The Implications of Offshore Petroleum Development for Atlantic Fisheries: a Socio-Economic Overview

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Ces rapports contiennent les résultats des recherches et des progrès qui peuvent être utiles à l'industrie pour des applications soit immédiates, soit futures. Ils sont préparés à l'intention principalement des membres des secteurs primaire et secondaire de l'industrie des pêches et de la mer. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du Ministère des Pêches et des Océans, notamment gestion des pêches, techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

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Les numéros de 1 à 91 de cette série ont été publiés à titre de rapports sur les travaux de la Direction du développement industriel, de rapports techniques de la Direction du développement industriel, et de rapports techniques de la Direction des services aux pêcheurs. Les numéros 92 à 110 ont été publiés à titre de Rapports à l'industrie du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été changé à partir du rapport numéro 111.

La page couverture porte le nom de l'établissement auteur où l'on peut se procurer les rapports sous couverture cartonnée.

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The views expressed are those of the author and not necessarily those of the Department of Fisheries and Oceans.

Abstract

Grinnell, H. R. 1981. The implications of offshore petroleum development for Atlantic fisheries: A socio-economic overview. Can. Ind. Rep. Fish. Aquat. Sci. 124: 31p.

In the course of generating background data for Fisheries and Oceans policies, an attempt was made to identify the major possible costs and benefits of offshore petroleum developments as they relate to the fishing industry. To this end, the United Kingdom experience was drawn upon and examined in the context of two different economic and social milieu , - - the U.K and Canada.

The overview looks first at fishing operations, followed by fishing costs as affected by oil and gas developments, including comments on service and repairs to fishing vessels. At the same time we cannot avoid recognizing the interaction between community viability and fishing activities. Here the interests are primarily socio-economic in nature: social change, housing, cost of living, infrastructure, incomes, education and community environment.

The overview then remarks on institutions, political and other, within which all activities either fit or are governed. In closing, the paper identifies several potential opportunities for action by Fisheries and Oceans.

Key words: Fishing, petroleum impacts, costs, operations labour, communities, damages, compensation, environment, institutions, jurisdiction, analysis.

Résumé

Grinnell, H. R. 1981. The implications of offshore petroleum development for Atlantic fisheries: A socio-economic overview. Can. Ind. Rep. Fish. Aquat. Sci. 124: 31p.

Tout en fournissant des données de base pour la politique du ministère des Pêches et des Océans, on a tenté de déterminer quels peuvent être les

principaux coûts et avantages de l'exploitation pétrolière hauturière dans la mesure où elle touche l'industrie de la pêche. Dans ce but, l'expérience du Royaume-Uni a été étudiée dans le contexte de deux milieux socio-économiques différents, soit le Royaume-Uni et le Canada.

L'exposé se penche d'abord sur les activités de pêche, puis sur les coûts de la pêche, qui sont touchés par l'exploitation des gisements de pétrole et de gaz; on y ajoute des commentaires sur l'entretien et la réparation des bateaux de pêche. Nous ne pouvons que reconnaître en même temps l'interdépendance du bien-être des collectivités et des activités de pêche. Ici, les préoccupations sont avant tout de nature socio-économique : changements sociaux, logements, coût de la vie, infrastructure, revenus, instruction et milieu communautaire.

L'exposé se continue par des observations sur les institutions, politiques et autres, au sein desquelles toutes les activités s'intègrent ou sont dirigées. Pour terminer, on mentionne plusieurs mesures que peut prendre le ministère des Pêches et des Océans.

What are the Prospects for Offshore Oil Development?

From the stand point of geology and geography, there are strong parallels between the North Sea fields and those off Canada's Coast. (Figures 1 and 2). The geological structures have some similar features and the location of oil in the north, and gas in the south, combine to suggest that the two regions have much in common. Other parallels are the location of the major finds, both generally situated between 100 to 300 Km from shore and the water depth over the fields, some 40 to 200 meters. As for recoverable oil reserves, it is generally considered that those in the U.K. sector of the N. Sea exceed 15 billion barrels to which might be added large gas reserves. Off Canada's Atlantic coast the current estimate of recoverable oil is 1.0 billion barrels with production expected to begin in early 1987. Estimates of potential supplies of gas are less firm.

North Sea oil and gas exploration began in earnest during the late 1960's with activities of all types peaking some five to seven years later. The Canadian "play" began with exploration in the early part of the same decade but the first commercial discovery was not made until September 1979. It is a matter of speculation whether the staging of activities on the Atlantic coast is wholly related to "finds" or partially to the schedules of the multi-national oil companies as related to political situations, the availability of drilling rigs or cash flows. However, the regulatory agency, the Department of Energy Mines and Resources (E.M.&R.), is in a position to intervene in such situations since it is fully apprised of all exploration results.

The Fishing Industry and its Operations - A Comparison Between Canada and the U.K.

-- Recent history

The worldwide introduction of a 200 mile coastal fisheries management zone affected Canada and the U.K. in quite different ways. For Canada, it increased the availability of supplies whereas for the U.K., their distant water vessels were denied access to traditional waters and home supplies were put under new pressures. However co-incidental with the peak period of North Sea

petroleum exploration and the decline of the U.K. distant water fisheries, fish prices rose and returns to fishermen reached record levels. It seems that the thrust of the U.K. response to the closing of foreign waters was to expand her efforts closer to home and to employ smaller vessels. The Scottish fleet held its catch levels steady and the catch of the fleet based in England fell only marginally. Employment in U.K. fisheries in 1979 was above 1978 as were its landings of "demersal" fish from the North Sea.

In major centers of oil and fishing activity, like Aberdeen, there was a decline in the number of fishermen during the peak period of petroleum development but no mass migration to oil related activities. In this period of adjustment, many distant water trawlers were either tied up or converted to "stand by" safety vessels for the oil rigs; some ports like Grimsby, Hull, and Aberdeen, centres of distant water fisheries suffered, but fishermen were loath to leave the profession.

-- Vessel ownership

Indeed, in Scotland where the majority of Scottish vessels were independently owned, the crew, usually having shares in the vessel, had little interest in other employment during periods of inactivity when fishing was restricted.

The merits of the share system of vessel ownership are recognized even by large trawling companies such as John Wood, out of Aberdeen, which offers a 25% share of a new vessel to the skipper and combines this with a special bonus plan that permits him to purchase this equity over time and later to expand it.

