

BARGAINING AND REGULATORY FORMATION:

A CASE STUDY OF OFFSHORE OIL IN BRITISH COLUMBIA

by

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ABSTRACT

The regulation of resource usage frequently reflects the interdependencies that can occur when one resource is subjected to a number of uses. The nature of these interdependencies will influence the manner in which each use must be limited to avoid damaging other uses. Limitations of resource use rights will be set through the process of regulatory formation or resource use planning within the political arena. It is this process that provides the focal point of this analysis.

Regulatory formation is conceptualized as a bargaining process in which new and existing resource users bargain through a government intermediary to define limitations upon new use rights. The preferred outcome of this bargaining process is posited to be those limited use rights that will facilitate the efficient internalization of external impacts through future bargaining. The argument is then made that the regulatory formation process must be structured in a particular manner to achieve this preferred outcome. It must allow all affected resource users discretion to bargain within a representative bargaining system where damages are known.

In developing this requisite structure the analysis draws upon two basic sources. These include the regulatory bargaining literature and the literature founded in the work of R.H. Coase on efficient resource allocation through bargaining. An attempt is made to apply the insights of the latter

to the conceptual framework of the former in generating an ideal type model of regulatory formation.

The application of this model is illustrated through discussion of the case of planning the regulation of offshore oil development in British Columbia. It is hypothesized both that the offshore planning process will not meet the structural criteria and that this failure will reflect both the nature of user group representation in that process and the discretionary control government agencies exercise over that process.

In addressing this hypothesis, the analysis proceeds in two distinct steps. First, the manner in which offshore exploration may impinge upon other users of the oceanic resource is discussed in some depth to determine those users who should be involved in regulatory bargaining. The ongoing regulatory formation process is then described to determine the actual extent of user involvement. Comparison of the results of these two steps provides a basis from which the offshore planning process is critiqued.

The analysis concludes that the planning process does, in fact, fail to meet the regulatory bargaining criteria initially developed. The factors found to underly this failure include both indirect user representation and government agency discretion as hypothesized. However, they also include the noncomprehensive nature of existing damage information. These findings suggest that the offshore planning process will produce new resource use limitations of a particular type.

In closing, the analysis attempts to predict the form these limitations will take and suggests alterations required of the process structure to more closely approximate those use right limitations preferred.

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that I should have my own aspirations.

Chapter One

Externalities And The Regulatory Bargaining Model

INTRODUCTION

At the present time, the government of British Columbia is planning for renewed oil and gas exploration off the northern mainland and Queen Charlotte Islands. Should exploration proceed, it will add a further use of the oceanic resource to those already established in the area. As is characteristic of many multiple-use cases, this new use can be expected to affect existing uses in some manner. Offshore exploration may generate both beneficial effects, such as an increase in fishing stocks around drilling platforms, and adverse effects, such as the disruption of marine birds and mammals in the area. Any of these biological effects will impact upon human usage of the affected resources in like manner. The range of these effects are termed external effects, or externalities. They comprise the nonmarket impacts of one use upon other users and involve the imposition of external costs or benefits on those other users. Where externalities exist, resource allocation will be inefficient (other things being equal). Internalization of external costs and benefits will be required to achieve allocative efficiency. Where negative externalities are significant, those users who face external costs can be expected to seek such internalization.

The externality problem has been a longstanding concern in the analysis of resource usage. The discipline of economics provides two central approaches to this issue. The first of these, grounded in the work of A.C. Pigou,¹ addresses the question of what measures are required to achieve internalization. The alternative approach, founded in the work of R.H. Coase, considers the process of internalization itself and the

structural conditions necessary to achieve allocative efficiency.² Both of these schools of thought have prescribed solutions to externality problems. The Pigovian school argues that government intervention is required to offset external impacts and recommends a remedy whereby externality generators are either taxed or subsidized to achieve internalization.³ The Coasian school, on the other hand, argues that the means to efficient solutions lies in private ownership of resource use rights and market trading of those rights between externality generators and recipients.⁴ A number of ingenious schemes have been devised to accomplish this bargaining solution.⁵

Though both of these approaches are well established in the realm of economic theory, their relevance for economic practice remains much less clearly defined. Neither school has succeeded in appreciably affecting government resource use policy. Governments, in their role as delineators of resource use rights, have not heeded the call for privatization. Similarly, where private rights exist, governments have tended not to rely upon private bargaining for internalization.⁶ Government intervention in the solution of externality problems has also not tended to reflect Pigovian prescriptions. Measures designed to prevent or minimize external effects or to require compensation for damages remain the dominant approaches to externality problems.⁷

The failure of both of these models to gain policy prominence may lie in the deficiencies of the models themselves. Certainly, both have been criticized at length.⁸ However, regardless of why this has occurred, the fact remains that government regulation appears likely to continue as the primary approach to the externality problems of resource usage. Rather than decrying this fact, it seems more reasonable to take it as a point of

departure. Once this perspective is applied, a number of interesting questions can be raised. Among these is the question of how government regulations are established. It can be argued that this is, in fact, the prior question. The process of regulatory formation will affect the type of regulations adopted. The process participants, the incentive structures they face and the rules governing their involvement and interaction are all factors that will affect regulatory outcomes.⁹ To the extent that the formative process determines the regulations adopted, analysis of this process is antecedent to the question of regulatory appropriateness.

This thesis will address the issue of regulatory formation where externality costs exists. It will conceptualize the formative process as a bargaining situation within which regulatory agencies and resource users interact to establish regulations. In focusing upon process as fundamental to the internalization of externalities, the argument herein resembles that of the Coasian solution to externality problems. It shares the Coasian assumption that the bargaining process can be structured to generate preferred outcomes. However, where Coase considers bargaining between private resource users, this analysis will take government regulation of resource usage as a given. In this context, resource user bargaining will be seen to occur through a government intermediary. The argument will be made that this is analytically parallel to the Coasian approach and that, as such, the Coase model can be modified and transferred to the formation of resource use regulations within the political arena. Modification of the Coase model will provide bargaining criteria against which any such formative process can be assessed. The thesis will develop a set of bargaining process criteria through analogous application of the Coase model to the political process. The process structure will be posited as a

determinant of regulatory outcomes and it will be argued that this structure must allow all affected resource user groups discretion to bargain within a representative bargaining system where damages are known. The bargaining process will tend to produce regulations that will facilitate the efficient internalization of externalities only if these requirements are met.

This argument will be illustrated through analysis of the case of regulatory planning for offshore oil development in British Columbia. Because offshore development can be expected to generate externality costs for existing resource uses, the resource use planning process provides a case to which the new bargaining criteria can be applied. This analysis will consider the presently ongoing planning process in terms of the negative, offshore-source externalities expected from such development. The role of government agencies and the involvement of new and existing resource users will be discussed in terms of the bargaining that occurs around expected externalities. The bargaining process itself will be assessed against the modified bargaining criteria referred to above.

Chapter One will develop the arguments introduced above. It will begin with a discussion of the conceptualization of regulatory formation as a bargaining process and proceed to consideration of the Coase model itself and the manner in which it is applicable to bargaining within the political arena. This discussion will provide the basis from which a set of regulatory bargaining process criteria will be developed. Those criteria will be applied to the regulatory planning case in the following chapters.

REGULATORY FORMATION AS A BARGAINING PROCESS

The conceptualization of regulatory formation as a bargaining process is based upon a pluralist perspective of government policymaking in which regulations result from the interaction of policy agencies and various

constituent groups. Bargaining has been identified within a number of regulatory settings, providing a range of arguments about how the bargaining process itself operates. Different resource analysts conceptualize the process in different ways.

One argument, evident in the work of Julian Wolpert, holds that the regulatory decision process is characterized by bargaining between agencies and those adversely affected by agency decisions. Bargaining results where there is a negative reaction to regulatory decisions. Adversely affected interests will seek to alter agency decisions and incremental changes will be gained through bargaining with agencies to a new, compromise decision.¹⁰ The distinction is made between these "strategic" decisions and "routine" decisions that do not elicit demands for a bargained settlement.¹¹ The implication of much of this literature is that bargaining results where the decisionmaking process somehow fails to adequately account for all affected interests. Further, it implies that the agencies could, and should, have taken these factors into consideration. In this context, bargaining is an after-the-fact reaction to systemic dysfunction.

Other analysts argue that bargaining is a central characteristic of the ongoing regulatory formation process. Even "routine" decisions can be bargaining subjects. Mathew Holden's analysis of American state pollution control regulations provides a good example here.¹² Holden argues that a number of features of pollution control regulation, including information constraints and the difficulty of enforcement, necessitate bargaining. "Successful regulation depends on the consent of the regulated...Such consent is achieved by a process of bargaining -- both explicit and tacit -- which induces the regulated parties to agree (even reluctantly)

to that which the regulator proposes."¹³ Much of Holden's analysis focuses upon the bargaining relationship between regulatory agencies and regulated industries. He argues that agencies have an incentive to adopt regulations to achieve industry consent, thereby avoiding conflict that could be construed as agency failure.¹⁴ However, Holden recognises that agencies will also be constrained by broader constituent reaction to the resource use problem. He states that the perceptions of other affected interests will "define the boundaries of the permissible and the impermissible in such a way as to structure the bargain process which he (the regulator) may follow".¹⁵ Furthermore, Holden argues that the reaction to increased pressure from interests outside the routine bargaining process may lead to greater "tacit bargaining" over the definition of the problem within that process.

It is in this sense that the distinction between "strategic" and "routine" regulatory decisions may be useful. More varied interests may demand inclusion in the bargaining process where decisions are seen to be "strategic". However, this demand need not come after the fact. Affected parties may also anticipate the strategic nature of regulatory decisions and seek entrance to the process at the outset. Holden implicitly recognises this in his description of regulatory formation as "the balancing of incommensurables", or conflicting interests, "to avoid the "costs" which would emerge from dissatisfaction".¹⁶ Similarly, this balance of regulated and affected interests may be built into the regulatory formation process. This point is raised by Dorecy, McPhee and Sydneysmith in their analysis of forestry regulation in British Columbia.¹⁷ The referral and folio practices of the Provincial Ministry of Forests serve as examples of established bargaining conventions designed to include both

regulated forest and affected fisheries interests in formative decisions.¹⁸

Dorcey et al.'s analysis illustrates the significance of bargaining in the regulation of any multiple-use resource where spillovers (externalities) from one use affect other users. Furthermore, the analysis presents a set of bargaining process characteristics peculiar to this case. First, bargaining will not be restricted to regulators and regulated users. Users who face externality costs will also be included in the bargaining process. Second, where the number of users is large, users will be grouped according to compatible interests and the bargaining structure will be a representative one. Some user groups will be directly represented by group members,¹⁹ while others' interests will be represented by government agencies whose mandate is the protection of that particular resource use.²⁰ The role of government agencies within the multiple-use bargaining case appears complex. While some agencies will serve as user-interest representatives, the role of others may more closely approximate the interest arbitrator stance implied by Holden's analysis. Those agencies responsible for the delineation of resource use regulations will serve as intermediaries, balancing the conflicting claims of multiple resource users. Where these intermediary agencies also have a particular resource use protection mandate, tension between the roles of arbitrator and interest representative can be expected.

A final facet of the regulatory bargaining process must be discussed here. Both Holden and Dorcey et al. perceive the process to be a dynamic one. Bargaining will occur at each phase in the regulatory process (in pollution control, from the establishment of general policy guidelines to the setting of site specific standards). New bargains, predicated on prior

bargains, will, in turn, form the basis for future bargaining.²¹ Dorcey et al. add the required spatial dimension to this temporal conception. They show that bargaining will occur at the range of organizational levels.²² Therefore, (for example) site specific bargaining will be predicated upon both prior site bargains and prior policy bargains. Each will constrain the bargaining process in some manner.

Holden writes that:

"Within (the bargaining) relationship at any moment, the main problem of the regulator is not, therefore, to find an optimal result so much as a satisfactory (tolerable), "workable" or "practical" result given the actual predicates served up by the complex of previous bargains."²³

His implication is that regulatory bargaining will tend to produce "second best" results. However, as Dorcey et al. recognise, bargaining is unavoidable in any multiple-user case where spillovers from one use affect other uses.²⁴ They argue that "regulation will continue to be a bargaining process; so the issue is how to improve this process."²⁵

This is the issue that will be addressed herein. The thesis will consider a particular part of the regulatory bargaining process; initial regulatory formation or, in Dorcey et al.'s terms, the beginning of the bargaining spiral. In so doing it will focus upon the process of resource use planning within the political arena. Regulatory formation will be conceptualized as a bargaining process in which resource user representatives bargain through a government intermediary to establish regulations upon which future bargaining to internalize externality costs will be predicated. In specifying improvements of the bargaining process, the thesis will draw initially upon the economic literature on bargaining to internalize

externality costs, and upon the work of R.H. Coase in particular. This task must begin with discussion of the concept of externalities itself.

Externalities Defined

Externalities can be defined as the nonmarket impact of any activity upon parties not directly involved in that activity. The impact may be beneficial, a positive externality, or harmful, a negative externality, to the affected party.²⁶ If, for example, summer cottage owners dump raw sewage into an adjacent bay, oyster growers may gain the positive externality of nutrient enriched oyster beds. However, swimmers may suffer the negative externality of fouled swimming grounds. The cottage owner's actions may generate benefits for, or impose costs upon, other users of the bay.

In this context we will be concerned with the negative external impacts of a resource use upon third party users. Negative externalities exist where the private and social costs of an activity diverge and there is no incentive for the externality generator to include social costs in calculating his optimal resource use level. Where this occurs, resource use levels will not reflect total use costs. External social costs will be imposed upon other users and resource allocation will be inefficient. To achieve allocative efficiency, some means must be found whereby the incentive to include social costs in private cost calculations is generated. This is the central concern of much of the economic literature on externality problems.

The Coase Model

One of the more significant contributions to the externality issue is the work of R.H. Coase.²⁷ The value of Coase's work lies initially in his recognition of the "reciprocal nature" of the externality problem. He

argues in regard to negative externalities that:

"The question is commonly thought of as one in which A inflicts harm on B and what has to be decided is: how should we restrain A? But this is wrong. We are dealing with a problem of a reciprocal nature. To avoid the harm to B would inflict harm on A. The real question that has to be decided is; should A be allowed to harm B or should B be allowed to harm A? The problem is to avoid the more serious harm."²⁸

Coase's logic suggests that the efficient solution to the externality problem will not necessarily be to force the externality generator to bear its cost. Rather, the value of his unrestricted use must be measured against the value of alternate uses. The earlier example can serve to illustrate this point. In this case, whether or not the cottage owners should be required to pay for sewage treatment depends upon the value of swimming in the bay. The cost to swimmers of using an alternate bay may be insignificant, or swimmers may be willing to pay the cottage owners to limit discharge. The amount swimmers are willing to pay will reflect the value of using the bay in this manner. Similarly, the amount that cottage owners are willing to pay to continue sewage discharge will reflect the value of this use. Efficiency will result where the resource is allocated to the use with the greatest marginal value.

Coase argues that private bargaining between resource users will ensure efficient resource allocation as long as all affected users are party to bargaining. This will occur in a competitive market in which transaction costs are zero, damages are known and resource use rights are clearly specified and transferable. Depending upon the existing liability rule, one of the two parties will have an incentive to induce the other party to exchange property rights in the externality. The liable externality

generator may pay for the right to impose external effects or pay for the damages imposed. Conversely, the recipient of external effects may pay for their cessation. Bargaining will continue until all gains from trade are exhausted and resource allocation is efficient.

Coase's analysis shows that, under his restrictive assumptions, the bargaining outcome will be efficient regardless of the prevailing liability rule. He argues that:

"It is always possible to modify, by transactions on the market, the initial legal delimitation of rights. And, of course, if such market transactions are costless, such a rearrangement of rights will always take place if it would lead to an increase in the value of production."²⁹

The neutrality of liability rules holds as long as Coase's assumption of zero transaction costs holds. However, given positive transaction costs, existing legal rights will not be allocatively neutral. Coase himself admits that once transaction costs are introduced, rights will be traded only when the resulting increase in the value of production is greater than total transaction costs.³⁰ "One arrangement of rights may bring about a greater value of production than any other."³¹

The fact that transaction costs will affect allocative efficiency has formed the basis for much criticism of the Coase model. While Coase recognizes that such costs may occur, he fails to realize that "transaction costs in fact dominate real world cases."³² The actual impact of transaction costs may be to render the market mechanism inappropriate. E.J. Mishan has shown that where transaction costs are positive the optimal externality level will depend directly upon the liability rule in force. The optimal level under full externality generator liability will be less than under no such liability.³³ Also, the difference between equilibrium solutions under full and zero liability increases as unit

transaction costs increase. Transaction costs can be sufficiently great as to result in complete internalization under full liability and no internalization under zero liability.³⁴

Significant transaction costs can be expected where externalities affect large numbers of users. As the number of users increases, both initial negotiation costs and the costs of agreement maintenance and revision can be expected to escalate accordingly. Where user groups exist, negotiation costs can be broken down further into the costs of (1) group identification, (2) persuading the group to make or accept a joint offer, (3) forming a full coalition on all matters relevant to negotiation and (4) negotiating with the other group(s).³⁵ The time, effort and compromise costs of each of these components will tend to increase with numbers.

If user groups are sufficiently large they may also face the problems of Mancur Olson's "latent groups."³⁶ Olson argues that the utility maximizing individual will have no incentive to support a large group that seeks to achieve collective benefits for its members. The reasons for this are threefold. First, the effort of any individual can be withdrawn without noticeable effect upon the total group effort. Second, the benefit that an individual will receive will tend to be smaller than the cost to each of actively supporting the group. Third, the group may be unable to stop the individual who refused support from enjoying the collective benefit; this occurs where the bargaining outcome is a public good. In this case large user groups may not voluntarily organize to bargain for internalization at all. Where they do, they will tend not to be all-inclusive because of high initial organization costs and the difficulty of ensuring continued support. Also, such groups will face free rider costs imposed by those who cannot be

excluded from enjoying the benefits of others' bargaining efforts.

Where, for example, a large, dispersed user group faces a single externality generator and internalization is a public good for the recipient group, transaction costs will be disproportionately spread. The recipient group is unlikely to initiate bargaining under these extreme conditions.³⁷ The zero liability rule will therefore benefit the externality generator. He will be free to impose external costs upon alternate users. Under full liability, excess costs may be shifted to the externality generator who may be required to bargain with each individual for the right to generate externalities. The cost of that right may be driven up beyond the value of the alternate use because of the opportunity of externality recipients to "hold out" for excessive settlements.³⁸ In either case, resource allocation will be inefficient.

This discussion of transaction cost effects suggests an initial refinement of the Coase model. Given positive transaction costs, the nature of the liability rule will influence bargaining outcomes. The liability rule required to achieve an efficient outcome, given positive transaction costs, is one that reflects the range of transaction costs. Thus, if we maintain Coase's assumption that use rights and liability rules are set, liability rules can be assessed in terms of the degree to which they reflect transaction cost levels.

However, Coase's assumption that use rights and liability rules are given does not always hold. For example, in any instance of new resource usage, rights and liabilities are not set. In fact, as the regulatory bargaining literature suggests, use rights and liability rules themselves are the object of continual bargaining. The bargaining process through which these rights and rules are determined is antecedent to the process

addressed by the Coase model. It is the prior step to bargaining to internalize externality impacts. The significance of bargaining to establish use rights and liability rules lies in the fact that these rights and rules are the predicates upon which future bargaining over externality internalization will be based. The former process determines the "rules of the game" governing the latter process.³⁹

In Canada, where resource ownership is generally vested in government and use rights and liability rules are largely expressed in regulations governing resource usage,⁴⁰ bargaining to determine rights and liabilities will occur during the regulatory formation process. Though antecedent to the bargaining process addressed by the Coase model, bargaining to form regulations remains an analytically parallel process. This is especially evident when the case of planning for a new resource use is considered. Where the Coase model assesses bargaining over externalities under a given use right structure, regulatory formation entails bargaining to establish that structure. In the formative process actors will bargain over the creation of regulatory rules designed to facilitate further bargaining to offset the negative external effects of a new resource use on existing users. Warren Samuels argues that these rules can be seen as "the functional equivalent of property rights." "...regulation is functionally equivalent to rights in governing the terms of access to and use of what one comes to call one's property."⁴¹ Use rights remain the terms of trade in the regulatory bargaining process. The outcome of regulatory bargaining will effectively be to grant limited use rights to the new user. These limited rights will, in turn, influence bargaining strategies in the ongoing regulatory process.

Given that bargaining to establish limited use rights is analytically

parallel to bargaining to internalize externality impacts, the logic of the Coase model remains relevant to the regulatory formation process. This has three central implications for the analysis of regulatory formation. First, Coase's process focus can be retained. In other words, the assertion that the bargaining process can be structured to achieve preferred outcomes can be made.⁴² Second, the Coase model itself can serve as a guide to the process structure required to achieve those preferred outcomes. Third, the model and the refinements made to it can be used to define the concept of "preferred outcomes." Preferred outcomes will be those use rights and liability rules required to facilitate efficient internalization through future bargaining. Given positive transaction costs, these rights and liabilities will be those that reflect the range of relative transaction costs faced by resource users.


THE NEW BARGAINING PROCESS CRITERIA

In the preceding section two central assumptions of the Coase model were challenged. The first of these was the zero transaction cost condition. Coase's initial work argued that, due to the reciprocal nature of externalities and the fact that use rights are transferable, efficient internalization will not depend on the liability rule in force, given zero transaction costs. However, the work of Mishan and others has shown that where transaction costs are positive, as is the case in any real world situation, the liability rule will influence internalization. Optimal internalization requires liability rules that reflect the range of transaction costs faced by both externality generators and recipients.

Where Coase's assumption that liability rules and use rights are given is maintained, the transaction cost effect directs attention to the rights and liabilities in force. However, where rights and liabilities are not

set, as in the case of new resource usage, attention is directed to the process by which rights and liabilities are established. The question that arises is: can this process be structured to facilitate the establishment of use rights and liability rules necessary to the efficient internalization of externalities?

Where use rights and liability rules are expressed as regulations governing resource usage, they will be established through a regulatory bargaining process. This process appears analytically parallel to that addressed by the Coase model. Thus, the model and subsequent refinements to it provide a basis from which the necessary features of a regulatory bargaining structure can be drawn. These features will differ from those of the Coase model to the extent that the characteristics of the regulatory bargaining system differ from those of the private use-right trading process envisioned by Coase. It is useful at this point to restate the contrasting characteristics of each. The Coase model refers to bargaining between individual resource users who face no transaction costs. Bargaining occurs between private use right holders where negative externalities are private goods to singular alternative resource users. The regulatory bargaining system, on the other hand, refers to bargaining between resource use groups who are represented in the actual bargaining process.⁴³ Given groups of users, transaction costs can be expected to be significant. Furthermore, bargaining will occur within the political arena where government agencies, acting either as user representatives or intermediaries, are a third party to the bargaining process. Government intervention may reflect either public resource ownership or latent group constraints arising where negative externalities are public goods for affected user groups. In either instance, limited private use rights will be established under continued

government regulation and review. 

The Coase model itself can be restated to determine the features necessary to achieve efficient resource allocation through bargaining. These features include (1) that all affected users are party to bargaining, (2) that transaction costs are zero, (3) that damages are known and (4) that use rights and liabilities are specified. These features can be refined to yield those systemic features necessary to achieve the use rights and liabilities demanded for efficient internalization. The refinements required will be determined by the regulatory bargaining process characteristics discussed above and by the required rights and liabilities themselves. The effect each of these systemic characteristics has upon the bargaining model must be addressed in turn.

First, the limited use rights required to facilitate efficient internalization through future bargaining are those that reflect the range of transaction costs. The establishment of these rights thus requires that the range of transaction costs be known. Furthermore, the transaction costs that will govern any user group's bargaining activity will be those costs that the group perceives itself as facing. Therefore, all cost claims must be stated and considered in compromise bargaining so that the rights and liabilities established will not favor any one user group in future bargaining. Bargaining over rights and liabilities must thus include all user groups that comprise the multiple use case. This logic is similar to that underlying Coase's initial comprehensive bargaining participation criterion. However, where the Coase model refers essentially to individual resource users who face no transaction costs in bargaining, the present discussion refers to bargaining between user groups where transaction costs can be expected to be significant. It poses a situation in which all groups

will be sufficiently large to face organization and coalition costs and some will face the excessive costs characteristic of Olson's latent groups. Furthermore, where resource users are grouped, the bargaining system will be a representational one. Therefore, where Coase argues that all affected users be party to bargaining, the argument here is that all affected user groups be represented in the bargaining process. Given the fact of representation, a secondary criterion must be added. Representatives must express the user's interests in bargaining.

Second, the existence of transaction costs demands a further refinement of the Coase model. Where Coase specifies zero transaction costs, the present discussion specifies that transaction costs not exceed the benefits obtainable from bargaining. If this condition is not met, user groups may expend more in bargaining than they can gain from any solution. Bargaining costs that exceed the best possible solution represent both a dead weight loss to the group and an inefficient allocation of resources.⁴⁴ An important caveat in this regard is that no single user group should face costs that prohibit bargaining regardless of potential benefits. Where both costs and benefits differ across affected users, those user representatives who feel potential gain does not outweigh the costs involved must be able to withdraw from bargaining. However, where transaction costs are disproportionately spread among users, no user group should face a cost level that is prohibitive regardless of potential benefit.⁴⁵ The bargaining structure must ensure user discretion regarding entry into, extent of involvement in and exit from the bargaining process. It must also provide some means of offsetting disproportionately excessive transaction costs.

Third, in the multiple user group case, Coase's requirement that

external damages are known must also be changed. His logic must be extended in this regard. Damages must be known to provide a basis for bargaining over use rights and liability rules. They must be known to all equally to avoid disproportionate bargaining power based upon exclusive possession of information.⁴⁶ If the full extent of damages is known to only the externality generator, he can minimize his liability by asserting that damages are less than actual. Similarly, he can maximize payment from externality recipients by claiming greater damages. The reverse holds where externality recipients have privileged access to damage information. In either case the future bargained solutions will be inefficient. Therefore, the bargaining system must provide for equal dissemination of damage information to all actors in the bargaining process.

Fourth, where Coase's model is applied to bargaining between private parties, this discussion deals with bargaining in the political arena. The Coase analysis refers to situations in which negative externalities are private goods to singular alternate users. Where negative externalities become public goods for affected user groups, latent group problems may require government intervention to facilitate bargaining.⁴⁷ Also, Coase deals solely with the case of private resource use rights. However, government involvement is often based upon public resource ownership.⁴⁸ Where this is the case, bargaining to establish limited private use rights will occur through government intermediaries.

Bargaining within the political process will differ somewhat from that under simple organized user exchange. First, parties to the bargaining process will include regulatory agencies that are not resource users. Some of the agencies may, however, serve as tacit representatives of user groups.⁴⁹ In light of the preceding discussion, the degree to which

user interests are actually represented becomes a significant question. Second, government agencies may have the authority to determine those user groups that will be represented in bargaining. The extent to which this violates the user discretion criterion set out earlier is another important consideration. Finally, because governments have the authority to delimitate resource use rights, bargaining will occur in this regard as well.

This leads to the final divergence between the present discussion and the Coase model. Where Coase is concerned with bargaining to exchange existing use rights, this analysis considers the establishment of limited use rights through bargaining. The criteria by which bargained outcomes are assessed in this case will differ from that of the Coase model. Where Coase aims to structure a bargaining process that will yield efficient internalization of externalities, this discussion seeks to generate a bargaining structure that will yield use rights and liability rules which will, in turn, facilitate efficient internalization. These rights and rules will be those that reflect the range of transaction costs faced by actors in the political bargaining process. To achieve this outcome, a representational bargaining system in which some (or all) actors face significant transaction costs must meet the set of structural requirements developed above.

These requirements include (1) that all affected user groups be represented in the bargaining process and that representatives express user interests, (2) that affected user groups have discretion to enter, to set the level of their involvement in and to exit the bargaining process and that none face excessively prohibitive transaction costs, and (3) that damages be known and known to all equally. These features comprise a set of

independent variables which, when characteristic of a regulatory bargaining structure, will yield use rights and liability rules that reflect the range of transaction costs. The regulatory bargaining process that displays these characteristics can also be conceptualized as an ideal type model against which bargaining to generate regulations in a multiple user case can be assessed.

The remainder of this thesis will apply this regulatory bargaining model to a case of regulatory planning for resource usage. The case study will be used to illustrate application of the model as a critical tool. Given time and resource constraints, no attempt will be made to test the model itself. Rather, the intent of this analysis is to initiate discussion of the issue of bargaining to generate use rights and liabilities within a multiple use case study where externalities exist. The regulatory bargaining model will serve to structure that discussion.

The case chosen was that of regulatory planning for offshore oil development in British Columbia. This development essentially comprises a new use of the oceanic resource that is expected to generate external costs for a range of existing users and provides a case to which the regulatory bargaining criteria can be applied. Consideration of the criteria themselves suggest the format required in such an assessment. To determine the manner in which affected user groups are involved in regulatory bargaining, these groups must first be identified. Therefore, potential externalities must be established and the existing resource users who face them specified. Secondly, both damage knowledge and transaction costs must be identified. And, finally, the bargaining process itself must be determined and assessed against the bargaining criteria.

CONCLUSION

This chapter has developed a model of bargaining over limited use rights within the political arena. It has adopted the conceptualization of regulatory formation as a bargaining process and drawn upon the work of R.H. Coase to generate a set of criteria by which that process can be assessed. This approach reflects Coase's assertion that efficient internalization can be achieved through an appropriate bargaining structure. However, it diverges from the Coasian model in defining what is appropriate. Coase's bargaining process requirements have been redefined to apply to the case of representational bargaining to establish resource use rights within the political arena, where some (or all) actors face significant transaction costs. The new requirements have been defined to be (1) that all affected user groups are represented in the bargaining process and that representatives express user interests, (2) that affected user groups have discretion to enter, to set the level of their involvement in, and to exit the bargaining process and that none face excessively prohibitive transaction costs and (3) that damages are known and known to all equally. The final section of the chapter has discussed the assessment of a bargaining case in terms of these criteria. In the following chapters this assessment will be undertaken.

Chapter Two will address the methodological issues relevant to this assessment. In defining the method to be employed, it will provide a structural basis for the Chapters to follow. Chapters Three and Four will introduce the case study and identify both the potential externalities of offshore oil activity and the potentially affected user groups. The existing bargaining process will be discussed in depth in Chapter Five. Finally, Chapter Six will assess that process in light of the bargaining

criteria delineated above and will, in conclusion, consider the implications of these findings for the process of regulatory formation.

