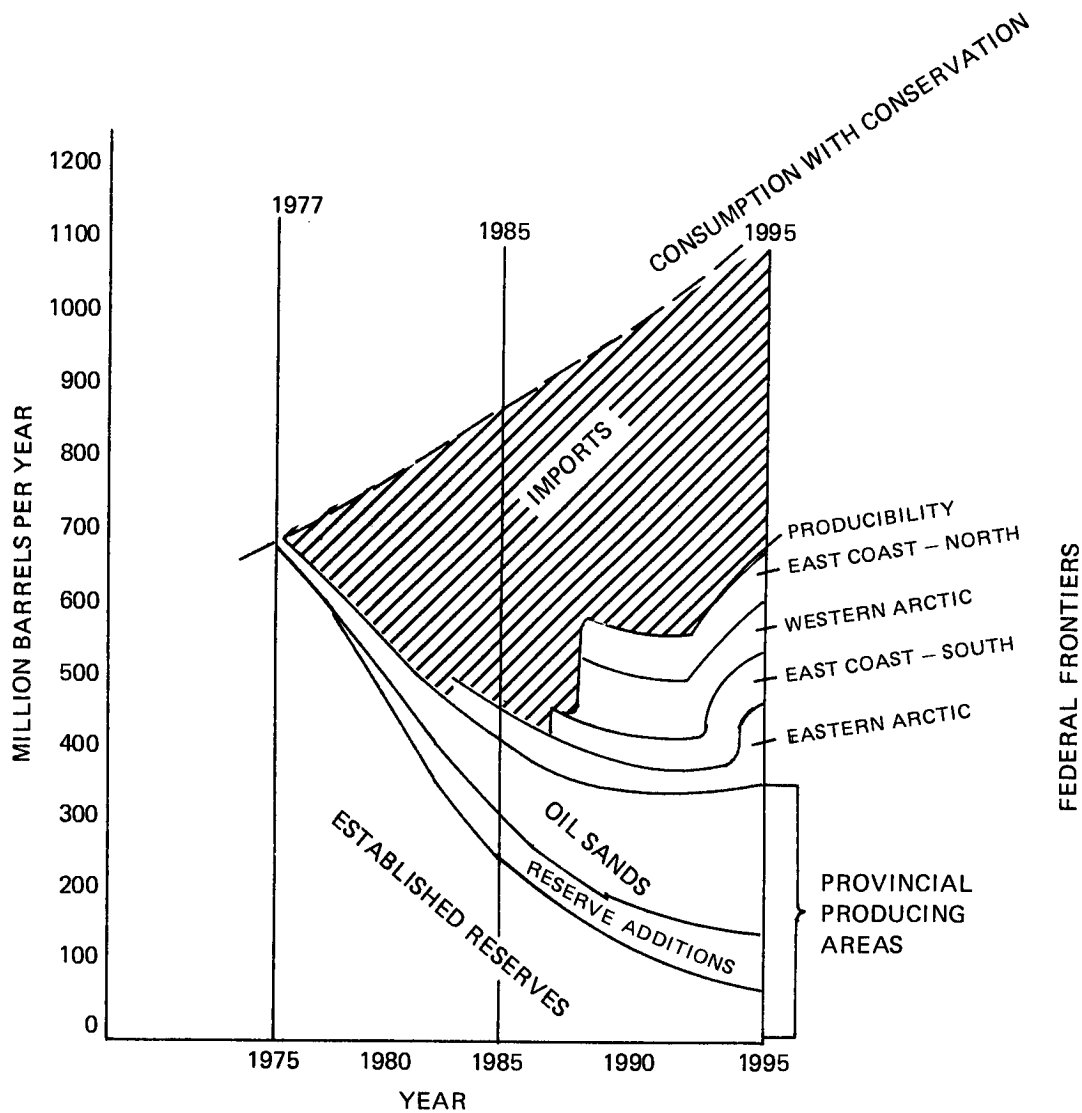
DCEAN INDUSTRY CONSULTATIVE TASK FDRCE (continued)

F. MacKay
R. Coke
W. S. Doggett
Ministry of Economic Development, British Columbia

G.R. Peters
Memorial University, Newfoundland

APPENDIX II

EXHIBIT 1
DOMESTIC CONSUMPTION AND PRODUCIBILITY
OIL



NOTE: Exhibit 1 and 2 are not forecasts of the amount of oil and gas that Canada is likely to produce between now and 1995: rather, they are projections of what might be obtained from the maximum exploration and development effort that we are realistically capable of mounting between now and 1985, an effort that would require changes in our present policies.