-- Factors influencing ownership

The location of current U.K. fisheries permits the operation of mid-size fishing vessels offering easier ownership by independents. By the same token the many easily accessible fresh fish markets responsive to quality , the large number of buyers and the small volume of each vessel's landings, all fit into an effective and profitable harvesting and market system which strengthens this ownership pattern. This pattern of independent ownership, frequently on a share basis, holds the crew to the vessel despite vessel "tie ups" resulting

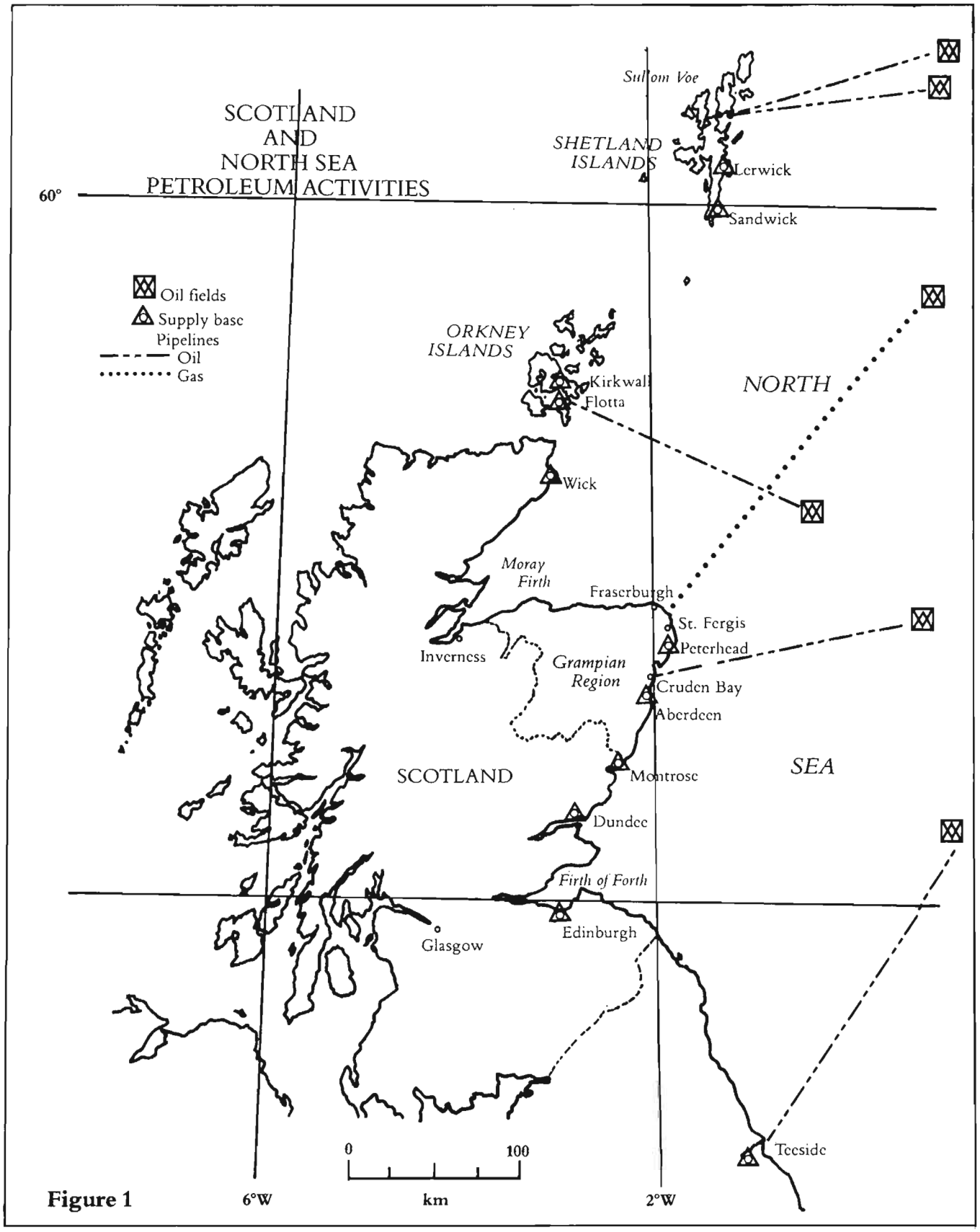
SCOTLAND
AND
NORTH SEA
PETROLEUM ACTIVITIES
Sullom Voe
SHETLAND
ISLANDS
Lerwick
Sandwick
60°
Oil fields
Supply base
Pipelines
Oil
Gas
ORKNEY
ISLANDS
Kirkwall
Flotta
NORTH
Wick
Moray
Firth
Fraserburgh
St. Fergis
Peterhead
Inverness
Grampian
Region
Cruden Bay
Aberdeen
SCOTLAND
Montrose
SEA
Dundee
Firth of Forth
Edinburgh
Glasgow
Teeside
0
100
km
6°W
2°W

Figure 1

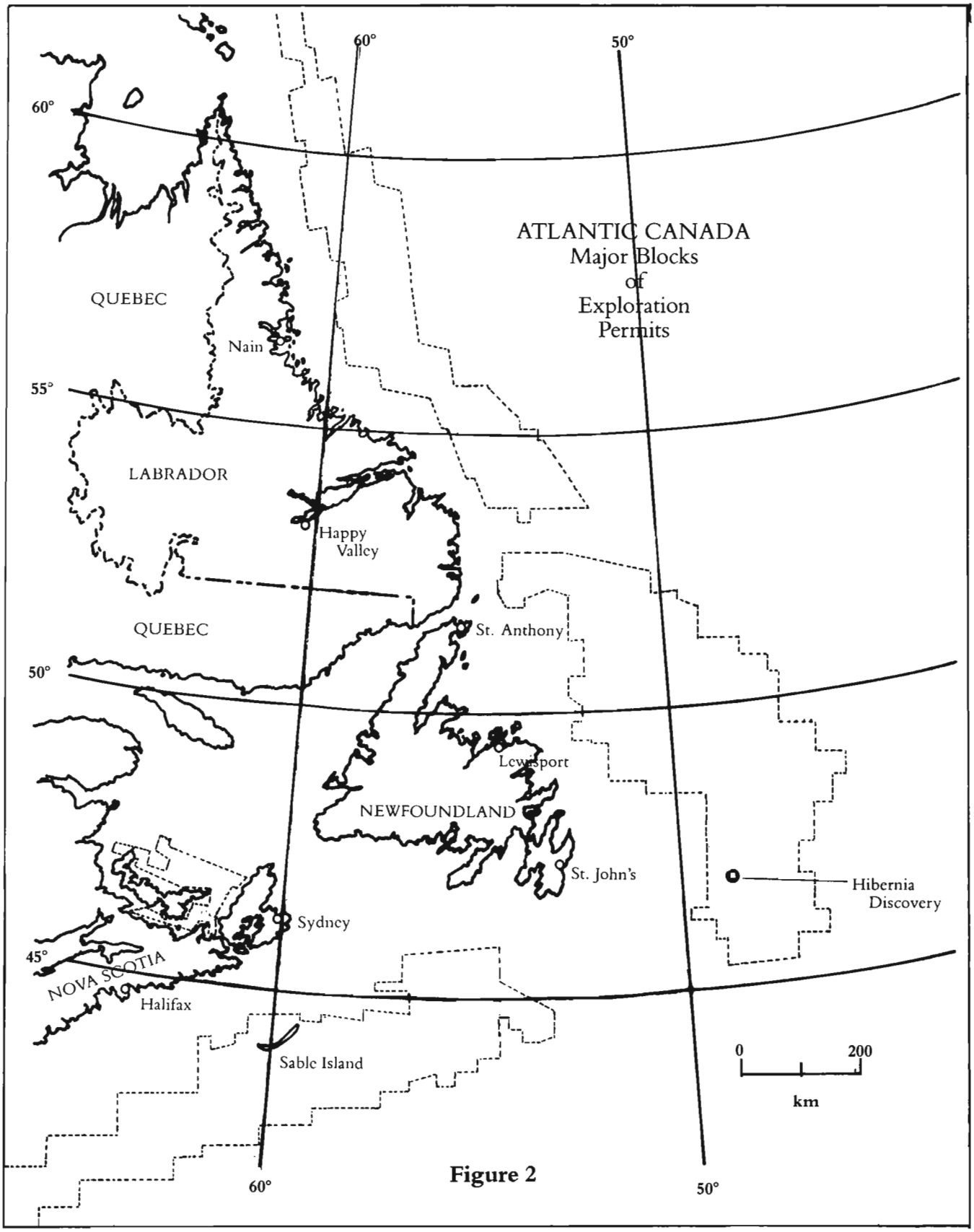
ATLANTIC CANADA
Major Blocks
of
Exploration
Permits
60°
50°
55°
45°
QUEBEC
LABRADOR
NEWFOUNDLAND
NOVA SCOTIA
Nain
Happy Valley
St. Anthony
Lewisport
St. John's
Hibernia
Discovery
Sydney
Halifax
Sable Island
0
200
km