Chapter 1 Notes

1. A.C. Pigou, The Economics of Welfare, (London, 1946).
2. R.H. Coase, "The Problem of Social Cost", Journal of Law Economics, Vol. III (1960), pp. 1-44.
3. See for example: Freeman, Haveman & Kneese, The Economics of Environmental Policy, (Toronto) or J.H. Dales, Pollution, Property & Prices, (University of Toronto Press, 1968).
4. See: R.H. Coase, Ibid. and subsequent articles by H. Demsetz, "The Exchange and Enforcement of Property Rights," J. Law & Economics, Vol. VII (1964), pp. 11-26, and A. Calabresi, "Transactions Costs, Resource Allocation and Liability Rules", J. Law & Economics, Vol. XII (1968), pp. 66-78.
5. See for example: W. Tucker, "Marketing Pollution: a proposal for the buying and selling of clean air", Harpers, (May, 1981), p. 31.
6. The extensive regulatory apparatus designed to deal with environmental spillovers in Canada attests to this fact. See for example: John Ince, Environmental Law: A Study of Legislation Affecting the Environment of British Columbia, (Vancouver, 1976).
7. See: J.M. Buchanan & C. Tullock, "Polluters, Profits and Political Response: Direct Control Versus Taxes", American Economic Review, Vol. 65, (1975), p. 139 for an interesting argument of why this is the case.
8. Much of the criticism of the Pigovian tradition has come from the Coasian school. See: Coase, Ibid. See also: Aranson et al, "Pigovian Policies in Closed Behavioral Systems", Public Choice, Vol. 33, No. 4, (1978), pp. 1-26 for a similar argument; Gene Muny, "Long-run Efficiency & Property Rights Sharing for Pollution Control", Public Choice, Vol 35, No. 1 (1980), pp. 60-74 for a critique of the Pigovian model; and James Stephenson (ed.), The Practical Application of Economic Incentives to the Control of Pollution: The Case of British Columbia, (Vancouver, 1971) for an assessment of the applicability of tax-subsidy schemes. For a good summary of the criticisms of the rights trading model see: E.J. Mishan, "The Postwar Literature on Externalities: An Interpretative Essay", Journal of Economic Literature, Vol. 19, No. 1, (1971), pp. 1-28.
9. On the impact of structure and process outcomes see for example: Robert Abrams, Foundations of Political Analysis, (Columbia University Press, 1980), pp. 28-39 on decision rules, Robert Mackay and Carolyn Weaver, "On the Mutuality of Interests between Bureaucracies and High Demand Review Committees", Public Choice, Vol. 34, (1979), pp. 481-91, on agenda setting and Gordon Tullock, The Politics of Bureaucracy, (Washington, 1965) on incentive systems. The analysis of these factors is also the central thrust of the institutional economics school. See for example: Armen Alchian and Harold Demsetz, "The Property Rights Paradigm", Journal of Economic History, Vol. 33, (1973), pp. 16-27 and

- Richard Stroup and John Baden, Property Rights and Natural Resources Management, Cato Institute, (1980).
10. Julian Wolpert, "Regressive Siting of Public Facilities", Natural Resources Journal, Vol 16, No. 1, (1976), pp. 103-115 and "Departures from the Usual Environment in Locational Analysis", Association of American Geographers Annuals, Vol. 60, (1970), pp. 220-229.
 11. See also: Colin Wood, "Conflict in Resource Management and the Use of Threat: The Goldstream Controversy", Natural Resources Journal, Vol. 16, No. 1, (1976), pp. 137-158 and George Hagevik, "Legislating for Air Quality Management: Reducing Theory to Practice", Law and Contemporary Problems, Vol 33, No. 2, (1969), pp. 369-398.
 12. Mathew Holden Jr., "Pollution Control as a Bargaining Process: An Essay on Regulatory Decision-Making", Cornell University Water Resources Center, Publication No. 9, (Ithaca, New York, 1966).
 13. Ibid., p. 11.
 14. This argument is similar to that made in the "captured bureaucracy" literature. See for example: William Niskanen, Bureaucracy and Representative Government, (Chicago, 1971) and in the "rent seeking" literature. See: Gordon Tullock, "The Backward Society: Static Inefficiency, Rent Seeking and the Rule of Law", Public Choice Working Paper, (CE 1978-7-1).
 15. Holden, Ibid., p. 36.
 16. Ibid., p. 47.
 17. A.H.J. Dorsey, M. McPhee & S. Sydneysmith, Salmon Protection and the B.C. Coastal Forestry Industry: Environmental Regulations as a Bargaining Process, Westwater Research Center, (Vancouver, 1980).
 18. Ibid., pp. 107-125. See also: M. McPhee, Water Quality Management in British Columbia: Pollution Control in the Pulp and Paper Industry, unpublished M.A. Thesis, (Simon Fraser University, 1978) and M. Sproule-Jones, The Real World of Pollution Control, Westwater Research Center (Vancouver, 1980) for further British Columbia examples and A.H.J. Dorsey, "Coastal Zone Management as a Bargaining Process", Westwater Research Center, (Vancouver, 1981), for an extensive review of forms of bargaining that occur within British Columbia coastal zone management.
 19. In Dorsey's analysis the forestry industry's involvement in regulatory bargaining provides a case in point. See: Dorsey et al., Ibid., pp. 137-142.
 20. The example provided by Dorsey's analysis here is the Federal Department of Fisheries and Oceans. See: Ibid.
 21. Holden, Ibid., pp. 42-44.
 22. Dorsey et al., Ibid., p. 140.

23. Holden, Ibid., p. 44.
24. See: Dorsey et al., Ibid., p. 137.
25. Dorsey et al., Ibid., p. xxi.
26. The externality concept was initially developed in the work of A. C. Pigou. The following discussion draws upon this analysis and Mishan's summary of the Pigouvian model. See: Pigou, Ibid., and Mishan, Ibid.
27. See: Coase, Ibid.
28. Ibid., p. 2.
29. Ibid., p. 15.
30. Ibid., p. 16. See also: Demetz, Ibid. for elaboration of this argument.
31. Coase, Ibid.
32. Warren Samuels, "The Coase Theorem and the Study of Law and Economics", Natural Resources Journal, Vol. 14., No. 1, (1974), p. 19.
33. Mishan, Ibid., p. 21.
34. Alan Randall, "The Coase Externality Theory in a Policy Context", Natural Resources Journal, Vol. 14, No. 1, (1974), p. 42.
35. This cost breakdown is Mishan's. See: Mishan, Ibid., p. 21.
36. The following discussion draws on Olson's analysis in Mancur Olson, The Logic of Collective Action, (Harvard University Press, 1965).
37. For a case study supporting this assertion see: Thomas Crocker, "Externalities, Property Rights and Transaction Costs: An Empirical Study", Journal of Law and Economics, Vol. XIV, (1971), pp. 451-464.
38. Randall, Ibid., p. 44.
39. See: Abrams, Ibid., on decision rules.
40. See: Ince, Ibid.
41. Samuels, Ibid., pp. 13-14.
42. George Hageviks's analysis of the effluent standard setting process in American states supports this assertion. He argues that the bargaining process can be structured to produce outcomes that approach economic efficiency. See: Hagevik, Ibid., p. 397.
43. The representational system will affect transaction cost levels itself. Both the costs faced by latent groups and those resulting from numerous single bargains may be covered by such a system because the numbers of

bargainers will be lower and government agencies may absorb some of the organization costs. For example, Randall has argued on these grounds that collective agency bargaining is one requirement for market solutions to externality problems. See: Ibid., p. 53.

44. This argument is developed at length in Demsetz, Ibid.
45. This addition is necessary to avoid an inequitable system that supports the status quo regardless of the benefits of internalization. See for example: Randall on Demsetz in Randall, Ibid., pp. 45-46.
46. See for example: Alastair Lucas, "Legal Foundations for Public Participation in Environmental Decision-making", Natural Resources Journal, Vol. 16, (1976), on the bargaining power of information, pp. 74-75 and Dorsey, Ibid., pp. 4-7.
47. Freeman, Haveman & Kneese, Ibid., pp. 96-97.
48. Robert Haveman, "Efficiency and Equity in Natural Resource and Environmental Policy", American Journal of Agriculture Economics, Vol. 55, (1973), pp. 868-878.
49. This could be expected where Niskanen's "captured bureaucracy" thesis holds. See: Niskanen, Ibid.

Chapter Two

Methodological Issues

INTRODUCTION

Chapter One constructed a bargaining model of regulatory formation and proposed a set of three criteria by which to assess any regulatory planning process. The following chapters will apply those criteria to an actual planning case. The present Chapter will begin this analysis by introducing the case and presenting the methodology to be employed herein. As such, it will provide the basis for the discussion to follow.

THE CASE STUDY

The Government of British Columbia is presently planning for renewed oil and gas exploration off the northern coast and Queen Charlotte Islands. The Queen Charlotte Sound-Hecate Strait area was the focus of extensive offshore exploration during the late 1960's and a proposal to reopen exploratory efforts was made in 1979.¹ Some initial seismic testing has already been undertaken and active exploration is tentatively scheduled to begin in the spring of 1982.² At present a number of provincial agencies are compiling studies to identify the potential impacts of offshore activities. In addition to this inhouse planning, a series of public hearings are to be held under the provisions of the Environment Management Act (1981).³ This two phase planning process will provide the basis for provincial regulation of any offshore oil exploration and development that occurs.

This analysis will deal with a segment of the provincial offshore planning process. It will consider planning for the regulation of negative effects of offshore activity on the marine environment and upon other users

of that environment. In this context offshore activity will be defined to include all routine offshore activities from the exploration or production point to where the product enters the onshore storage facilities.⁴ In excluding all other impacts the definition constrains analysis to this particular aspect of the regulatory planning process.

The essential problem in so limiting the analytical focus is that developmental impacts are obviously of greater scope than negative offshore-source effects on the marine environment. Potential impacts also include provincial, regional and local socio-economic effects and onshore-source marine and land environmental effects. Focusing upon a single aspect of developmental externalities may distort analysis of the bargaining process. The analysis may fail to take a number of factors into account. These include, first, that actors bargaining over external impacts on the marine environment may be willing to trade off restrictions in this area for concessions in another. (Or, in bargaining over other impacts they may trade off environmental concessions for beneficial economic spinoffs, for example.) Second, users affected by external impacts may differ across impacts. Those affected by negative externalities to the marine environment may not be the same groups who are affected by socio-economic impacts or other environmental impacts. Therefore, proponents of development may be able to bargain support from one affected user group against opposition from another within the overall bargaining process. This form of bargaining power may be difficult to identify in assessing only a segment of that process. A final problem occurs where bargaining group membership overlaps. Actors who are represented in multiple bargaining situations will have larger tradeoff options and thus greater potential bargaining power than

those who are not. Again, the analysis of a single bargaining segment may fail to identify this form of bargaining power.

There is, however, justification for restricting the focus to the negative impact of offshore activity on the marine environment. Initially, an argument can be made on the grounds of manageability. Time and information constraints render a comprehensive study of the entire bargaining process beyond the scope of this thesis. More importantly, several aspects of the existing planning process lend credibility to this approach. First, the government impact studies are being compiled in three component parts (environment, financial and socio-economic) by three different agencies. To the extent that bargaining affects the proposals made by these studies, there is some grounds for restricting the focus to at least the component level.

Second, the public hearings prior to development will be held under the provisions of the new Environment Management Act. The Act provides for the establishment of an inquiry "with respect to the environment."⁵ Therefore, though other impacts may be discussed, the central focus of these hearings will be environmental concerns. To the degree that bargaining occurs around the public hearing forum, focusing on the environmental component again appears justified.

Third, potential offshore-source impacts can be fairly accurately predicted at this point. For example, the type of exploration equipment that will be used is known. However, because the scale of onshore development will depend initially upon the success of exploration, onshore-source impacts are much more difficult to predict. Therefore, it seems reasonable to restrict our focus further to negative offshore-source impacts on the marine environment. As long as the potential intervention of outside

tradeoffs in the bargaining solution is recognized, the limited focus adopted here appears justified.

The analysis will view regulatory planning for offshore-source impacts as a bargaining process in which the resulting regulatory composite will be a limited use right to the exploration firm. The bargaining process itself will be assessed in light of the criteria set out in Chapter One. It is hypothesized that the planning phase bargaining structure of offshore oil development will not meet the bargaining criteria. It will not generate those limited use rights required for efficient internalization. It is further hypothesized that this lack will result from indirect user representation and discretionary government agency control of involvement in the bargaining process. The data necessary to test these hypotheses was collected in three stages.

METHODOLOGY

Initially, affected user groups were identified. "Affected" was taken to mean those existing user groups in the study area who would bear external costs from offshore oil exploration given no limitation of new use rights, or no regulation of offshore activities. The identification of affected groups began with consideration of the offshore exploration and development process. From this, impacts upon the marine resource that have been apparent in other development areas were assessed. This assessment allowed for the identification of expected impacts, given no regulation.

This initial section drew upon the literature regarding the exploration and development process, the potential effects of that process on the marine resource, given no regulation and the impact of these effects upon categories of other users of that resource. These issues will be discussed in the text initially at a general level and then as specified to the B.C. case.

The case study discussion required consideration of the expected offshore process, relevant characteristics of the marine environment of Queen Charlotte Sound-Hecate Strait and actual resource use patterns in the area. The literature available in this regard was further supplemented by interview data. This assessment identified those impacts relevant to the B.C. case and this facilitated the identification of categories of affected users in the study area. For example, if the literature indicated that particular rig discharges are harmful to ground fish and this resource was found to occur and to be commercially harvested in Queen Charlotte Sound-Hecate Strait, then commercial ground fishermen in the area were said to comprise one "affected" category.

Once "affected" categories were determined, specific user groups within these categories could be identified. This was accomplished through the use of a snowball sampling technique.⁷ Initially, government agencies who are the primary regulators of "affected" uses were identified on the basis of agency mandate. These agencies were asked to identify the user groups that exist in the case study area. The initial group contacts were then asked to identify further user groups. Given the numbers involved and the time constraint faced, it was necessary to select out user groups to be interviewed. This was done on the basis of group reputation. Both agency and group contacts were asked to rank identified groups according to their perceived primacy in the area. Those groups that were most consistently listed in, for example, the first three rankings were selected.⁸ The groups themselves were asked to nominate a group member to speak on their behalf.

A central criticism of reputational sampling is that interview findings may be distorted because selection is based essentially on visibility.

Therefore, interviews will be conducted with the more highly organized groups, or those that have, to some extent, overcome any transaction cost problems. Unorganized groups will be selected out by this procedure.⁹ However, given that sampling was required, the reputational method was best suited for this analysis. First, random sampling may have resulted in the selection of groups that represent a small number of users with "extreme" interests. For example, a group that seeks to preserve a pristine environment at all costs could have been selected here. The selection of such groups would have also biased the analysis. Second, the findings for large, highly organized groups may be considered applicable to less visible groups in the sense that if the former are not adequately represented in bargaining, one can reasonably assume the latter will not be either (other things being equal).

Having identified and selected out "affected" user groups, the second analytical step was the identification of the existing bargaining process. A number of questions had to be addressed in this regard including: (1) what user groups and government agencies are involved in planning phase bargaining?; (2) to what extent are they involved?; (3) by whose discretion does involvement occur?; (4) what level of transaction costs do groups face?; (5) do measures exist to offset prohibitive transaction costs?; (6) do government agencies act as user group representatives?; and (7) if so, do they adequately represent user interests? These questions were answered on the basis of information gathered from interviews, review of the legislation and review of factual data on user group characteristics.

Identification of planning phase participants began with interviews of provincial Ministry of Environment personnel. The Planning Branch, Ministry

of Environment has the legislative mandate for both the environmental impact assessment and the public hearing process. These will provide the basis for further intra-agency bargaining over policy recommendations and for inter-agency bargaining in the final regulatory formation stage.¹⁰

Environment personnel were asked to identify other agencies and groups involved in planning regulation of the environmental impacts of offshore oil development. They were asked to identify agencies and groups that had been consulted, those that had sought consultation and those that had provided information. Environment personnel were also asked to identify those agencies and groups that they expected to be involved at the public hearing stage. To confirm Environment's data, the agencies and groups identified were also asked if they had been consulted, had sought consultation, had provided information, or intended to intervene in the public hearings.

These initial interviews were further supplemented by open-ended interviews of the Director, Offshore Petroleum Division, Ministry of Energy, Mines & Petroleum Resources. The Offshore Petroleum Division serves in a supervisory capacity over the entire regulatory planning process and is working in concert with Environment to establish the public hearings. In its lead agency role, the Division has actively sought a degree of user group involvement in the planning process and as such has provided a second point of user group access to that process.

Measurement of the extent of user group involvement proved difficult to operationalize. The frequency of consultation with both lead agencies provided one indication of this. Also, Environment personnel were asked to identify any group(s) that were making a significant contribution to the planning effort in terms of information or suggestions for consideration.

This was checked against agency and group perceptions of the centrality of their involvement. Finally, the argument can be made that groups involved in the prior planning process have a greater impact than those who enter during the public hearing stage.¹¹ Because the relevancy of this argument will depend, to some degree, upon the design of the public hearing process, the proposed structure and intent of that process was established from open ended interviews with Environment personnel.

The question of where discretionary authority over involvement in planning phase bargaining lies was addressed through a review of relevant legislation. Legislation governing the compilation of impact studies and the public hearings process and that governing lead agency consultation with other agencies and with resource user groups was reviewed. Environment personnel were also asked if any Ministry policy required consultation with user groups or agencies.

In determining transaction cost levels, the analysis was restricted to an estimate of relative transaction costs. Calculation of absolute transaction costs for any group would have required both refined cost figures and some estimate of what should be considered a prohibitive cost level. This could not be adequately established here. Instead, surrogate measures of relative transaction costs were developed. These included group size and geographic dispersal; reflecting the assumption that large, dispersed groups will face higher transaction costs.¹² Also, an attempt was made to establish the level of formal organization within each group. Groups were asked if they organized in response to the offshore development issue, if they maintain a full, salaried executive, how often they meet and if they produce a newsletter on a consistent basis. Higher organizational

levels were taken to indicate a greater ability to bear transaction costs as initial organization costs had already been absorbed.

Measures to offset transaction costs were identified from a review of provincial legislation and policy in this regard. Such measures were defined to include both the availability of funds for organization, information gathering and lobbying efforts and the availability of free damage information for those groups who require it. Lead agency personnel were questioned to determine the existence of such measures and groups were questioned to determine knowledge and use of them. In keeping with the focus on relative transaction cost levels, no attempt was made to establish those groups that require assistance to offset "prohibitive" transaction costs. The bargaining system was assessed simply in terms of its ability to meet this need should it arise.

The issue of government agency representation of user group interests required a two-step approach. Initially, the fact of representation had to be established. This first step was allowed to rest solely upon impressionistic data. Government agencies identified as involved in the planning process were asked if they saw themselves as representing user group interests and if this was a central factor determining their position in that process. User groups identified by these agencies were asked to specify any agency that represented their interests and if they felt this was a central factor in that agency's position.

The second step in addressing the representation issue was to determine how adequately user interests are represented by government agencies. Both impressionistic data and surrogate measures of adequacy were used to assess this factor. Both agencies and represented groups were asked how adequate they felt representation of the group's interests were. Groups that indicated that representation was inadequate were asked why they felt this

was so. The divergence between agency and group assessments in this regard were taken as the basis for an estimate of adequacy.¹³ This was supplemented by measures of the degree and type of communication between the two. Both agencies and groups were questioned regarding the frequency of consultation and information exchange and who initiated consultation. The underlying assumption here was that agencies had to be made aware of user interests in order to represent them.

Having established those agencies and groups involved in the provincial planning process and those users "affected" by offshore activity, the analysis turned to identification of gaps in the planning process. Gaps were initially defined to include both those groups who were identified as "affected" but were not represented in the planning process and those whose sole representative was a government agency, where this representation was found to be inadequate. Interviews revealed that all groups but one identified a representative government agency, rendering the first half of this definition invalid.¹⁴ The question of user group involvement thus came to rest upon the evaluation of agency representativeness.

Furthermore, the public hearings process also raised problems for this analysis. It was initially assumed that public hearings would have been held before the analysis was completed and it would therefore be possible to identify participants in that portion of the planning process.¹⁵ Because hearings have yet to be held, only potential participants could be identified. With only this speculative data available, the analysis had to rest upon the distinction between prior planning and public hearing involvement. This distinction is based upon the argument that groups involved in prior planning have greater impact upon regulatory formation than do those whose involvement is restricted to the public hearings. One

indication of the validity of this argument was taken to lie in the existence of discretionary governmental control over the public hearing process. If the timing, content and structure of that process are left to government agency discretion, access to those agencies may be used to influence that process. Also, if public hearings are a subject of prior planning, then those groups who are involved in the latter have an initial influence not available to those whose involvement is restricted to the former.¹⁶

In the context of this distinction, process gaps were redefined to include "affected" user groups not represented in prior planning or who were inadequately represented through government agency involvement. Gaps were established by comparing the actual planning involvement of user groups and those user groups identified as "affected" on the basis of offshore activity impact assessment. In this manner the planning process itself was critiqued in light of the initial bargaining criteria; comprehensive user group representation. The process was then assessed against the damage knowledge and user discretion criteria from information garnered in step two interviews and legislation reviews.¹⁷

CONCLUSION

This chapter has outlined the methodology applied herein. It has discussed both the gathering and application of information necessary to assess the case of regulatory formation for offshore oil activities in British Columbia in light of the bargaining model developed in Chapter One. The following Chapters will reflect this methodological structure in presenting the offshore case. Chapter Three will discuss the process of offshore development and identify expected impacts and "affected" user categories given no regulation. In Chapter Four this discussion will be set

in the context of the case study area and "affected" categories relevant to that area will be defined. Chapter Five will set out the actual planning process, identifying prior planning participants and elaborating upon the prior planning-public hearing distinction. The identification of gaps and consequent critique of the planning process will be the subject of Chapter Six. The analysis will now turn to consideration of the offshore process.

Chapter 2 Notes

1. Though exploration may extend into Dixon Entrance and Queen Charlotte Strait, the study area in this context has been restricted to that area which; Chevron Standard Ltd. has applied for permission to explore. See map 1 attached, Appendix I. For a similar focus see: M. McPhee, "Offshore Oil and Gas in Canada: West Coast Environmental, Social and Economic Issues", Westwater Research Center, (Vancouver, 1982).
2. Victoria Times-Colonist, "Offshore Drilling Lid Comes Off Soon," November 10, 1981, p. 13.
3. British Columbia, Environment Management Act, (1981), Section 7(1). The hearings were initially to be held under the B.C. Utilities Commission inquiry procedure. See: Ministry of Energy, Mines & Petroleum Resources, News Release, June 2, 1981. However, they are now to be held under the Environment Management Act.
4. For a similar restriction of focus see: Canada, Department of Environment, Environment Protection Service, "Sources of Pollution and Causes of Environmental Disruption Associated with Canadian Offshore Oil and Gas Production," (1979). The definition specifies "routine" offshore activities because spill response is also an offshore activity and as such must be excluded from the definition.
5. British Columbia, Environment Management Act, Section 7(1).
6. This rather ponderous approach was necessary because: (1) the actual process of offshore activity in the case study area cannot be known until exploration indicates the actual extent of the find; (2) actual effects and impacts of that activity can only be determined through site-specific, project-specific environmental assessment, and, therefore; (3) the most that can be accomplished here is a discussion of the range of potential effects and the specification of those relevant to the case study area given certain known characteristics of that area.
7. For a similar application of snowball and reputational sampling see: M. Sproule Jones, The Real World of Pollution Control, Westwater Research Center, (Vancouver, 1980).
8. This selection technique was followed with the exception of one highly ranked user group whose representative consistently refused to be interviewed. The group is specified in Chapter Five, note 84.
9. Reputational sampling has been used most extensively in studies of decision making at the local community level. For an overview of its use and the problems associated with this method, see: W.D. Hawley and J.H. Svara, The Study of Community Power, (Beverly Hills, 1972).
10. The assumption is made here that bargaining will also occur within the intra-ministerial planning committees and between ministries

represented in the formal, two-tiered committee planning structure. The formal structure is discussed in Chapter Five.

11. This argument is developed in Alastair Lucas, "Legal Foundations for Public Participation in Environmental Decisionmaking," Natural Resources Journal, Vol. 16 (1976), pp. 71-102. It rests, to some extent, upon the different roles characteristic of intervenors in the prior planning and public hearing processes. In the former, participation tends to be cooperative, while in the latter, groups and agencies tend to assume an adversarial stance.
12. See: Mancur Olson, The Logic of Collective Action: Public Goods and the Theory of Groups. (Harvard University Press, 1965), pp. 51-65. Olson's argument is applicable here as the externalities faced by "affected" user groups have the character of a public good in that no group member can be excluded from enjoying the benefits of cost internalization by others.
13. A similar approach is used in assessing discrepancies between lobbyists' and legislators' perceptions of their interaction in H. Zeigler and M. Baer, Lobbying: Interaction and Influence in American State Legislatures, (Belmont, California, 1969).
14. The single exception to this was the Sierra Club. As this left only one case of fifteen that would fit the initial definition of process "gap," the definition was altered accordingly.
15. This appeared to be a reasonable assumption at the time given the public announcement that hearings would be held in the spring of 1982. See: Energy, Mines & Petroleum Resources, News Release, June 2, 1981.
16. The validity of this distinction rests also upon the public hearing planning structure, especially in terms of agency discretion. This factor is discussed further in Chapter Five.
17. Questionnaires are attached in Appendix II.

Chapter Three

The Impacts of Offshore Activities

INTRODUCTION

The initial methodological step specified in Chapter Two was the identification of "affected" user groups; those existing users that will face external costs given no regulation of offshore oil activities. It was argued that this step must begin with the identification of "affected" user categories and proceed to the specification of groups within these categories. This, in turn, rests initially upon the identification of external cost-generating impacts.

The fact that external impacts occur at all can be tied to the nature of the marine environment itself. Though both potential offshore oil activities and the existing patterns of resource usage will obviously be directed toward the consumption of a range of different resources, their usage can be seen as the consumption of some portion of a broader resource, the marine environment. This resource is characterized by a plethora of biological resources and physical qualities that determine patterns of usage. The inter-dependency of these patterns of usage reflects initially the inter-dependency of the biological resources supported by the marine resource. Consumption of one biological resource may well affect the availability of another that depends upon the first as a food or habitat source. Similarly, the physical qualities of the marine resource will influence the inter-dependence of both biological resources and use patterns. This is most apparent in terms of direct uses of the physical environment such as marine transportation. In this regard the inter-dependence of transportation uses will reflect physical factors that

determine, for example, the number of users at which congestion occurs. To the extent that use patterns of the marine resource are inter-dependent, external impacts can be expected to occur. The actual form these impacts take and the external costs they generate will depend, to some extent, upon the inter-dependence of the biological and physical characteristics of the marine resource. Thus, in specifying external impacts, the nature of this resource and of the human uses it supports must be discussed at length.

To identify external impacts, a method advocated by J. Zinn & J. Clark for use in environmental impact assessment will be adopted.¹ Though Zinn and Clark's methodology was designed for site-specific, project-specific impact analysis, it remains useful for the organization of data at a more general level. Zinn's & Clark's method proceeds in six progressive steps, four of which are relevant to this discussion.² First, the proposed development itself must be analyzed. The development program will be composed of various projects and their component subprojects, each of which will, in turn, consist of a series of construction and operation activities. Identification of these activities facilitates the second analytical step, the selection of those activities that generate potential environmental disturbances.

Disturbances are simply initial alterations of the natural state. They, in turn, generate reactions from the environment, or ecological effects. Once identified, disturbances and effects must be evaluated. This third step is the most difficult and potentially contentious point of any impact analysis. Natural ecological variability and complexity render conclusive evaluations difficult to achieve even in site and project-specific analysis.³ Thus, at the general level of the following

discussion, effective evaluation must remain suggestive at best. Potential effects can, however, be identified and the fourth step in Zinn & Clark's procedure, the identification of the impacts of these effects upon human usage of the marine resource, can be undertaken. Categories of "affected" users can then be defined on the basis of those impacts identified.

This method will essentially be applied twice in the following discussion. Initially, the discussion will proceed at a general level; identifying the offshore process, the disturbances expected from offshore activity, the effects generated by these and, finally, the associated impacts on human usage. Secondly, those effects and impacts especially pertinent to the case study area will be drawn out from a discussion of the existing use patterns and of the relevant biological and physical characteristics of that area.

The first of these discussions will be undertaken in this chapter. The chapter will apply Zinn and Clark's methodology to identify the external impacts that can be expected given no regulation of offshore exploration and development. Section I will discuss the offshore process, identifying component subprojects and the range of activities evident at each. Section II will elaborate upon the disturbances associated with offshore activities and identify ecological effects and the resultant impacts. Finally, "affected" user categories will be discussed in Section III.

THE OFFSHORE PROCESS

This section will discuss the process of offshore oil exploration and development. It will begin with a general discussion of operational methods; specifying activities that generate potential disturbances for the marine environment. Expected disturbances will also be identified, though in-depth discussion of these and of their associated effects will be reserved for the following section.

The project under consideration was identified in Chapter Two to be the offshore component of offshore oil exploration and development, comprising all routine activities from the production point to where the product enters the onshore storage facilities. At any one site, this offshore process is composed of a series of four overlapping component subprojects; exploration, development-completion, production and transportation.⁴ Each of these phases can be further divided into a series of offshore activities in which certain types of equipment are employed and certain disturbances of the marine environment can be expected.

The exploration component begins with a series of regional surveys in which potential oil bearing geological formations are identified. Air or ship borne measurements of various indicators are made. Those "passive" techniques are followed by detailed surveys of promising sites. Initially, seismic surveying is undertaken. Sound waves bounced off the ocean floor indicate the location of geological structures likely to be oil bearing. Sound waves may be generated by the use of open or contained explosives or electronic vibration devices. Because uncontained explosives can create fish kills the tendency has been to restrict seismic survey operations to the remaining two methods. Neither of these creates any apparent adverse disturbances in marine populations.⁵

Seismic surveying may be followed by bottom sampling and coring operations in some promising sites. Sediment samples are extracted by a limited drilling process to facilitate further testing. There is some blow-out potential in this operation that can be lessened by limiting sampling depth.⁶ Visible disruption of bottom sediments will occur and bottom and water column dwellers may be affected but only localized disturbances are expected.⁷

The final exploratory phase step is the actual determination of oil or gas presence through exploratory drilling. Drilling is usually undertaken from jackup platforms, drillships or semi-submersible platforms. The equipment used will depend to a large extent upon factors such as water depth, bottom conditions and weather severity.⁸

Jackup platforms are bottom supported during drilling and are thus restricted to water depths of under 100 meters. Though they are considered stable at shallower depths, jackups are susceptible to shifting or settlement of the seabed, near base scouring and bottom structure sliding once positioned. Drilling at water depths beyond 100 meters is undertaken from either drillships or semi-submersible platforms. Because they are self-propelled, drillships are not as susceptible to storm hazards during transport as are platforms. They are relatively stable in rough sea conditions and can be equipped with dynamic positioners that automatically correct any movement of the ship off the drillsite.

Semi-submersibles are similarly suited to severe weather conditions. They are freefloating structures consisting of a platform deck supported above the water by columns attached to underwater caissons or displacement hulls. These are ballasted to minimize wave force and maintain platform stability in high seas. However, semi-submersibles respond to rough weather roll more slowly than do drillships and their use is restricted to water depths above 400 meters at present. Semi-submersibles are usually accompanied by a standby vessel during drilling as a safety precaution for the crew in the event of wellhead fire. The platform generally houses two shifts of crew members⁹ and is supplied by supply vessels or helicopters.

Regardless of the platform type used, the drilling process itself remains the same.¹⁰ The process involves rotation of a drillbit at the end of a narrow length of hollow pipe. The pipe is rotated by a table on

the platform floor and guided by wire strung from the derrick. Between the platform and the ocean floor the drill pipe is stabilized by a "marine riser" designed to allow some lateral and vertical movement without pipe breakage thus counteracting any platform movement.

The drillbit cuts into the ocean floor under pressure provided by the weight of the rotating pipe. As the subsurface hole deepens it is "cased" with wider steel pipe sunk parallel to the rock face. Progressively smaller bit and pipe sizes are used as casing proceeds. Drilling activities require continual rig maintenance, including the cooling of equipment with filtered seawater and the washing of rig surfaces with detergent and water. Both heated cooling water and rig washwater may be discharged into the marine environment.¹¹

An important substance in the drilling process is drilling mud. Mud is pumped under high pressure down the drill pipe where it sprays out the end of the bit and is forced back up the annular area between the drill pipe and the casing or rock face. The mud itself is either oil or water based and contains various chemical additives designed to control the density, viscosity, pH and gel strength of the substance.¹² Drilling mud serves a number of functions in drilling operations. It aids the bit cutting action, acts as a lubricant for the bit, brings rock cuttings to the surface where they are studied for hydrocarbon content and maintains pressure in the well to prevent fluid seepage and counteract well blow-out. Mud pressure is closely monitored at the surface for any sudden declines that may indicate an impending blow-out

Though some mud is recycled back through the drillstem, much is disposed of after recovery of the rock cuttings. Mud is discharged into the marine medium either in bulk (usually between 100 and 300 bbls)

intermittently when the mud consistency is altered, or in small amounts along with intermittent discharges of drill cuttings.¹³ In this latter case a turbid effluent plume extending out from the platform is created, though discharge volume decreases as hole depth increases. The chemical content of drilling mud is such that there is some concern over the effect of eventual dissolution in the water medium.¹⁴

Upon reaching the target depth, the rock formation is tested for the presence of oil using an "electric logging" technique in which oil, water and gas content is calculated from the resistance of the formation to current flow. If the rock shows promise a drill stem test may follow. The well is uncased and mud is mechanically lifted out of the inside of the positioned pipe until the formation pressure is greater than the back pressure of the mud. Reservoir fluids then flow to the surface. If this test indicates oil then the final production casing is cemented into place and perforated opposite the desired strata. Production pipe is lowered inside the casing to a point just above the perforations and drilling mud is removed and replaced by a lighter fluid (possibly salt water) that will allow the oil to rise in the pipe. After this "washing in" procedure the well is ready to flow.