APPENDIX III

PROJECTED ANNUAL EXPENDITURES IN OFFSHORE OIL & GAS
EXPLORATION AND DEVELOPMENT
CANADA

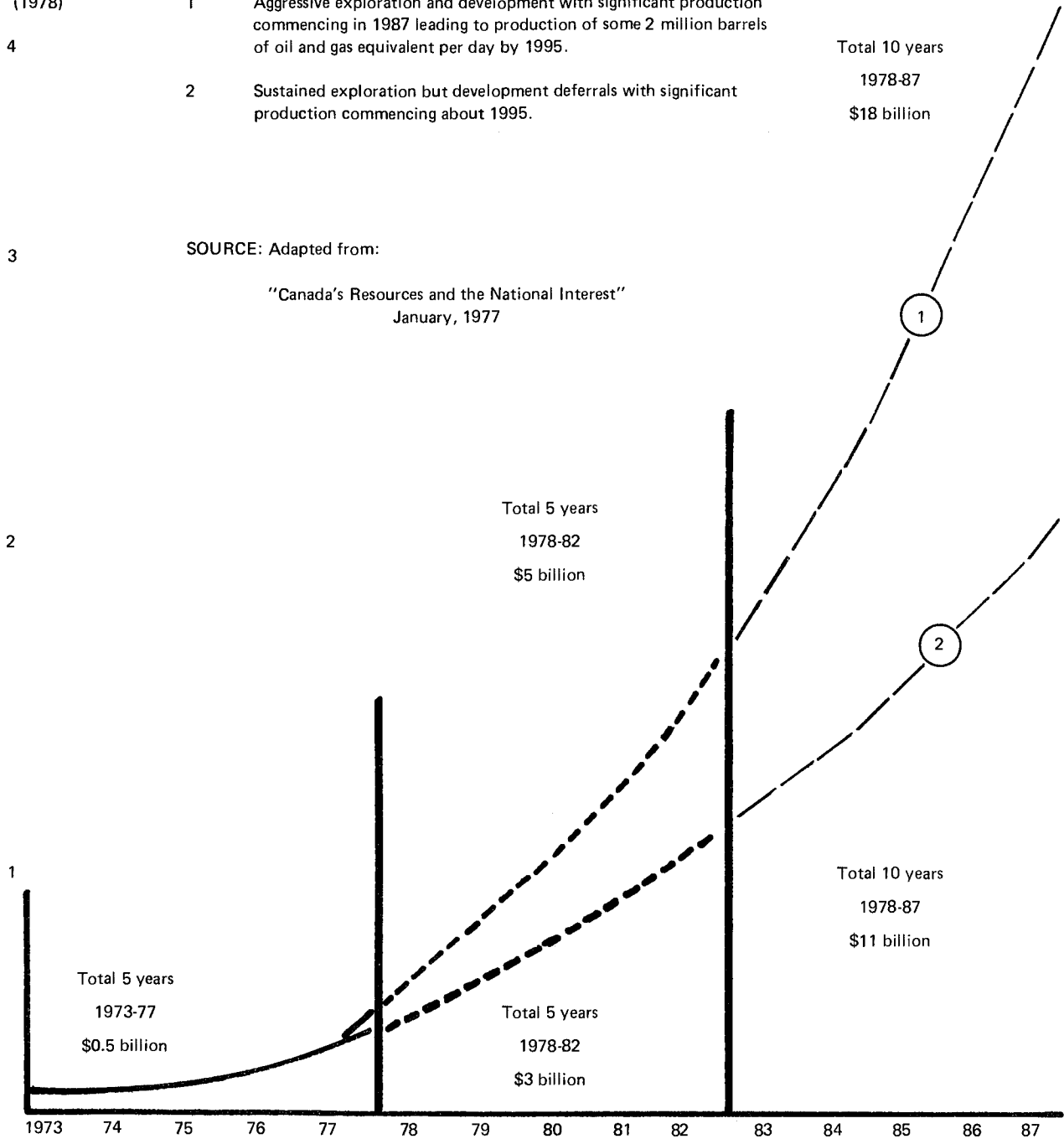
\$ Billion
(1978)

- 1 Aggressive exploration and development with significant production commencing in 1987 leading to production of some 2 million barrels of oil and gas equivalent per day by 1995.
- 2 Sustained exploration but development deferrals with significant production commencing about 1995.

Total 10 years
1978-87
\$18 billion

SOURCE: Adapted from:

"Canada's Resources and the National Interest"
January, 1977



APPENDIX IV

IMPACT OF PROPOSED TAX DEDUCTION FOR EQUITY INVESTMENT

Examples of the impact of such tax legislation upon both corporate and individual investors follows. The examples assume a taxable income of \$50,000 and a \$10,000 investment in an ocean industry company. Case A shows the approximate tax payable before the special deduction proposed and Case B shows the approximate tax that would be payable after deduction of the 150 per cent investment deduction.

Corporations

Case A	Tax at 46 per cent of \$50,000	\$ 23,000
	Less small business deduction of 21 per cent of \$50,000	- 10,500
	Less Federal tax abatement of 10 per cent of \$50,000	- 5,000
	Plus average Provincial tax of 12.5 per cent of \$50,000	- 6,250
		<u>\$ 13,750</u>
Case B	Taxable income after deducting 150 per cent of investment would be \$35,000	
	Tax at 46 per cent of \$35,000	\$ 16,100
	Less small business deduction of 21 per cent of \$35,000	- 7,350
	Less Federal tax abatement of 10 per cent of \$35,000	- 3,500
	Plus average Provincial tax of 12.5 per cent of \$35,000	- 4,375
		<u>\$ 9,625</u>

The difference between taxes payable in Case A and Case B equals a tax savings of \$41,125 to a corporation making a \$10,000 investment in an ocean industry company.