Figure 2

from quota limitations. Under these circumstances, loyalty, job satisfaction and profit sharing gives fishing a strong weapon to fight the petroleum industry for labour. One vessel inspected, a 110 ft. seiner delivered in the past year at a cost of $4,800,000, had a shared ownership by 12 crew members!

A rough interpretation of catch data for the whole U.K. fleet places the majority of the catch within 75 miles of its coasts. In Shetland, almost 80% of the catch is taken within 50 miles of its coasts. The small vessels generally fish at distances less than 40 miles from shore.

Number of Fishing Vessels by Size Class

Scotland (1979) Length Ft.	No.	Length Ft.	Nfld. No.	N.S. (1978) No.
110-140	24	over 100	89	125
80-110	56			
70-80	201	65-100	18	86
60-70	275			
50-60	320	35-65	1,049	2,116
40-50	215			

In 1978, landings of groundfish in Newfoundland and Nova Scotia totalled 417,000 tons and in Scotland 385,000 tons. The preponderance of seining vessels or combination seining and trawling vessels in the U.K. groundfish fleet indicates a difference in fishing techniques and possibly fishing conditions, from those common to Canada. Of the U.K. landings of groundfish in 1978, 13% was caught by the distant water fleet, 22% by the near or middle water fleet and 65% by the inshore. In 1979 the distribution was 9, 21 and 70 respectively.

In Canada's Atlantic fishery we find few parallels. Canada operates many more large (100' plus) vessels of which in 1976 some 90% were company owned. At that time this fleet took 33% of all landings, mostly groundfish. In Scotland only 18% of the 1978 catch was taken by vessels 80' or more in length. A comparison of the fleet operating from Scotland to that of the combined N.S.

and Nfld. fleets suggests that the former relies heavily on vessels in an intermediate size range whereas the latter stresses either the large or relatively small.

Fishing Costs and Petroleum Developments

From the standpoint of costs to fishing, four elements are directly affected by petroleum activities either onshore or offshore: (1) labour; (2) repair or service; (3) port congestion; and (4) interruptions in fishing operations by rigs and/or sea bottom obstructions. Each, in turn, is related to the operational base of the vessel, vessel type, and ownership; the scheduling of the petroleum activities, particularly its peak and intensity of the activity; and the location of the drilling and pipeline placement vis-à-vis fishing grounds. Let us look at labour first.

-- Labour -- working conditions

We are familiar with the ability of the petroleum industry to offer high wages and relatively steady work on either "rigs" or service vessels but does the industry compete with fishing? For the U.K. the answer has been, not too strongly. The reasons are several but perhaps the most significant are working conditions. These include such divers elements as whether a fisherman either owns the vessel on which he works or has a share in its ownership, to the physical conditions of work.

Perhaps the most important is the stimulation and satisfaction derived from working on a vessel in which you have some share of ownership. Next to that is working closely with a small crew on a profit sharing basis and lastly, sharing in catch revenues on a larger vessel. In Shetland and Scotland, the first two conditions appear to dominate, providing an almost unshakeable stability to a large component of the work force in fishing.

Other factors influencing labour supplies to fishing are the working and living conditions associated with oil and gas, social amenities and the perceived status of the jobs offered. Working on rigs, where accommodation is provided will be attractive to some, but the routine repetitive nature of the

work is unsatisfactory to others. This applies to seamen on the service vessels as well. As for social amenities, it is generally agreed that where temporary camps are in use, they must be well supplied and of the highest order, otherwise unrest makes labour hard to hold and those that remain tend to destabilize communities with serious results. As for the status jobs in the petroleum industry, the early glamour is soon lost. Work on the rigs is recognized as monotonous and isolated but, above all, the two weeks on and two weeks off working schedules are disruptive to normal home life. The percentage of unmarried workers on exploration and drilling is the highest of all categories of work in oil-related firms in Aberdeen.

-- Demands for skilled labour

One of the perceived fears of the fishing industry is the loss of better trained skilled workers. Indeed, well qualified and experienced tradesmen and technicians are quickly absorbed into the oil and gas industry. But some skills do not require a depth of formal technical training. One aspect of so-called skilled labour needs of the oil industry is met by "on the job training". Apparently many of the specialists used in different phases of drilling and "rig" activities are trained as apprentices. In support of this contention, 41.6% of the male employees working on exploration and drilling out of Aberdeen were age 29 or less. For workers on supply vessels and helicopters, the figure was 22.5%. Alberta petroleum activities are worthy of study in this regard. This suggests that with some advanced knowledge of industry needs and carefully staged development of oil fields, considerable employment of local labour is not only possible but also practical, particularly from the standpoint of industry. In the U.K. the demand for skilled labour has already peaked and recent BBC programs have described the plight of a growing number of unemployed petroleum workers.

-- Effects of labour demands on other industries

In Shetland with a total population of less than 20,000 and little or no unemployment, the impact of petroleum related employment opportunities on other industries is said to have been large. Women from the processing plants were quickly absorbed into service jobs related to the camps and plant

construction. The knitting industry has declined. It appears that industries utilizing part-time workers have received the brunt of the impact. It need only be said that the Sullom Voe terminal work force exceeds 4,000 and much of the staff is housed in temporary quarters. The job opportunities, although temporary were tremendous when we look at the total resident population of the Islands. Concern is expressed that neither the knitting industry nor the fish processing industry will fully recover from the impacts.

Aberdeen, with a population of some 180,000, and a relativley high unemployment rate in both the city and the adjacent Grampian Region, adjusted more easily and slack in employment was reduced by oil industry employment. However, negative effects on local industries in the way of increased wage costs or labour shortages do not appear to be serious. Over 5000 new people have come to the city, particularly to fill jobs offered by new employers. These include companies providing helicopter services, diving skills and other highly specialized services which do not infringe on traditional labour suppliers. Statistics for the Grampian Region, encompassing Aberdeen and Peterhead, where unemployment had been the highest and wages some 14% below Scottish and U.K. averages in 1974, fell further behind to over 20% in the two years that followed the peaking of oil activities, despite the fact that the Grampian Region had more oil related jobs than any other Scottish region.