Drilling operations now move into the development and completion phase. Development initially involves testing the discovery to determine the extent of the find. The production capacity of the well is estimated from surface and subsurface metering of the flow at varying pressures and over time. The general practice is to dispose of this test flow into a tanker moored alongside the drilling platform. However, if the volume of test oil is minimal, disposal into the marine environment can occur.¹⁵

The volume of test oil flowed and the observed decline in flow pressure are used to calculate the volume of oil in place. This information, plus the original seismic data provide the basis for an estimate of field size. Field development entails drilling additional wells within estimated field boundaries. These wells are usually drilled off the original structure by repositioning either the platform itself or the derrick or through the use of deviated drilling techniques.

Field development also involves a number of activities collectively referred to as well completion. Wells that prove to be dry or not commercially viable are plugged with cement and abandoned. Finds that are commercially viable are "completed." Completion can include setting and cementing production casing, setting tubing conduit for routing oil and gas to the surface, consolidating sand to prevent it from filling the well bore and installing downhole safety devices. These activities are designed primarily to facilitate safe production. Other completion activities are designed to increase well recovery rates. These can include perforating holes in the casing to permit flow, fracturing the oil bearing formation to increase permeability and acidizing to enlarge the formation opening to increase flow. Such activities may increase the blow-out risk for any given well.¹⁶

In both the exploration and development/completion phases well blow-out is one of the most problematic sources of potential external disturbances.¹⁷ If drilling operations tap into a reservoir that is under significant pressure, the countervailing force of the mudflow may be inadequate and the oil will gush uncontrollably to the surface. Mudflow pressure is thus constantly changed to counterbalance reservoir pressure by careful monitoring of on-platform instruments.¹⁸ Rigs are also

equipped with blow-out prevention (BOP) devices that can be activated in response to a sudden drop in mudflow pressure. BOP stacks consist of a series of control valves that either close around the drill pipe sealing off the annular space or close off the hole completely. On bottom standing platforms the BOP stack is attached to the top of the surface casing just below the rotary table. On floating rigs the stack is attached to the top of the surface casing on the ocean floor. In this case the valves are remotely controlled from the platform, though both are activated manually. During completion BOP stacks are replaced with velocity activated down-hole safety valves to automatically close wells in the event of a production blowout. "Unfortunately, the velocity-activated valves...are among the most inadequate pieces of equipment used on the O.C.S. (outer continental shelf), as demonstrated by their performance record."¹⁹

After field development and completion, offshore operation moves into the production phase. Production platforms may also be bottom standing (fixed-pile platforms) or free floating (gravity platforms). Two types of subsea production systems also exist. These avoid the weather related problems of surface systems but remain susceptible to damage from ocean floor shifting and anchor dragging. Also, both types require diving operations for maintenance and repair and are thus both difficult and expensive to service.²⁰

Any platform may be collecting oil from up to fifty directional wells. Recovered oil and gas is run through various treatment processes in preparation for eventual sale. Treatment facilities may be mounted on production platforms to separate oil and gas, remove any sand and water from oil emulsion and separate any water vapor from recovered gas. The sand and

water waste is disposed into the marine environment, generally under maximum oil content regulations.²¹

Production is a continuous activity in which the operations are usually controlled automatically. Production valves are generally operated from onshore bases and, though frequent checks are made of offshore operations, the time lag between malfunction and response can be hazardous.²² valve failure, wellbore blockage and downhole pressure changes require immediate response to avoid spillage. Production equipment is installed for the life of the field and maintenance remains problematic, requiring complex and expensive diving technology.

The final phase of offshore activity is the transportation of recovered oil and gas to onshore storage and refinery sites. Oil is transported by bulk carriers or pipelines. If carriers are used, some form of offshore storage will be required to provide a buffer between continuous well production and discontinuous tanker operations. Both ocean floor and floating storage tank siting involves some localized disruption of the marine environment and can increase navigation risk in the area.²³ Also, risk of spillage during transfers between storage tanks and bulk carriers is quite high, especially in rough sea conditions.²⁴ Use of pipeline transportation precludes the need for offshore storage but entails other disruptive problems and requires a significant find to justify the expense of pipeline construction.²⁵

The potential environmental risks of tanker or barge transportation have been well documented. The bilge and tank cleaning practices of bulk carriers head the list in terms of aggregate amount of oil discharged into the water medium, *aside from land based* but the disturbances from these activities in offshore areas remain minimal due to the dissolution factor.²⁶ Bilge and tank

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cleaning can, however, have deleterious effects in enclosed harbour areas
where the potential for chronic pollution is high. A similar logic applies
to small scale spills that occur during transfer operations. Offshore
transfer spills will generally be dissipated relatively rapidly by wave
action and water turbidity. Such spills that occur in more sheltered
onshore transfer sites will not be so readily dissipated and are a
significant source of chronic harbour pollution.²⁷

The risk of large scale spillage from tanker grounding or collision is
a third major concern. Large spills will generally dissipate more slowly
even offshore and the continued existence of an oil slick can have a variety
of adverse effects. Disturbance of the marine environment is further
exacerbated if the spill grounds, especially if marine bird or mammal
habitats or sensitive estuarine environments are affected. Finally,
extensive use of bulk carriers can produce navigational problems simply by
increasing the number of vessels traversing shipping corridors. This may,
in turn, heighten collision potential, thus increasing spill risk.

An alternate method of transportation is provided by the use of oil and
gas pipelines where field size is large enough to warrant the immense
capital expense required and where depth and bottom conditions are
favourable. Pipeline systems generally involve a complex of gathering lines
connecting a number of producing wells to central production platforms where
oil is treated, metered and stored.²⁸ Transmission lines then transport
produced oil from these central platforms to onshore facilities. Pipelines
can be laid in depths up to 500 feet providing that bottom obstructions can
be avoided. Present techniques generally involve burying the pipe through
bottom sediment displacement. This process is designed both to minimize the

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probability of accidental puncture due to anchor dragging by vessels crossing pipeline paths and to slow corrosion of pipe material.

The potential marine environment disturbances from pipeline transport are twofold. First, placement will entail localized disruption of bottom dwellers and nearshore habitats. Second, there is a risk of pipeline spill due to accidental puncture, rupture from internal pressure buildup due to pipeline blockage, and leakage from pipeline corrosion. The practice of burying pipelines is one method that has been adopted to minimize this risk. Other methods include the use of buoys to mark pipeline positions and the installation of safety shut off valves that are sensitive to any increase in flow pressure at intervals along the line.

This concludes discussion of the process of offshore oil exploration and development. The process was found to proceed in the four phases of exploration, development-completion, production and transportation. Activities undertaken within each have been discussed in some detail and the potential disturbances generated by certain activities have been identified. These disturbances and the effects associated with them will be discussed indepth in the following section.

DISTURBANCES AND RELATED EFFECTS UPON THE MARINE ENVIRONMENT

The preceding section has identified a number of offshore production activities as potential sources of disturbances in the marine environment. These disturbances are of two main types; biological and physical. Potential sources of biological disturbance include both routine and accidental discharges of oil and other substances. Among routine oil discharges are platform and related vessel runoff, vessel bilge and tank cleaning practices and test oil disposal. Other substances that routinely

enter the marine environment include domestic waste, rig washwater, process cooling water, drilling mud and production water. A final routine biological disturbance source is the noise generated at all phases of the offshore process.

Accidental sources generally refer to oil discharge. These include well blowout, leakages from valve failure or fractures in conducting pipes, storage tanks or transmission pipelines and spillage. Spills can result from pipeline puncture or rupture, oil transfer accidents, bulk carrier groundings or collision, and platform movement due to weather related moorage and collision problems. Finally, sources of physical disruption include solid waste disposal, platform siting and increased navigation. Any disturbance of the marine environment generates a related effect upon, or reaction from, that environment. This section will explore the effects associated with each of the biological and physical disturbances identified above.

The Range of Effects

Initially, it is important to note that disturbances can generate a range of effects. Beyond the division of biological and physical effects, biological effects can be further categorized into five types. These include (1) lethal toxicity, (2) sublethal disruption, (3) mechanical interference, (4) incorporation into organisms and (5) alteration of habitat.²⁹

Lethal toxicity involves interference in the cellular and subcellular process of an organism, resulting in death. Sublethal effects similarly involve such interferences, though death results only indirectly. Sublethal effects include changes in feeding and reproductive behaviour. Also the metabolic, respiratory, disease resistant and developmental

characteristics of marine organisms may be altered. Discharge may also result in mechanical interference with an organisms respiration, movement, feeding patterns, or innate insulative ability. Incorporation of discharge components by marine organisms raises two principal concerns. The first is direct harm to the organism from carcinogenic or mutagenic substances. To the extent that these substances persist they will be transferred up the food chain. Secondly, incorporation may result in tainting, rendering marine organisms inedible. Finally, the selective suppression of particular species can produce a significant disruption of the ecosystem as a whole. Habitat alteration can result from both physical and chemical changes, (including, for example, incorporation of oil into bottom sediments). Though natural variability and lack of adequate base line data render specific effects difficult to identify, significant long term shifts in species composition and distribution can occur and ecosystem recovery may be impaired.

The Interaction of Determining Factors

The biological and physical effects generated by any particular discharge will depend upon a number of factors. These include both discharge and recipient medium characteristics. Discharge characteristics are especially significant to biological effects. Pertinent discharge characteristics include chemical composition, physical properties, time span between discharges and absolute size of a single discharge.³⁰ In the case of oil, for example, toxicity is related to aromatic fraction context; the highly soluble, lower boiling aromatics of refined oil being more toxic.³¹ However, greater mechanical interference due to oil coating is expected from crude oil discharge and both crude and refined oils contain carcinogenic hydrocarbons.³²

The composition of oil also influences the effect of "weathering" on the chemical and physical properties of any discharge. Oil discharges form slicks on the ocean surface. As the slick is dispersed and dissolved, a subsurface suspension of oil, termed a diffusion cloud, forms within the water column. The diffused oil is further broken down by microbial action within the water column. The combined processes of evaporation, dissolution, microbial action, chemical oxidation and photochemical reaction are included in the concept of oil weathering. Weathering effects depend upon both the amount of thermal and mechanical energy available for oil degradation and the physical characteristics (including volatility, fluidity and density) of the oil discharge.³³ For example, the toxic aromatics are not readily broken down by microbial action and heavy residuals are not easily dissipated. Rather, they tend to consolidate into tar deposits, generating sediment disruption.³⁴

Similarly, the time span between oil discharges is an important factor influencing discharge effects. Significant organismic or ecosystem recovery may follow intermittent or single shot oil discharge. But continual discharge can result in cumulative contamination of the marine environment.³⁵ Finally, the absolute size of any discharge is also important in assessing potential biological effects. Generally, large spills will weather more slowly and are thus more likely to ground in sensitive shoreline areas. Also, their mere size may render containment and cleanup highly problematic.³⁶

The relative significance of any of these discharge characteristics in determining biological effects depends also upon the nature of the marine environment at the discharge point. Though it is beyond the scope of this

study to document the site specific characteristics required in impact assessment, the importance of recipient medium characteristics can be argued at a more general level. For purposes of this discussion, it is useful to divide the marine medium into two categories; open and inland coastal waters.³⁷ Open coastal waters are relatively more exposed to the open sea and thus show stronger wind and wave action and greater depth, turbidity and current mixing action than do sheltered inland waters. All of these characteristics are factors determining relative discharge effects.³⁸

Similarly, the relatively greater biological productivity of inland coastal areas renders them particularly vulnerable to biological discharge effects. Physical effects will also differ between open and inland coastal waters. For example, severe weather disturbances will be of greater concern in open coastal areas, while inland areas pose greater navigational hazards and increased congestion problems.³⁹

Any assessment of potential discharge effects requires integration of the discharge and recipient medium characteristics discussed above. This interaction will be stressed in the following discussion of the range of biological and physical effects potentially generated by a number of discharge types.

Biological Effects

Routine Discharges

-- Manned Platform Discharges

Substances that routinely enter the marine environment during manned platform operations include domestic waste, rig washwater and process cooling water. In a sizable field occupied by a number of drilling platforms, daily domestic waste production can be significant.⁴⁰

Untreated waste can generate high BOD and suspended solid levels potentially effecting water column organisms. The water used to wash down rig surfaces may also be disposed overboard. Rig washwater contains detergents that may be toxic to marine organisms. Similarly, the discharge of sea water used to cool drilling machinery may have a localized effect. On average, over 200,000 gallons of heated sea water (10°-40°) will be discharged from a single platform each day.⁴¹ This can raise surrounding water temperature and cause plankton mortality in a localized area. Also, cooling water may contain oil and lubricants that will add to aggregate runoff and discharge amounts.

-- Mud Discharges

A significant concern regarding platform discharge is drilling mud and formation cuttings disposal. "During the course of drilling an average 15,000 ft. well, approximately 110 tons of commercial mud components and 950 tons of drill cuttings are discharged overboard."⁴²

The initial environmental concern regarding this discharge is the chemical composition of drilling muds. First, some mud types are oil based. Disposal of these muds will increase aggregate oil discharge. Second, the major components of all drilling muds contain potentially toxic metals such as lead, zinc, copper or mercury.⁴³ The effect on marine organisms due to absorption of these elements in the water column and in bottom sediments is a matter of some contention in the literature. While potential toxicity of these substances is admitted, it is argued that:

"concentrations that would occur in a drill mud plume are far below those necessary to create toxicity problems for water column organisms...Near field benthic organisms may be affected for short periods of time due to mud and cuttings settlement...(but) recovery is thought to be rapid in offshore areas."⁴⁴

Because dilution and dispersion of discharged drilling muds will be more

rapid in offshore areas, organisms and sediments in sheltered inland waters will be more susceptible to adverse effects.

The second concern with regard to mud disposal relates to the concentration of suspended solids in drilling mud. The increased turbidity of the discharge plume may generate localized water column disruptions. Phytoplankton photosynthesis rates may be reduced and the breathing and feeding mechanisms of zooplankton may be interfered with. Similarly, suspended solids can clog fish gills and interfere with feeding. If these solids settle to the bottom, benthic organisms may be smothered or displaced and sediment alteration can occur. Water depth and current mixing action are thus important considerations here. If mud settles toxins may continue to leach and benthic habitats may be destroyed. However, the long term effects of habitat alteration have not been established.⁴⁵

-- Production Water Discharges

Production water is the sand and water recovered with oil from producing wells. In offshore treatment it is disposed in a continuous discharge from the oil-water separators on the platform. Production water generally contains mineral salts and small amounts of oil. An increase in mineral content will lower dissolved oxygen levels and may contaminate the subsurface in a localized area. Though fish are expected to avoid the discharge plume, plankton communities carried through the plume will suffer losses. The effect on the overall planktonic population is not known. Nor, therefore, is the cumulative effect understood.⁴⁶

-- Noise

The noise associated with offshore platform and vessel activity is another source of disturbance of the marine environment. There is

speculation that such noise interferes with the echolocation of certain marine mammals⁴⁷ and that, in avoiding offshore noise, mammals will be displaced from feeding and breeding grounds or migratory routes. Marine birds face similar noise avoidance effects and may show stress mediated responses including lower disease resistance, endocrine imbalances which may affect reproduction, and increased vulnerability to environmental disturbances.⁴⁸



Routine and Accidental Oil Discharges

Both routine and accidental forms of oil discharge were identified in the preceding. Routine discharges were said to include runoff, bilge and tank clearing practices and test oil disposal, as well as some oil in mud and production water discharges. Accidental discharge sources include blowout, leakages, and spills. Furthermore, it has been noted that the effects of any oil discharge will depend upon discharge and recipient medium characteristics, time span between oil discharges and single shot discharge size.

The crude oil extracted from offshore wells will contain both toxic light and nontoxic heavy fractions.⁴⁹ Discharges will be initially quite toxic and will become less so as lighter fractions dissipate due to weathering. Discharge location and size are thus of central importance.

-- Large Scale Oil Discharge: Open Coastal Waters

Large scale discharges are generally single-shot events resulting from accidental sources such as well blowout, undetected pipe or valve leakage or carrier, storage tank or pipeline spillage. Blowouts and tanker accident are the most usual sources. Though estimated probabilities of spills from both sources show that the probability of spillage is not high overall,⁵⁰ spill probability increases, and time lapse between spills

decreases, with field size.⁵¹ This latter point is important, as recovery time between spills is significant for the marine environment. Also, the probability of bulk carrier spillage appears relatively higher in inland coastal waters where navigational hazards are generally greater.⁵² These waters are also more susceptible to oil discharge effects.

The effects generated by any large spill will depend to a great extent upon the nature of the medium into which it is discharged.

"It is generally agreed that concentrations following a spill in the open sea are so low and dilution effects so rapid that consequences are not significant to the organisms in the water column beneath the spill."⁵³

However, a range of deleterious effects can occur in offshore areas if certain specific conditions prevail. Planktonic communities will be significantly disrupted if spillage coincides with seasonal plankton blooms.⁵⁴ The destruction or fouling of plankton blooms is expected to have repercussions on organisms further up the food chain, though natural variability renders specific effects difficult to identify.⁵⁵ Aside from lethal effects, changes may also result in the photosynthetic rates, growth characteristics and reproduction patterns of various planktonic types.⁵⁶ The broader ecosystemic effects of such changes have not been determined.

Fish populations may also suffer direct adverse effects. Oil coating of floating rafts of pelagic fish eggs will produce lethal effects and, if spillage occurs in areas of upwelling, schooling or feeding behaviour, fatalities from both lethal and sublethal effects are expected.⁵⁷ Again, organisms higher up the food chain may be indirectly affected.

Marine birds will be adversely affected if spillage occurs along migration routes in feeding or congregation sites. Diving birds are most at

risk in open coastal waters. These birds may land on, or dive through, the slick while feeding and become coated in oil. Major coating results in loss of insulation and death from exposure. Minor coating can also result in death due to ingestion of oil while preening.⁵⁸ "Oil may also act indirectly by affecting the laying rate and hatchability of eggs and the growth rate of chicks - sublethal effects which in the long term would reduce the chances of survival of both individual birds and breeding populations."⁵⁹

The effect on marine mammals who may surface through oil slicks is similarly adverse. Oil coating interferes with the thermo regulation of fur seals, sea otters and young hair seals and death from exposure can result. Pinnepeds are also susceptible to ingestion of oil during grooming, suckling or eating. Ingestion is also a hazard to plankton sifting whales whose baleen plates can become fouled by oil. Finally, all marine mammals can suffer irritation and inflammation of their eyes and mucus membranes from oil fouling.⁶⁰

-- Large Scale Oil Discharge: Inland Coastal Waters

The effects of large scale oil discharge remain potentially more deleterious in sheltered inland coastal waters. First, the biological productivity of these areas is greater. Second, slick stranding can be expected soon after the discharge and thus little loss of toxic elements due to weathering will occur.⁶¹ Intertidal and nearshore organisms are therefore particularly at risk. Beyond the effect of contact with oil contained toxins, intertidal organisms may be smothered by oil coating. Nearshore marine grasses are also susceptible to oil coating damage. Recovery of these plants is slow and requires a long time to stabilize.⁶²

The third characteristic of inland waters that increases their susceptibility to oil discharge effects is mixing action. The lower mixing action of sheltered waters results in less hydrocarbaon dilution and concentrations may remain high enough to damage phyto and zooplankton in the water column.⁶³ Nontoxic, incorporated hydrocarbons may be passed up the food chain in this manner. Also, a thick oil layer can reduce light penetration in shallow areas by over half. Phytoplankton photosynthesis will be decreased and the vertical migration of zooplankton will be interferred with.⁶⁴

The fourth relevant characteristic of inland waters is depth. Because inland waters are shallower, contact between oil in the water column and bottom sediments is increased. Similarly, the lower turbidity and more localized current mixing action of inland waters will allow oil to bind more readily to sediments in suspension and then to settle out. For these reasons, the oil content of bottom sediments will be greater in inland waters and consequently a greater incorporation of oil by benthic organisms can be expected.⁶⁵

Other fish populations are also more at risk in inland waters. This is especially true in estuarian environments because of their prominent role in fish rearing and food production. Fish fry may be more susceptible to death and damage from oil contamination of their habitat and food sources.⁶⁶ Finally, oil discharges in inland waters generate more adverse effects for seabird and marine mammal populations. Because the rookery sites of both are located primarily in these waters, damage potential is greater.⁶⁷

-- Small Scale Oil Discharges

Small scale oil discharges occur as a result of both routine practices and accidental spillage. Routine sources include runoff, test oil disposal and bilge and tank cleaning practices. The latter remains one of the most

significant sources of oil discharge. Small accidental spills can occur at a number of points in offshore activity including contained leakage and oil transfer spillage.

The effects of small scale discharge are generally much less dramatically obvious than those of large scale discharge, but they remain potentially more insidious. Again, spill location is of primary concern. The total volume of single small discharges restricts their effect offshore. Smaller amounts of oil will dissipate more quickly and are thus less likely to drift inland or ground in sensitive shoreline areas. Similarly, the disruption of marine birds and mammals associated with large scale spills is less likely to occur.

However, small scale discharges remain of concern in inland coastal waters especially because such spills tend to occur relatively regularly.⁶⁸ Routine bilge and tank cleaning practices may pose the greatest problem for sheltered areas. Because this form of discharge is a continuous activity, cumulative contamination of harbour sites is a potential problem. Observed inharbour effects include the destruction of limpet, barnacle and sea anemone colonies and of major vegetation. This latter effect produces anaerobic conditions which result in further destruction of marine plants and removal of the food sources of various birds and aquatic organisms. Ecosystem disruption appears significant.⁶⁹

Accidental spillage does not pose as great a contamination potential. However, the frequency of discharges, such as offloading transfer spills,⁷⁰ remains problematic. Because of the slow recovery rate of affected nearshore ecosystems, spillage may reoccur before recovery has stabilized. Studies have indicated cumulative effects on marine grasses and

algae beds⁷¹ and on organisms at the base of the food chain.⁷² Again, the potential for long term disturbance of the ecological balance is high. Finally, small scale inland spillage poses the same threats to intertidal and nearshore organisms as does large scale spillage, in terms of the stranding of nonweathered hydrocarbons. This adverse effect again increases with spill frequency.

The preceding discussion of the biological effects of both oil and other substances discharged indicates that offshore activity will generate a range of effects. It is also clear from the preceding that specific effects will depend on a number of factors. However, even if these are known many effects cannot be predicted. As is apparent above, the literature is most comprehensive in regard to direct lethal effects, while less obvious effects that may be manifested only over a long term remain largely undetermined. The inconclusiveness of biological effects data provides a source of contention over actual effects that could in turn become focal points of disputes, bargaining and negotiations.

Physical Effects

Physical effects are of a generally more obvious nature than biological effects. They result from solid waste disposal, platform and storage tank siting and the increase in oceanic traffic produced by the activities of supply, standby and oil transport vessels.⁷³ Solid waste disposal includes the disposal of obsolete drilling equipment and the abandonment of wells in the oceanic medium. This waste entails a hazard for fishing operations and can result in gear damage and consequent catch losses to fishermen in the area. Relatedly, having to avoid such obstructions can produce time waste costs for fishing operations.

Offshore siting and transport activities may increase congestion in the

exploration/development area. This can, in turn, generate a number of secondary effects. Spill risk from collision may be heightened and disruption of established shipping lanes or fishing fleet areas can occur. The distinction between open and inland coastal waters may be less relevant in regard to physical effects. Though congestion can be expected to be greater in inland waters, platform siting within an important fishing zone will disrupt fishing activities regardless of where the zone is located.

Summary of Effects

The preceding has identified a range of biological and physical effects or reactions of the marine environment to disturbances generated by offshore activity. Biological effects have included (1) lethal toxicity, (2) sublethal disruption, (3) mechanical interference, (4) incorporation into organisms and (5) habitat alteration. Though the lethal effects have been most conclusively documented, evidence of the range of biological effects upon various marine organisms has been cited for a number of discharges. Those organisms identified as susceptible to adverse effects include planktonic populations, benthic organisms including fish populations, pelagic and anadromous fish, algae and marine grasses, intertidal shellfish and marine birds and mammals. Though specification of biological effects requires greater indepth knowledge of discharge and marine medium characteristics than is available here, it remains legitimate to discuss potential effects at a general level. In this sense it is clear that particular marine populations remain at risk in both open and inland coastal waters. Physical effects have also been identified. These result essentially from the increased congestion produced by offshore process usage of the marine environment, and lead most directly into consideration of the focus of the next section of this analysis; impacts on existing uses of the marine medium.

IMPACTS UPON EXISTING USES

The preceding section has discussed biological and physical effects of offshore activities. From this the impacts on other uses of the marine environment can be determined. In terms of biological effects, the identification of potentially affected populations can be followed by a selection of those populations relevant to human usage. Physical effects more obviously generate direct impacts on usage.

The concept of usage itself must include both active and passive consumption.⁷⁴ Active consumption involves the extraction of some component of the marine resource. Fishing, for example, is active, while bird watching is essentially passive. The line becomes difficult to draw in the case of navigational usage. Sailing extracts space from the marine environment, but so too does beachcombing. However, because the central issue here in regard to navigation is the congestion effect, it will be included in the active category.

The significance of both active and passive uses of the marine resource can be illustrated by example. The individual who enjoys watching harbour seals basking in the sun (or simply enjoys the knowledge that they are basking should he choose to watch) is using a component of the marine resource, just as surely as is the commercial fisherman. The former use is virtually impossible to quantify for comparative purposes, yet it generates some consumptive value for the individual concerned.

Passive uses potentially at risk from offshore activities include marine bird and mammal watching, beachcombing, and the option demand for such activities. Their value is expressed in the concern for preservation of marine bird and mammal populations and of pristine natural habitats in

both open and inland coastal waters. Potentially affected active uses include both commercial and noncommercial consumption. The former includes commercial fishing, navigation and shellfish and marine plant harvesting. Noncommercial uses include sport fishing, recreational boating and consumption of shellfish and marine plants.

The end result of identifying potentially affected uses is to specify affected user categories. Initially, this concept was defined to include all those users that would be affected if the offshore process was not regulated and thus all the routine discharges identified above occurred. Because of both the accidental nature of many discharges and the undeterminable effects of many disturbances, this definition must be altered to comprise those user categories potentially affected given no regulation. These can be ascertained from the potentially affected uses outlined above. Affected user categories include both the commercial and sport fisheries, commercial shipping interests, recreational boaters, and both commercial and noncommercial shellfish and marine plant harvesters. Affected user categories also include the beachcombers, bird and marine mammal watchers and those who demand some degree of general habitat conservation.

CONCLUSION

This chapter has identified those uses of the marine environment that could face external costs from unregulated offshore oil activities. Beginning with a discussion of the offshore process, activities that could generate disturbances in the marine environment have been identified and the associated biological and physical effects have been discussed. Following from this, those affected marine resources used by human populations were selected to identify the potential impacts of the offshore process and the consequent "affected" user categories.

It was argued at the outset that the interdependency of the biological and physical characteristics of the marine resource is a central factor in the interdependency of resource usage, and thus the generation of external costs. The influence of the marine resource itself upon external impacts is evident to some degree in the preceding discussion. The nature of the resource becomes even more central as the analysis moves to a less general level. This will be apparent in the context of the following Chapter which will turn specifically to the case study. Those potential impacts relevant to the B.C. case will be identified through further discussion of the actual offshore process, the nature of the marine medium and the existing patterns of human usage in the case study area.

Chapter 3 Notes

1. J. Zinn & J. Clark, "A Proposed Method for Assessing Impacts of Energy Development on Living Resources and Habitat in the Coastal Zone" in Energy Across the Coastal Zone, Proceedings of the Third Annual Conference of the Coastal Society, (Virginia, 1977), pp. 30-41.
2. The final two being to identify required modifications to the proposed development and to make preliminary policy recommendations. See: Ibid.
3. See for example: Canada, Department of Environment, Environmental Protection Service, "Sources of Pollution and Causes of Environmental Disruption Associated with Canadian Offshore Oil and Gas Production," (Ottawa, 1979).
4. The average time spans for each phase are: one to eight years for explorations, four to twenty years for development and five to twenty-five years for production. This subproject breakdown is based upon that in: D.E. Kash et al., Energy Under the Oceans: A Technological Assessment of Outer Continental Shelf Oil and Gas Operations, (Oklahoma, 1973), pp. 25-63. Much of the following discussion is drawn from Kash and from Peter Hinde, Fortune in the North Sea, (London, 1966), pp. 88-161.
5. Kash, Ibid., p. 30.
6. One justification for American O.C.S. regulation to limit core drilling depth is to minimize blowout potential. See: Ibid., p. 31.
7. Ibid.
8. A good discussion of platform types and how their use is constrained by such conditions is found in Hinde, Ibid., pp. 113-122. The following platform descriptions are based largely upon Hinde's discussion.
9. Shifts number approximately twenty-five men. Because they reside on the platform, domestic waste will be generated and may be disposed overboard. See: Ibid., p. 123.
10. The following discussion of the drilling process is based largely upon the description provided in Kash, Ibid., pp. 25-63.
11. Obsolete equipment may also be disposed of overboard. These concerns are raised in M. McPhee, "Offshore Oil and Gas in Canada: West Coast Environmental, Social and Economic Issues", Westwater Research Center, (Vancouver, 1982), p. 11.
12. For a detailed discussion of the potential constituents of drilling mud see: R.W. MacDonald, "An Examination of Metal Inputs to the Southern Beaufort Sea by Disposal of Waste Barite in Drilling Fluid," (Victoria, 1980). The author indicated further during an interview that chemical composition will differ significantly over muds used and that actual composition is rarely specified.

13. National Research Council, Marine Board Assembly of Engineering, Outer Continental Shelf Frontier Technology, (Washington, 1980), p. 80.
14. See: MacDonald, Ibid. and Canada, Fisheries and Oceans, Institute of Ocean Sciences, "Environmentally Acceptable Trace Metal Contents of Barite for Arctic Disposal," (Victoria, 1980).
15. Hinde, Ibid., p. 145.
16. Kash, Ibid., p. 59.
17. A.T. Chandler, "Environmental Problems Associated With Petroleum Exploration and Development" in United Nations, Economic Commission for Asia and the Far East, Proceedings of the Seminar on Petroleum Legislation with Particular Reference to Offshore Operations, (Bangkok, 1971), p. 66 gives blowout as the cause of 20% of offshore accidents.
18. Blowouts are most frequently due to human errors that reflect improper training, failure to measure mud volume accurately, late detection of mud volume changes, and inadequate response to indications of an impending blowout. See: Kash, Ibid., p. 58-60.
19. Ibid., p. 60. He cites an estimated failure rate of between 25 and 40 percent.
20. A good summary of production platform types is available in National Research Council, Ibid., pp. 31-40.
21. American O.C.S. regulations specify maximum oil in production water levels. See: U.S. Council on Environmental Quality, "Outer Continental Shelf Oil and Gas--An Environmental Assessment," Volume 1, (Washington, 1974), p. 167.
22. The relatively high blowout risk characteristic of production operations can be attributed to these factors to some extent. See: Ibid., p. 176.
23. Kash, Ibid., p. 64.
24. See: Ibid., p. 63.
25. Hinde, Ibid., p. 134.
26. These types of discharge constitute an estimated 33% of oil addition to the marine environment. D.F. Boesch et al., Oil Spills and the Marine Environment, (Cambridge, Mass., 1974), p. 61.
27. See: B.C. Ministry of Environment, Land Management Branch, "The Environmental Implications of Oil Tanker Traffic on the B.C. Coast," (Victoria, 1977) for a good discussion of oil spill effects.
28. Hinde, Ibid., provides a good discussion of pipeline systems at pp. 152-53. Much of the following is drawn from this.