Individuals

Case A	Federal taxes payable on \$50,000	\$ 14,380
	Plus Provincial taxes at average for Canada (50.9 per cent of Federal tax)	7,319
	Total taxes payable on \$50,000	<u>\$ 21,699</u>
Case B	Taxable income after deducting 150 per cent of investment would be \$35,000	
	Federal taxes payable on \$35,000	\$ 9,040
	Plus Provincial taxes at average for Canada (50.9 per cent of Federal tax)	4,601
	Total taxes payable on \$35,000	<u>\$ 13,641</u>

The difference between taxes payable in Case A and Case B equals a tax savings of \$8,058 to the individual making a \$10,000 investment in an ocean industry company.

The tax savings to corporations and individuals with taxable income in excess of \$50,000 would, of course, be even greater than the above examples show.

SECTOR PROFILE

THE OCEAN INDUSTRY IN CANADA

THE OCEAN INDUSTRY IN CANADA

DESCRIPTION OF THE OCEAN INDUSTRY SECTOR

Early activity in the offshore areas was dominated by the acquisition and application of scientific knowledge of the oceans. In the last decade, scientific activity has been overtaken by commercial activity as economic and political factors affecting the cost and supply of oil and gas have acted as a major catalyst for the development of hydrocarbon resources located in the world's offshore areas. The vast expenditures incurred in the worldwide offshore energy search and exploitation have provided significant business opportunities across many traditional industry sectors and have contributed to the development of new companies not related to traditional sectors. More recently, it has been recognized that the oceans can contribute to the social and economic environment in other ways. Ocean mining is being actively pursued, aquaculture (ocean farming) is being evaluated, and generation of energy from tidal and wave action is a distinct longer term possibility. These new developments will also generate requirements for new equipments and services. In addition, Canada is facing increasing responsibilities of managing the resources of its continental shelf. This responsibility will impose a significant requirement for ocean science instrumentation and equipment in order to understand, monitor and manage these resources.

To provide a focus for these activities, a new industry grouping has emerged called Ocean Industries. This sector, then, is composed of those establishments which manufacture equipment or provide services for all commercial and scientific activities in the oceans. Marine transport vessels and traditional fishing support equipment, however, are generally excluded. In Canada ocean industry equipments are not identified individually or collectively by the Standard Industries Classification because they include products from many current industrial groupings. As well, because it is a fledgling industry, there is little relevant historical data and the projections contained in this document are necessarily speculative.

The industry in Canada, although still small, is growing in size, output and technological capacity. Equipment such as drill ships, sub-sea production systems, sub-sea surveying systems, manned and remotely controlled submersibles have been developed and are marketed internationally. Over the past eight years annual sales by Canadian companies have risen from a few million dollars to more than \$200 million in 1976. Current exploration activities for hydrocarbons in Canadian waters is providing a continuing impetus for the development in Canada of industrial, technological and scientific competence and capacity to exploit offshore natural resources.

If, as anticipated, commercial deposits of oil or gas are found off the East Coast or in the Arctic, and given the right environment, significant industrial benefits will accrue to Canadian industry. Logically, much of the industrial growth can take place in regions such as the Atlantic Provinces.

ENVIRONMENT

The severe dislocation of petroleum supplies caused by the Arab oil embargo in the early 1970s and the longer run implications of OPEC's pricing has provided incentives for accelerating the development of hydrocarbon resources located in the world's offshore areas. Currently oil and gas exploration and production activities are underway in many offshore areas including the North Sea, Brazil, Gulf of Mexico, Canada, Australia, Southeast Asia and India. In the longer term 40 to 50 countries are expected to support such activities. In 1976 worldwide expenditures on oil and gas operations in the offshore were estimated at more than \$6 billion.

Exploitation of hydrocarbon resources in offshore areas began about 20 years ago in the shallow waters of the Gulf of Mexico. Many components of the operating systems used then were identical to those used for land operations. In the last decade, as the price of oil and gas rose, offshore operations moved progressively to deeper waters and more hostile environments. In support, new technologies were developed and a large industry, fiercely competitive and highly mobile has grown internationally.

American service and equipment supply companies, as a result of pioneering oil and gas exploration in the Gulf of Mexico, dominate many aspects of the world's offshore hydrocarbon operations. These companies over the years have established close working relations with the major oil companies, resulting in a petroleum infrastructure in both technical and financial fields. European industry and governments, through

the North Sea development, have recognized the potentially long-term industrial benefits from offshore hydrocarbon activities. These governments and others are actively promoting, through legislative and funding support, the development of indigenous industries with technical capabilities, to take advantage of the current and future ocean industry worldwide markets.

In Canada, the ocean industry market is still small. Canadian companies must compete in the highly competitive international market, unlike those based in other countries, where viability is often provided through preferential support in a dynamic home market, or through special relationships with oil companies. Consequently, while Canadian companies can offer a broad range of equipment and services, their volume of business is small in terms of the international market, their financial base is weak and profitability fluctuates sharply. In spite of these drawbacks, some Canadian companies have developed an internationally-recognized technical capability in areas such as manned and unmanned submersibles, survey systems, sub-sea oil well systems, pollution control equipment and oceanographic instrumentation. Many of these companies have grown with the new technology requirements of the ocean industry and were not in existence as late as 1969, when total Canadian ocean industry sales amounted to about \$5 million. In 1976, industry sales amounted to about \$200 million. A large portion of expenditures for offshore oil and gas activities go to the service contractor. The development of a broadly based service industry in Canada has been hindered by the lack of a significant domestic market and difficulties encountered by companies in obtaining adequate financing.