Peterhead, second only to Aberdeen, among Scotland's fishing ports maintained its fishing community and fishermen but male labour in its processing plants found other work attractive. It is said that the significant result of the labour shortage has been the modernization of processing facilities whereby production could be maintained with reduced labour inputs.

-- Area affected by new demands on labour

Shifts of labour from one community to another are strongly influenced by cost of living differentials and transportation factors. At the key centres of oil activity, Aberdeen, Peterhead, Lerwick and others, the cost of living, particularly housing, has risen sharply cancelling out the benefits of higher wages and steady work. (In Aberdeen, existing housing tripled in price over the period 1970-74 when development activities rose towards their peak).

Interestingly, this impact did not extend much beyond ten miles from the centres themselves. Perhaps the price of petrol @ $3.75 to $4.25/gal. minimizes the radius of the influence. For example, Fraserburgh, a fishing town some 12 miles from the oil service port of Peterhead, is relatively unaffected by oil activities. The mobility of Newfoundland labour, as indicated by studies, may contribute to a different response in that province.

-- Fishing vessel service and repair costs

Interestingly, although the demand for vessel service has multiplied many times, the permanent nature of the fishing industry vis-à-vis petroleum, combined with loyalty to long standing customers, has given the fishermen first call on services. Costs have risen but not significantly above the inflationary rate, with the rises primarily related to higher labour rates in the trades rather than high demand pressures. In smaller ports like Lerwick, the fishermen/service relationships appear to be very strong with engineers and fitters ready to work long hours, even on Saturdays and Sundays, to make a fishing vessel ready for sea.

Service and repairs to transient fishery vessels stopping in an oil rig service port are reported to be another matter. It was stated by officers from one trawling company in Hull that their vessels, calling in for repairs at Aberdeen, are faced with costs at least 30% above home port levels and in some cases 50% higher for specific items.

Part of the answer to stable costs of service to fishing vessels is given by the fishing industry itself. Some larger and more aggressive U.K. fishing companies, providing service to the petroleum industry in addition to their fishing activities, prepared themselves well for the increased demand for service by hiring U.S. consultants to guide their expansion programs and match the new facilities to the needs of the offshore rigs. Apparently these adjustments have not been done at the expense of the fishing industry.

-- Fishing harbours and ports

In the early phases of oil exploration and development, it is obvious that port crowding can be a serious problem and intrude on space available for fishing vessels. Initially this happened at both Aberdeen and Peterhead but facilities were soon expanded and the problem solved. However, in Shetland, the decision was made to avoid friction by building a deep water port at the new terminal site itself. Only more recently has significant expansion taken place elsewhere in Shetland, essentially adjacent to the harbour of Lerwick. This has intruded on the visual aesthetics of the old city, but is of such a low profile that it would go on unnoticed in our less aware environment. However, the environmental sacrifice has perhaps increased the scope for longer term industrial activity complementary to the urban community. It should also have side benefits for the fishing industry. A point of interest to planners is that all harbours in Shetland were placed under the control of the Council to ensure comprehensive planning and integrated development.

At Sullom Voe, the Council went even further to protect its interests by participating in a company that provides the harbour tugs and services. In this context it is said that the fishing interests of the area are well protected in that the skippers of such vessels are ex-fishermen and very much aware of fishing needs.

The Shetland Island Council took a further piece of the action by participating equally with the oil companies in the construction, development and operation of the Sullom Voe Terminal through a limited liability non-profit corporation. This ensured the Council a flow of information as to what might happen as well as what was happening in the way of tanker traffic and environmental impacts.

-- Fishing costs and marine pollution

It has yet to be documented worldwide that oil spills and "blowouts" have caused widespread, major and long lasting damage to offshore marine life. This includes the commercial stocks of pelagic and demersal fish species. Coastline damage and the tainting of sensitive shellfish by oil has occurred.

However, the unknowns may prove to be very serious, particularly the potential damage to fish larvae and its effects on year class strength. At this point in time, the apparent problems for the majority of fishermen appear to be damage to nets from underwater debris and installations, lost time from fishing, damage to gear from oil, and reduced access to fishing grounds. The U.K. experience is worthy of close examination. Also, the Kurdistan disaster off Atlantic Canada, which resulted in very high damage payments, gives some understanding of the dimensions of cost associated with spills and the potential for damage to the fishing industry.

-- Underwater debris and installations

Damage to gear usually occurs from underwater debris resulting from trenching along the sea floor to bury pipelines, material dumped or lost overboard, sea anchors abandoned or lost and production installations on the sea floor, usually capped wells. Most of these obstructions are known and mapped but others are not and some are subject to movement by trawls, etc. Often they are of unknown origin. Indeed there are anti-dumping regulations but to date there has been no requirement for marking of equipment and supplies used by the petroleum industry in U.K. waters to enable lost or discarded materials to be identified as to ownership. The regulations are therefore ineffective. Marking is obviously difficult and expensive, suggesting the value of cost/benefit analysis of alternative procedures.

Under the U.K. Continental Shelf Act (1964) wilful or culpably negligent damage to pipelines is a subject for civil action against the skipper/owner of the vessel causing the damage. A point of interest is the declared policy of the offshore oil industries which states that it is preferable to them to have fishermen sacrifice their gear when it becomes entangled with underwater installations, and receive compensation, rather than to carry out costly repairs and initiate litigation.

Lost fishing time stems first from "down time" caused by gear damage or loss, or vessel damage (including propeller damage), and second, from the need to avoid known obstructions such as pipelines, rigs, etc. In the U.K., "down time" has more recently been recognized and made subject to compensation

up to a fixed maximum but this has not included vessel damage. Such damage is presumed to be covered by standard insurance protection. The time lost avoiding obstructions and rigs, with their adjacent safety zones, has not been subject to compensation. However, "disturbance" payments were made to the Shetland Island Fishermen's Association in connection with the laying of the two pipelines to the Sullom Voe terminal in Shetland.

-- Loss of access

Loss of access to fishing grounds results in extra steaming time, as above, but also crowding and possibly lower catches from waters occupied by oil installations, either because the total fishing area is reduced or the actual yield falls off. Safety zones of some 500 meters, established around installations, are the main cause of reduced access in the UK. Although some fish congregate around production platforms and immediate populations are heavier, it is not known whether fish are attracted into these zones reducing their numbers in adjacent waters or whether yields increase as a result of changes in the marine environment. It is conceivable that these zones could become nursing areas and their yield spill over into adjacent areas resulting in increased availability. In short, except where a concentration of installations are interfering with the exploitation of sedentary species, no real case has been made for compensation. As to this last item, the exploration and development activities are in such heavy concentration in the high yielding Moray Firth fishery that a further look at the problem is now underway and may lead to compensation proposals.