29. This breakdown is based on ones proposed in D. Scarralt "Impact of Oil on Fisheries," in The Proceedings of the 9th Environmental Workshop on Offshore Hydrocarbon Development, (May, 1980), pp. 317-332 and in Canada, Fisheries and Oceans, Working Group on West Coast Deepwater Oil Ports, "Potential Pacific Coast Oil Ports: A Comparative Environmental Risk Analysis," Volume 1, (Vancouver, 1978), pp. 7-29.
30. This list of relevant discharge properties is based on a review of the effect assessment literature including Scarralt, Ibid., Fisheries and Oceans, Canada, Ibid., B.C. Ministry of Environment, Land Management Branch, Ibid., and S.L. Ross, "Oil Spills Countermeasures in Offshore Production" in The Proceedings of the 9th Environmental Workshop on Offshore Hydrocarbon Development," (May, 1980), pp. 372-390.
31. B.C. Ministry of Environment, Land Management Branch, Ibid., p. 7.
32. Scarralt, Ibid., p. 321.
33. The availability of energy for degradation depends upon the nature of the marine environment. Thermal energy availability is related to wind and water temperature such that slick degradation rates are lower given colder wind and water temperatures. Mechanical energy availability is a function of wave energy, tides and wind force. See: B.C. Ministry of Environment, Assessment and Planning Branch, "Preliminary Environmental Assessment: Offshore Oil Exploration," (Victoria, April, 1982, draft), p. 65.
34. See: McPhee, Ibid., p. 8.
35. See for example: A. Nelson-Smith, "Effects of the Oil Industry on Shore Life in Estuaries," Proceedings of the Royal Society of London, Vol. B. 180. (London, 1972), pp. 487-496.
36. See: Ross, Ibid., p. 384.
37. This approach is adopted in: B.C., Ministry of Environment, Land Management Branch, Ibid.
38. Particularly important to biological effects is the relative degree of hydrocarbon weathering that occurs in each medium type. See: note 34.
39. B.C. Ministry of Environment, Land Management Branch, Ibid., p. 4.
40. Some indication of the extent of domestic waste production is suggested by the fact that a platform houses from 50 to 100 men working 12 hours a day per shift.
41. McPhee, Ibid., p. 11.
42. U.S. Council on Environmental Quality, Ibid., p. 76.

43. See McDonald, Ibid., and Institute of Ocean Sciences, Ibid.
44. National Resource Council, Ibid., p. 84-86.
45. Interview with R. MacDonald, Institute of Ocean Sciences, Victoria, January 1981.
46. U.S. Council on Environmental Quality, Ibid., p. 110.
47. Since water is an efficient transmitter of low frequency sound, this effect will not be restricted to localized areas. See: McPhee, Ibid., p. 12.
48. B.C. Ministry of Environment, Assessment and Planning Branch, Ibid., p. 108.
49. McPhee, Ibid., p. 8.
50. Blowout estimates range from 1 in 500 wells drilled (Kash, Ibid., p. 67) to 1 in 106 wells (Imperial Oil Ltd., "Environmental Impact Statement for Exploratory Drilling in Davis Strait," 1978). The U.S. Council on Environmental Quality estimates the probability of spillage exceeding 1,000 barrels from all offshore sources to be approximately .25 for a field of 500 million barrels. See: U.S. Council on Environmental Quality, Ibid., p. 6.
51. Ibid., p. 74.
52. Ibid., p. 72. The Council report notes that: "Most large tanker spills occur withing 50 miles of land."
53. B.C. Ministry of Environment, Land Management Branch, Ibid., p. 5.
54. N. Snow, "The Effects of Petroleum Hydrocarbons on Phytoplankton and Macrophytes," in Canada, Ministry of Environment, Environmental Protection Service, Oil and Dispersants in Canadian Seas: Research Appraisal and Reconstructions, (Ottawa, 1979), p. 61.
55. Interview with D. Tillipough, Ministry of Environment, Victoria, January, 1982.
56. Snow, Ibid. and M.L.H. Thomas, "Oil and Dispersant Effects: Communities and Ecosystems," in Canada, Ministry of Environment, Environmental Protection Service, Oil and Dispersants in Canadian Seas, p. 124.
57. D. Gordon, W. Duval and R. Olmstead, "An Assessment of the Implications to Northern British Columbia Fisheries Resources of Tanker Operations Associated with the Proposed Kitimat Pipeline Limited Development," (Vancouver, 1977) and Scarralt, Ibid.
58. G.B. Brown, "Birds, Oil and the Canadian Environment," in Canada, Ministry of Environment, Environment Protection Service, Oil and Dispersants in Canadian Seas, pp. 80-113.

59. Ibid., p. 112.
60. B. Smiley, "The Effects of Oil on Marine Mammals," in Canada, Ministry of Environment, Environmental Protection Service, Oil and Dispersants in Canadian Seas, pp. 114-122 and A.W. Mansfield, "Impact of Oil Production on Marine Mammals, The Proceedings of the 9th Environmental Workshop on Offshore Hydrocarbon Development, (May, 1980), pp. 334-353.
61. It should be noted here that the effect of slick stranding upon intertidal and shoreline ecosystems will be influenced by the relative "oil retention potential" of the grounding area. Oil retention potential is a function of shoreline substrate size, exposure and slope, such that retention increases with a decrease in these factors. See: B.C., Ministry of Environment, Assessment and Planning Branch, Ibid., pp. 54-57.
62. See: Nelson-Smith, Ibid.
63. B.C. Ministry of Environment, Land Management Branch, Ibid., p. 8. The planktons larva of benthic organisms may be particularly susceptible. See: P.G. Wells, "The Effects of Petroleum Hydrocarbons on Zooplankton," Canada, Ministry of Environment, Environmental Protection Service, Oil and Dispersants in Canadian Seas, pp. 62-76.
64. B.C. Ministry of Environment, Land Management Branch, Ibid., p. 10.
65. Ibid.
66. One reason for this is that fry are less mobile than adult fish and thus cannot avoid contaminant contact as readily. See: Scarralt, Ibid., and Gordon et al., Ibid.
67. Brown, Ibid., and Mansfield, Ibid.
68. Nelson-Smith, Ibid., p. 488
69. Ibid., and Thomas, Ibid., p. 126.
70. See: Canada, Department of Environment, Environmental Protection Service, Ibid., p. xii.
71. B.C. Ministry of Environment, Land Management Branch, Ibid., p. 9.
72. Nelson-Smith, Ibid.
73. See: I.L. White et al., North Sea Oil & Gas: Implications for future U.S. Development, (Oklahoma, 1973), pp. 113-115.
74. Though the terms "active and passive consumption" are my own, the concepts are analogous to those of extractive and nonextractive uses as defined in J. Krutilla and A. Fisher, The Economics of Natural Environments: Studies in the Valuation of Commodity and Amenity Resources, (Washington, D.C., 1975), p. 33.

Chapter Four
Offshore Exploration and Development in Hecate
Strait and Queen Charlotte Sound

INTRODUCTION

In Chapter Three the analysis proceeded at a general level, specifying the offshore process and associated disturbances, effects, impacts and "affected" user categories. This chapter will draw upon the preceding to determine those effects and impacts relevant to the B.C. case.

The case study area itself is composed of the waters of Hecate Strait and Queen Charlotte Sound in northern British Columbia. In the summer of 1979 Chevron Standard Ltd. approached the Provincial Government for permission to undertake exploration activity in this region. The area remains under Federal permit to Shell Oil Ltd., who conducted an exploratory drilling program during the late 1960's within the Sound and along the west coast of Vancouver Island. Though Shell's efforts were unsuccessful Chevron plans to reopen exploration in lease areas farmed out by Shell in Queen Charlotte Sound and Hecate Strait.¹

In identifying the potential effects and impacts of renewed exploration in this area, three factors are especially important. These include the actual offshore process, the nature of the marine medium, and the existing patterns of human usage in the region. The actual offshore process refers to the equipment that will be used and the activities that will be undertaken. As noted earlier, actual exploration and development activities will depend to some degree upon the extent of the find, so that knowledge of actual activities will be available only as the process progresses. This discussion must, therefore, consider probable activities and alternative possibilities.

The offshore process will determine expected disturbances. The effects associated with these will depend to a large degree upon the nature of the marine environment. Characteristics that must be specified include oceanographic factors, that will influence both spill risk and discharge effect, and biological resource factors that are of significance in the latter regard. Finally, impacts on human usage and the specification of "affected" user categories will depend, at a minimum, upon the existing patterns of usage in Queen Charlotte Sound-Hecate Strait.

The following discussion will focus upon these three central factors of the case study area. It will begin with an identification of probable process activities, proceed to consideration of the relevant oceanographic and biological resources of the study area, and conclude with a discussion of the existing patterns of marine environment usage and the identification of "affected" user categories.

THE OFFSHORE PROCESS

The actual process of offshore exploration and development in the Queen Charlotte Sound-Hecate Strait area has yet to be determined. Exploratory phase timing and extent will be specified in negotiated exploration permits to be granted by the Ministry of Energy, Mines and Petroleum Resources. These have yet to be finalized. Corporate decisions will determine equipment used and activities undertaken. These have yet to be announced. The extent of any find will be a major factor in what form of transportation is adopted, and this is obviously not known at present. However, a few fairly reliable suppositions can still be made in the face of such uncertainty.²

First, seismic sounding will be restricted to contained explosive techniques to avoid obvious fish kill problems.³ Second, it is likely that semi-submersible rigs will be used in exploration. Though the offshore area is relatively shallow (ranging from 50 to 400 m.),⁴ these depths are beyond the limits of jackup platforms. Also, the relatively severe weather conditions of the area require the stability provided by semi-submersible platforms. This platform type proved stable even under the severe storm conditions that occurred during Shell's exploration program in the late 1960's.⁵ Exploration platforms will, no doubt, be accompanied by standby vessels as is the established practice. Finally, if the sought after oil find is made it is likely that tankers will be the preferred method of transport to onshore facilities. The average expected oil find has been estimated as approximately 241 million barrels.⁶ It is questionable that a find of this extent could justify the expense of laying and maintaining a transport line from the drill site.⁷ Because of the relatively larger amount of natural gas expected (a mean value of 9.38 trillion cubic feet),⁸ such a find, if developed, could justify pipeline transportation. However, it is unlikely that any gas find would be developed in the near future given the surplus of proven gas reserves presently existing in the province.⁹

For the reasons discussed above, the following specification of effects and impacts relevant to the case study area will assume the use of contained explosives, the employment of semi-submersible platforms and standby vessels, and the use of tankers to transport discovered oil. The effects of activities that cannot be designated from the data available will be discussed in terms of the range of possible alternatives.

MARINE ENVIRONMENT CHARACTERISTICS

Oceanographic Characteristics

Oceanographic conditions are relevant to both the risk of accidental spills and to the behaviour of both routine and accidental discharges. Among these conditions are weather patterns, (including severity of wave and wind action, average storm warning times, and fog) earthquake potential, current and tidal flows, turbidity and water temperature.¹⁰ Each of these conditions must be specified in turn for the case study area.

The typical weather patterns of the Queen Charlotte Sound-Hecate Strait area are considered comparable to those of the North Sea.¹¹ Severe winter weather conditions generally begin in October, continuing through February. Frequent storm conditions pose a hazard to drilling and transportation activities during this period.¹²

From the month of June to early September prevailing winds in Queen Charlotte Sound and Hecate Strait are from the northwest. Mean wind speeds range from 11 kn in open coastal areas to 8 kn near the mainland coast. By October the prevailing winds shift to the southeast and during the months from November to February mean wind speeds increase to 20 kn at the seaward approach to Queen Charlotte Sound and 15 kn along the mainland. During this period winds blow at galeforce (34 kn) or greater over 10% of the time.¹³

Wave conditions are similarly severe during autumn and winter months. Hazardous wave heights are particularly characteristic of Queen Charlotte Sound and the south end of Hecate Strait because of their relatively clear access to the open sea. From October to February, the average occurrence of wave heights in excess of 3.5 m ranges from 20-30% of the time in open coastal areas to approximately 10% along the mainland. This diminishes to a

range of 15 to 5% frequency by March and to 5% throughout the region during the spring and summer months.¹⁴

The central problems for rig and transport operations generated by these wind and wave conditions are not essentially related to their severity, but rather to the suddenness with which storm conditions can arrive. "The most dangerous aspect of these storms is not the magnitude of the waves generated but the rapidity with which operating conditions change from difficult to dangerous or impossible."¹⁵ Though average storm warning times are not available for the Queen Charlotte Sound-Hecate Strait area, it is apparent that storms can arise suddenly. For example, Thomson notes that "frontal systems are known to rapidly generate steep mountainous seas over the broad shoal area adjacent to the east coast of the Queen Charlotte Islands and leave the hapless mariner no choice but to ride them out."¹⁶ Reports of actual storm conditions in the area also indicate rapid storm escalations. The Shell Drill Rig (SEDCO 135F) anchored off Cape St. James in Queen Charlotte Sound in October 1968 encountered winds gusting to 80 kn and average wave heights increasing from 10 to 65 ft over an eight hour period. During this time the platform was hit by a wave that approached 100 ft in height.¹⁷

Such severe wind and water conditions pose the greatest danger in open coastal areas, though inland coastal conditions may be similarly risky. Another concern in nearshore areas is the possibility of a tsunami, such as that which resulted from the 1964 Alaskan earthquake. Tankers navigating coastal inlets or anchored alongside harbour facilities and storage tanks located nearshore would be particularly vulnerable to damage by a tsunami.¹⁸

A final weather related factor affecting spill risk is the incidence of fog and precipitation that reduces visibility. Fog presents the greatest

visibility problems to offshore drilling and transport operations. The seaward approach to Queen Charlotte Sound displays a greater prevalence of fog than does Hecate Strait, though seasonal variations remain important in both areas. August and September are the foggiest months with fog conditions occurring an average 10-15% of the time.¹⁹ During these months visibility is restricted to two miles or less 15% of the time in the open coastal areas of Queen Charlotte Sound. In Hecate Strait this frequency is smaller at 5%.²⁰

The severe weather conditions of Queen Charlotte Sound and Hecate Strait present a number of potential hazards to offshore drilling and transport activities. Severe wind and wave action increases the risk of platform displacement and tanker accident. These risks are further heightened by the suddenness with which storms can escalate, leaving little rig and vessel preparation time. Visibility problems resulting from fog conditions generate navigational hazards in rig transport, tanker movement and maintenance of regular supply lines. Because storm conditions tend to be more severe in the winter months and fog conditions are worse in the late summer and autumn, only the spring and early summer months are relatively free of routine weather-related hazards.

A non-routine condition that is potentially hazardous to the offshore process is the occurrence of an earthquake. A summary of the distribution of Western Canadian earthquakes of magnitudes of 3.0 or greater indicates that significant earthquake activity has occurred in the case study area.²¹ For example, the 1949 Queen Charlotte Island-Hecate Strait earthquake was the largest ever recorded in Canada, registering .8 on the Richter scale. Based upon analysis of the probability of strain release in the area, McPhee concludes that "it is clear that an earthquake potential does exist

for proposed hydrocarbon drilling sites."²² Earthquake hazards to offshore activities include potential rupture of storage tanks or pipelines, extensive damage to wellhead and drilling platform equipment and ground fracture resulting in oil mitigation into the ocean. Production phase activities are most susceptible to earthquake damage, though spill risk is significant at all phases.²³

The final set of relevant oceanographic characteristics includes current and tidal flows, turbidity and water temperature. These factors are of greater relevance to the behaviour of offshore discharges than to accident risk. Their importance in determining oil slick behaviour in offshore and inland coastal waters was discussed in Chapter Three. In this section the earlier discussion will be set in the context of the case study area. The offshore coastal areas of western Queen Charlotte Sound and southwestern Hecate Strait display colder water temperatures, greater turbidity and stronger current flows than the inland coastal areas. Average surface water temperatures range from 11°C in mid winter to 20°C in late summer.²⁴ Colder temperatures serve to slow degradation of oily substances, while increased turbidity and current action work to increase weathering rates. Overall, discharges occurring in these offshore coastal areas will break up more rapidly and ground less often than those occurring in northern Hecate Strait or in waters adjacent to the mainland and southern Moresby Island. An indication of the area that could be affected by a major exploration blowout of 10,000 barrels of oil off southern Moresby Island is provided in Appendix III.²⁵

Biological Resources

The second characteristic of the marine environment relevant to

discharge effects is the nature of the biological resources of the case study area. The major bio-marine resources of the Queen Charlotte Sound-Hecate Strait area can be identified from resource inventories compiled for the area.²⁶ Major biological resources include planktonic organisms, marine plants, shellfish, fin-fish, marine birds and marine mammals. Each will be discussed in turn.

-- Planktonic Organisms

The primary importance of planktonic forms to the marine ecosystem is their role as a central link at the base of the food chain. Though specific inter-relationships between plankton communities and fish species are not well established, it remains reasonable to assert that depletion of plankton communities could have a deleterious effect on fish and other populations higher up the food chain.

Queen Charlotte Sound-Hecate Strait is considered a very productive area for plankton, including the short term planktonic stage of fish and invertebrate larva. The existence of productive fisheries in the area provides an indication of this. However, the detailed distribution and productivity of planktonic communities has yet to be established.²⁷

-- Marine Plants

Marine plants include both macro and micro organisms. The macro-phytes include benthic macro algae such as kelp and vascular plants such as sea grasses (ell and surf grass) and tidal marsh vegetation. Kelp beds are prevalent in both Hecate Strait and Queen Charlotte Sound and sea grass and tidal marsh vegetation is characteristic of the estuarian areas of the region.

The role of these marine plants in the coastal ecosystem is diverse. Occurring primarily in estuarian areas, marsh plants and sea grasses serve

as both sheltered habitats and food sources for the fish fry, invertebrate populations, water fowl and shore birds of the region. They also provide stability in soft bottom areas. Macro algae serve a similar function in less sheltered areas, providing protection from current flows and wave action. Macro algae beds are used for habitat, feeding and egg disposition by a similar array of marine organisms. One of their central roles in the case study area is as the depository of row from herring stocks that breed in the region.²⁸

-- Shellfish

A wide range of shellfish types inhabit the Queen Charlotte Sound-Hecate Strait area including dungeness crabs, shrimps, prawns, clams, oysters, mussels, abalone, sea urchins, squid, octopus, and scallops. Though specific data on shellfish populations is restricted largely to commercially harvested populations, a general overview of shellfish habitats in the case study area can be provided.

The inland coastal waters of Hecate Strait are well populated with various shellfish types. Populations include significant numbers of dungeness crabs off northwest Graham Island and concentrations of geoduck clams along the east coast of the Queen Charlotte Islands, of butter clams along both the east coast of Graham Island and south of Prince Rupert, and of razor clams along Graham Island's northeast coast. Scallop populations are also concentrated off northeast Graham Island.

Other shellfish types are spread along the coastlines on both sides of Hecate Strait and the mainland coast of Queen Charlotte Sound. Natural oyster populations are found in many of the coastal bays and inlets, and mussels inhabit the intertidal areas along the coast. Abalone are similarly distributed, though primary concentrations occur along the coastal areas of

Hecate Strait. Sea urchins are generally found in deeper areas with rocky substrates or in kelp beds along the coast. Squid and octopus populations are also distributed along the coastline. Shrimp and prawns populate coastal areas off the south and Prince Rupert areas of the mainland as well as along the east coast of the Queen Charlotte Islands.²⁹

-- Fin Fish

The Queen Charlotte Sound-Hecate Strait area contains significant stocks of salmon, herring and various groundfish. Salmon run in nearly every coastal river, with the Skeena run ranking second in the province. River estuaries and nearshores contain salmon fry and juveniles from approximately April to September depending on species. Areas near the Skeena are particularly important as juvenile salmon habitats. Adult salmon of all five species are distributed throughout the case study area, though pink, chum and coho are most abundant. x

The eastern coastline of the Queen Charlotte Islands and the northern mainland coast also contain important herring spawning and rearing grounds. Adult herring return to spawn in these shallow coastal waters during the months of February through June. Herring roe is deposited on kelp, eelgrass or rocks and larva and juvenile fish remain in these areas during the summer months, heading into deeper waters in the Sound and offshore in September.³⁰

Groundfish stocks in Queen Charlotte Sound-Hecate Strait include ocean perch, cod, halibut, flounder and sole. Larva and fry of all these groundfish types inhabit shallow coastal waters throughout the case study area. Adults are found in the deeper waters of both Hecate Strait and Queen Charlotte Sound. Particular groundfish types tend to inhabit particular areas. Ocean perch are found in the open coastal waters of Queen Charlotte

Sound, while Hecate Strait contains the principal Pacific cod habitats, and the primary stocks of English and rock sole occur in Northern Hecate Strait. Two ground fish types are distributed throughout the case study area. Halibut stocks occur in deep waters along the inner continental shelf and flounder inhabit shallower waters throughout the area.³¹

-- Marine Birds

The Queen Charlotte Sound-Hecate Strait area underlies the migratory routes of many marine bird types and contains major nesting areas. Several hundred species of waterbirds, shorebirds and ducks inhabit or traverse the region. A diving bird, the acilid, is the most abundant breeding species with over 400,000 pairs nesting along the coastline.

Species composition and numbers change seasonally, though spring and summer are the most populous months overall. Marshes and tidal flats provide important feeding areas for both resident and migratory populations. These areas and rocky outcroppings offshore also provide nesting grounds. An estimated 530,000 pairs of seabirds breed in colonies in the case study area from March through September. Of these, 475,000 pairs nest along the Queen Charlotte Islands and 55,000 pairs nest along the northern mainland coast. Major breeding colonies exist on the west coasts of Moresby, Graham and Langara Islands and off the mainland coast on Lucy, Byers & Moore Islands.³²

-- Marine Mammals

The Queen Charlotte Sound-Hecate Strait area also provides habitat and breeding areas for various species of marine mammals. One of the most populous species migrating through the region are the stellar sea lions. Between 5000 and 6000 sea lions use areas along the east coast of Moresby

Island and the mainland coasts of Hecate Strait and Queen Charlotte Sound as haul out and rookery sites. Harbour seals are also numerous, particularly along the north coast near the mouths of the Nass and Skeena Rivers. Fur seals migrate off the east coast of the Queen Charlottes and though adult seals usually remain in the offshore area, large numbers of yearling pups traverse Hecate Strait and Queen Charlotte Sound.

Various species of cetaceans also move through the case study region. An estimated 12,000 gray whales migrate across Queen Charlotte Sound and up Hecate Strait in the early spring. They are known to feed along Rose Spit and off Langara Island in the Strait. Killer whales move in smaller numbers north from Johnstone Strait along the mainland coast to Namu. There are also relatively large populations of dolphins and porpoises in the case study region. Dall porpoises are the most common and have been sighted in both Hecate Strait and Queen Charlotte Sound.³³

PATTERNS OF USAGE

The preceding discussion has provided an indication of the major biological resources of the Queen Charlotte Sound-Hecate Strait area. This must now be followed by a discussion of the existing use patterns of these resources. The importance of plankton to human usage is indirect. Plankton supports other resources that are directly consumed. Direct consumption includes marine plant and shellfish harvesting, fishing, and passive consumptive activities in regard to marine birds and mammals. Each of these uses will be discussed in turn.

Marine Plants

Both Hecate Strait and Queen Charlotte Sound contain a number of major kelp beds. The role of these beds as herring spawn habitats and egg depositors makes kelp somewhat commercially important. The herring roe on

kelp industry is the central use of B.C. seaweed at present,³⁴ though red algae derivatives are also used in the food and chemical industries. Herring roe on kelp is also considered a food source by the native population of the area, as are some marine plants. This use of marine plants is the most significant as other commercial and recreational uses remain minimal.³⁵

Shellfish

Many shellfish types are consumed by both commercial and recreational users in the area. Commercial consumption includes the harvesting of Graham Island dungeness crab stocks (which provided 35 per cent of the total B.C. harvest from 1974-78)³⁶ and of pink shrimp in the Goose Island area of Queen Charlotte Sound. Various types of clams are harvested in significant population areas along the coast and the provincial harvest of abalone is concentrated principally in the Hecate Strait area. Other shellfish populations, including mussels, squid and octopus, have been identified as having commercial potential. Shellfish populations particularly important to local food and recreational uses include clams, oysters, abalone and scallops.³⁷

Fin-Fish

The diverse fish population of Queen Charlotte Sound-Hecate Strait forms the basis of an important commercial fishery in the region. "Commercial fishing for salmon occurs in most of Hecate Strait, Queen Charlotte Sound, and channels along the Inside Passage."³⁸ The relative size of the Skeena run underlies the importance of these areas for the commercial fishery. The salmon fishery remains the major source of income to Prince Rupert residents. Commercial landings of salmon from Hecate Strait averaged 6909 mt. or 11.7 per cent of the total B.C. catch during 1978-1980.

Comparable figures for Queen Charlotte Sound were 9500 mt. or 16 per cent of the total catch.³⁹

The landed catch value of the herring fishery in the area ranks second to that of salmon. The herring runs through Queen Charlotte Sound and Hecate Strait are harvested primarily for their roe, though herring is also sold as food and as bait. The landed value of the roe harvest alone was \$130 million in 1979.⁴⁰ Hecate Strait is the more important fishing ground in the area. Herring landings in the Strait averaged 11,959 mt. or 23.9 per cent of the total B.C. catch from 1978-1980. This compares to 4018 mt. or 8.0 per cent of the B.C. total landed in Queen Charlotte Sound during that time.⁴¹ Halibut and other ground fish stocks are also harvested commercially. Hecate Strait again contains the most significant fishing grounds. During 1978-1980 the halibut catch in the Strait averaged 1070 mt. or 32 per cent of the B.C. total. The Queen Charlotte Sound fisheries averaged a .345 mt. halibut catch, or 10 per cent of the B.C. total. The other Hecate Strait ground fish catch averaged 5105 mt., or 17.4 per cent of the B.C. total from 1976-1980. Ocean perch comprise the major portion of this commercial fishery, though cod remains the most important catch of trawler operations in Hecate Strait.⁴²

Finally, the fin-fish resource also supports important food and recreational fisheries. Once again the extent of these uses is not documented. However, it should be noted that native residents of the area harvest salmon, herring, herring roe from kelp and halibut as major food sources.⁴³

Marine Birds and Mammals

Active consumption of marine birds (either commercially or recreationally) is rare. However, passive use of bird populations remains

important. The protection of the marine birds resource is sought by users, such as bird watchers, and for the sake of the resource itself. As was argued earlier, this demand is grounded in an estimate of consumptive value as valid as the landed catch value of the commercial fisheries.

Like marine birds, marine mammal populations are not harvested either commercially or recreationally. However, passive uses remain important in regard to marine mammals as well. Once again the demand that they are protected rests upon some intrinsic value attributed to the resource itself.⁴⁴

Physical Uses

To the human use patterns of these biological resources must be added the uses of the physical environment. In this context, physical uses have been taken to mean recreational and commercial navigation. The Queen Charlotte Sound-Hecate Strait area is not, at present, a major navigational corridor. Though no actual numbers of navigational users are available, the relative extent of this use can be estimated from the fact that it has not been considered sufficient to warrant any form of traffic management control.⁴⁵ Major expansion planned for the Prince Rupert harbour has precipitated the installation of shore-based radio control of marine traffic, but the radar control system used in major coastal corridors is not considered necessary.

The increased traffic resulting from offshore exploration and development could, however, result in congestion problems. The heavy seasonal use of both Hecate Strait and Queen Charlotte Sound by the herring and salmon fishing fleets could be problematic depending upon rig siting and transport routes. Furthermore, the use level associated with offshore

activities themselves could result in congestion hazards if the extent of the find is sufficiently large.⁴⁶

EFFECTS, IMPACTS AND AFFECTED USERS

It is apparent from the discussion in Chapters Three and Four that both the biological and physical resources of the Queen Charlotte Sound - Hecate Strait area could face a number of deleterious effects from offshore oil activities. To reiterate briefly:

- (1) Planktonic organisms may be damaged or destroyed by routine discharges of domestic waste, rig wash water, equipment cooling water, drill mud and cuttings, production water and disposed oil. Major oil spills occurring during seasonal plankton blooms will be most damaging.
- (2) Marine plants inhabiting the upper intertidal zone are most susceptible to oil spill and near shore contamination damage, though subtidal algae and seagrass may be damaged if oil sinks. Destruction of kelp and eelgrass beds will have adverse effects on other marine organisms in terms of habitat, egg despository and food source loss.
- (3) Shellfish are most susceptible to oil incorporation from persistent discharge in sheltered areas and to coating damage or toxicity as a result of slick grounding. Also, benthic communities may be smothered by mud and cuttings disposal, or may incorporate associated heavy metals producing sublethal effects, behavioural changes and tainting.
- (4) The potential effects upon fish species include lethal effects of oil coating or toxicity on eggs, larvae and adult fish, contamination of habitats and food sources and behavioural changes. Non-oil discharges

from rig operations may also generate lethal and sublethal effects, interfering with respiration or smothering bottom dwellers.

- (5) Marine birds and mammals are similarly susceptible to oil coating and toxicity effects. The acilid population of the case study area is particularly at risk from offshore spills. Nearshore spills and spill groundings could threaten the important breeding areas of both birds and mammals in the study region.

Earlier discussion of the oceanographic characteristics of Queen Charlotte Sound-Hecate Strait raises two central issues in this context. First, the accident risk from both rig and tanker operations will be relatively high in the case study area. The severity of wind and wave conditions, the suddenness of storm escalation, the prevalence of fog conditions and the possibility of earthquake all contribute to this risk. Because of the potentially deleterious effects of oil spillage on the range of biological resources, the risk to these resources from offshore activity remains significant. Secondly, the most susceptible marine resources will be those of northern Hecate Strait and the inland coastal waters of the mainland and Moresby Island. The lesser dissolution effect of these more sheltered waters will increase biological resource risk from oil spillage.

The interaction of oceanographic conditions with potential physical effects is even more apparent. The severe storm and fog conditions characteristic of the case study area increase the accident risk associated with increased navigation and generally minimal storm warning times further exacerbate this problem. Inland coastal areas may face the greatest risk from fog conditions as navigational hazard increases near shore. The

relatively less severe storm conditions of inland areas may be somewhat of a "double edged sword". Navigational hazards may be lessened, but the breakup time of any spill that does occur remains greater.

Given that these biological and physical resources may be potentially at risk as indicated, the resource uses discussed previously face potential impacts from offshore development. These uses correspond to the "affected user" categories of the case study. These include (1) shellfish harvesters, (2) fin-fishermen (3) marine transportation users and (4) passive consumers. The first three categories must be further disaggregated into commercial and recreational users. Finally, the existence of a number of native Indian communities throughout the area whose consumption spans all affected categories (and also includes consumption for sustenance) requires a final "affected" user category. "Affected" users thus become: (1) commercial shellfish harvesters, (2) recreational shellfish consumers, (3) commercial fin-fishermen, (4) sport fishermen, (5) commercial marine transport interests, (6) recreational boaters, (7) passive consumers and (8) resident native Indian groups.

CONCLUSION.

This chapter has identified eight affected user categories in the Queen Charlotte Sound - Hecate Strait area. Proceeding from a discussion of the expected offshore activities, the oceanographic characteristics and the biological resources of the case study area, this chapter explored the interaction of these factors and the potential effects of offshore activity detailed in Chapter 3. A review of existing resource use patterns in the area facilitated elaboration from these relevant effects to expected impacts on human usage. Those uses facing potential effects became the affected

user categories. User groups within these categories must now be identified and their relationship to present planning for offshore development ascertained. This will be undertaken in the following Chapter.

Chapter 4 Notes.