While the current Canadian government position encourages exploration as fully as possible, there is no legislation requiring foreign oil companies to utilize Canadian expertise when operating in Canadian waters. The conditions under which exploration permits are issued by Energy, Mines and Resources and Indian Affairs and Northern Development do little to encourage the oil company or its contractor to source in Canada.

The Advisory Committee on Industrial Benefits from Natural Resource Development, chaired by Industry, Trade and Commerce and with participation from other departments, does evaluate most proposals for resource development on Canadian lands with the objective of maximizing industrial benefits to Canada. The Committee, however, can only attempt to meet its objective by suggestion and moral suasion. The multinational oil companies are extremely reluctant to alter their sourcing from their traditional foreign suppliers with whom they have worked in other countries. In view of the current lack of legislative Canadian content requirements, there is little incentive for oil companies to use capable Canadian suppliers in their operations. Consequently, Canada risks being dependent upon foreign operators not only for the primary production of its resources but also for most of the ancillary goods and services which might otherwise provide the most important direct impact upon the local economy.

In 1973 a new Canadian oceans policy was announced, the key element of which was that "Canada must develop and control within its own borders the essential elements needed to exploit offshore resources". Other important elements of the policy included:

- "Canada stimulates development and effective participation of Canadian industry in the plan to see that Canada controls the essential industrial and technological ingredients to exploit offshore resources".
- "Canada... achieves world-recognized excellence in operating on and below ice-covered waters".
- "increased development and application of ocean engineering at selected universities and government laboratories".

INDUSTRY IN CANADA

As ocean industry equipment is supplied by elements of many industries, little or no relevant historical data exists. In order to describe the types of companies in this sector, they have been categorized into three distinct groupings: core companies whose production and services are significantly allocated to the ocean industry market, secondary companies a portion of whose activities are destined for this market, and tertiary companies which have the capability to produce equipment and supply services for this market once the exploitation of offshore resources commences. The Department of Industry, Trade and Commerce has developed some data on the core companies, however little or no relevant data exists on secondary or tertiary companies.

INDUSTRIAL ORGANIZATION

Size and Characteristics of Industry

There are approximately 180 companies in Canada whose production and services are either totally or partially devoted to this sector. Forty of these can be considered as "core" companies since they depend on this market for the majority of their revenues. These companies offer virtually 40 different products or services for a single market and generally have the following characteristics:

- sell low volume/high value custom-engineered products or services.
- employ mainly highly skilled people.
- mainly Canadian owned.
- have a high ratio of R&D costs/annual sales and long lead time from product inception to actual sales. This often results in significant financing problems.
- have a strong potential for a several-fold increase in sales when the Canadian domestic market develops to its full potential.
- must compete internationally with foreign firms much larger than themselves, yet have achieved significant export sales successes to date.
- many have world leading technology in a specific technical area.

The remaining 140 "secondary" companies have sold or have plans to sell into the ocean industries market, but their principal products are currently directed toward traditional land-based and marine markets. These companies can range in size from a few employees right up to large multinational companies with several thousand employees and, in many cases, have simply adapted their traditional products to meet the demands of this new and growing sector.

In addition, there is a group of tertiary companies offering products or services which could be applied to the ocean industries market but they have made no such attempts to date. Their involvement is only anticipated when the Canadian domestic market reaches the late exploration phase or the production phase. A large number of these companies are located in Atlantic Canada. This group of companies would include metal fabricators, helicopter operators, catering services, warehouse services, drilling materials suppliers, etc.

Sales

Sales data has been obtained directly from the core companies in this sector. Although total sales data from the secondary companies is not available, it is estimated to be about 50 per cent of total core company sales.

Table I
Core Company Sales – 1976 Estimated

	Total Sales (\$ Million)	%	Export Sales (\$ Million)	%	Domestic Sales (\$ Million)	%
Manufacturing	82.2	49.1	70.3	95.8	11.9	12.6
Service	80.3	47.9	1.5	2.1	78.8	83.7
Consulting Design	5.0	3.0	1.5	2.1	3.5	3.7
TOTAL	167.5	100.0	73.3	100.0	94.2*	100.0

Source: Companies

* This figure (\$94.2 million) does not reflect actual value added to Canada. A large portion of this amount is service revenue, and much of that represents amortization of very expensive foreign-built equipment. As activity increases offshore Canada, the percentage of Canadian participation may drop since no other Canadian service contractors exist to pick up this future business and are unlikely to be formed without a change in the business climate affecting them.

Table I shows that the manufacturing and service activities account for the majority of sector sales in roughly equal amounts, and that the large majority of manufacturing sales are to the export market while most of the service revenue is obtained from the domestic market. This is explained by the fact that the

Canadian market is currently in the exploration phase which relies heavily on service activities and necessitates that the manufacturers seek markets for their products in other countries which in general are currently in the production phase. No precise data is available on sector sales in previous years. However it is known that in 1969 most of the core companies were not yet in existence and total sector sales were likely well under \$5 million per annum.