The Extent of Compensation to U.K. Fishermen

Despite a well organized U.K. fishing industry, an interval of 5 years elapsed from the time of intensive oil and gas exploration in 1969 until compensation measures were put in place to permit fishermen to claim for damages to gear from "unattributable" oil related debris. As noted above, the Dumping at Sea Act of 1974 contained penalties for contravention of its provisions but the question of proof remained. It was in 1975 that the United Kingdom Offshore Operator's Association (U.K.O.O.A.) established a fund to cover such losses. At the outset of the plan no consideration was given to lost time and only in 1977

was it recognized and allowances first granted. At that time the maximum compensation granted for each incident was $500, not including damage to the vessel. This maximum has now been raised to approximately $2,000 per incident. Whether the levels of compensation were low or losses few is not clear but, to date, the total amount of compensation granted by the U.K.O.O.A. to fishermen is only some $310,000. The ease of access to compensation funds, and the institutions participating in the administration funds, will be discussed further in the paper under "Institutions". As noted above, there is as yet no compensation for loss of access.

Impacts of Petroleum Developments on Communities

Although the amelioration of social impacts might be viewed as the particular responsibility of other departments and levels of government, the economic importance of fishing to coastal communities and the relationship between the efficient exploitation of the marine resources and community stability, places a share of that responsibility with D.F.O. When viewed in this light it seems appropriate to offer a few brief comments.

-- Segments of communities suffer

Because of the distinct difference in levels of expenditure between the "build up" and production phases of petroleum field development, particularly the labour intensive nature of the first phase, the potential exists for unreasonable increases in the cost of living, particularly housing. The initiating factors are rising expectations and a relatively sharp increase in industrial activity with attendant increases in wages.

In the U.K. the differential in salary rates between labour inside and outside the petroleum industry, has been as much as 40%. The resulting attitudes towards the "benefits" of the petroleum industry are extreme. To many the short term impacts are almost wholly negative. In one particular case only about 1/3 of the local county families benefited either directly from the higher wages or indirectly in improved business. The remainder faced marked changes in cultural life, increases in cost of living, a squeeze on housing, crowding in

schools, and increases in taxation. Those suffering the brunt of change were senior citizens, civil servants and others in work areas of a more permanent nature.

-- Housing costs

Housing prices can be pushed up to the point where non-petroleum related labour are excluded from the housing market. In particular, this affects young couples just entering the housing market. Contributing to the U.K. problem, housing estates have been unable to proceed with construction because of the absence of trunk services resulting from rapid expansion of new developments. Whether the heavy involvement of the Regional Council and its related bureaucracy had a bearing on the situation, is unknown.

St. John's is already experiencing upward pressure on house prices despite its relatively large size and the impact resilience it offers. What will happen to smaller centres if, as is possible, one or two other communities are developed as service ports? Such centres will, per force, be located where "back-up" storage areas are satisfactory, the ports ice free, and the space for more extensive docking facilities exist. Such communities, because they are small when compared to St. John's, will be faced with almost unbelievable demands for housing. These demands can either be controlled and, through high quality planning and implementation, result in long term benefits, or if left uncontrolled, result in a chaotic situation where the future of the community may be jeopardized, environmentally and culturally. Currently Canada shows little ingenuity in the creation of environmentally acceptable housing estates where aesthetics have been given proper emphasis. In this area we have much to learn. In Aberdeen, an opinion was expressed that rather than sponsoring symphony concerts, the oil industry should contribute to community development by underwriting facilities that add to community amenity levels. The segment of the voting public targeted by the industry is readily apparent.

The Shetland Island Council took a very positive attitude towards housing. In anticipation of a sharp rise in demand followed by a levelling off after a five or six year development period, it decided to offer new permanent homes primarily to residents, and provide temporary accommodation for others.

There were some qualifications to this policy but, in essence, it seems to have been followed carefully and been effective. The temporary housing has been augmented, e.g. two cruise ships anchored at the Sullom Voe Terminal, each accommodating 300 persons.

However, it must be recognized that the jurisdiction and role of the Council in Shetland affairs is somewhat different from that of a council in Canada. The Council supplies some 60% of the housing and has strong powers of planning and development which were further strengthened by the Zetland* County Council Act. This was a central government Act which gave special powers to the Council to control development and as noted earlier, to actually become a partner with the oil companies in onshore activities. It also gave control of immediately offshore areas.

Most important in this whole scheme of things was the attitude of the Shetland Council. They took a very independent stand made possible by an existing stable economy and culture, albeit perhaps less materialistic than others, based primarily on a healthy fishing industry, a high demand for knit goods and a related small scale agriculture. They set the terms for development and, after some struggle, the oil majors agreed to them. The planning for, and selection of land-fall sites and the terminal, were made by the Council and based on their research. The oil majors were then assessed the cost of such planning studies.

-- Infrastructure and community planning

The importance of exploiting the short term benefits of petroleum development for long term gains cannot be over-emphasized. To this end, the planning of an infrastructure to accommodate new housing, communications, service and port facilities should take into consideration the implications for both environmental and cultural impacts. This calls for clear objectives, particularly in land use, community design, and construction standards, which in turn, require strong planning powers and orderly phased development.

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* Zetland - the ancient name for Shetland.

The U.K. experience varies, particularly because of differences in authority held by Regional Councils, eg. Grampian (Aberdeen at the center) and Shetland. Where authority is divided between jurisdictions, co-ordinated planning is difficult. For example, the Grampian Council Planning Authority has representatives sitting on the Aberdeen Harbour Trust Board but has no authority over it. The matching of industrial estates and back-up space for the harbour fall short of ideal. In contrast, the Zetland County Council Act gave to the local Council such authority over the Lerwick Harbour Trust. Without such authority it is probable that Harbour Trust would have acted to fill the need for expanded facilities by large scale construction at the existing port rather than selecting a new site. The additional facilities at Lerwick are modest when compared to Aberdeen.

However, the key to successful planning is early information on petroleum industry programs. A common complaint of U.K. administrators is that the oil majors did not provide sufficient advance information when it was actually available, to give the lead time necessary for good planning. Again some authorities were slow to move, not having a clear understanding of the potential impact of oil development but also, because they lacked perspective when it came to developments of the scale encountered. Mundane local matters blurred the vision of the larger picture. Trunk services, roads, and the basic elements of infrastructure were often not programmed in time to meet needs. Indeed it was clearly stated that greater pressure should have been applied to the oil majors to either state their needs or face arbitrary delays in the implementation of their plans. It appears that the more recent U.K. practice of slowing down the offering of blocks of sea bed for exploration should have been followed earlier. The Norwegian example, where some areas have been completely withheld from exploration and development, is perhaps worthy of study.

-- Infrastructure costs

Not only is the early planning for infrastructure development important but also decisions are required as to who is to shoulder the cost. With the advent of oil related industrial expansion in the Grampian Region, federal development grants to the Region were reduced without a commensurate increase in assessment for oil related industries and property taxes to cover

the cost of new service facilities. Local "rates" or taxes were increased yet the majority of those facing such taxes held jobs unrelated to the petroleum industry, and their wages had changed very little. With Shetland controlling the landfall of pipelines and drawing revenue from the volume of landings at the terminal at Sullom Voe, the need for higher tax rates was at least partially offset by revenues collected from the oil industry.

If there is one thing to learn from the U.K. experience, and is worthy of repeating, it is in the area of planning, implementation and realization of projects. The relatively short term high profit activities of the oil related industrial expansion should be carefully and fully exploited by small communities, particularly the more remote and vulnerable communities with limited prospects for alternative economic ventures. Community amenities, environmental values and visual aesthetics should be given the highest priority.