1. See: G.A. Nelson, "Offshore Oil and Gas in Canada: West Coast Events 1949-1980", Westwater Research Center, (Vancouver, 1981, draft), p. 96.
2. These are supported by opinions expressed in interviews with Ministry of Small Business and Industrial Development and Environment personnel, October 1981 - January 1982.
3. This is now standard operating procedure. See: Nelson, Ibid., p. 17.
4. R. Thomson, Oceanography of the British Columbia Coast, (Victoria, 1981), p.237.
5. This incident is described in depth in the following section.
6. Canada, Ministry of Energy, Mines and Resources, Geological Survey, "Hydrocarbon Potential of offshore B.C.", (Ottawa 1981). p. 6.
7. Ibid. Comparable fields include Southern California offshore: 14 billion barrels in Ibid. and Canadian east coast offshore: 47.5 billion barrels, 1973 estimate, Geological Survey of Canada in Gibbon and Voyer, A Technology Assessment System: A Case Study of East Coast Offshore Petroleum Exploration, (Toronto,1974), p. 42.
8. Canada, Ministry of Energy, Mines and Resources, Geological Survey, Ibid.
9. This was expressed in an interview with Ministry of Small Business and Industrial Development personnel November, 1981.
10. Oil spill impact assessment also requires baseline data regarding existing hydrocarbon and trace metal levels in the production area. See: Ministry of Environment, Assessment and Planning Branch, "Preliminary Environmental Assessment", (Victoria, April 1982, draft), p. 59.
11. Interview, B. Wolferstan, Ministry of Environment, January 1982. For an indication of what this implies see: C. Callon, Power from the Sea: The Search for North Sea Oil and Gas, (London, 1973), pp. 109-122.
12. A.T. Chandler, "Environmental Problems Associated with Petroleum Exploration and Development" in United Nations, Economic Commission for Asia and the far East, Proceedings of the Seminar on Petroleum Legislation with Particular Reference to Offshore Operations, (Bangkok, 1971), estimate that 20 per cent of offshore accidents result from storm conditions., p. 66.
13. See: Thomson, Ibid., p. 239.
14. Ibid., p. 240
15. Ibid., Quoting R.W. James, "Abnormal Changes in Wave Heights", "Mariners Weather Log 13, (1979).

16. Ibid.
17. Canada, Ministry of Transport, Canadian Coast Guard. Termopol Assessment of the Kitimat B.C. Marine Oil Terminal Proposal, (Vancouver, 1977). pp. 5-54 and pp. 5-62.
18. This concern is raised in M.McPhee, "Offshore Oil and Gas in Canada: West Coast Environmental, Social and Economic Issues", Westwater Research Center, (Vancouver, 1982), p. 27.
19. Thomson, Ibid., p. 241.
20. McPhee, Ibid., pp. 16 & 17 noting data from D. Faulkner and D. Schaefer, "Meteorological Aspects of a West Coast Oil Port", Atmospheric Environmental Service, Unpublished M.S., (1978).
21. W. Milne et al. "Seismicity in Western Canada", Canadian Journal of Earth Sciences. Vol. 15 No 7. (1978) quoted in McPhee, Ibid., pp. 26.31
22. McPhee, Ibid., p. 27.
23. Ibid.
24. Thomson, Ibid., p. 238.
25. Unfortunately, estimates of relative spill risk have not been developed for the Queen Charlotte Sound - Hecate Strait area. To the extent that storm conditions influence equipment failure and tanker accident risk, a relatively high risk level may characterize the area as a whole. However, because human error is the major cause of well blowout and platform spillage, overall risk predictions remain difficult to calculate. See: British Columbia, Ministry of Environment, Assessment and Planning Branch, Ibid.
26. See: Trans Mountain Pipeline Company Ltd. In the matter of the NEB Act and in the matter of an Application By Trans Mountain Pipeline Company Ltd., (1980), Volume XVI "Marine Resources Inventory & Impact Assessment Report, Northern B.C." and B.C. Provincial Museum "Sea Bird Colonies of the Queen Charlotte Islands." (Victoria, 1979) and "Marine Mammals of Northern B.C." (Victoria, 1979).
27. Trans Mountain Pipeline, Ibid.
28. Ibid.
29. Ibid.
30. A. Hourston, "Stock Assessment for B.C. Herring Management Units in 1978", Fisheries Marine Service M.S. Report No. 1493., (1979), estimates that approximately 15% of the provinces's 1978 herring run was produced in the Queen Charlotte Sound-Hecate Strait area.

31. Trans Mountain Pipeline, Ibid., pp. 142-144.
32. B.C. Provincial Museum "Sea Bird Colonies of the Queen Charlotte Islands" and Trans Mountain Pipeline, Ibid., pp. 171-177.
33. B.C. Provincial Museum, "Marine Mammals of Northern B.C." and Trans Mountain Pipeline Ltd., Ibid., pp. 238-240.
34. The Queen Charlotte Sound-Hecate Strait area produced approximately 67% of the total B.C. herring row on kelp industry in 1978-1980 inclusive. See: Ministry of Environment, Assessment & Planning Branch, Ibid., pp. 94-95.
35. See: Fralick and Tillapaugh, "A Review of Smaller Fishery-Mariculture Industries in B.C.," Westwater Research Center, U.B.C. Info Report, No. 3, (Vancouver, 1979).
36. McPhee, Ibid., p. 41.
37. See: Fralick and Tillapaugh, Ibid., and W. McKay, "The Native Food Fisheries and the Potential Impacts of Oil Spills Near or En Route to Kitimat, Port Angeles and Cherry Point," Regional Program Reports 78-21 & 22., Environmental Protection Service, (1978).
38. Trans Mountain Pipeline, Ibid., p. 142.
39. B.C. Ministry of Environment, Assessment and Planning Branch, Ibid., pp. 94-95.
40. McPhee, Ibid., p. 44.
41. B.C. Ministry of Environment, Assessment and Planning Branch, Ibid., p. 95.
42. Ibid.
43. McKay, Ibid.
44. The conservation demand may be reflected, to some degree, in the number of Ecological Reserves established to preserve seabirds and marine wildlife in the area. See: J.B. Foster "Coastal Ecological Reserves: Helping to Keep the Options Open", in A.H.J. Dorsey (ed.), Coastal Resources in the Future of B.C., Westwater Research Center, (Vancouver, 1979), pp. 37-46.
45. Interview with Traffic Management Center, Canadian Coast Guard personnel, February, 1982.
46. This concern is also expressed in McPhee, Ibid., p. 51.

Chapter Five

The Offshore Planning Process

INTRODUCTION

Chapter Four identified eight use categories that could experience external costs from offshore activity. The logic of the bargaining model argues that users from within these categories should have the discretion to be represented in planning offshore regulation. To establish if such discretion characterizes the case under study, the ongoing planning process for offshore oil development must be discussed and assessed. This chapter will outline the provincial planning process in light of the bargaining issues of user discretion, user representation, transaction costs and damage information. Through identification of the formal structures governing the planning process and of the process participants, the question of adequate user representation can be then addressed.

The initial step in this discussion is the identification of user groups from within affected user categories. The categories were established in Chapter Four to include (1) commercial shellfish harvesters, (2) recreational shellfish consumers, (3) commercial fin-fish harvesters, (4) sport fishermen, (5) commercial marine-transportation interests, (6) recreational boaters, (7) passive consumers and (8) resident Indian groups. User groups within these were identified by the reputational sampling method described in Chapter Two. No user groups were identified for the recreational shellfish consumer and recreational boater categories. As these were also not among the groups identified by the lead planning agencies as involved, the assumption will be made that they have, in fact, not been party to the planning process. In all the other categories, except the commercial shellfish harvesters, selection of ranked groups was

was required. Their degree of involvement will be taken as indicative of the involvement of all groups within these categories.¹ Information gained through selected user group interviews was checked against lead agency interview data to establish actual planning process involvement. These agency interviews also provided information regarding the formal planning structure. The chapter will discuss this structure in relation to the degree of user participation identified.

Before proceeding to a discussion of present offshore planning activity, the chapter will first consider the history of offshore exploration and the existing regulatory framework governing both that exploration and related resource uses in the case study area. It is necessary to set the present planning process in this context in order to identify both constraints on that process and uncertainties within it that arise from these sources. Following this, the planning process presently ongoing at the provincial level will be specified. The following chapter will assess that process in light of the bargaining model criteria.

THE HISTORY OF OFFSHORE ACTIVITY IN QUEEN CHARLOTTE SOUND-HECATE STRAIT

Active interest in the hydrocarbon potential of Queen Charlotte Sound-Hecate Strait dates back to at least 1949 when the first provincial permits for offshore exploration were issued.² The first seismic and geological surveys were undertaken by Richfield Oil Corporation in the years 1959 to 1961.³ Richfield's activities did not progress to the drilling stage. However, their cessation coincided with the beginning of the most extensive exploration program undertaken in the area. In 1961, Shell Oil through Shell Canada Resources Ltd. and Shell Explorer Ltd. began surface geology and magnetic survey studies of a large area in Queen Charlotte Sound-Hecate Strait and off the northwest coast of Vancouver Island. Seismic surveying,

begun in the summer of 1963, led to an exploratory drilling program in 1967. From June 1967 to August 1969, Shell drilled fourteen exploratory wells, eight of them in the Queen Charlotte Sound-Hecate Strait area.⁴ The total drilling program cost an estimated 30 million dollars and produced disappointing results. The sole find in Queen Charlotte Sound-Hecate Strait was a noncommercial oil show at Sockeye B-10 east of the Queen Charlotte Islands.⁵ By the fall of 1969, all fourteen wells had been plugged and abandoned.

Other companies had also shown an interest in the hydrocarbon potential of Queen Charlotte Sound-Hecate Strait during this time. Provincial exploration permits were granted to Canada Superior Oil Ltd. and the Calgary and Edmonton Corporation Ltd., among others, in September of 1961.⁶ Federal permits were granted to Union Oil and Chevron in 1968, and to Lochiel Exploration in 1969.⁷ However, no other exploratory drilling program materialized. By the completion of Shell's activities, attention had swung to the exploration of permit holdings in the Strait of Georgia and by 1971 a number of inter-related events had led to the imposition of a moratorium on exploration off the B.C. coast.

THE JURISDICTIONAL DISPUTE

One of the most central factors in the decision to suspend offshore exploration in 1971 was the Federal-Provincial dispute over offshore ownership and resource jurisdiction. The governments had clashed over ownership of the sea bed off British Columbia as early as 1904. Though this dispute centered on fisheries jurisdiction, it marked the first in a series of competing claims to sea bed ownership.⁸

In the face of increasing interest in offshore hydrocarbon potential in the postwar era, B.C. made the first defacto claim to resource jurisdiction.

In 1949 the first offshore exploration permits were issued under the Petroleum and Natural Gas Act. Conflicting Federal claims began in 1957 with the introduction of "An Act to Amend the Territorial Lands Act" which extended the definition of Federal lands to the seabed off provincial coasts.⁹ Though the Bill was never passed, its intent remained evident in later Federal actions.

The Geneva convention of 1958 was welcomed by the Federal government in that it recognized the right of coastal states to explore and exploit the resources of their contiguous continental shelves.¹⁰ British Columbia announced further permit issuances shortly after the Convention was declared. By this time, the Province had already begun to transform its permitting method to a competitive bid system and a large portion of the territorial waters was designated as Crown Reserve for this purpose in 1959.¹¹ The Province had effectively laid further claim to offshore resource jurisdiction.

Federal legislation in 1960 directly challenged this claim. The Canada Oil and Gas Regulations, established under the Public Land Grant and Territorial Land Acts, provided for permitting of offshore exploration and the first west coast permits were issued soon after.¹² The two Canadian subsidiaries of Shell Oil Limited were granted 10 million offshore acres under Federal permit in 1961¹³ and the Province responded by suspending the Crown Reserve and inviting permit applications in the area. When Shell did not apply, the Province granted permits to other interested corporations, 420 thousand acres of which overlapped Shell's permitted area.¹⁴ This battle of the permits precipitated a Provincial decision to refer the questions of offshore ownership and resource jurisdiction to the courts in 1962.¹⁵ However, a change in government in Ottawa and an

application by Shell for Provincial permits aborted the proposed reference. The administration of offshore exploration settled into a period of dual permitting¹⁶ and Federal-Provincial negotiation.

Bilateral talks proceeded until 1964 and the dispute entered the realm of general Federal-Provincial negotiation at the Federal-Provincial Conference of that year. Faced with strong support of British Columbia's position on provincial resource ownership, the Federal government referred the questions of ownership, exploration and jurisdiction rights both within and beyond the limits of the territorial sea off British Columbia's coast to the Supreme Court of Canada.¹⁷ The antagonistic provincial reaction that greeted this reference was simply intensified by the ruling of 1967. The unanimous opinion of the court was in favor of Federal ownership, exploration and jurisdiction rights over the waters and sea bed beyond the low water mark and outside of the inland waters of the province. The ruling rested upon historical ownership and jurisdiction and the 1958 Geneva Convention.¹⁸

Though this opinion may have caused some consternation in the Province, British Columbia's essential response was to reiterate its claim and uphold existing permit agreements.¹⁹ The Province had declared a second Crown Reserve extending beyond the three mile limit to the exploitable Continental shelf a year prior to the reference decision.²⁰ The reserve remained in place after the decision, though no large scale use-rights auction was undertaken.

Federal-Provincial negotiations over offshore jurisdiction began in earnest again in 1968 with the Federal proposal of "Mineral Resource Administration Lines." Administration lines would follow the coastline a short distance offshore.²¹ Landward areas would be under provincial

jurisdiction. Seaward areas would be under Federal administration, but revenue from permit holdings here would be shared with the province.²²

This arrangement was rejected by B.C. and both the Province and the Federal government continued to issue permits for southern offshore areas through the late 1960's and into the early 1970's.²³

An exploratory drilling program was begun by Canadian Pacific Oil and Gas in Georgia Strait in 1969. The acquisition of dual permits again served to sidestep the Federal-Provincial conflict but this exploration raised other concerns. Public reaction to the exploration announcement was vocally negative. A growing "conservation ethic," crystallized by the Santa Barbara blowout in 1969 and the Arrow spill in Chedabucto Bay in 1970, led to strong public reaction against the exploration proposals.²⁴ Both levels of government eventually responded. In May of 1970 the Federal government announced suspension of seismic operations and proposed drilling. The Provincial government supported this action and, in July, suspended all exploration permit obligations.²⁵ Federal permits in the Strait were surrendered in exchange for permit and expenditure credits in the north in January 1971.²⁶ A further Federal permit issuance of acreage in Queen Charlotte Sound in November 1971 met opposition from the public, the Province, and the Federal Department of Fisheries and Environment.²⁷ In January 1972, this pressure was followed by an informal moratorium on offshore exploration that has lasted to the present.

The moratorium left the jurisdiction issue unsettled. However, some headway was made in regard to the southern Straits by the Georgia Strait Reference of 1976. Conflict with the Federal government over ownership of the Roberts Bank coal port led the Province to refer the question of

ownership of Georgia, Johnston, Queen Charlotte and Juan de Fuca Straits to the British Columbia Court of Appeal in October of 1974. In June 1976 the Court opened, that as these were "inland waters," the waters and sea bed belonged to the Province.²⁸ In response, the Federal government filed notice of appeal with the Supreme Court. However, it has yet to carry this action through.

Though the questions of offshore jurisdiction and resource ownership were the subject of intermittent negotiation through the early 1970's and during the First Minister's Conferences on the Constitution in 1978, 1979 and 1980, the issue remains unsettled. The most recent Federal position rests upon the 1967 Offshore Mineral Reference and on the Resource Administration line policy, though new proposals advocate a revised form of revenue sharing and joint administration.²⁹ British Columbia's position with regard to Queen Charlotte Sound and Hecate Strait rests on the 1976 Georgia Strait Reference. These waters, demarcated by a base line corresponding to the fishing zone line that extends north from Vancouver Island to southern Moresby Island, are taken to be inland waters. The waters and sea bed are thus argued to be under Provincial ownership and jurisdiction.³⁰

The impact of this continued dispute upon present exploration plans rests essentially on the uncertainty generated by the failure to reach a resolution. The dispute can be circumvented once again by resurrection of a dual permit system when the moratorium is lifted, but the threat of sudden suspension of exploration remains. The experience of companies in 1972 attests to this fact. Also, the Federal government could proceed with its appeal of the Georgia Strait Reference. A decision in either government's

favour would leave exploration companies attempting to recuperate fees paid to the other level for permits that had become invalid.

Finally, uncertainty can influence the interaction of Federal and Provincial officials at the Ministry level. Informal cooperation between the ministries of both governments could be adversely affected and established roles vis-a-vis each other disrupted by political conflict. For example, Federal officials interviewed remain uncertain as to what their position in proposed Provincial hearings on offshore development will be. They indicate that whether their agencies appear in coordination with the province or as interveners depends largely on the jurisdictional question.³¹

As yet, these potential problems do not appear to have significantly affected present offshore proposals. For its part, Chevron remains committed to exploration in Queen Charlotte Sound-Hecate Strait. Chevron presently holds a large portion of Shell's federal permits in the area under a farm out agreement made in 1971.³² Chevron felt at that time that Shell's exploration remained inconclusive and had planned to begin more extensive drilling in 1972. However, its plans were abruptly terminated by the moratorium announcement.³³ The company approached the Federal government again in 1978 and by 1979 had begun compiling an Initial Environmental Evaluation, under Federal Environment Assessment and Review Process guidelines, as the first step in project approval.

At the time these guidelines were drawn up, Federal officials also contacted the Provincial Ministry of Energy, Mines & Petroleum Resources to advise them of Chevron's interest and to propose informal coordination of planning for the resumption of offshore activity.³⁴ Chevron also approached the Province directly in the summer of 1979 and in June 1981 the

Province responded publicly. It announced the creation of an Offshore Petroleum Administration Division within the Ministry of Energy, Mines and Petroleum Resources and a new permit administration system to include the submerged lands of Queen Charlotte Sound, Hecate Strait, Queen Charlotte Strait and Dixon Entrance. The status of these waters as inland waters was reiterated. Also, the Province committed itself to a comprehensive environmental, social and economic impact assessment culminating in public hearings under the auspices of the B.C. Utilities Commission.³⁵ In-house assessments are now underway.

At the Ministry level there appears to be a high degree of informal interchange and coordination between the ongoing Federal and Provincial assessment processes.³⁶ It is possible that the ongoing parallel review process will proceed to exploration under dual permitting as in the past. However, settlement of the jurisdiction issue remains a key to counteracting the uncertainty faced by both government agencies and resource users under present conditions.

JURISDICTION OVER OTHER USES:

To some degree, the interaction between Federal and Provincial agencies reflects a need for coordination. Review of the legislation relevant to both offshore hydrocarbon activities and other existing uses of these waters reveals a plethora of mandated agencies at both levels of government. Some of these mandates depend upon which level has jurisdiction over the hydrocarbon resource, but others will apply regardless. A significant degree of administrative overlap will remain even if the offshore jurisdiction issue is settled.

In the context of routine offshore activity and related external impacts on uses of the marine environment, both dependent and nondependent mandates exist.³⁷ The former include both Federal and Provincial agencies responsible for policy development and those who will be responsible for policy implementation. Provincial agencies include the Offshore Petroleum Administration Division of the Ministry of Energy, Mines and Petroleum Resources, responsible for supervision of the offshore planning process and development of an administration program.³⁸ The Assessment and Planning Division of the Ministry of the Environment is empowered under the Environment Management Act (1981) to compile an environmental impact assessment and develop environmental protection policies.³⁹ The involvement of the Ministry of Lands, Parks and Housing is mandated by the Lands Act that vests all crown lands, including the sea bed underlying inland waters, in the Province.⁴⁰ Finally, the commissioner(s) appointed to undertake the proposed public inquiry into environmental implications of offshore development will add a fourth Provincial planning agency.⁴¹ Their federal counterparts include Environment Canada,⁴² the Environmental Assessment and Review Agency, responsible for supervision of the FEARO process,⁴³ and the Environmental Assessment Division, Ministry of Energy, Mines and Resources, responsible for assessment of the environmental impacts of any development proposal under the Oil and Gas Production and Conservation Act.⁴⁴

Other agencies have a policy development mandate that is more closely tied to eventual regulatory implementation. These include a number of Provincial agencies. Under the Petroleum and Natural Gas Act, Energy, Mines and Petroleum Resources has the authority to issue exploration licenses⁴⁵

and to cancel these without notice given "danger to any person or to public or private property."⁴⁶ The Ministry also has the authority to specify spill prevention equipment and to inspect facilities and enforce requirements in both drilling and pipeline operations.⁴⁷ The Waste Management Branch, Ministry of Environment is responsible for permitting of any operations discharge and establishing and enforcing effluent standards under the Pollution Control Act.⁴⁸ Also, the Environment Management Act allows the Ministry to issue "environment protection orders" that may require modification, or even prohibition of activity that has any detrimental environmental impact.⁴⁹ The Ministry of Health could also be involved through its responsibility under the Health Act for any discharge that threatens health or sanitation and its role in effluent permit approval.⁵⁰

Related Federal agencies include two divisions of the Ministry of Energy, Mines & Resources. Its Mineral Rights Branch is responsible for issuing exploration and production leases and supervising the maintenance of their stipulated conditions.⁵¹ The Resource Management and Conservation Branch is empowered by the Oil and Gas Production and Conservation Act to shut down any operation to prevent pollution.⁵² Under this Act, the Canada Oil and Gas Drilling and Production Regulations grant the Branch broad regulatory powers, including the approval of exploration, development and production methods, the stipulation of safety standards and regulations for wellhead and production operations, the regulation of geophysical survey and diving operations, and the enforcement of measures designed to prevent or remedy the "injurious access of oil or gas into water."⁵³ A final related Federal agency is the Environment Protection Service, Environment

Canada, that sets and enforces industrial effluent levels in concert with Fisheries and Oceans Canada.⁵⁴

It is clear that the application of any of these agency mandates could be altered by settlement of the resource ownership issue in either government's favor. For example, Federal permitting activities would be rendered invalid by establishment of Provincial ownership and resource jurisdiction. However, other agencies have responsibilities that ensure them a role in offshore regulation regardless of the jurisdiction dispute. Provincially, these include the Marine Resources Branch, Ministry of Environment that is responsible for the protection of mariculture resources under the Provincial Fisheries Act, the Fish & Wildlife Branch that is responsible for wildlife habitat including intertidal wetlands,⁵⁵ and the Parks Branch that administers the Provincial parks and Ecological Reserves in the coastal zone.⁵⁶

A number of related Federal agencies also exist. Foremost among these is Fisheries and Oceans Canada that has a mandate to protect the fisheries resource under the broad provisions of the Fisheries Act. The Act grants Fisheries officials the authority to require an assessment of any development that may impact upon the fisheries resource. Furthermore, it prohibits dumping of any substance "deleterious" to the fisheries resource, including ballast waters and oil.⁵⁷ Fisheries officers are empowered to terminate any operations that contravene this prohibition.⁵⁸ The Environment Protection Service also has an assured role through its administration of the Ocean Dumping Control Act which prohibits dumping of deleterious substances into the marine environment except under permit. Similarly, the Canadian Wildlife Directorate, Environment Canada is

mandated to protect migratory bird habitats under the Migratory Birds Convention Act.

Finally, the Ministry of Transport regulates all coastal navigation under the Canada Shipping and Navigable Waters Protection Acts. Its Marine Regulation Branch sets vessel safety and operating standards that are enforced by Canadian Coast Guard inspection and certification.⁵⁹ The Canadian Coast Guard is also responsible for the regulation of shipping lanes and oceanic traffic control under the Navigable Waters Protection Act. Section 19 of the Act prohibits any dumping that could interfere with navigation and requires Ministerial approval for any project or activity that could restrict navigation. This latter prohibition would, no doubt, include the siting of offshore drilling platforms. Also, the Act grants M.O.T. officials authority over standards for ship-to-shore and shore-to-ship cargo transfer that would include oil tanker transfer operations.⁶⁰ Finally, if offshore activities require use of a national harbour, such as Prince Rupert, regulation of harbour use, development and shipping will be under Harbours Board jurisdiction.⁶¹

The existence of these areas of obvious agency mandate overlap necessitates some coordinative action on the part of Federal and Provincial officials.⁶² This requirement would persist even if the jurisdictional issue was settled. However, it may be greater given the continued existence of parallel planning and regulatory systems under conflicting claims to resource ownership. For example, the safety equipment stipulations of any Provincial permit agreement cannot contradict those of the Federal permit to any great extent or exploration activities could not proceed. Similarly, the two sets of effluent standards must coincide to some degree so that routine discharges can be adequately regulated. This coordinative

requirement is reflected in the level of informal interchange, information exchange and shared policy advice that characterizes the present offshore planning process.

THE PLANNING PROCESS - INTRODUCTION

In discussing the actual planning process it is useful to initially provide a summary statement of process characteristics. Characteristics that must be specified include where user group-planning agency interaction occurs, what form that interaction takes, and in what manner it influences the planning process. Selected user group and agency interviews reveal trends relevant to each of these process characteristics.

User group-planning agency contact occurs at three central points within the planning process. These include informal contact with the agencies of Environment and Energy, Mines and Petroleum Resources, representation on the Offshore Petroleum Administration Technical Conference planning committee and involvement in the public hearings. Because the public hearings have not been held as yet, actual user group involvement can be specified only in regard to the first two access points. User group-planning agency contact at these points will be referred to as prior-planning involvement.

Prior-planning involvement includes both direct user group-planning agency contact and indirect contact through other government agencies identified as representative of user interests. Direct user group contact tends to entail the expression of user group concerns. Indirect contact includes both the expression of these concerns and the provision of information and advice to planning agencies. Information provision can also be taken to reflect a degree of user interest representation to the extent that, in providing information, agencies are also ensuring the effects

especially relevant to particular user groups are identified, and thus considered, in policy formation.⁶³

Both direct and indirect prior-planning involvement varies widely across user groups. Those user groups directly involved tend to have established informal contacts with planning agencies or have been selected by those agencies to express user concerns. The involvement of agencies identified by user groups as representative of their interests tends also to reflect established informal relationships with planning agencies. Furthermore, planning agencies have sought representative agency involvement as a source of information regarding the expected impacts of offshore development.

The issue of user group involvement appears to revolve to some extent around the question of representative adequacy. Though all groups identify government agencies as representative of their interests and most of these agencies maintain prior-planning involvement, this cannot be taken as indicative of adequate user group involvement. Virtually all user groups perceive agency representation to be inadequate and argue that direct user group involvement is required to adequately express user interests.

A central characteristic of prior-planning involvement is the extent to which both direct and indirect involvement is dictated by planning agency discretion. Though, at one level, all user groups are essentially free to contact Provincial planning agencies, the significance of this fact must be assessed in light of three central facets of the prior-planning process. First, beyond an initial announcement that impact assessment would precede offshore development, prior-planning has maintained a low public profile. Knowledge of present planning activities appears to vary across user groups, with those having established informal contacts tending to be more aware of

planning activities. Because this knowledge is obviously central to group involvement, the failure to publicize planning activities tends to limit process accessibility to well-connected user groups.

Secondly, the lead planning agencies are not required to contact any user groups or any representative agencies during the prior planning process. To the extent that group and agency involvement has been solicited, their selection reflects planning agency discretion regarding information requirements, the relevancy of user group concerns to the issue at hand, and the legitimacy of user groups themselves. Selection of representative agencies for prior-planning involvement tended to reflect planning agency information requirements. Where direct user group involvement was sought, their selection rested more upon planning agency definitions of relevant concerns and legitimate groups.

Finally, the lack of any direct contact requirement underlies planning agency discretion over the extent to which user group involvement influences prior planning outcomes. Planning agencies have the discretion to define what group concerns are relevant to the issue at hand as they see it and, therefore, can to some extent determine the relative bargaining power of user groups. Where group concerns are deemed irrelevant, the group's ability to influence the planning process will be minimized. Conversely, the influence of groups whose concerns are seen to be relevant can be expected to be relatively greater. Yet, the significance of this influence as well will rest upon planning agency discretion. One factor constraining agency discretion in this regard will be the existence of other sources of bargaining strength such as public support, or the support of agencies with whom co-ordination in offshore administration is necessary.

Planning agency discretion is also characteristic of the third point of access; the proposed public hearings process. However, because hearings have not been held to date, the extent of that involvement cannot be established. As such, the discussion is constrained to assessment of the proposed hearings process itself. The most evident feature of the hearings process is the degree of planning agency discretion that characterizes it. Provincial planning agencies have discretion over the hearings' structure, timing and content. The concern here is that the process offers no assurance that public hearings will not be structured on the basis of expediency or held at the most politically convenient time. Similarly, there is no assurance that the issue at hand will not be defined so as to constrain debate and limit controversy.

Lack of any assured format can generate uncertainty costs for user groups planning to intervene in the hearings process. These costs may be even greater for groups who face excessive transaction costs. Given the discretionary nature of funding provision, such groups have no assurance that transaction costs will be offset. Such uncertainty costs are particularly evident in the case study where the structure and timing of the hearings process has been altered from that originally announced and where hearings content remains indeterminate.

These then are the central features of the planning process under study. They have been specified here to structure further discussion of process trends in terms of the access points, roles, and constraints characteristic of user group involvement in the offshore planning process. The following sections will consider these issues in depth.

THE PLANNING PROCESS - POINTS OF ACCESS

The formal provincial planning structure for proposed offshore development is composed of a two tier committee system. The "Inter-ministerial Steering Committee for Offshore Development" is chaired by the Offshore Petroleum Administration Division, Energy, Mines and Petroleum Resources, and includes representatives of the Ministries of Environment, Industry and Small Business Development and Transportation and Highways. Under this committee are three "Working Groups"; Environment and Land Use, Social and Economic Benefits and Impacts, and Tax and Fiscal Policy. The Ministry of the Environment chairs the first of these groups, which is composed of representatives of Energy, Mines and Petroleum Resources, Lands, Parks and Housing, Municipal Affairs, Intergovernmental Relations and Transportation and Highways.

The Environment and Land Use working group, as its name suggests, is responsible for policy recommendations regarding the environmental impacts and land use requirements of offshore development. Under its auspices, the Assessment Branch, Ministry of Environment is presently preparing a Preliminary Environment Assessment of offshore development that will form the basis of regulatory recommendations. It is also acting in concert with the Offshore Petroleum Administration to plan the proposed public hearings on environmental impacts.

User group involvement in environmental policy formation is presently evident at three essential points related to this structure. First, there exists some informal contact with the central planning agencies, Environment and the Offshore Petroleum Administration.⁶⁴ Both the user groups themselves and the government agencies identified as representative of these groups maintain informal contact, though the degree to which this occurs

varies with the group or agency itself. This involvement entails both the provision of information and advice for the Preliminary Environmental Assessment and the general planning process, and the direct expression of user concerns. Information exchange occurs essentially between governmental agencies.⁶⁵ The Assessment Branch's work relies heavily upon Federal data collection agencies as an information source. To some extent these agencies are simply providing information. However, in so doing, some of them are also ensuring that effects especially relevant to particular user groups are identified and thus considered in policy formation. Such involvement should also be recognized as user group representation.

Direct expression of user concerns also occurs. Such involvement takes various forms, ranging from casual contact with Ministry officials to petitioning the Minister of the Environment. Some direct user involvement in the initial environmental assessment process has been solicited by the Ministry. In September 1981, the Marine Resources Branch requested a brief on their concerns regarding offshore oil development from a number of selected fisheries groups.⁶⁶ Only two of ten groups responded. This should, however, not be taken to reflect lack of concern on the part of all the recalcitrant eight. A Ministry official noted that, because their request coincided with the herring season, timing may have contributed to the low response rate.⁶⁷ Also, a fisheries group spokesman indicated that the letter requested a response within a week of its receipt and compliance was thus difficult and rejected on principle.⁶⁸

Regardless of the response rate, the fact that these groups were canvassed is, in itself, significant. It reflects a general concern about impacts adverse to the fin-fish resource evident in discussions with Environment officials and may, to some extent, reflect the perceived

legitimacy of the groups themselves. Such gear-type groups are often canvassed for their response to agency activities. Furthermore, this practice can be contrasted to the interview response that the agency would not undertake similar contact with "environmental" groups, whose forum was seen to be the public hearings stage.⁶⁹

The second point where user group involvement is evident is through a related structure generated by the Offshore Petroleum Administration. This agency will sponsor an informational conference on offshore development in November 1982.⁷⁰ Though the Conference will deal essentially with the industrial spinoffs of such development, it will also have an environmental impact component. The Conference format is presently being compiled by a Committee composed of selected representatives of three Provincial ministries.⁷¹ Environment Canada, the Federal Environment Assessment Review office, the petroleum industry, the fisheries industry, the Prince Rupert Chamber of Commerce and environmental interests. Committee members were selected on the basis of "their representativeness--their ability to command the respect of their peers in part and in part on the basis of personality."⁷² Though the formal purpose of the committee is to plan the technical conference, it is also designed as a forum where user concerns can be raised and where cooperation between conflicting interests can be fostered. The implication here is that such cooperation will be instrumental in future regulatory planning. Thus, though the Committee does not have a regulatory planning mandate, it serves as a second point of access for user group involvement in the planning process.