Employment

Total direct employment by the core companies exceeded 3,200 in 1976. It will be noted in the table below that a significant number of employees are professionals. Predominant areas of expertise are engineering, geology, marine biology and geophysics. Approximately 46 per cent of the core company employees are located in the Atlantic Provinces, particularly Nova Scotia. No data is available relating to employment generated from sales made by the "Secondary" group of companies.

Table II
Composition of Labour Force
Core Companies Only

	<i>Mfg.</i>	<i>%</i>	<i>Service</i>	<i>%</i>	<i>Consulting and Design</i>	<i>%</i>	<i>Total</i>	<i>%</i>
Professional and Technical	519	24.7	288	28.5	67	60.0	874	27.0
Skilled	970	46.3	452	44.7	33	29.0	1,455	45.0
Unskilled	607	29.0	271	26.8	12	11.0	890	27.0
TOTAL	2,096	100.0	1,011	100.0	112	100.0	3,219	99.0

Source: Companies

Regionalization

Geographic distribution of the industry is illustrated in the following table:

Table III
Geographic Distribution of Canadian Ocean Industry Firms

<i>Province</i>	<i>"Core" Companies</i>	<i>Secondary Companies</i>
Ontario	10	37
British Columbia	9	32
Alberta	11	23
Quebec	2	19
Nova Scotia	5	19
New Brunswick	—	1
Newfoundland	3	6
N.W.T. and Yukon	—	2
P.E.I.	—	1
	40	140

With the development of East Coast offshore hydrocarbon reserves, it is expected that the proportion of core companies will increase in the Atlantic Provinces.

Ownership

Thirty-five of the 40 core companies are owned or controlled by Canadians and many of the smaller firms are privately owned. Those core companies which are foreign-controlled tend to operate independently of their parent corporation. Some of these foreign companies are among the largest in the Canadian industry today.

FINANCIAL CONSIDERATIONS

Summary financial data for this sector is not available. Furthermore, the accumulation of such data would be of limited value because of the diversity of products, services, size and structure of the core companies. Many of these firms do not normally separate the financial statistics related to their ocean industry product line from other product lines, and indeed many of the smaller privately-owned firms do not normally make financial information public.

In general, however, several basic financial characteristics run through this sector. Many hardware manufacturers must underwrite long and costly product development phases for their high technology products before any sales revenue is generated. Large gross margins are necessary to defray these costs and, when sales revenue does commence, it is often sporadic because of the low volume and high unit cost nature of their products. Cash flow difficulties along with volatile profitabilities often result in these situations.

Offshore service contractors are generally considered to be a crucial factor in the development of ocean technology and the ocean industry. It is important that Canada develop and encourage a broad and competitive service capability to take advantage of the anticipated large domestic market. For this to take place, they must have access to reasonable interest rates in order to finance the purchases of expensive capital equipment.

The capital investment requirements to bring an offshore oil or gas field into production in the ice-infested offshore areas of Canada are expected to be enormous. It has been estimated, for example, that up to several billion dollars could be required to develop a single field off the Canadian East Coast. Such projects dwarf the financing requirements of traditional on-land oil and gas developments. There will be substantial opportunity for Canadian financial involvement in these projects.

TECHNOLOGY

Over the last decade offshore activities have progressively moved to deeper waters and more hostile environments. This has required the constant development of new techniques and new designs in equipment and systems.

Canadian offshore environmental conditions are unique as a result of ice infestation. Internationally, foreign ocean service companies in resource development are most advanced and highly competitive. These firms could rapidly adapt their expertise to meet Canadian offshore requirements. To maintain a strong presence of Canadian companies in the development of Canada's oceans, an emphasis will need to be placed on advancing those technologies required to meet specific Canadian challenges.

Some Canadian companies have already demonstrated a technological competence in several areas such as manned and unmanned submersibles, survey systems, sub-sea well systems, pollution control equipment and oceanographic instrumentation. In addition, Canada possesses five excellent oceanographic research facilities, three federally supported (Bedford Institute of Oceanography, Nova Scotia; Canada Centre for Inland Waters, Ontario; and the Institute of Ocean Sciences, Patricia Bay, British Columbia) along with two provincially supported facilities (Nova Scotia Research Foundation and the British Columbia Research Institute). These facilities could provide the technological base required for the effective development of the new technology that would be required to meet Canadian conditions.

In recent years, it has been demonstrated that close liaison between these institutes and private industry can result in commercially successful products for Canadian ocean industry companies. The federal government, through its "Make or Buy Policy", is encouraging these institutes to contract out goods and services which historically have been handled in-house.

MARKET

Ocean industry equipment and services are currently being absorbed by offshore oil and gas activities and, to a lesser degree, by marine science activities. Future requirements for equipment and services to support deep ocean mining operations and generation of energy from tidal and thermal gradient techniques have not been estimated here, as these types of activities are still basically at the concept stage and market requirements are not expected to emerge in the near term.