It may be that where a fishing community is threatened by relatively large scale changes to its social and economic life from new industrial activity, that two options are open, -- either to integrate the new associated urban development or to keep it separate, yet complementary. This decision must be carefully weighed.

-- The urban environment

Whenever offshore petroleum developments are mentioned, the focus of attention is usually the marine environment and the dangers of oil pollution. However, perhaps the most insidious and devastating effects of industrial development are those affecting the urban environment. This is a mix of both the physical development and the social attitudes engendered in the community. From the standpoint of the physical environment, the perception of aesthetic qualities, in either the natural environment or man's changes to that environment, is a reflection of its awareness of immediate surroundings and instilled values. Community participation in the planning process can be of great value in generating such awareness.

The visual qualities have economic connotations as well, since they influence the movement of people and capital. Only history records the effects

of their pervasive influence on the decline of the vitality of communities where those with mobility, and perhaps leadership, choose other centres for their homes and businesses. We might add that aesthetic considerations may be critical to the future value of tourism to a small community.

In one sense it is fortunate that development in Canadian offshore waters can be slowed down or adjusted to ensure adequate lead time for onshore planning through the Environmental Impact statement and subsequent review process interacting with the Department of Energy Mines and Resources, the regulatory agency for oil and gas development. However, that, in itself, does not guarantee a satisfactory result. Funds must be made available to implement plans and provisions made to ensure adequate administrative "back up".

Since the Shetland County Council collects revenue on each barrel of oil landed, this has given the administration greater financial scope for ingenuity in planning. The latest Council sub-division is a reflection of this attribute. The new homes are of interesting design and finish which complement the landscape rather than destroy it. They can give joy to those living in them!

Obviously the siting of oil and gas separating facilities or service facilities vis-à-vis the existing or future communities are inseparable planning opportunities. In Shetland permanent housing for staff at the Sullom Voe terminal is located at a distance from, and out of sight, of the terminal. The terminal with its oil and gas separation works and loading docks is confined to a single block of some 1000 acres or 1¼ miles square, a large area. The specific physical space and facilities needed by industry to carry on its onshore is a function of the rate of oil field development, the methods to be used in the transportation of oil or gas, and the degree of processing. Again, U.K. experience suggests that better advance information for planning could have been supplied earlier by the Majors and more orderly development and less expensive facilities could have resulted. Since the determination of the commercial viability of any oil discovery is only made possible after government decisions on royalties etc, there is ample opportunity for government to participate in both the scheduling of exploration and the rate of subsequent development. Indeed the oil industry reduces costs by rapidly developing and

exploiting discoveries, not only because of high exploration cost, heavy capital investments but also the rapid deterioration of sea installations. However, there must be a balance between the negative impacts of rapid development on the local communities and the added cost to industry of orderly scheduling.

-- Natural environment

In the U.K. great care has been shown to the natural environment, particularly the landfall for pipelines where, on careful searching it is often almost impossible to locate their route. Grasses on sand dunes have been replanted, ancient stone fences replaced exactly as they were built, and terminals located inland away from high quality coastline environments. Ample proof is provided that natural environments need not be downgraded by development.

As noted earlier of Shetland, the Council conducted the environmental surveys and selected the most appropriate points of landing. As luck would have it, a national wave of environmental awareness peaked at the time when oil came on stream, giving impetus to their call for legislative authority over development and the opportunity to protect environmental values. However, legislative authority in itself is not enough. The will of the people should be given the opportunity to express itself through institutions and organizations of its own making if programs are to be successfully implemented.

Institutions, - - Administrative and Political

The success of planning for, and control of, developments to generate the greatest benefits and minimize the costs are related to institutions either in place or created for that purpose. Institutions are, first, a structure or organization to achieve a desired end; they are the embodiment of social objectives; they are political and reflect the interests of people; and their strength is derived from cultures and the maturity of such cultures.

-- The United Kingdom milieu

In Scotland and Shetland, fishermen are well organized and speak with strong voice; government planning and related controls are firmly established;

deep cultural mores shape the flow of ideas; and political leaders have a rich background of education and experience. In short, their institutions are mature, healthy and active. The result, politicians do not play lightly with major issues! Such is the local milieu in which the petroleum industry began its development. Those in Atlantic Canada must be aware of their local milieu, the strength of their institutions, and the determination of their leaders. They must answer the question, are the institutions strong enough to initiate measures to exploit the potential benefits of change yet withstand the outside pressures that can bring about the ultimate destruction of cultural values?

In the UK, at the national level of government, the large economic picture dominated thinking. As a result of a serious balance of payments situation stemming from O.P.E.C. pricing strategies, the Government pressed for the quick exploitation of the new found oil fields. Despite the enormous costs of introducing new technology to unlock the deep undersea resources, the high world prices for oil kept the operations exceedingly profitable and development moved apace. As it has turned out there were other unexpected costs. "Petro inflated pounds" exerted downward pressures on national production to the detriment of a competitive economy but with respect to local impacts, environmental and economic, the regions closely associated with the North Sea developments seem to have withstood them well. The organizations and institutions either developed or, in place, have helped.

-- Fishing organizations

Of particular interest to Atlantic Canada are the institutions brought into play in the UK, and the constraints on their success in helping the fishing industry accommodate to the new economic and operational circumstances. In the first instance there were two major fishing organizations; the Scottish Fishermen's Federation which includes some eleven associations such as the Shetland Fishermen's Association and represents mostly independent fishing boat owners; and the British Fishing Federation which represents the large companies, each of which usually operates several or more large vessels. These two organizations have played a key role in compensation procedures. They have been helped by Government, particularly the Department of Agriculture and Fisheries. The White Fish Authority, because of its methods of operation and close contact

with all elements of the industry, no doubt plays a role in drawing together the industry as a whole and permitting it to focus on issues.

-- Institutions to determine compensation

When exploration for oil first began, the fisherman found himself contending with more and more damage to his fishing gear which came from oil related debris on the sea floor. He was on his own to find the culprit. Finally in 1975 help arrived in the form of a compensation fund set up by the U.K.O.O.A., a group of petroleum industry related companies. Now, within a set of rules, including maximum levels of compensation, the fisherman is able to claim compensation for damage to his fishing gear from oil related debris and pollution, unidentified as to source. An office of the Department responsible for fisheries is available to help vet his claim which is fowarded to a Committee of the U.K.O.O.A. This Committee, appointed from the two fishing organizations referred to above, with the advice of the Fishing Inspector of the Dept. of Agriculture and Fisheries for Scotland rules on each application. The success of the Committee is related to its clear mandate, independence within its rules, and the absence of bureaucratic delays or political interference. It continues to mature as the pattern of problems generated by the interaction of the two industries becomes clearer. Communications play an important role here.