User groups will have a third point of access through the public hearing process. In June 1981, the Ministry of Environment announced that any offshore activity would be preceded by a two-phase public inquiry under

the auspices of British Columbia Utilities Commission (BCUC). Public hearings on the environmental and socioeconomic impacts of proposed development were originally established for the spring of 1982.⁷³ However, the Province has since decided against employing the BCUC process. This has been replaced by proposed public hearings under the provisions of the Environment Management Act. The Act allows the Minister to appoint a Commissioner to hold "an inquiry with respect to the environment...in accordance with terms of reference and any procedural guidelines for the inquiry specified by the Minister."⁷⁴ Though the definition of "environment" under the Act is broad,⁷⁵ it may require the addition of provisions of the Ministry of Energy, Mines & Petroleum Resources Act (Section 5) to enable consideration of socioeconomic impacts as well. The terms of reference for this new public hearings process have yet to be finalized and the hearings themselves have been postponed to an, as yet, unspecified date.

These then are the major points of user access to the present planning process; informal contact with the Offshore Petroleum Administration and the Assessment Branch, Ministry of Environment (especially through its preliminary environmental assessment), selected participation in the Technical Conference Committee and future involvement in the public hearing process. The extent to which groups from within each affected user category are involved in offshore planning through these points of access must also be identified.⁷⁶ Similarly, the representational role of government agencies that regulate these uses must be assessed.

THE PLANNING PROCESS--THE ROLE OF EXISTING USERS--PRIOR PLANNING INVOLVEMENT

As an initial step in discussing the role of existing users, it is useful to consider that of the petroleum industry. Chevron first contacted

the Ministry of Energy, Mines and Petroleum Resources regarding their interest in renewed exploration in Queen Charlotte Sound-Hecate Strait in 1979. Since that time, informal contact between the Province and Chevron officials has been frequent. Much of the data that is presently being collected for Chevron's Initial Environmental Evaluation has been shared on an ongoing basis with Ministry of Environment personnel and, though not formally required to do so, Chevron intends to provide the Province with the completed document. The company's informal contact with the Offshore Petroleum Administration has been similarly routine and a Chevron representative sits on the Technical Conference Planning Committee. Also, once the decision to proceed with exploration is made, Chevron officials will negotiate permit agreements with Energy Mines and Petroleum Resources staff. Finally, the company may also participate in the public hearings process, though the decision to do so will depend largely on the terms upon which their participation is invited.⁷⁷

Direct contact between the Province and those user groups that will be affected by offshore activity has tended to be relatively less frequent. Groups with the highest level of contact are from within the commercial fin-fish category, though contact varies widely across fisheries groups. The Fisheries Association of B.C., representing many of the major processing companies, maintains occasional informal contact with the Offshore Petroleum Administration and sits by Provincial invitation on the Technical Conference Committee.⁷⁸ The processing industry in Prince Rupert is also represented by that city's Fisheries Exchange. This group approached the Minister of Environment with their concerns regarding offshore oil development in the Fall of 1981, but to date has had no further contact with Provincial officials. They remain unaware of any formal fisheries

involvement.⁷⁹ The Pacific Coast Fishing Vessel Owners Guild, representing vessel owners in the halibut and cod fisheries, was among the groups canvassed by the Marine Resources Branch in September 1981. The Guild declined comment in response to the seven day limit and has not had any further contact with Provincial officials in regard to offshore development.⁸⁰ The Prince Rupert Fishermen's Co-operative Association, a co-operatively owned processing operation representing approximately 2,500 fishermen along the coast, was also listed as a Marine Resources Branch contact. However, Co-op spokesmen were unaware of any correspondence with the Branch. The Co-op has not had any contact with Provincial planning agencies regarding offshore activity to date, though their resolutions committee is presently compiling a statement of their concerns. Upon completion it will be circulated to the Provincial Environment Minister, the Federal Minister of Fisheries and Oceans and the local M.P. and M.L.A.⁸¹ Finally, the Fishermen and Allied Workers Union, with approximately 7,000 members along the west coast, has had neither formal nor informal contact with the Province to date.⁸²

Though direct contact by fin-fish groups has been relatively minimal, they remain indirectly involved through the Federal Fisheries and Oceans Ministry. All of the fin-fish groups interviewed identified Federal Fisheries as representative of their interests. Fisheries officials have been in constant informal contact with Provincial Environment officials, providing information and expressing concerns in regard to the Preliminary Environment Assessment. Also, Fisheries personnel are aware of their representative role, which is seen to reflect the coincidence of their interests and those of the commercial industry in protection of both the fin-fish resource and its habitat.⁸³ Some minimal discussion regarding

offshore activity has occurred between Fisheries and various fin-fish groups⁸⁴ and both parties expressed confidence in ongoing informal exchange. However, though this indirect user involvement appears significant, the fin-fish groups as a whole remain unconvinced of the adequacy of Fisheries representation. The degree to which this is the case differs across groups, but all argued the need to be directly involved in Provincial planning to ensure that their interests are considered.⁸⁵

A related affected use represented by Federal Fisheries officials is commercial shellfish harvesting. Groups within this category overlap fin-fish groups because their members tend also to be fishermen. Neither of the two shellfish groups interviewed have had any contact with Provincial agencies regarding offshore oil. The Abalone Harvesters Association's concerns were expressed to the Federal Fisheries Minister in concert with those of the northern halibut and cod fisheries. The Underwater Harvesters Association, representing goosneck clam license holders, remains uncertain as to the potential for adverse impacts upon their resource. They have yet to approach Provincial or Federal officials in this regard.⁸⁶

The remaining affected users show varying degrees of contact with the Province and of desire for such contact. The sport fisheries group, the B.C. Wildlife Federation, maintains continual informal contact with officials in the Ministry of Environment and Energy Mines and Petroleum Resources, though they have not as yet discussed offshore exploration concerns specifically. On the basis of its past involvement in various oil transportation inquiries, the Federation remains confident of some access into the planning process. To some degree, that access will be through the Fish and Wildlife Branch, the Canadian Wildlife Service and Environment Canada, the last being in close contact with Provincial officials. However,

the Federation will also seek direct access through established informal contacts, as government agencies are seen to be constrained by political factors.⁸⁷

The interests of the B.C. Wildlife Federation extend beyond the sport fisheries to defense of the passive uses of the marine environment.⁸⁸ Passive users are represented on the Technical Conference planning committee by M. Rankin, a professor of Environmental Law at the University of Victoria, and a member of the Westcoast Environmental Law Association.⁸⁹ His involvement to date has been limited to this arena. Other passive user groups indicate various degrees of contact. None of the groups interviewed had been contacted by the Province. However, the Federation of B.C. Naturalists has been active on its own initiative, contacting both the Environment Minister and Ministry personnel to express its concerns regarding offshore exploration.⁹⁰ The Islands Protection Society has directed its concerns to the Member of Parliament for Skeena, but has had no involvement with the Province.⁹¹ The Sierra Club has not contacted any government agency to date.⁹²

The issue of government representation of passive user interests shows a similar diversity across the groups interviewed. Like the Wildlife Federation, the Federation of B.C. Naturalists and the Islands Protection Society identified Environment Canada as a representative agency with whom they maintain informal contact. Federal Environment officials have been closely involved in the Provincial planning process. The Environmental Protection Service has continually provided information and advice for the Province's preliminary assessment. The agency recognises its representative role and sees one element of its interaction with the Province to be the advocacy of user interests.⁹³

Environment Canada is also involved with the Provincial Environment Ministry at a policy level. Regular informal contact has been maintained between the Provincial Assessment Branch and the Pacific Regional Office, Environment Canada. Along with the Federal Environmental Assessment and Review Agency, Environment Canada personnel have been co-ordinating the parallel review process, considering the potential for joint public hearings, and frequently attending Provincial Ministry briefing sessions. The regional office spokesman did not stress the agency's role as a user representative, though he recognized some element of this in discussions with the province.⁹⁴

The degree of indirect passive user group involvement through the agencies of Environment Canada appears as great as that of the commercial fishing interests. Also in this case, a similar concern over representational adequacy arises. None of the passive user groups were satisfied with this indirect involvement. Some felt that Environment Canada could not represent their concerns adequately due to political constraints.⁹⁵ While others distrusted Environment Canada to do so even if it could.⁹⁶ Again, the common desire was for direct involvement in the planning process.

The two other affected user categories displayed little desire for direct involvement with the province at present. Having established contacts with Federal agencies, they expressed a preference to work through those channels in voicing their concerns regarding offshore activities. The first of these are the commercial transportation users. A spokesman for the Council of Marine Carriers noted that they had had no direct contact with Provincial agencies regarding offshore development, nor did they expect to. They remain assured that their interests will be advanced through the

Federal Ministry of Transportation (M.O.T.). The Council maintains close informal contact with the Traffic Management Division of the Canadian Coast Guard, and has been involved in developing and maintaining the vessel traffic management program since its inception. Their comments are regularly solicited by MOT in regard to regulatory and policy changes that affect the industry and they are able to make submissions to the Marine Safety Advisory Council regarding any such matters.⁹⁷

MOT for its part has not been in contact with the Province regarding proposed offshore activity, though they maintain regular informal contact with Ministry of Environment personnel. Though Traffic Management officials realize that any large development could require changes in traffic management along the north coast, they will not seek involvement until site specific proposals emerge. Their involvement is ensured given MOT's mandate over vessel and navigation safety. For example, drilling platform placement will require MOT approval. Also, any development entailing a significant increase in vessel traffic will require analysis and approval through the TERMPOL Assessment Process.⁹⁸ MOT officials will thus most certainly influence the future development planning process. The commercial transportation users appear satisfied that this involvement will adequately voice their concerns.

The second category of affected users that is not presently seeking direct contact with the province is the native Indian users. For the Indian groups, this stand reflects present strategy rather than trust in the representativeness of other government agencies. None of the three groups interviewed indicated any contact with the Province, though the Native Indian Brotherhood was on the Marine Resources Branch letter list. All indicated concern over the effects of proposed offshore development and stated that their first point of contact will be the Federal Ministers of

Energy, Mines and Resources and Fisheries and Oceans. Their intent is not primarily to solicit representation on their behalf, but rather to assert their right to direct involvement in any offshore development planning. In the words of the Native Indian Brotherhood spokesman, the Minister of Energy, Mines and Resources "has to deal with the Indians before he deals with the Province."⁹⁹ The Union of B.C. Indian Chiefs and the North Coast Tribal Council expressed a less stringent stand. However, both will contact the Federal Ministers and their Provincial counterparts in Energy, Mines and Petroleum Resources and in Environment to demand direct involvement.¹⁰⁰ The latter organization also indicated confidence in the M.P. for Skeena to be active on their behalf. Other government agencies identified as potentially representative included Indian and Northern Affairs and Fisheries and Oceans, with whom all groups maintain some informal contact. However, this form of involvement was rejected as entirely inadequate.

PUBLIC HEARINGS INVOLVEMENT

The preceding has detailed the extent to which selected user groups have been involved in the Provincial offshore planning process to date. It is clear that the degree of involvement through informal contact and the Technical Conference Planning Committee varies widely across user groups. Future involvement through the third point of access, the public hearing process, will likely be less group specific. Involvement in this process will be a matter of user group discretion, and most groups indicated that they will intervene. Exceptions to this included the Council of Marine Carriers, who will rely upon involvement through MOT intervention and the Sierra Club, who will participate only if the inquiry's terms of reference are set through public involvement.

Any user group's willingness to intervene in the public inquiry is, of course, a matter of speculation at present. The uncertainty that remains about the nature of the proposed hearings process renders any conclusive statement regarding relative levels of group involvement impossible. As such, the fact that hearings have yet to be held underlies a central gap in this analysis.¹⁰¹ However, it also raises an important point in regard to the public hearings process itself.

Originally, a series of hearings were to be held in the spring of 1982 under the auspices of the British Columbia Utilities Commission. At present, hearings are slated for some as yet indefinite time in the future. They will be held under the Environment Management Act and may be a joint Federal-Provincial process. This change in format raises two central issues. The first of these relates to the distinction between political and public accountability. The British Columbia Utilities Commission is composed of seven members appointed for a period of up to five years.¹⁰² The Commission is an existent body and BCUC inquiries follow an established format, though the inquiry terms of reference are set by the Ministers of Energy, Mines and Petroleum Resources and Environment.¹⁰³ The stipulations under which Environment Management Act hearings will be held stand in some contrast to those of the BCUC process. The Act allows the Minister to appoint one or more Commissioners to oversee hearings.¹⁰⁴ The Commission is established simply for the duration of the inquiry and aside from the due process provisions of the Inquiries Act¹⁰⁵ the Commission faces no format constraints. The Environment Management Act inquiry will, thus, lack the degree of independence from the political process assured a BCUC inquiry and as such the Commissioner(s) will have greater discretion than that granted BCUC commissioners. The obvious concern

in this regard is the extent to which the Environment Management hearings process will be determined by, and their conclusions swayed by, political considerations. It could be argued that the format change itself reflected political factors. Provincial Ministries certainly expect an element of public opposition to offshore activities and the Environment Management process may facilitate easier containment of any such opposition.

The second issue raised by this format change is that of uncertainty costs to prospective intervenors. The government has employed its complete discretion over the hearings process to revoke their original public commitment. The present indeterminate state of the hearings process entails costs to public groups who remain unsure of the structure, timing and content of future hearings. Preparations for intervention in response to the initial announcement must now wait for a conclusive government decision that may require tactical or organizational changes on the part of intervenors. The level of uncertainly costs will reflect the extent of changes required and, as such, will differ across intervening groups.

Three further issues must be raised in this regard. The first of these is the question of who sets the terms of reference for the inquiry process. These terms stipulate what can be discussed during the public hearings. They constrain discussion to those points deemed of relevance to the issue at hand, and can thus prohibit debate of more contentious questions. For example, Alistar Lucas notes that most public hearings are constructed to elicit public reaction to an already formulated position. Alternatives to the position are not, therefore, within the hearing's terms.¹⁰⁶ In the present context the hearings could address the question of whether or not to lift the moratorium on offshore development. Conversely, they could be restrained to the question of public reaction to the exploration proposal

for Queen Charlotte Sound-Hecate Strait, assuming that the moratorium will be lifted.¹⁰⁷ Which of these alternatives occurs will depend upon a number of factors, including what considerations determine the inquiry's terms of reference. Leaving those terms to government discretion, as in the present case, affords little assurance that the issue at hand will not be dictated by extraneous concerns such as political or bureaucratic expediency or the desire to contain conflict to a chosen cadre of user groups.

The second issue that must be raised in this regard is related to the question of what provisions are made to facilitate public involvement in the hearings process. Interview data provides evidence that some user groups may face greater transaction cost constraints upon involvement than others. Unfortunately the data at hand can provide only rough approximations of relative transaction cost levels. Chapter Two listed three surrogate measures from which relative transaction cost levels were to be estimated.¹⁰⁸ Figure one lists these measures for each of the user groups interviewed. Where the measures are not contradictory, as in the case of a large, dispersed group with a low organizational level or, conversely, a small, localized group with a high organizational level, then transaction costs can be said to be higher or lower as indicated. However, where the measures are contradictory, they must be weighted in some manner to achieve a ranking of transaction cost levels. This, in turn, requires an arbitrary assignment of relative importance to each surrogate. Because the literature does not offer any guidance as to how the components of transaction costs should be weighted, this will not be attempted. However, the argument can still be made that a range of transaction costs does occur. For example, the Islands Protection Society, that has a provincial membership exceeding 600 and is run solely by volunteers, can be contrasted

FIGURE 1. TRANSACTION COST INDICIES

Group	Group Size	Dispersal	Organizational Level*
Fisheries Association of B.C.	eight firms	Prince Rupert & Lower Mainland	high
Prince Rupert Fisheries Exchange	six firms	Prince Rupert	high
Prince Rupert Fishermen's Cooperative Association	2500 fishermen	Coastal	high
Fishermen & Allied Workers Union	7000 fishermen	Coastal	high
Pacific Coast Fishing Vessels Owners Guild	300 fishermen	Coastal	medium
Abaloni Harvesters Association	24 license holders	Coastal	low
Underwater Harvesters Association	45 permit holders	Coastal	low
Council of Marine Carriers	15 towing companies	Coastal	medium
Union of B.C. Indian Chiefs	192 tribal councils	Provincial	high
Native Brotherhood of B.C.	25000 members	Provincial	high
Northwest Tribal Council	11000 members	Prince Rupert & north coast	high
Sierra Club	1500 members	Provincial	medium
B.C. Wildlife Federation	25000 members	Provincial	high
Federation of B.C. Naturalists	2000 members	Provincial	medium
Islands Protection Society	600 members	Provincial	Low

* Organizational levels were calculated on a four point scale calculated by determining if the group (1) held regular meetings, (2) maintained a salaried executive, (3) was a registered society or corporation and (4) produced a regular newsletter. The designation "high" indicates a score of 4, medium indicates 2 or 3 and low indicates 0 or 1. The fifth surrogate, if the group organized in response to the offshore development issue, was dropped from the calculation as no group answered in the affirmative.

with the Fisheries Association of B.C., a highly organized group that represents eight major processing firms operating along the coast. Transaction costs in the latter case can be expected to be both lower and more readily absorbed. This comparison is, of course, one of extremes and can be criticised as such. However, it remains illustrative of the range of potential transaction costs that may exist.

A further indication of transaction cost levels lies in the concern over information costs expressed by some interviewed groups. Certain groups were more definitive about their intention to participate in public hearings than were others. Aside from the two exceptions noted above, group reticence appears to reflect concerns about the inaccessibility of information necessary to build a strong case. For example, two of the commercial fin-fish groups noted that their organizations lacked adequate information on fisheries impacts should hearings be held soon.¹⁰⁹ Similarly, the Northwest Tribal Council expressed concerns about early access to required information to enable them to formulate a position on the issue before hearings are held. The Islands Protection Society voiced similar concerns.

Other groups, including the B.C. Wildlife Federation, the Federation of B.C. Naturalists, the Native Indian Brotherhood, the Fishermen and Allied Workers Union and the Fisheries Association of B.C., appeared less concerned about information access. All have some established informal contacts with government officials and appear confident that they can garner information from these agencies. Also, the former four groups have been active in past inquiries into hydrocarbon transportation on the coast and have accumulated a reserve of information on oil related impacts. Assuming this information is of a reasonable quality, it provides a base that will lower the information gathering costs of these groups relative to those faced by

other organizations. To the extent that information costs contribute to transaction cost levels, those with greater access to information will also face relatively lower transaction costs.

The publication of Environment's Initial Environmental Assessment will provide one source of free damage information to which all user groups will have access. Provided that the time span between Assessment availability and the public hearings is adequate, the Assessment will serve to offset transaction costs to some degree. However, existing disparities can be expected to remain. Also, given that information will be a factor of bargaining strength, those groups who must rely upon a single information source may be at a comparative disadvantage.

This potential disparity could, in turn, be counteracted by the provision of funding for information gathering to appropriate groups. Such funding could also serve to offset other transaction costs where these are prohibitive. It is likely that the hearings Commissioner will have the discretion to provide extra funding to inquiry intervenors.¹¹⁰ However, not all interviewed groups knew about the prospective availability of these resources and, given discretionary provision, knowledge of funding availability could be an important factor determining its utility in offsetting transaction costs. Other related factors include the timing of funding provision, the appropriate selection of recipient groups and the level of transaction costs faced.

Finally, it must be noted that even if prohibitive transaction cost problems do not arise and the inquiry's terms do not limit debate, the Province retains some discretion over the influence that both particular intervenors and the hearings process as a whole has upon planning outcomes. This discretion may be more constrained than that which governs prior

planning involvement, because the former is less easily shielded by the cloak of administrative secrecy. Given that the hearings are a public forum, public support for user group positions may provide a greater potential constraint upon planning agency discretion. However, there remains no assurance that the hearings will form an integral part of the planning process or that the hearings' outcome will reflect the inclusive range of user group intervention.

The preceding discussion of the public hearing process indicates a significant element of government discretion. This discretion is reflected in agency control over the structure, timing and content of the hearings process, the provision of damage information and intervenor funding and the role of the hearings process in offshore planning. Though no conclusive statement can be made regarding the effect this will have upon user group involvement until the hearings process is complete, analysis of the process format can indicate potential problems that may adversely affect that involvement. If government discretion is employed to generate a hearings process that influences planning outcomes and meets the regulatory bargaining criteria, then many of the preceding criticisms will be rendered invalid. To achieve this the hearings must allow (1) discretionary user group intervention that is not constrained by excessive transaction costs, (2) damage information that is not selectively known and (3) a definition of the issue at hand that does not limit debate. The preceding criticisms remain relevant at present because the planning process offers no assurance that discretion will be employed in this manner.

CONCLUSION

This chapter has identified the Provincial offshore planning process in terms of both the formal planning structure and informal access to that

process. This discussion was initially set in the context of the history of offshore development and the Federal Provincial dispute over offshore jurisdiction that pervades that history. The point was made that failure to settle this dispute generates uncertainty for participants in the planning process. Also, the overlap that characterizes other resource use jurisdictions in the case study area was reviewed as a source of constraint upon the planning process. It was argued that this overlap necessitates a degree of interministerial and intergovernmental coordination in offshore development planning.

Indepth consideration of the existent planning process revealed three central points of access to that process; the Ministry of Environment's Initial Environmental Assessment, the Offshore Petroleum Directorate's Technical Conference Planning Committee and the future public hearings process. There has been some degree of user group involvement, both direct and through representative agencies, at the two former points. Direct involvement has varied across user groups and appears to reflect the extent to which any group has established informal contact with lead planning agencies. Indirect involvement through agency representatives has also varied across user groups. However, all user groups, including those whose representative agencies maintained close contact with the planning process, indicated that this form of involvement remained inadequate.

The selection of both groups and representative agencies for involvement in prior-planning indicated the discretionary control exercised by planning agencies in this regard. Representative agency selection tended to reflect the information requirements of planning agencies while user group selection essentially reflected planning agency definitions of the relevancy of user concerns and the legitimacy of the groups themselves.

All groups will have an opportunity for direct involvement through the third access point, the public hearings process. It was noted that the fact that hearings have yet to be held renders any conclusive statement regarding user group involvement impossible. However, the argument was also made that discretionary control over the structure, timing and content of the hearings process itself will influence the user group involvement. Group intervention may be constrained by uncertainty and/or excessive transaction costs. Also, the restrictive definition of hearings content may restrain involvement to groups whose positions are relatively less contentious. Finally, the degree to which that involvement influences hearing's outcome remains open to government discretion.

This chapter has discussed the issues of actual and potential user group involvement in the Provincial planning process. The involvement levels identified must also be assessed against the bargaining model criteria set out in Chapter One. The following chapter will undertake this task. It will identify "gaps" in the present planning process in light of the preceding discussion and address the question of the extent to which the present process fails to meet the requirements of the bargaining model.

Chapter 5 Notes

1. See discussion of sampling logic in Chapter Two.
2. The first permits were issued to Bralco Ltd. and Royalite Oil Co. Ltd. in that year. This information is provided in G.A. Nelson, "Offshore Oil and Gas in Canada. West Coast Events, 1949-1980", Westwater Research Centre, (Vancouver, 1981, draft), p. 4 citing British Columbia, Ministry Energy, Mines & Petroleum Resources Offshore, Crown Petroleum and Natural Gas Permits issued under the Petroleum and Natural Gas Act, (February 28 1963), p. 1.
3. Ibid., p.5.
4. See map #ii and schedule attached, Appendix I.
5. There were also a few minimal gas shows in the Tofino Basin. See exploration summary in Oilweek, July 6, 1970, pp. 12-13.
6. Nelson, Ibid., p. 9. During the years 1965-66 the province also issued extensive permits for exploration in the southern straits. See Ibid., pp. 109-110.
7. Ibid., pp. 105-108 provides a summary of all federal permits dates. See also; Map #iii attached, Appendix I.
8. The provincial claim was to lands lying beyond the low water mark to a line drawn from headland to headland or within one marine league of such a line or the boundary of the province. See; British Columbia, Ministry of the Attorney General, The Attorney General for the Province of B.C. v. Benjamin J. Short, Statement of Claim, (June 7, 1905), p. 2.
9. Nelson, Ibid., pp. 4-5.
10. This Convention on the Continental shelf was one of four signed at the first United Nations Conference on the Law of the Sea, April 1958.
11. This Crown Reserve was designated by Order in Council under the provisions of the Petroleum and Natural Gas Act, Sec 81(e). See: Order in Council 1842 (August 11, 1959) & 2014 (September 4, 1959).
12. The first federal permits were issued under the Canada Oil and Gas Regulations on June 29, 1960. See: Nelson, Ibid., p. 6.
13. Ibid., p. 7.
14. Ibid., p. 9.
15. Ibid.
16. The provincial Crown Reserve and competitive bid permitting system was cancelled indefinitely as of January 1, 1963. See: British Columbia, Order-in-Council 3109, (December 20, 1962).

17. The federal government referred the following questions:
- "1. In respect of the lands, including the mineral and other natural resources, of the sea bed and subsoil seaweed from the ordinary low-water mark on the coast of the mainland and the several islands of British Columbia, outside the harbours, bays, estuaries, and other similar inland waters, to the outer limit of the territorial sea of Canada, as defined in the Territorial Sea and Fishing Zones Act, Statutes of Canada 1964, Chapter 22, as between Canada and British Columbia.
 - (a) Are the said lands the property of Canada or British Columbia?
 - (b) Has Canada or British Columbia the right to explore and exploit the said lands?
 - (c) Has Canada or British Columbia legislative jurisdiction in relation to the said lands?
 2. In respect to the mineral and other natural resources of the sea bed and subsoil beyond that part of the territorial sea of Canada referred to in Question 1, to a depth of 200 metres, or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the mineral and other natural resources of as, the said are as between Canada and British Columbia,
 - (a) Has Canada or British Columbia the right to explore and exploit the said mineral and other natural resources?
 - (b) Has Canada or British Columbia legislative jurisdiction in relation to the said mineral and other natural resources?"

Reference Re: Ownership of Offshore Mineral Rights (1968) 65 Dominion Law Reports (3d) 363.

18. Ibid.
19. In fact, the province consistently refused to refund permit fees paid by Shell and other permit holders. In Shell's case this amounted to \$2,400,000 by 1968. See: Nelson, Ibid., pp. 18-19.
20. The Crown Reserve was declared by Order-in-Council 3807, (December 6, 1966). Additionally, a similar Reserve of these offshore lands was declared under the Mineral and Placer Mining Acts by Order-in-Council 309, (January 30, 1967). They remain in force to date.
21. See Map #iv attached, Appendix I.
22. These Resource Administration Line proposals were announced in the House of Commons on December 4, 1968. See: Canada, Debates of the House of Commons, December 4, 1968. This proposal still forms the basis of federal policy, though the revenue sharing provisions have changed off and on. See for example: Nelson, Ibid. on eastern offshore negotiations, p. 42, and the agreement signed between Nova Scotia and the federal government in March 1981. Vancouver Sun, "Newfoundland Urged to Resume Talks", March 3, 1981 p. A1.
23. British Columbia issued its last permits in November 1969 to Union Oil for exploration off the Queen Charlotte Islands. Nelson, Ibid., p. 97. The last Federal permits were issued to Chevron Canada Ltd. in December 1971. Ibid., p. 107.
24. Newspaper reports at the time indicated a diversity of protesting

groups and vocal opposition to exploration. See for example: Ibid., note 83.

25. British Columbia, Order-in-Council 2562, (July 28, 1970).
26. Nelson, Ibid., p. 28.
27. Some of this opposition was sparked by the government's opposition to increased American tanker traffic off the B.C. coast. See: Ibid., p. 30.
28. Reference Re: Ownership of the bed of the Strait of Georgia and Related Areas. (1976) 1 British Columbia Law Reports 97.
29. Nova Scotia recently settled for a 30 per cent share of all offshore revenues. Offshore development will be administered by a joint Federal-Provincial board. See: Vancouver Sun, Ibid.
30. The position is stated in British Columbia, Ministry of Energy, Mines & Petroleum Resources, News Release, June 2, 1981. See also: Maps attached #5, Appendix 1.
31. Interviews with Dr. David Marshall, Federal Environmental Assessment Review Office & Dr. John Wiebe, Pacific Regional Office, Environment Canada, February-March 1982.
32. The term "farm out" refers to an agreement between a permit holder and another company under which that company undertakes the permit holders work obligations in exchange for a portion of the returns from any find.
33. Information provided by Gary Nelson indicates that two supply vessels under contract to Chevron were in transit to Queen Charlotte Sound at the time the moratorium was announced. The company has also concluded a tentative drilling contract.
34. Nelson, Ibid., p. 47.
35. British Columbia, Ministry of Energy, Mines & Petroleum Resources, Ibid. An Inland Marine Zone that included the water of Queen Charlotte Sound-Hecate Strait was established by British Columbia, Order in Council 1347, (June 4, 1981).
36. This assertion is based on interview data and will be substantiated further in the discussion to follow.
37. As defined in the preceding chapters, these activities do not include spill response and clean up. A number of agencies are involved in this aspect of offshore activity, as well. See for example: Jean Hyndman, "Institutional Arrangements for the Provision of an Oil Spill Clean Up System: Puget Sound-"Strait of Georgia", Unpublished Paper 1975 and British Columbia, Ministry of Environment, Pollution Control Branch, "Federal-Provincial Division of Responsibility in Contingency Planning and Abatement for Oil and Other Hazardous Material Spills", (Victoria, 1974).

38. The mandate of this agency is set out in a Cabinet Submission approved March 11, 1981.
39. British Columbia, Environment Management Act (1981), Section 2(a) allows the Minister to request an impact assessment.
40. British Columbia, Land Act, Section 31.
41. The inquiry will be held under the Environment Management Act (1981), Section 7(1) & (2), that provides for Ministerial appointment of a Commissioner(s) to conduct a public inquiry within terms specified by the Minister.
42. Environment Canada was established under the Government Organization Act, 1970 Section 5 details the agencies duties.
43. The Federal Environmental Assessment and Review Process was established under the auspices of the Ministry of Environment in December, 1973. It comprises a detailed environmental review process for major development projects that includes a public hearing component. See: Canada, Environmental Assessment & Review Office, Revised Guide to the Federal Environmental Assessment and Review Process, 1979.
44. Canada, Oil and Gas Production and Conservation Act, Section 12(m) & (q).
45. British Columbia, Petroleum and Natural Gas Act, Sections 33, 36 & 38.
46. Ibid., Section 35.
47. Ibid., Sections 23(2)(a), 120 and 118 and British Columbia, Pipelines Act, Section 37 respectively.
48. British Columbia, Pollution Control Act, Sections 5 5A, 11 & 20A.
49. Environment Management Act (1981), Section 4.
50. British Columbia, Health Act, Section 55 establishes local Boards of Health under the Ministry that are responsible for inspection and enforcement of standards regarding discharges that constitute a "nuisance" to health. Sections 59 through 64. The Pollution Control Act, Sections 4(4) & (5) provides for Ministry of Health involvement in effluent permit approval. Also, it must be noted that the Provincial Fire Marshal's office and local officials could also have regulatory responsibility through their their jurisdiction over the manufacture, use, storage, carriage and disposal of inflammable liquids, oils and compressed gas systems. However, their involvement is likely to be in the area of onshore source spill prevention, through equipment and storage facility regulations. See: British Columbia, Fire Marshal Act and associated regulations.