The myriad products and services utilized by offshore oil and gas activities, constant changing of technology and techniques, and the global scope of the market make it extremely difficult to provide a concise analysis and identification of opportunities for Canadian companies. Working within these parameters an attempt has been made to assess the current and future domestic and international markets.

Current Domestic Market

There are four main phases of offshore oil and gas operations, each having a different impact on equipment and service requirements. These four phases are:

1. Geological and Geophysical Surveys
2. Exploratory and Appraisal Drilling
3. Development Drilling
4. Production and Transportation of Hydrocarbons

In Canada, offshore activities in the Beaufort Sea, Arctic Islands and off the East Coast have required the equipment and services used in phases one and two above. The graph on the following page indicates the total expenditures by oil companies for these types of operations over the last nine years.

Of the \$106.5 million expended on drilling activities in 1976, the majority of the equipment used was foreign-built, while labour, supplies and transportation services were principally sourced in Canada.

Analysis of "other expenditures" in 1976 shows that \$36.1 million was expended on seismic surveys and that the majority of this work was captured by U.S.-owned Canadian subsidiaries using mainly foreign-built equipment and vessels. Deep seismic capability in Canada is dominated by foreign-owned companies and future expenditures on this type of activity in Canada are expected to be captured again by these companies.

Consulting services for engineering, environmental studies and ice surveillance accounted for about \$3.5 million in 1976. These activities were undertaken primarily by Canadian companies.

Beyond the \$146 million expended by oil companies in 1976, an estimated further \$20 million was spent on equipment such as navigational aids, pollution control and diving systems, supplied by Canadian companies.

The Ministry of State for Science and Technology has estimated that total Canadian government science and technology expenditures on oceans and ice-covered or ice-infested waters will be in excess of \$45 million this fiscal year, an increase of 7 per cent over last year. Less than \$7 million of this amount will go towards outside purchases of equipment and services. Many departments will take part in these activities with major roles for the Department of Fisheries and Environment, National Research Council, Department of National Defence, Department of Transport and Energy, Mines and Resources. Industry feels that there should be a higher level of government marine science subcontracting and that subcontracts should be given on a regular basis in order for firms to effectively plan their operations and amortize their expensive capital equipment.

The current domestic market for equipment for oil and gas and marine science activities alone has been too small to support Canadian industry. Those companies that are successful have had to penetrate the foreign market.

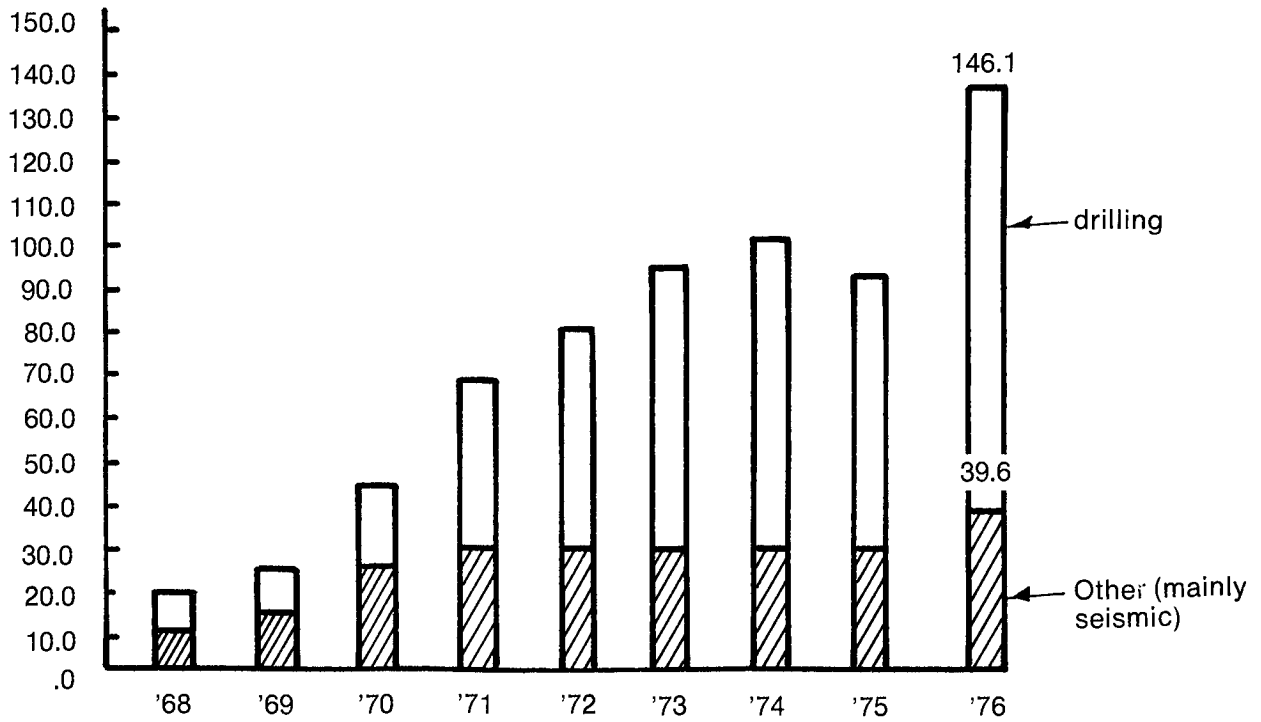
Potential Domestic Market

The future of the Canadian ocean industries market relating to offshore oil and gas activities alone depends on political, economic and technical factors and is difficult to accurately predict. However, assuming that future Canadian offshore operations will follow a similar development pattern to those of the North Sea, it is projected that an annual Canadian domestic market pessimistically estimated at \$500 million and optimistically estimated at \$2 billion could materialize by the mid-1980's. Due to the harsh environment in Canada's offshore areas, capital costs for developing and exploiting offshore hydrocarbons will be extremely high and will require unique design and engineering capabilities.