An additional body, the Fisheries and Offshore Oil Consultative Group (F.O.O.C.G.) has been set up by the National Government to improve communications between both industries, and industry and government. Here the bureaucracy does a service by providing a mechanism for consultation and through it applies pressure on the U.K.O.O.A. Also, a communications service is provided by a full time staff operating within the Dept. of Agriculture and Fisheries. Notices of all impending offshore oil activities are sent to all fishermen on a regular basis. In Shetland a supplementary local organization has been set up, called the Shetland Oil Terminal Advisory Group, which meets every six weeks. The petroleum industry and the local council have balanced representation. Its' most important role is to monitor all activities for environmental problems. These include problems generated by the construction, development, and operational company, Sullom Voe Association Ltd., owned jointly by the same parties.

Legislation

Mention was made earlier of the U.K. 1974 Dumping at Sea Act, which legislates the dumping of debris and pollutants. As noted then, it is rather ineffective because its enforcement requires proof of ownership or source and proof may be difficult to come by. In the U.S., the Office of the Secretary of the Interior has been considering legislation to overcome this problem by requiring company marking of all tools etc. used on the continental shelf of the U.S. The U.K. is looking at this type of legislation.

With respect to protection of the marine resources, Canada's legislation appears to be stronger than that of the U.K. However, this legislation does not extend to the protection of the fishing industry against offshore engineering construction and transport activites. In this context, one of the more important pieces of U.K. legislation from the standpoint of fishermen is the Petroleum and Submarine Pipelines Act (1975), administered by the Department of Energy. This requires that consultations with the fishing industry be held prior to the issue of a work permit for marine activities.

Since most onshore environmental matters in Canada are within provincial jurisdiction, Ottawa can only advise and help. In the U.K., where the Town and Country planning Acts are national, they have been instrumental in the success of communities to control and plan satisfactory development. The provinces should take note of the importance of sound legislation to back up local community planning. Another piece of U.K. legislation, the Offshore Petroleum Development (Scotland) Act, 1975, gave the government powers of compulsory purchase of land for oil-related developments, as well as power to provide supporting financial assistance. Perphaps parallel provincial legislation would have merit in Canada.

Beyond the need for clearer legislative authority on the part of D.F.O., it is quite possible that our fishing industry should be drawn more tightly together into one organization to speak for all fishermen, and that D.F.O. and E.M.R. should set up a standing committee to bring together (at regular intervals) the oil and fishing interests. The licensing of all fishermen on the Atlantic Coast will be a step in this direction. To date,

D.F.O. has not established any other organization or mechanism through which all fishermen can effectively express their aspirations or, in reverse, through which D.F.O. can provide an understanding of proposed policies and legislation. In it's Community Development Officers, D.F.O. does have an extension service in the Maritime Region, but it appears that this should be upgraded to a professional level and extended to Nfld. Certainly, close co-operation with the provinces would be a prerequisite to success of any such scheme.

Political Conflicts and Jurisdiction

Offshore in the UK, there are no jurisdictional disputes between different levels of government over petroleum activities or environmental concerns. They all fall under national jurisdiction. However in Canada, two levels of government, each having large fields of jurisdiction of a high political profile, claim jurisdiction over offshore petroleum activities. Indeed even within a single federal jurisdiction there are the problems of departmental co-operation and communications which can lead to uncertainty in the fishing industry with attendant economic costs.

Onshore, in the U.K., two situations exist. In Orkney and Shetland, because of recent legislation, local authorities have jurisdiction over most activities whereas in Scotland the jurisdictions are mixed, some local and some national. In Canada there are two senior levels of government, each with particular fields of jurisdiction that make integrated management policies mandatory if satisfactory results are to be achieved. For example, the protection of migratory birds and their habitat is a federal responsibility but requires close co-operation with the provinces; harbours for larger vessels are federally developed yet the infrastructure related to them is largely a provincial responsibility.

This second senior level of government, in addition to local government, complicates the role D.F.O. might take in support of fishing communities. Indeed, D.F.O. feels that their viability is essential to the orderly exploitation of fisheries, yet these communities are solely under provincial jurisdiction. There is clearly a continuing need for close co-operation between the two levels of government, particularly at the working level.

In the U.K., the government recognized the value of selective treatment for isolated communities with somewhat different cultures and economic life by giving special powers to Shetland and Orkney to control all onshore developments. In short, it delegated national powers to each. The islanders were given the right to shape their own destiny. It was a unique move that recognized the strength of local institutions and their ability to exercise control over the oil majors without losing integrity. It was a success that stemmed from obvious needs and demonstrated responsibility.

The Opportunities and Responsibilities

Added wealth and social change bring new energy and new opportunities to a community. The energy can either be harnessed, and with it the opportunities seized for the benefit of all, or the energy dissipated in ill conceived ventures with few residual benefits. Our brief analysis of the U.K. experience vis-à-vis Atlantic Canada suggests several actions. They begin with the setting of tentative objectives followed by suggestions as to how D.F.O. policies might be framed to encourage their achievement. Let us look first at the objectives.

-- Preliminary objectives

In recognition of the excellent work being done by D.F.O. Habitat Protection administration and the supporting scientists in the coastal establishments, we make no comments on marine environment per se. Rather, our objectives all centre around fishing communities and the fishing industry, and how they might benefit from change. From the standpoint of D.F.O., fishing and fishing communities might well be looked upon as a single entity. Although fish may be seen as a resource to be managed for the benefit of Canadians, the management tool is the fisherman, and his harvest the benefit for both parties. If the fishing industry is efficient and profitable, all Canadians benefit but most of all the fisherman and the local community. New petroleum based wealth can help in several ways.

The Atlantic fishing communities face two related problems. First, the overall fishing capacity on the Atlantic coast is greater than needed to

harvest the resource efficiently and profitably. Secondly, inshore fisheries, often conducted from small communities remote from service centres and markets, are seasonal and, more often than not, conducted at a cost to all Canadians. Petroleum industry generated activities can absorb some of the surplus fishing capacity in both vessels and fishermen and help small communities overcome the difficulties of transition to a new status. If fishing communities are close to developments they can benefit from improved community services and a better infrastructure. Undoubtedly some communities will find their economies strengthened but others will be weakened, giving rise to change. If this change can be anticipated, and growth centres identified, many social and economic benefits can be realized.

-- Data needs

To allow time for planning to exploit the benefits of change, the first need is information. Currently Canadians have been advised that commercial volumes of oil and gas are located in the area of Hibernia and probably in the Sable Island area as well. Perhaps the time will soon be ripe to receive statements from the petroleum companies and E.M.&R. as to their parameters for maximum rates of development as well as for new exploration. Certainly these parameters would apply only for the medium term but they would provide a firm planning base. The rates finally agreed upon by both levels of government and the industry should not be dictated simply by national economic needs or petroleum industry objectives, but include consideration of local and regional needs. The experience of the U.K. makes it abundantly clear that the long term answer to national economic problems may not lie solely in petroleum production. It can solve balance of payment problems over the short term but may well carry with it a legacy of industrial weakness. Indeed, the Economic Council Report on Newfoundland states that oil and gas "will not be the panacea for all of the province's ills". Too frequently new wealth generated by oil has distracted attention from more stable fields of industrial production by creating an economic cushion which encourages complacency and industrial stagnation. As such, governments should stand firm and refuse to accept vague statements of plans which are open to subsequent political and economic pressures for change in scope or intent, probably at the expense of orderly community development.