51. Canada, Public Lands Grants Act, Canada Oil & Gas Land Regulations, 1961.
52. Canada, Oil and Gas Production and Conservation Act, Section 14(3).
53. Ibid., Canada Oil and Gas Drilling and Production Regulations, 1978.
54. Effluent standards are for industrial sectors under the legal authority of the Canada, Fisheries Act.
55. British Columbia, Wildlife Act.
56. British Columbia, Parks Act and British Columbia, Ecological Reserves Act.
57. Canada, Fisheries Act, Section 33(1) & (2). Oil is not specified in the Act as a deleterious substance. However, John Ince notes: "The term deleterious substance has been held to include oil: Suzuki v. "Ionian Leader" (1950) Ex CR 427," Ince, Environmental Law: A Study of Legislation Affecting the Environment of British Columbia, (Centre for Continuing Education, University of B.C., 1976), p. 86.
58. Fisheries officials exercised their discretion in refusing to approve seismic survey operations in Georgia Strait in 1967. See: Nelson, Ibid., p. 15.
59. Canada, Canada Shipping Act. The "Oil Pollution Prevention Regulations" of the Canada Shipping Act also prohibit the discharge of oil & oily mixtures from vessels in Canadian waters. Enforcement is a Canadian Coast Guard responsibility, but it remains virtually impossible outside of a harbour.
60. Canada, Canada Shipping Act, Section 483(2).
61. Canada, National Harbours Board Act and related sections of the Shipping Act and Navigable Waters Protection Act.
62. An example of co-ordinated regulations is found in the application of national source point effluent standards. See: M. Sproule-Jones, The Real World of Pollution Control, (Vancouver, 1980), p. 45.
63. To substantiate this, agencies identified as data sources were also asked if they felt they represented some user group(s). The involvement of those who answered in the affirmative was assumed to reflect this.
64. Though a formal planning structure exists, the committees have not been active and the planning agencies presently supervising environmental impact work are those noted.
65. Exceptions to this include a number of academic agencies and the Environmental Division of Chevron Canada Ltd.
66. See list attached, Appendix IV.

67. Interview, D. Tillapaugh, Marine Resources Branch, Ministry of Environment, February 1982.
68. Interview, E. Wicken, Pacific Coast Fishing Vessel Owners Guild, March 1982.
69. Interview, R. Langford, Assessment and Planning Branch, Ministry of Environment, January 1982.
70. A second conference is presently also being planned for May 1983. This conference will deal with environmental planning for large development projects, including offshore oil and coal development. It will include representatives of a number of Pacific Rim countries and is designed to provide planning agencies with information on comparative environmental management processes. The Conference Steering Committee includes representatives of Provincial and Federal agencies and of industry. Though interaction in this regard may serve to cement informal relations given the Conference focus, this forum will be considered ancillary to present offshore planning.
71. These are: Environment, Offshore Petroleum Administration, and Industry and Small Business Developments.
72. Interview, Dr. P. Finkle, Director, Offshore Petroleum Administration, March 1982.
73. Ministry of Energy, Mines and Petroleum Resources, Press Release, June 2, p.2.
74. Environment Management Act, Sec.7(1).
75. Under the Act, "environment included air, land, water and all other external conditions or influences under which man, animal and plants live or are developed", Ibid., Interpretation.
76. These groups were identified using the reputational sampling method discussed in Chapter Two, with one exception. The group S.P.E.C. was identified as a significant environmental interest. However, apart from initial phone contact, the S.P.E.C. official proved continually inaccessible to the interviewer. Therefore, the discussion in this regard is based on information from only three groups.
77. Interview, E. Cudby, Chevron Canada Ltd., March 1982.
78. Interview, M. Burgess, Fisheries Association of B.C., February 1982.
79. Interview, G. Linguist, Prince Rupert Fisheries Exchange, March 1982.
80. Interview, E. Wickem.
81. Interview, R. Shumka, Prince Rupert Fishermen's Co-operative, March 1982.
82. Interview, A. Tomlison, Fishermen and Allied Worker's Union, February 1982.

83. Interview, M. Flynn, Habitat Management, Fisheries & Ocean Canada, March 1982.
84. For example, the Pacific Coast Fishing Vessel Owners Guild have expressed their concerns regarding offshore activity to the Federal Fisheries Minister.
85. The reasons expressed to explain this include the past record of the Ministry, the difference in field and administrative staff policy and a general lack of trust in the Ministry.
86. Interview, E. Wickem, Abalone Harvesters Association, and J. Hume, Underwaters Harvesters Association, March 1982.
87. Interview, David Anderson, B.C. Wildlife Federation, March 1982. This confidence may well reflect the established personnel contacts of Mr. Anderson, as well as those of the Federation.
88. To quote D. Anderson: "The actual animals hunted are only part of what our members enjoy out of doors".
89. M. Rankin, Professor, University of Victoria Law School. Mr. Rankin does not see himself as representing any particular group in his position on the Committee.
90. Interview, Val Schaffer, Federation of B.C. Naturalists, February 1982.
91. Interview, J. Wier, Islands Protection Society, March 1982.
92. Interview, Bob Nixon, Sierra Club, February 1982.
93. Interview, John Millan, Environmental Protection Service, Environment Canada, February 1982.
94. Interview, Dr. J. Wiebe, Director, Pacific Regional Office, Environment Canada, February 1982. For its part the FERA office sees its role as ensuring access of "whoever has an interest" at the public hearing stage. As such, their policy is to actively solicit public input. If hearings on the Chevron application to Energy Mines & Resources are held jointly with Provincial public hearings, FERA will be the Federal agency responsible. This will have implications for the structure, and perhaps, comprehensiveness of the hearings process. Interview, Dr. D. Marshall, FERA, March 1982.
95. B.C. Wildlife Federation and Federation of B.C. Naturalists.
96. Sierra Club, Island Protection Society.
97. Interview, P. Woodward, Council of Marine Carriers, March 1982.
98. This is a project specific impact review that can be required by the

Canadian Coast Guard of any marine terminal proposals, under the "Code of Recommended Standards for the Prevention of Pollution in Marine Terminal Systems."

99. Interview, J. Revard, Native Indian Brotherhood, February 1982.
100. Interview, S. Bassel, Union of B.C. Indian Chiefs, and F. Parnell, Northcoast Tribal Council, March 1982.
101. It should be noted that this work was undertaken with the, perhaps naive expectation that public hearings would be held as announced.
102. British Columbia, Utilities Commission Act, 1980 Section 2.
103. Ibid., Section 20. Section 132 allows for representation to the inquiry by a class of interested persons. See also: Province of British Columbia, Ministry of Energy Mines & Petroleum Resources, Energy Project Review, Guide to Agencies, 1981.
104. Environment Management Act, Sec 7(1).
105. British Columbia, Inquiry Act, 1979, Sections 3-5.
106. Alastair R. Lucas. "Legal Foundations for Public Participation in Environmental Decisionmaking", Natural Reserve Journal, Vol. 16, January 1976 pp. 71-102.
107. The terms of reference have not been formalized as yet. Ministry of Environment and Offshore Petroleum Administration officials are presently compiling them.
108. See: Chapter Two pp. 35-36.
109. The Pacific Coast Fishing Vessel Owners Guild and the Prince Rupert Fisheries Exchange.
110. Such funds can be made available under the B.C.U.C. process.

Chapter Six

Bargaining Conclusions and Regulatory Implications

INTRODUCTION

This analysis began with the construction of a model of bargaining about the formulation of resource use rights. It proposed a set of three characteristics required of a bargaining structure that seeks to achieve those use rights and liability rules that will, in turn, facilitate the efficient internalization of externality effects. These characteristics are: (1) that all affected user groups be represented in the bargaining process and that representatives express user interests, (2) that affected user groups have discretion to enter, to set the level of their involvement in and to exit the bargaining process and that none face excessive transaction costs, and (3) that damages are known and known to all equally.

Having established these criteria, the analysis then applied them to the case of regulatory planning for offshore oil development in British Columbia. The initial step in this assessment was the identification of "affected" users, or those who would face external costs given no regulation. That required the specification of both external effects and existing users. In-depth discussion of the process of offshore exploration, the biological and physical effects that could be expected from such activity and the manner in which these would impact upon existing users of Queen Charlotte Sound-Hecate Strait provided the categories of affected users. The analysis then turned to discussions of the ongoing planning process to determine if user groups from within these categories were, in fact, represented in that process. The discussion also considered the structure of the planning process itself in light of constraints faced by planning agencies.

The tone of the discussion to this point has remained largely descriptive. It serves as a necessary prelude to the analytical task of the present chapter. This chapter will critique the regulatory planning case in light of the bargaining model developed in Chapter One. Initially, process "gaps"; defined in Chapter Two to include affected user groups not represented in prior-planning or inadequately represented by government agencies, will be identified. The issue of user discretion in both prior planning and public hearing involvement will be addressed and constraints upon user involvement, including transaction costs and information inaccessibility, will be discussed. In concluding, the Chapter will reflect upon the regulatory outcomes that can be expected given the manner in which the planning case fails to meet each bargaining criterion.

USER GROUP REPRESENTATION--THE PRIOR-PLANNING STAGE

User group involvement was seen to occur at three central points of access to the planning process. At two of these, informal contact with the Offshore Petroleum Administration and Ministry of Environment and the Technical Conference Planning Committee, actual user group-agency interaction was identified. The third access point, future public hearings, was discussed in terms of the potential for user group involvement. Discussion of the former two access points, termed the prior-planning stage, showed both direct user group contact and indirect involvement through government agency representatives with both direct and indirect involvement differing significantly across user groups. Involvement at this stage remained largely a matter of planning agency discretion.

Of the eight categories identified as affected user types, six yielded identifiable user groups.¹ A total of fifteen user groups were selected

to be interviewed.² Of these, only five indicated any direct contact with Provincial agencies responsible for prior planning. Two groups, the B.C. Wildlife Federation and the Federation of B.C. Naturalists, had minimal informal contact with the Provincial Ministry of Environment. Two fin-fish groups and the Native Indian Brotherhood had been contacted by Environment regarding their concerns and a third fin-fish group maintained a representative on the Technical Conference Planning Committee.³ The Committee also included a representative of passive user interests who declined affiliation with any particular user group.⁴

These directly involved groups were distinct from the remaining ten in that they maintained ongoing informal contacts with the relevant Provincial agencies or had been contacted by those agencies. In either case, involvement was selective and reflected agency familiarity with the particular user groups. Familiar groups were, in turn, considered to be legitimate and to have relevant concerns. The preponderance of fin-fish groups among those directly involved (three of five) suggests another factor governing selection. As was argued in Chapter Five, Provincial discretion over the prior planning process may face certain constraints given the significant Federal presence in the coastal zone. In the case of the fin-fish resource, this Federal presence is ensured by the broad regulatory mandate of the Fisheries Act.⁵ This mandate not only ensures Federal Fisheries some involvement in the planning process, but may also underlie the perceived legitimacy of the fin-fish groups themselves. It appears reasonable to assert that where concerns for resource protection are backed by potential Federal intervention, these concerns may gain more credence than do those that lack such support.

Beyond direct involvement, some user groups were also represented in prior planning by government agencies. Federal Fisheries and Environment Canada were the two agencies indicated as both representative and involved. Though both of these agencies maintained continual informal contact with Offshore Petroleum Administration and Environment personnel, for purposes of this analysis the significance of inter-agency contact rests upon two further factors. The first of these is the fact of interest representation itself. Both Fisheries and Environment indicated that their involvement with Provincial planning agencies entailed some aspect of resource user representation. Thus, this involvement was taken to reflect an element of interest representation for those user groups who had nominated Fisheries or Environment as agency representatives. These groups included the fin-fish, shellfish, sport-fish and all but one of the passive user groups.⁶ These groups can, therefore, be said to be indirectly represented in prior planning.

The relevance of this fact must, however, rest upon a second factor; the adequacy of indirect representation. None of the groups interviewed felt that indirect representation was adequate. They expressed concerns about the political constraints upon representative agencies and about the discrepancy between their own interests and those of the agencies. All of the user groups agreed that, though government agencies may serve to represent user interests in resource protection to some degree, direct involvement was required to ensure adequate representation. Thus, if it is assumed that users judge their own interests accurately, indirect involvement in prior planning remained inadequate.

Four affected user groups from within three of the user categories indicated neither direct nor indirect contact with the prior planning

process. These included one of the passive user groups who maintained that no government agency represented their interests, the commercial transport group, and two of the native Indian groups.⁷ All but one indicated a preference for direct involvement in the process but all were unaware of any opportunity for active involvement at that time. The commercial transport group displayed an alternative approach to the situation, preferring to rely upon the intervention of Ministry of Transport personnel on their behalf. Like Fisheries, MOT's involvement is ensured at some point, given their mandate under the Canada Shipping and Navigable Waters Protection Acts. However, unlike Fisheries, MOT was not found to be involved in prior planning. This may reflect the fact that the informal relationship between MOT and Provincial agencies is not as well developed as that between Fisheries and the Province. MOT had not sought prior planning involvement and appeared to maintain more of an adversarial stance toward the Province. Furthermore, MOT can be expected to formulate transportation regulations that will impinge upon, but remain ancillary to, the Provincial regulation of offshore activities.⁸

The option to approach the regulatory issue in this manner appears more open to MOT than to Fisheries. The resource use of concern to MOT can be reasonably protected through ancillary transportation regulations. Protection of the fisheries resource, on the other hand, may require the application of preventative and prohibitory regulations to a range of offshore activities. This would be more easily achieved within the complex of new resource use right limitations. Fisheries thus could have been expected to move within the provincial process, while MOT appears content to operate from outside of that process.

Those user groups who initiated contact with prior-planning agencies must also be discussed. These included one fin-fish and one passive user group, both of which approached the Minister of Environment directly with their concerns.⁹ In the case of the fin-fish group, this was the extent of their contact with the prior-planning process. The passive user group, for its part, also had minimal informal contact with Environment personnel. Both user groups remained unsure of the impact of their actions and neither was optimistic in this regard. Both had attempted to enter the prior-planning process and neither appear overly successful.

Finally, note should be made of the role of the "new" user in the prior-planning process. Chevron has maintained continual informal contact with both the Offshore Petroleum Administration and the Ministry of Environment. This contact has included the provision of information for Environment's Preliminary Environmental Assessment and the discussion of impact concerns with both agencies. Furthermore, Chevron is formally represented on the Technical Conference Planning Committee by a member of their Environment Assessment division. As the company spokesman did not indicate any government agency as representative, no assessment of additional indirect contact can be made. However, the extent of direct involvement appears significant relative to that of any affected user group.

The preceding discussion bears directly upon the first two criteria of the regulatory bargaining model. It can obviously be concluded that the prior-planning process meets neither of these requirements. Direct user group representation remained noncomprehensive, as did indirect representation. More user groups were indirectly represented than were directly so, but further analysis showed that indirect representatives were

not expressing user interests as defined by the users themselves. Secondly, the significant level of new user involvement in the prior-planning process appeared in some contrast to that of existing users. The extent of direct new user involvement was paralleled only by indirect involvement in the case of existing user groups. Direct user group involvement at the prior-planning stage remained largely a matter of planning agency discretion. Though some groups exercised their discretion to approach government agencies in hopes of entering the planning process, planning agencies were under no formal obligation to facilitate this. The level and impact of user group involvement remained open to planning agency discretion. Thus, where direct user involvement did occur, it tended to reflect the factors of agency-group familiarity and agency assessments of the legitimacy and relevance of group concerns. Direct user group involvement tended to be restrained to a relatively minimal level and planning agency discretion defined the central actors in prior-planning bargaining. These central actors essentially included the planning agencies themselves, the new user, and agency representatives of fisheries and passive user interests. Given group assessments of representative adequacy, this process in no sense approaches the initial regulatory bargaining criteria.

USER GROUP DISCRETION--THE PUBLIC HEARING STAGE

Where user group involvement in prior-planning can be assessed against both the representational and discretionary involvement criteria, only the latter is relevant to the future public hearings process. Because the hearings have yet to be held, no definitive statement regarding user groups representation can be made at present. However, the issue of discretionary involvement raises two ancillary arguments. The first of these rests

upon the nature of the hearings process itself. The second, related argument underlies the distinction between the prior-planning and public hearings stage and suggests the significance of involvement in the former.

It must be noted initially that virtually all of the user groups interviewed indicated an intention to intervene in the public hearings. The two exceptions to this included the Commercial transport group, whose particular approach has been discussed above, and the Sierra Club who will only intervene if allowed participation in defining the hearings' terms of reference. Because the intervention of any user group will be a matter of group discretion, the hearings process initially appears capable of meeting the discretionary requirement. However, this claim must be tempered in light of the nature of the hearings process itself. The central point that must be raised in this regard is that the hearings process will be determined through the exercise of planning agency discretion. Given their discretionary control over both the structure of the hearings process and the degree of influence the hearings will have upon regulatory outcomes planning agencies can effect user group involvement in that process. This will be of particular importance if the hearings process is structured so as to restrain debate and achieve outcomes preferred by planning agencies regardless of user group preferences. Agency discretion may, of course, not be employed in this manner. However, the fact remains that nothing in the present process structure ensures that constraints will not be placed upon user group involvement. Furthermore, the restructuring that has occurred to date suggests that this concern is well founded.¹⁰

The fact of planning agency discretion over the hearings process raises a further, ancillary point. The structure and influence of the public hearings will be set during the prior-planning stage. Participants in this stage thus have the potential to influence the construction of the hearings

process. User groups involved in prior-planning may be able to secure a hearings agenda that reflects their particular concerns (or that constrains the influence of competing users). The minimal direct user group-agency contact evident in the case study does not appear to have extended to influence over the hearings process. However, indirect user representation may be reflected in the hearings' structure. Environment Canada has been directly involved in planning the hearings' process¹¹ and Fisheries' contact with Provincial planning agencies has been extensive. To the degree that this interagency contact involves the representation of user interests, these interests (as they are defined by representative agencies) could influence the hearings' structure. Similarly, the extent of new user involvement in prior-planning may be translated into influence of the hearings process. Such influence may simply involve the inclusion (or exclusion) of some particular issue in the hearings' agenda. However, it could remain significant if that issue would not otherwise have been included (or would otherwise have been addressed).¹² Therefore, where planning agency discretion characterizes the public hearings process, those users who are represented in prior-planning have a distinct advantage over those who are not.

The conclusion that the public hearings process will meet the user group discretion criterion must be tempered in light of the preceding two arguments. User groups may, in fact, have discretion to enter, to set the level of their involvement in and to exit the hearings process. However, if, for example, the terms of reference are designed to restrict debate, then user group involvement itself can be said to be constrained. Furthermore, where the public hearings process is open to agency discretion, the hearings stage is a less critical point of access to the planning process than is the prior-planning stage.

In concluding discussion of the user discretion criterion the influence of transaction costs upon user group involvement must also be considered. Though no attempt was made to determine the existence of prohibitive transaction costs, user groups interviewed were found to face a range of such costs.¹³ The relative levels of user group participation in the public hearings can be expected to reflect this cost range and were prohibitive costs exist, groups can be expected to decline any involvement. The provision of funds to offset prohibitive transaction costs remains a matter of planning agency discretion. If the public hearings' process is structured to resemble British Columbia Utilities Commission inquiries in this regard, such funding will be available at the Commissioner's discretion. In this instance, funding levels, the timing of funding provision and the selection of user groups to receive funds will be important factors determining the utility of funding in offsetting transaction costs. If funding is "appropriate" in terms of each of these factors, then the public hearings process will meet the transaction cost requirement of the user discretion criterion. However, it should be noted that, once again, the hearings structure does not ensure that this will be the case.

DAMAGE KNOWLEDGE ASSESSMENT

The final criterion, that damages be known and known to all equally, can be assessed for both the prior-planning and public hearings stages. Because one aspect of prior-planning is the consolidation of damage information applicable to the exploration area, comprehensive damage information will obviously not be available at this stage. However, it is unlikely that such information will be available to hearings' participants either. The reason for this lies ultimately in the complex nature of the oceanic resource itself. As was apparent in Chapter Three, establishing the

effects of offshore exploration activities upon the marine resource is not a simple task. Much uncertainty remains in the literature about both the immediate and long term effects of a range of discharges. Even if all discharge effects were known, only the probability of occurrence could be established. Estimates of accident risk remain relatively inexact and provide another source of controversy over offshore exploration effects.¹⁴ Furthermore, baseline data required for an indepth assessment of expected impacts in the Queen Charlotte Sound-Hecate Strait area remains inadequate. Present Environment Ministry efforts to evaluate potential impacts indicate a significant lack of requisite information.¹⁵

Such uncertainty about exploration impacts can be expected to influence the regulatory bargaining process. Potential damages themselves will become bargaining issues.¹⁶ Where uncertainty occurs, existing users have an incentive to overstate the damages expected from the new use to maximize the new user's liability. Conversely, new users have an incentive to understate damages, thus minimizing their liability. Because no definitive damage statement exists, the ability to present a strongly supported case will be one significant factor determining the bargaining outcome. Those bargaining process participants who have access to more apparently comprehensive damage information will be at a distinct advantage.

Analysis of the case study indicates that certain users do, in fact, have greater access to damage information. Chevron has perhaps the greatest access. The Company commissioned an extensive study (termed an Initial Environmental Evaluation) of the impacts of its proposed drilling activity to meet the requirements of the Federal Environmental Assessment Review Process. The study is to be completed shortly and if it maintains the

caliber of part Initial Environmental Evaluations, it will be relatively comprehensive.¹⁷

Environment Canada and Provincial planning agencies will have access to Chevron's study and it will also become available to the general public through the FEARO process. If FEARO hearings precede provincial hearings or if joint Federal-Provincial hearings are held, then other user groups will have adequate access to the Chevron study. Chevron's advantage in the Provincial hearings process will be lessened accordingly. However, if independent Provincial hearings precede the Federal hearings, then Chevron may maintain the advantage afforded it by access to such information.

Furthermore, the Company's role in the prior-planning process will continue to be supported by this relatively exclusive access. The value of its impact study to Chevron's bargaining position is suggested by the fact that the study has been used as a data source by the Ministry of Environment in compilation of its Preliminary Environmental Assessment. As was argued earlier in regard to representative agencies, information provision also entails the expression of user interests. To the extent that this is characteristic of the exchange of information between Chevron and Provincial officials, the Company occupies a stronger bargaining position in prior-planning than do any of the existing user groups. The comparable positions in respect to existing users are occupied by representative agencies rather than the user groups themselves.

The availability of damage information also differs between existing users. Five of the groups interviewed indicated that they presently had access to damage information. Four others expressed concern over the lack of such information.¹⁸ This discrepancy will be lessened through public availability of the Ministry of Environment's Preliminary

Environmental Assessment (and potentially Chevron's Environmental Evaluation) prior to the Provincial hearings. However, because damages themselves will be a bargaining issue, those who have additional sources of information will retain a bargaining advantage.¹⁹ This may be offset, in turn, by the provision of funding for data collection, but, as with transaction cost funding, the utility of this approach will depend upon funding level, timing, and appropriateness. Also, it is possible that the provision of the Preliminary Environmental Assessment may be considered adequate for public information purposes. In this case bargaining position discrepancies will remain.²⁰

It is clear from the preceding discussion that neither the prior-planning process nor the public hearings stage meets the damage availability criteria. This lack is unavoidable in the prior-planning stage as one of its functions is the collection of damage information. However, given the existing level of uncertainty regarding offshore exploration effects, a lack of damage information will characterize the hearings process as well. Damage knowledge is not only noncomprehensive, it is also not equally available. Those bargaining process participants that have greater access to damage information can thus be said to have a bargaining advantage. Relative advantages will also depend upon the comprehensiveness of damage information. Given this, those possessing a distinct advantage include the provincial planning agencies, the new user and the two representative agencies. Those user groups with access to damage information occupy a middle position between the former four actors and those user groups who lack such access.

The preceding discussion of information availability concludes this assessment of the offshore planning process in light of the three

regulatory bargaining criteria. The planning process has been found lacking in terms of each of the criteria. All affected user groups have not been represented in the prior-planning bargaining stage and where indirect representation occurred, representatives were not seen to express user interests. Furthermore, affected user groups lacked the discretion to enter or to set the level of their involvement in prior-planning. Though the public hearings process may show comprehensive user group representation and will be characterized by user discretion over process entry and exit, there is no assurance that the level of user group involvement will reflect user preferences. This involvement may be constrained by the nature of the hearings process itself. Planning agency discretion over the structure and purpose of the public hearings may grant minimal significance to the hearings process in determining resource use rights. If this occurs user involvement in that process will be rendered ineffectual. A similar problem is apparent in regard to excessive transaction cost levels. Though funding to offset such costs will likely be available at the Commission's discretion, there is no assurance that funds will be appropriately distributed. Finally, the planning process also fails to meet the damage knowledge criterion. Damages are not known and where damage information exists it is not available to all equally. This failure of the offshore planning process to meet the regulatory bargaining criteria has implications for the regulatory outcomes that can be expected of that process. In discussing the relationship of the planning process to each of the criteria these implications have been suggested. They will be elaborated upon further in the following section where an attempt will be made to predict the regulatory outcomes of the offshore planning process.

PREDICTED BARGAINING OUTCOMES

One of the fundamental premises throughout this analysis is that the structure of the bargaining process is a primary determinant of bargaining outcomes. This premise underlay construction of the regulatory bargaining model and allowed for the assertion that given the specified criteria the bargaining process would produce the limited use rights required for efficient internalization of external costs. Had the planning case met these criteria, this analysis would have concluded that those limited use rights could be expected to result. However, because the case fails to meet any of the regulatory bargaining criteria, the analysis must conclude that those use rights cannot be expected. The limited use rights established will not reflect the range of transaction costs faced by user groups.

The manner in which the case fails to meet each of the criteria suggests the alternate outcomes that can be expected. Because user group representation can be established conclusively for only the prior-planning stage, this assessment must rest upon incomplete information. Its validity remains open to question accordingly. However, as was argued in the preceding, prior-planning representation remains a critical factor. Bargaining at this stage will influence not only regulatory outcomes but also the structure of future bargaining within the public hearings process. Given this, identification of prior-planning participants can indicate the expected structure of the hearings process and, as such, can suggest the nature of expected regulatory outcomes.

The primary actors in the prior-planning process were established to include the Provincial planning agencies, the new user, and the two agency representatives of existing user interests. None of these actors have a strong incentive to avoid constraining direct user group involvement in the

public hearings stage. A comprehensive public hearings process that directly influences regulatory outcomes will lessen the arbitrary control these actors have over those outcomes. It remains in the interests of all the central prior-planning participants to confine the public hearings to issues they deem relevant or to restrict the influence of the hearings process.

In the case of the representative agencies, this incentive would cease to apply if they saw themselves at a relative disadvantage in the prior-planning process. It would then be in their interest to ensure that the involvement of at least those user groups they represent was not constrained. However, the prior-planning involvement of both Fisheries and Environment Canada does not place either agency at a relative disadvantage. As such, this countervailing incentive does not appear relevant at present.

Given the common incentive to constrain the hearings process, this can be expected to occur. It is likely that the role of hearings will be defined to protect the prior-planning participant's discretion over regulatory outcomes. The hearings will likely consider the limitations upon new resource use rights required for exploration to proceed and not the lifting of the exploratory moratorium itself. Furthermore, though the hearings will provide a forum where user group concerns can be aired, it is unlikely that these concerns will automatically be accepted as legitimate. Provincial planning agencies will maintain their discretionary control over the definition of which concerns are considered relevant and only those so deemed will influence regulatory outcomes. Finally, given the distinct levels of indirect representation in prior-planning, the hearings can be expected to address the issues of concern to various user groups with various degrees of adequacy. Fisheries interests will be most adequately

dealt with and passive user interests will be addressed, though not sufficiently enough to meet the demands of some user groups.²¹ Other existing user interests, including those of the Native Indian users, will be even less adequately addressed.

The logic behind these predictions of public hearings structure can also be extended to indicate the nature of regulatory outcomes expected from the planning process as a whole. As in the public hearings case the character of user group involvement indicates where use right limitations can be expected to occur. The issue of damage information availability adds further insights to this assessment and the nature of that information itself suggests the form those use right limitations can be expected to take.

In the case of any accidental discharge, only the risk of damage can be established. Therefore, the applicable use right limitations will be constrained to two types; preventive and compensatory regulations. Preventive regulations, such as equipment or operating requirements, will be designed to lower the risk of accident, while compensatory regulations may serve both to increase precautions against accidents and to ensure that total damage costs are not shifted to other resource users. Where discharges are intentional or damages result from routine operating procedures, then use rights limitations can also include prohibitory regulations. Prohibitory regulations include outright prohibition of certain activities and the limitation of activities to specified levels, as in effluent dilution standards. Because both accidents and routine procedures can result in damages during offshore exploration²² the range of these use right limitation types can be expected from the planning process.

What user group interests these limitations will best serve can be predicted from the character of user involvement in the planning process. Initially, it is clear that new use rights will be limited to protect the fisheries resource. The level of both direct and indirect fisheries representation in prior-planning attests to this fact. However, it is likely that the degree to which new use rights are limited will be considerably less than that sought by fisheries groups. The groups themselves lack the bargaining power afforded the new user through both prior-planning involvement and information access. This bargaining power is counter-balanced by that of Federal Fisheries, but, assuming that the perception of fisheries groups is correct, the agency can be expected to settle for a lower level of resource protective limitations than would the user groups themselves. Similarly, use rights will be limited to protect those resources of concern to passive users through the prior-planning influence of Environment Canada. Again, the extent of these limits can be expected to be less stringent than that sought by the user groups.²³

In the case of both passive and fisheries users regulatory limitations designed to protect their use can initially be expected to reflect the transaction cost levels faced by these groups only to the extent that these costs are adequately represented through indirect involvement. Given inadequate representation, the full extent of these costs will not be expressed in regulatory bargaining. Bargaining outcomes can be expected to reflect a lower transaction cost level than is actual and new use rights will initially be less limited than is required for efficient outcomes in future bargaining. These use right limitations may be altered to better reflect actual transaction cost levels through direct involvement in the public hearings process. However, given that the influence of that process

upon regulatory outcomes will be constrained, use right limitations can be expected to remain inadequate.

The discrepancy between actual transaction cost levels and those reflected by regulatory limitations can be expected to be even greater where user group involvement is restricted to the public hearings process. Such groups include the Native Indian users, the Sierra Club, the commercial transport users, and the two use types for which no groups were identified; the recreational shell-fish users and recreational boaters. This argument is not intended to imply that the resources of concern to these users will remain unprotected by regulatory limitations. Regulations established in the interest of fisheries and passive user groups will extend some protection to the resources used by each of these other groups. Furthermore, it is likely that the interests of recreational boaters and commercial transport users will be protected to some degree through MOT regulation of transport corridors. However, resource protection is not the primary issue here. The issue is, rather, the manner in which use right limitations established through the present regulatory bargaining process will facilitate future bargaining over internalization of external impacts. The use right limitations expected will place these three user groups at a disadvantage in future bargaining relative both to fisheries and passive user groups and to the new user.

In conclusion, the bargaining outcomes predicted from analysis of the prior-planning process are two-fold. First, the influence of the public hearings process upon regulatory outcomes can be expected to be minimized, and the hearings can be expected to fail to adequately address some user group interests. Second, use right limitations will not adequately reflect the transaction cost levels faced by any of the existing user groups.

Regulatory limitations will more closely approximate the cost levels of fisheries and passive user groups than those of other existing users, but will remain inadequate in these cases as well. Over all, the use right limitations established through bargaining will reflect lower-than-actual transaction costs. New use rights will thus be less limited than is required to achieve efficient outcomes through future bargaining. The range of existing user groups will remain at a comparative disadvantage in future bargaining over externality impacts and future bargaining will thus not achieve efficient internalization. Existing users will continue to bear external costs generated by offshore exploration and resource allocation will remain inefficient.

This prediction of outcomes appears to rest upon two central features of the offshore planning process. The first of these is the nature of existing damage information. Incomplete damage information generates bargaining over the extent of damages. The unequal availability of such information generates comparative advantages in the bargaining process. This works to the benefit of the new user in this case who, given his corporate status, can more easily bear the costs of information gathering. In regard to existing user groups, only their indirect representatives possess a similar advantage. The value of this to the groups themselves is constrained by the factor of representative inadequacy.

In order to rectify this situation, some means must be found to either generate complete information or provide equal information accessibility to all bargaining process participants. Given the nature of the externality problems at hand, the latter approach appears more feasible. One solution would be to simply ensure that information available to one was made available to all. Another possibility would be to subsidize the gathering

of information by user groups. Neither approach would terminate bargaining over the extent of damages, but both would reduce the disparity between actors within that bargaining process.