For the Arctic Islands, for example, feasibility and preliminary design and engineering studies are currently being undertaken to produce oil and gas resources. The development of sub-sea production systems for this area is currently underway and, if sufficient resources are found, close to 100 such systems may be required over the next ten years. Estimated expenditure on this hardware alone could exceed several hundred million dollars excluding the costs of sub-sea pipelines, conversion facilities and all supporting services.

Off the East Coast, ice conditions differ from those in the Arctic and unique production systems and techniques will be required. Exploration to date indicates the probability of large hydrocarbon reserves;

(\$ MILLION)



GRAPH 1
EXPENDITURES BY OIL COMPANIES
OFFSHORE CANADA TOTALS

preliminary design concept and feasibility studies are being undertaken for the development of these reserves. It has been estimated that, in order to develop these resources, up to \$8 billion will be expended over a period of ten years beginning in the early 1980s.

An example of the types and costs of equipment and services required for development of a single field, based on actual North Sea experience, is provided in Table IV.

Table IV
Estimated Capital Equipment and Services Required for a North Sea Hydrocarbon Field Development*

<i>Item</i>	<i>Main Cost Centre</i>	<i>Estimated Costs (\$ Millions)</i>	<i>%</i>
1. Platforms – Fully equipped and installed	Design, construction and management. Materials, equipment and deck modules. Diving systems, provision for derrick barges, work barges and supply ships.	\$ 700	64
2. Drilling – approximately 100 development wells	Drilling materials and drilling contracts. Supply boats for delivery of materials.	150	14
3. Submarine Pipelines – 100 miles	Design and management. Pipe coating, welding materials, pipe laying and burying contracts.	200	18
4. Marine Terminal	Design, construction and management. Materials Supply.	50	4
TOTAL		1,100	100

* *B.P. Forties Field*

Source: Study by Guildstream Research Associates.

Material costs represent about \$330 million of the above total, of which 20 per cent is for machinery and equipment, much of which is custom-engineered.

Because of the scale of operations, it is not feasible to expect Canadian industry to supply all equipment and services in the Canadian offshore. British industry for example, is currently securing only 57 per cent of the total value of orders placed in the British sector of the North Sea. This has occurred because of considerable support from its government. However, this domestic share of the British market has generated employment for an estimated 30,000 persons along with further secondary employment for another 30,000 persons. Table V details penetration by British companies into their own domestic market in 1976.

Table V
British Offshore Oil and Gas Equipment and Services Expenditures 1976

<i>Sub-sector</i>	<i>Total Market (\$ Million)</i>	<i>Domestic Sales by British Companies (\$ Million)</i>	<i>Market Penetration by British Companies %</i>
1. Capital Equipment	645	450	70
2. Services	1,100	500	45
3. Design and Consultants	170	140	82
TOTAL	1,915	1,090	57

Source: Offshore Supplies Office, Britain

Foreign Markets

In 1973 world total offshore oil and gas production amounted to about 535 million tons (415 million tons oil and 120 million tons gas). This was about 13.5 per cent of total onshore/offshore production. By 1980, it is forecast that world offshore production of oil and gas will represent between 25 per cent and 30 per cent of total world production. This would account for an increase of between 2.2 and 2.8 times the 1973 offshore production level and indicates clearly the extent of the general shift of the search for hydrocarbons to the world's continental shelves. Of course, future international oil and gas pricing policies could have a profound effect on this projection.

The estimated market for equipment and materials for offshore oil and gas activity is provided in Table VI below. The table reflects the total of announced exploration and production development plans for eight geographical zones.

Table VI
World Offshore Equipment and Materials Requirements – by Geographical Areas
1976 to 1981 Projected Totals

	Equipment			Exploration	Materials	
	Exploration	Production	Total		Exploration	Production
	(\$ Millions)				(\$ Millions)	
Western Europe	2,600	5,000	7,600	620	320	940
North America	1,640	3,080	4,720	240	240	480
South America	210	400	610	30	40	70
Central America/ Caribbean	400	440	840	40	50	90
Africa	900	1,340	2,240	90	120	210
Middle East	920	3,140	4,060	110	290	400
Far-East and Australasia	1,360	2,520	3,880	150	240	390
Communist Nations	1,690	2,190	3,880	160	220	380
TOTALS	9,720	18,110	27,830	1,440	1,520	2,960

Source: Scottish Council – Development and Industry Report.

A breakdown of the major items of equipment and materials comprising the above values is given in Table VII below.