The variability of employment opportunities and the uncertain duration of benefits should be carefully assessed. Newfoundland has seen a steady out-migration over a long period of time. Scotland has faced the same. During the early period of Scotland's oil based activities, 1968-1969, annual out-migration fell from 45,000 to 20,000, and even lower in 1974-1976, only to return to about 20,000. Will this be a pattern followed in Newfoundland? The permanent employment generated by oil field developments is not that large.

Baseline data, specific to the economics of fishing, is a further information need. Currently environmental impact statements are being prepared for both the federal and provincial authorities. In this context, not only is it important to have such studies vetted by D.F O. before they are finalized, but also that D.F.O. offer support and provide some communication between the two study groups to ensure the collection of pertinent data leading to accurate analyses and effective policies. Indeed we should avoid the information trap associated with E.I. statements which gather all currently known information into a single presentation and add nothing to the understanding of potentially important impacts. Rather, the advice of the economic and scientific community should be drawn upon to identify priority areas of study and then concentrate upon their understanding. This is particularly true with respect to biological and oceanographic information but also, new social and economic studies should be tied in closely to perceived needs.

Since federally required Environmental Impact Statements are generated internally and applicable to federal lands only, they do not necessarily fill provincial requirements. Further, since the current situation is unique, where two levels of government are claiming responsibility for resource management, it is quite possible, in their haste to outperform one another, that research resources will be overtaxed. Indeed, every effort must be made to bring all parties together to provide the best data and analyses.

-- Communications

A second responsibility of D.F.O. and other agencies of government is to prepare the fishermen and their communities for change and thereby enable them to exploit its potential benefits and counter negative impacts. This

function is somewhat related to the collection and use of data for planning, but more closely associated with the psychology of development, -- people awareness and participation satisfaction.

In this same context, fishermen and others should be made aware of the limits to work opportunities in the new industry together with training requirements or skills in demand. A thorough knowledge of working conditions should be known. In other words a specialized guidance service should be readily available. Whether the famous mobility of Newfoundland workers is a reality will be tested when new petroleum related jobs are located in only one or two centers and movement of workers from other communities is required if the jobs are to be filled from local labour pools. It may be that those with higher educational levels suited to the technical work in the petroleum industry are less mobile than surveys suggest.

With respect to training, already colleges are anticipating the demand for training in technical and professional skills and some expansion in enrollment has taken place. However, the projections at hand do not justify any wide scale adjustment to capacity at this point in time. Potential sources of local labour (and skills) should be examined carefully in the light of industry projections and then followed by a program of vocational guidance linked to the expansion of training facilities.

With respect to the achievement of major goals: - the utilization of local labour, good planning, and minimum social dislocation, etc., government and industry must communicate with the public at non-political levels. Formalization of contacts between organizations, within an integrated communication framework, can bridge information gaps. In addition, direct community involvement in local planning would give people the opportunity to shape their own destiny, at least within the bounds of their ability and the availability of guidance and training. Through these mediums of communication it is possible to match expectations to achievable objectives. To do otherwise is to invite social unrest and political conflicts at a cost to all.

-- Institutions

Another matter, somewhat related to communications are institutions. The government has a responsiblity to generate an awareness of the value of institutions, both provincial and local, through which people can negotiate and give voice to their aspirations. Fishermen must be able to speak with a single voice when it comes to matters of compensation for gear damage and lost fishing time. It may be that only the government can bring such institutions into play within an acceptable time frame. Indeed, fishing can be faced with serious cost increases unless D.F.O. works closely with representatives of both industries, fishing and petroleum.

-- Legislation

As a corollary to the above, the fifth need is to have well conceived legislation in place which gives authority for actions. For fisheries, the Federal legislation of import to offshore oil and gas activities focusses on the introduction of deleterious materials or pollution to a fishing ground. It fails to recognize that the fisheries resources achieve meaningful value only when exploited. This calls for orderly exploitation and stable fishing communities, as well as protection of the fish and fishing grounds. It behoves the government of Canada to make certain that fishing is given proper priority in the scheme of ocean management. Specifically, this calls for close co-operation between departments in setting up compensation mechanisms for damage claims by fishermen and ensuring that through them, claims can readily be processed and funds accessed.

-- The fishing industry

Since the economic health of the fishing industry is closely related to federal policies, past, present and future, the responsibility for the success or failure of the industry to withstand the impacts of a new competitive industry falls directly upon it. The prospects are not bright because the fishing industry, at both the primary and secondary levels, has been used to resolve regional economic problems whereby industry has been encouraged to increase capacity to compete for resource supplies, through the introduction of

subsidies and special unemployment rules for fishermen, and uneconomic resource management practices. Without change, the industry will be justified in calling again for help, this time to compete with the oil industry for labour supplies, port and maintenance services, and capital. The fishing industry will compete successfully with the petroleum industry only when freed from the influence of distorting support programs, when shares of the resource to the individual enterprises are made reasonably secure, and economic viability is determined by fishing efficiency and quality of production.

Summary

The Petroleum Industry is already having an impact on a few Atlantic coast communities by stimulating some industries, providing jobs in research and mildly pushing up the cost of living, particularly housing in at least one centre, St. John's. The impacts appear to be generally positive and expectations are rising. They should not rise too fast!

The U.K. experience tells us that a rapid escalation of petroleum activities can offset routine gains in employment and business activities by losses in environmental values and social conditions, as well as sharp increases in cost of living for those on fixed incomes or in work areas not associated with the petroleum industry, - - without a commensurate increase in income. In addition, industries competing for labour and space with the new industry, and marketing products in competition with those from industries in low cost situations, may have economic problems. Fishing, if conducted inefficiently, can be particularly vulnerable.

The U.K. experience alerts us to the variables that come into play which can either reinforce negative impacts or mitigate them. Most important are the scheduling of petroleum developments; adequate "lead time" for planning; the very size of communities or centres of petroleum activity; the economic viability of industries competing for labour and space; the strength of the institutions either "in situ" or developed in response to needs; the maturity and diversity of the regional economy; and the determination of people to control their own destiny.

For the Canadian Fishing Industry the variables which will determine the impact of the petroleum industry on its viability are: the structure of the fleet, the ownership; the returns to labour; the loyalty of crews to the vessel owner or fishing enterprise; the cost of services and repairs; and the decisions taken by the government to introduce management procedures that will bring about a rationalization of catching capacity to resource supplies, increasing both efficiency and profitability. A final and perhaps quite important variable for fishermen living in communities in the immediate area of new developments is, whether through poor planning of developments, and disproportunate increases in inflation, they cannot afford to remain in fishing.

The advantages Canadian fishermen have over the fishermen from other nations are many: - low cost fuel, access to large volumes of fish, relatively low levels of inflation and a low value dollar. These, when combined with the new opportunity to match catching capacity to resource supplies that stems from exclusive management of fisheries, place them in an enviable competitive position. Indeed, with the advent of large scale petroleum developments some costs will rise but, with orderly scheduling of activities and adequate planning, these costs can be offset by positive gains. Navigational facilities will be improved, safety at sea will be greater and onshore technical services will be of a higher order and more diversified. It is not a time for the fishing industry or D.F.O. to either wait with apprehension for something to happen, or to "cry wolf", but rather to act to make change work in favour of the industry.

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