Table VII
World Offshore Equipment and Materials Requirements – by Type
1976 to 1981 Projected Totals

Type	Units	Value (\$ Millions)
Drilling rigs and drill ships	160-200	3,000-4,000
Supply ships	530-600	1,500-1,600
Derrick/lay barges	25-40	700-900
Diving systems	375-450	140-160
Production platforms	165-200	10,000-120,000
Submarine pipelines	9,000-13,000 kilometres	4,000-5,000
Mud, cement, chemicals, etc.	—	600-800
Casing and other tubulars	—	500-600
Drilling tools and equipment, machine spares, etc.	—	500-600

Source: Scottish Council Development and Industry Report.

In addition to the exploration and production requirements, it is anticipated that a considerable market will materialize for equipment maintenance services (e.g. corrosion services, pipeline inspection surveys, etc.). This market in the North Sea alone has currently been estimated to be about \$150 million per annum and is expected to rise to \$500 million by the early 1980s.

Due to lack of present domestic capability, Canadian companies cannot be expected to compete internationally for such major items of equipment as production platforms, derrick/lay barges and certain pieces of drilling equipment. As well, no Canadian company exists to compete for the large submarine pipelaying contracts. These types of equipment and expertise have been developed largely through the North Sea and Gulf of Mexico.

Canadian companies have been successful internationally in supplying specialized equipment and services principally in the sub-sea surveying and production sector, and to some degree in petroleum engineering services. Currently two Canadian companies are developing new diving and support systems which will enable them to compete internationally.

GOVERNMENT INVOLVEMENT

Foreign

Major maritime nations – France, Britain, Japan, the U.S., Norway and others – exhibit varying degrees of government involvement in the ocean industry. Legislation governs coastal trading, local participation, exploration permit issuance, and several other facets of ocean industry activity. Advisory councils and committees exist in Japan, Britain, and other countries which recommend, implement and oversee programs designed to accelerate ocean industry research and development and to focus resources on specific goals.

U.S. law prohibits operations of foreign-built vessels within territorial waters. Import tariffs on exploration equipment prevent foreign drill rig activity. Its own firms are assisted with MARAD (Maritime Administration) loans and guarantees for 75 per cent of U.S. content and the loans are spread over 25 years.

In Britain, the Offshore Supplies Office (OSO) seeks to ensure full and fair participation for British industry. Its role is to provide advice on joint ventures and licensing arrangements; to purchase equipment leased back to British contractors; to use the Industry Act so as to foster British-foreign partnerships with companies which are experienced; to establish information banks; and to provide direct R&D funding. Foreign-based companies ultimately find that a local British partner is often required for participation in the British offshore play.

Japanese government sponsored ocean industry R&D budget appropriation, through Science and Technology Agency and the Environmental Agency, for 1977 was about \$120 million.

France's main thrust is through IFP (Institut Français du Pétrole) funding of ocean industry development. Through joint arrangements with various French private companies several million dollars are spent each year towards evolution of new hardware, systems and processes. Cold-water and Arctic applications are high on the list of developmental priorities.

Canada

Energy, Mines and Resources and Indian Affairs and Northern Development, through the issuing of exploration permits and leases, encourage Canadian content to a marginal extent. However, there is no legislation requiring Canadian content in exploration or production equipment and, in fact, large projects could be carried out with only minimal substantive Canadian involvement.

Industrial benefits from any resource development on Canadian lands and offshore are evaluated by the Advisory Committee on Industrial Benefits from Natural Resource Development, chaired by Industry, Trade and Commerce and with participation from other departments. While the Committee cannot force Canadian industrial benefits, it does evaluate most proposals and attempts through discussions with the companies involved to ensure that industrial benefits are maximized. In addition, when the production phase begins, a company must meet certain very limited "Canadian participation provisions" which are not defined and which are open to interpretation.

The National Energy Board proposed specific administrative procedures in relation to the Northern Gas Pipeline so as to achieve an optimum level of Canadian content in its construction. It would have required the

contractor to submit to the Board for its approval a report specifying the proposed contractual and purchasing arrangements for procuring goods and services for the project. However, the National Pipeline Agency now being proposed will probably carry out the same functions.

The responsibility for various ocean programs is scattered throughout a number of departments and agencies such as the Department of Industry, Trade and Commerce, Fisheries and Environment Canada, Transport Canada, Energy, Mines and Resources, Department of National Defence, National Research Council, and Indian Affairs and Northern Development. Attempts to have the development of the ocean industry included in the deliberations of the many related government, academic and industry committees (e.g. Canadian committee on Oceanography and the Panel on Ocean Management), has presented some difficulty because of the numbers involved.

On February 1, 1977, the Maritime Provinces Agreement was signed between the federal government and the provinces of Nova Scotia, New Brunswick and Prince Edward Island under which the federal government will administer the offshore oil and gas rights and formulate the operation regulations on behalf of these provinces. The province of Newfoundland has not accepted this agreement and has laid claim to its entire continental margin by citing international law and pre-Confederation rights. This jurisdictional dispute remains unresolved as of October, 1977. However, the governments of Newfoundland and Canada, and those of the other Atlantic Provinces, are in full agreement on the goal of industrial benefits to Canada from offshore oil and gas exploitation.



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