No adjustment of information availability will, however, suffice if some users retain greater access to the bargaining process. This characteristic of the offshore planning process appears directly tied to the level of planning agency discretion evident within that process. This planning agency discretion is, in fact, the key feature in predicting process outcomes. Discretionary control allows planning agencies to select process participants and to set their level of involvement in both the prior planning and public hearings stage. As such, planning agencies appear to have constrained process participation to a chosen cadre of constituent groups whose concerns are seen to be relevant to the issue at hand as defined by planning agencies. As the bargaining process itself is a selective one, so the bargaining outcomes will be selective. Accordingly, they will fail to meet the needs of the range of user groups.

The logic of this analysis would suggest that significant constraint of planning agency discretion is required to achieve the preferred outcome. The planning process must be restructured to require comprehensive, adequate user group representation, to allow user groups the discretion to enter, define their level of involvement in and exit the process, and to offset prohibitive transaction costs. Planning agencies should be required to determine the range of user groups that will be affected by any new resource use and to consult with each. User groups must be involved in the definition of relevant concerns as well as in the establishment of limitations upon new resource use rights. Finally, the planning process that is structured to achieve these ends must not rely upon planning agency

discretion for application. Rather, it must automatically apply in any instance where new resource use rights are generated, the resource is subjected to multiple-use, and the new use is expected to generate externality costs for existing user groups.

CONCLUSION

This thesis has considered the formulation of new resource use rights within a multiple use case where the new use can be expected to generate externality costs for existing users. Use right formulation has been conceptualized as a bargaining process and the preferred outcome of that process has been posited to be a set of limited use rights that reflect the range of transaction costs faced by resource users. These use rights are those that will, in turn, facilitate the efficient internalization of externality impacts through future bargaining. Further to this, the thesis has argued that the formative process must be structured in a particular manner to achieve these limited use rights. A set of requisite structural characteristics were developed from consideration of both externality and transaction cost problems and of the nature of the use right formation process itself. The process was said to be a representational one, wherein resource users, some (or all) of which faced significant transaction costs, bargained through a government intermediary to establish new, regulated resource use rights. For this process to achieve those use rights necessary for future efficient internalization it required the following structural characteristics: (1) all affected user groups must be represented in the bargaining process and representatives must express user interests, (2) affected user groups must have the discretion to enter, to set the level of their involvement in, and to exit the bargaining process and none may face excessively prohibitive transaction costs and (3) damages must be known and known to all equally.

Having established these structural criteria, the thesis then applied them to the case of planning for offshore oil development in British Columbia. Expected externalities from such development were discussed in depth to determine the existing users that would face external impacts. The offshore planning process was then considered to identify the role of those affected users in use right formulation, the influence of transaction costs, and the availability of damage information. This chapter has concluded that the case meets none of the regulatory bargaining criteria. User group representation remains noncomprehensive and inadequate. User group involvement does not reflect user group discretion and excessive transaction costs may not be adequately offset. Finally, damage information remains incomplete and not equally available. These conclusions were reached on the basis of information regarding what was termed "prior-planning" involvement. The second stage in the planning process, the public hearings stage, remains as yet indeterminate. However, some judgements could still be made about the expected nature of future public hearings. Given the extent of planning agency discretion over the hearings process, the hearings can be expected to fail to meet the user group discretion or excessive transaction cost criteria. Also, given the nature of existing damage information, the hearings will not meet the information criteria either. Damages will remain a bargaining issue and information access will generate a comparative advantage in the hearings process as well.

In the final stage of this analysis, the failure of the planning case to meet each of the regulatory criteria provided a basis from which predictions of the character of regulatory outcomes were made. It was argued that new limited use rights resulting from the offshore planning process would fail to reflect the range of transaction costs. Furthermore,

these use rights will err on the side of leniency to the new user. The new use will be insufficiently limited to facilitate the efficient internalization of external effects in future bargaining. Existing users will bear externality costs from offshore activities and resource allocation will be inefficient. Two offshore planning process characteristics were identified as particularly relevant to the predicted outcomes. These included the nature of existing damage information and the level of planning agency discretion evident in the planning process. The latter of these was held to be especially significant as it underlies the dysfunctional structure of the present process. In concluding, the analysis proposed that the planning process be restructured to provide equal access to information and to limit planning agency discretion to achieve a process that better approximated the regulatory bargaining criteria.

The thesis has accomplished the task originally set out. It has developed a regulatory bargaining model and has applied this model to an appropriate case. In so doing, it has served to initiate discussion of the process of regulatory formation and has generated a means by which to structure that discussion. Finally, the conclusions of this analysis provide a number of implications about the nature of bargaining to establish use rights within the political arena. It is hoped that these implications and the concluding attempt to provide requisites of process change will encourage further discussion of the regulatory formation process.

Chapter 6 Notes

1. The six categories included (1) commercial fin-fish, (2) commercial shellfish, (3) sportfish, (4) commercial marine transport, (5) passive consumer and (6) resident native Indian. See: Chapter Five.
2. See Interview Schedule, Appendix II.
3. The interviewed fin-fish groups contacted by Environment were the Pacific Coast Fishing Vessel Owners Guild and the Prince Rupert Fishermen's Co-operative. The fin-fish group represented on the Technical Conference Planning Committee was the Fisheries Association of B.C.
4. Mr. M. Rankin.
5. As was noted in Chapter Five, the Federal fisheries mandate will remain unaffected by settlement of the offshore jurisdiction issue. See: Canada, Fisheries Act.
6. The Sierra Club indicated no government agency representative.
7. The Native Indian Brotherhood denied involvement but was listed as a contact on the Marine Resources Branch Letter list. See: List, Appendix IV.
8. The interview response of MOT officials was that any offshore development would have to meet transportation regulations.
9. These groups were the Prince Rupert Fisheries Exchange and the Federation of B.C. Naturalists.
10. See the discussion of hearings' format change, Chapter Five.
11. The hearings may, in fact, be held jointly by the Federal government and the Province.
12. This latter possibility has been expressed as a concern of the Sierra Club and of the United Fishermen and Allied Workers Union.
13. See: Figure I.
14. See for example: the range of blowout risk estimates, given in Chapter Three, Note 50.
15. See: British Columbia, Ministry of Environment, Assessment and Planning Branch, "Preliminary Environmental Assessment," (Victoria, April 1982, draft).
16. This concern is also raised in A.H.J. Dorsey, "Coastal Zone Management as a Bargaining Process," Westwater Research Center, (Vancouver, 1981).

17. See for example: TransMountain Pipeline Ltd., in the matter of the NEB Act and in the matter of an Application by TransMountain Pipeline Company Ltd. (1980) Volume XVI. "Marine Resources Inventory and Impact Assessment Report, Northern B.C.," Ottawa, 1980.
18. Those who indicated information access included the B.C. Wildlife Federation, the Federation of B.C. Naturalists, the Native Indian Brotherhood, the Fishermen and Allied Workers Union and the Fisheries Association of B.C. Those without access include the Pacific Coast Fishing Vessel Owners Guild, the Prince Rupert Fisheries Exchange, the Northwest Tribal Council and the Island Protection Society.
19. The bargaining advantage will depend also upon the comprehensiveness of damage information. The additional information available to user groups can be expected to be less comprehensive than that available to new users as the impact study commissioned by Chevron is specific to the Queen Charlotte Sound-Hecate Strait area. No similar study presently exists.
20. This conclusion must unfortunately remain speculative at present as the province has yet to announce the public hearings structure.
21. The Sierra Club, for example, will not gain the hearings' planning role they seek.
22. See discussion of offshore effects, Chapter Three.
23. This discrepancy will be especially evident in the case of those passive users who seek resource preservation without compromise.

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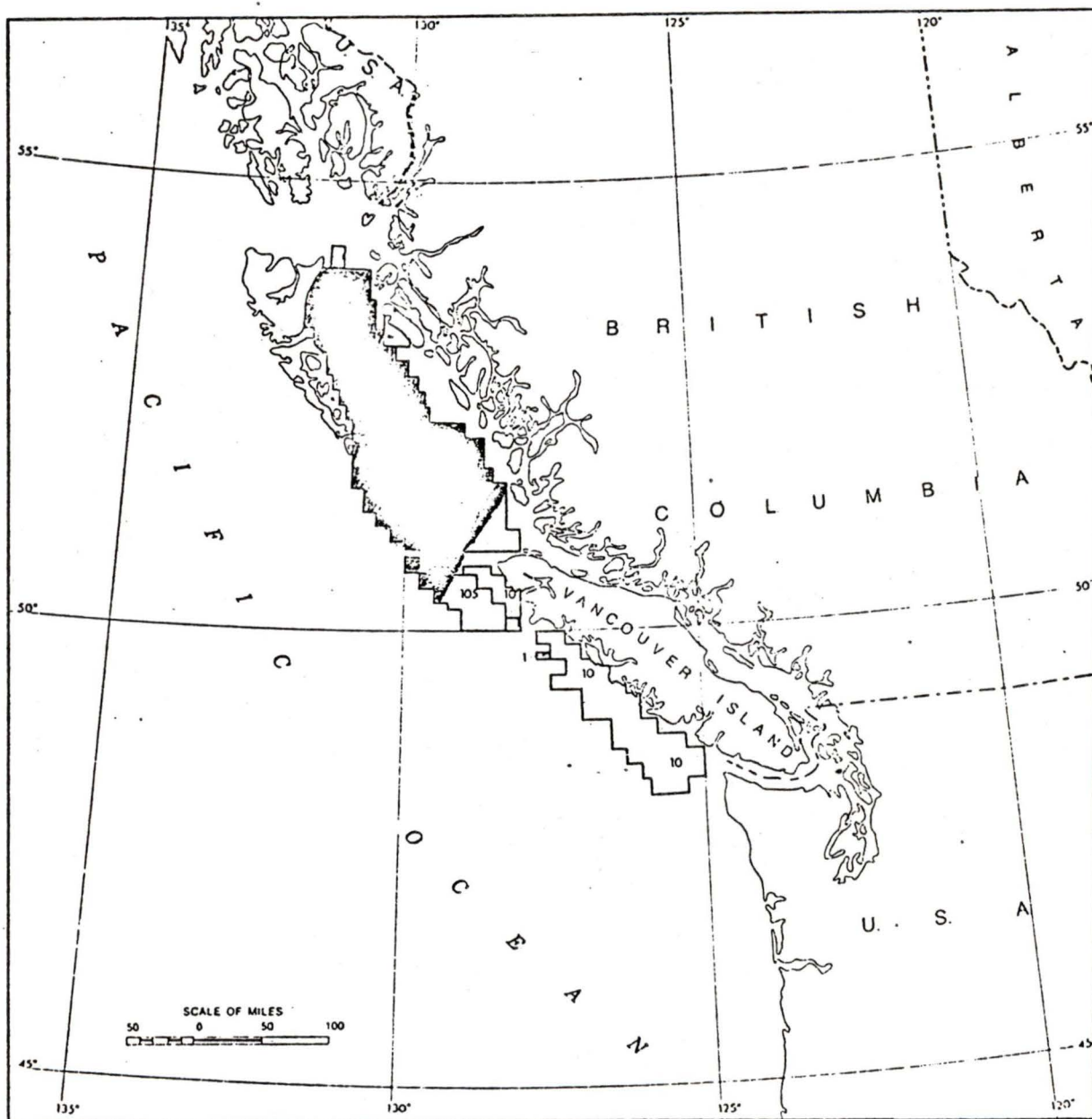
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APPENDIX I MAPS i THROUGH v

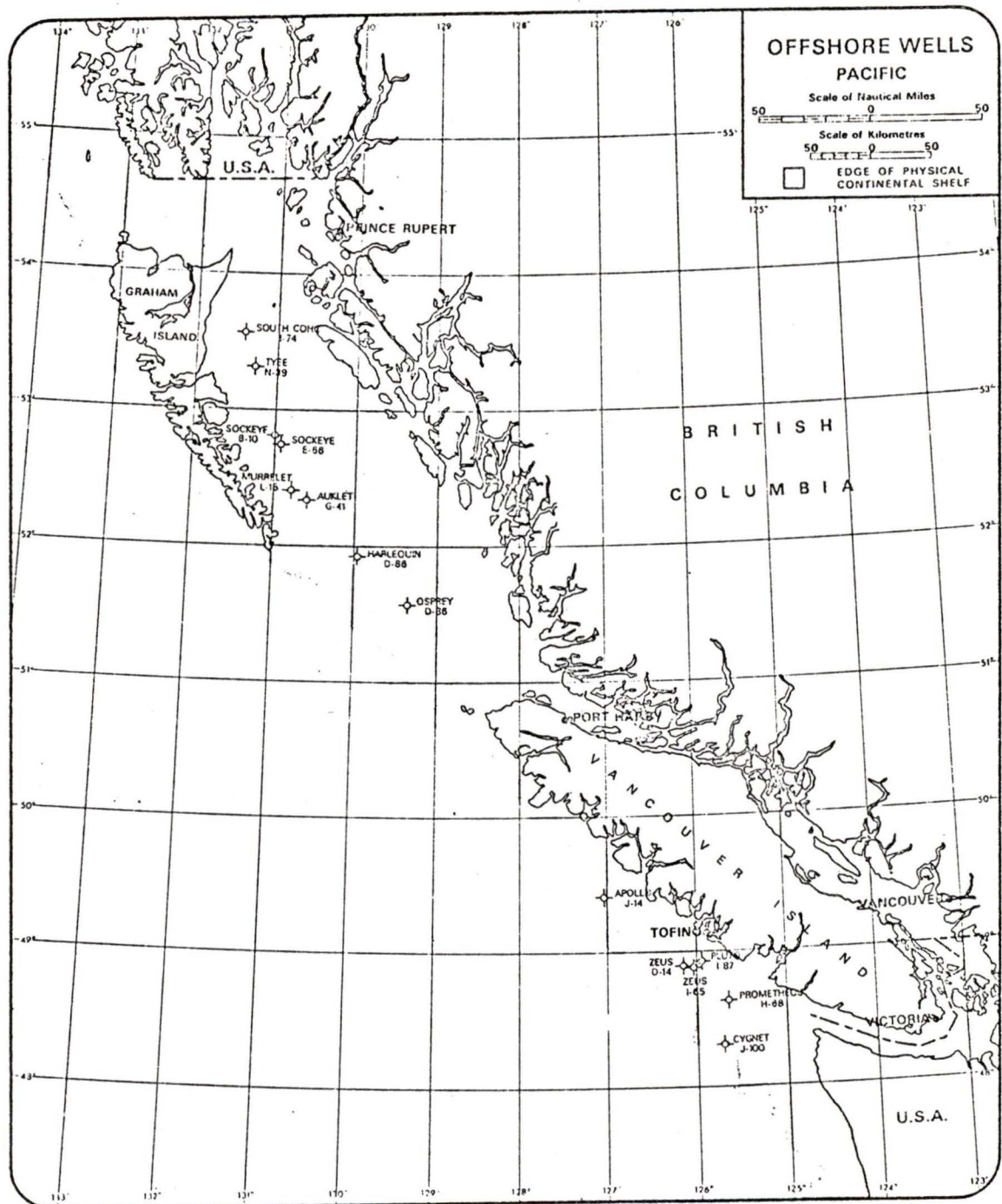
Map i Case Study Area



Shaded area is proposed exploration area.

Source: Canada, Department of Energy, Mines and Resources Resource Management Branch, Offshore Exploration, No. 8, Ottawa, April, 1979. p. 51.

Map ii Location of Pacific Offshore Wells



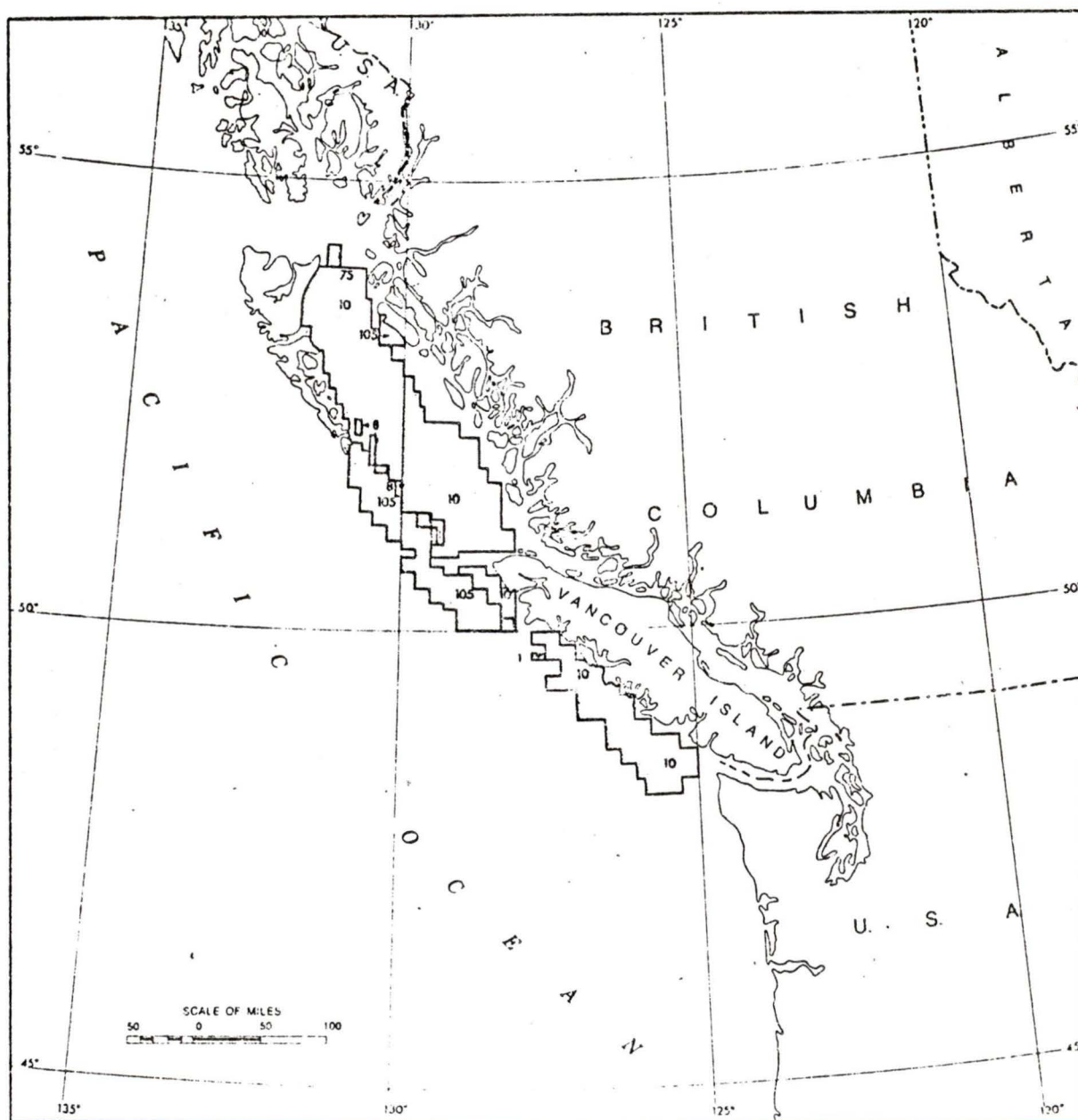
Source: Canada, Department of Energy, Mines and Resources, Resource Management Branch, Offshore Exploration, No. 8, Ottawa, April, 1979. p. 52.

Figure 2. Schedule of Wells Drilled on The West Coast

Well Name	Area	Latitude Longitude	Spud Date Rig Released	RT Elev'n Water Depth	Depth (RT) Well Status
Shell Anglo Prometheus H-68	West of Van- couver Island	48° 37' 19.57" 125° 39' 06.54"	67-06-11 67-08-09	34.4 m 55.2	2 335.m Abandoned
Shell Anglo Pluto I-87	West of Van- couver Island	48° 56' 36.73" 125° 57' 01.30"	67-10-12 67-10-12	32.9 60	3 726.2 Abandoned
Shell Anglo Zeus I-65	West of Van- couver Island	48° 54' 34.25" 126° 09' 09.93"	67-11-07 68-02-05	34.4 98.5	3 042.2 Abandoned
Shell Anglo Zeus D-14	West of Van- couver Island	48° 53' 01.0 " 126° 02' 59.8 "	68-02-24 68-03-31	34.1 79.9	2 433.5 Abandoned
Shell Anglo Tyee N-39	Hecate Strait	53° 18' 54.51" 131° 20" 21.42"	68-04-07 68-05-19	29.3 27.4	3 459.5 Abandoned
Shell Anglo Sockeye B-10	Hecate Strait	52° 49' 08.53" 131° 00' 44.19"	68-05-21 68-07-22	35.4 31.1	4 771.9 Abandoned
Shell Anglo Sockeye E-66	Hecate Strait	52° 45' 24.62" 130° 55' 19.44"	68-07-23 68-08-12	34.7 55.8	2 786.5 Abandoned
Shell Anglo Auklet G-41	Hecate Strait	52° 20' 16.12" 130° 36' 32.77"	68-08-16 68-08-29	34.7 169.5	2 370.4 Abandoned
Shell Anglo Osprey D-36	Queen Charlotte Sound	51° 35' 06.20" 129° 20' 47.65"	68-09-01 68-09-17	34.1 58.5	2 530.4 Abandoned
Shell Anglo Harlequin D-86	Queen Charlotte Sound	51° 55' 03.58" 129° 58' 12.35"	68-09-22 68-11-01	34.1 139.9	3 240.9 Abandoned
Shell Anglo Apollo J-14	West of Van- couver Island	49° 23' 34.60" 127° 02' 04.58"	68-11-23 69-01-23	34.1 141.1	3 094.3 Abandoned
Shell Anglo Cygnet J-100	West of Van- couver Island	48° 19' 42.3 " 125° 43' 03.0"	69-01-26 69-02-20	34.1 147.8	2 459.7 Abandoned
Shell Anglo South Coho I-74	Hecate Strait	53° 33' 32.6 " 131° 25" 48.9"	69-03-12 69-04-05	35.4 21.3	2 780.1 Abandoned
Shell Anglo Murrelet L-15	Hecate Strait	52° 24' 41.3" 130° 47' 38.0"	69-04-13 69-05-05	33.8 110.9	2 919.4 Abandoned

Source: Canada, Department of Energy, Mines and Resources, Resource Management Branch, Offshore Exploration, No. 8, Ottawa, April, 1979. p. 72.

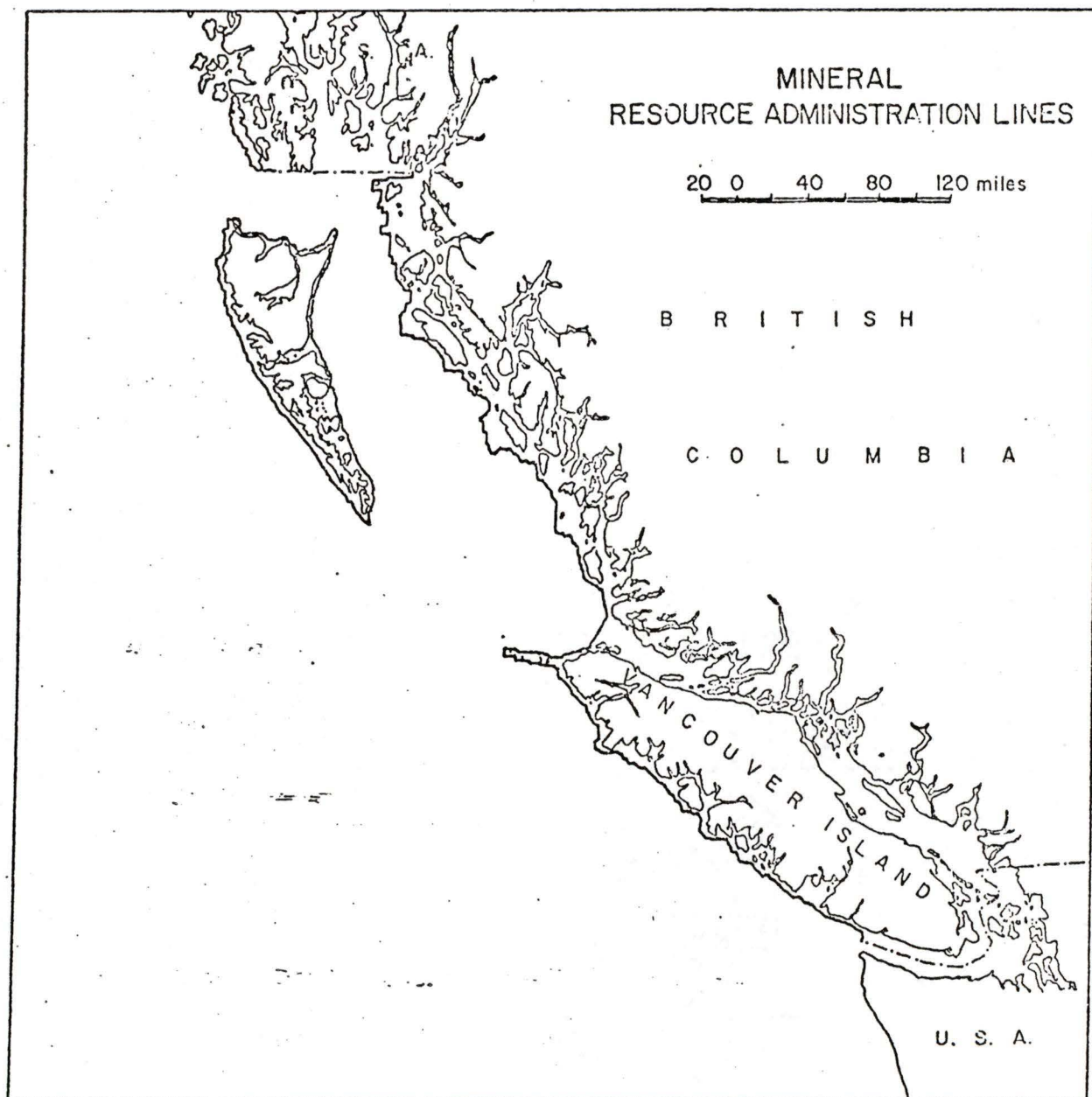
Map iii Federal Exploration Permits on the West Coast



- Key:
- 1. Lochiel Exploration Ltd.
 - 8. Ranger Oil (Canada) Ltd.
 - 10. Shell Canada Resources Ltd.
Shell Explorer Ltd.
 - 75. Union Oil of Canada Ltd.
 - 105. Douglas Smith (Chevron Canada)

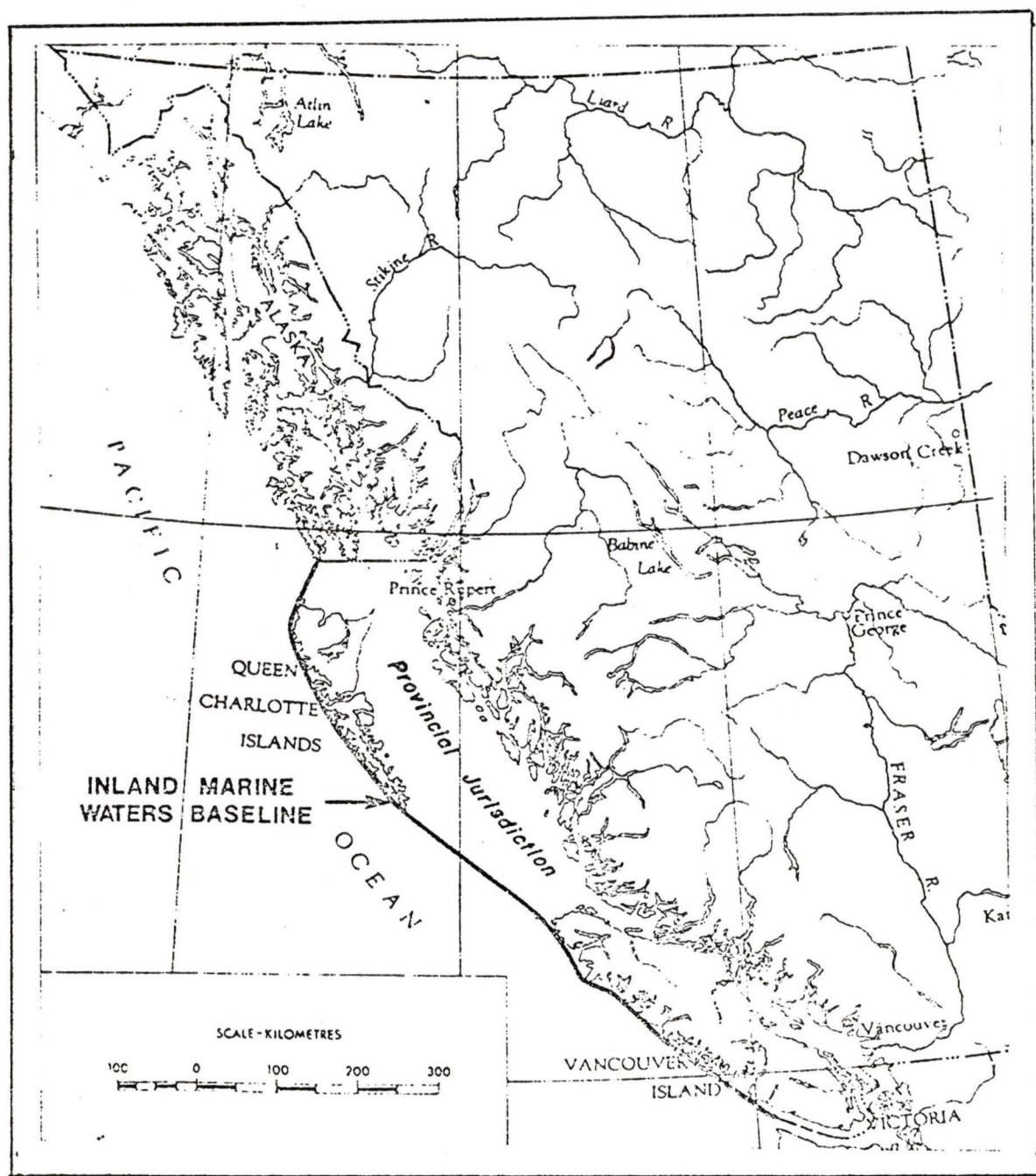
Source: Canada, Department of Energy, Mines & Resources, Resource Management Branch, Offshore Exploration, Vol. 8, Ottawa, April, 1979. p. 51.

Map iv Proposed Mineral Resource Administration Lines



Source: G.A. Nelson, "Offshore Oil and Gas in Canada: West Coast Events, 1949-1980", Westwater Research Center, (Vancouver, 1981, draft). p. 23.

Map v Provincial Jurisdiction Claim



Source: B.C. Ministry of Energy, Mines and Petroleum Resources, Press Release, June 2, 1981.

APPENDIX II INTERVIEW SCHEDULE AND QUESTIONNAIRES

Interview Schedule

Agencies

1. Dr. R. Langford, Assessment and Planning Branch, Ministry of Environment.
2. Dr. P. Finkle, Offshore Petroleum Administration, Ministry of Energy, Mines and Petroleum Resources.
3. Dr. John Wiebe, Director, Pacific and Yukon Regional Office, Environment Canada.*
4. Dr. David Marshall, Federal Environmental Assessment Review Office, Western Region.
5. Dr. John Millan, Environment Protection Service, Environment Canada.
6. Michael Flynn, Habitat Management Division, Fisheries and Oceans Canada.
7. M. Turner and J. Cottingham, Traffic Management Division, Canadian Coast Guard, Ministry of Transport.
8. Dr. J. Cornford, Ocean and Aquatic Management, Fisheries and Oceans Canada.

* Indicates Telephone Interview

Groups:

1. Ernest Cudby, Environment Affairs, Chevron Standard Ltd.*
2. Michael Burgess, Fisheries Association of B.C.
3. Gordon Linguist, Prince Rupert Fisheries Exchange.*
4. R. Shumka, Prince Rupert Fishermen's Co-operative Association.*
5. Arnie Tomlison, Fishermen & Allied Workers Union.
6. E. Wickem, Pacific Coast Fishing Vessel Owners Guild and Abaloni Harvesters Association.*
7. Jim Hume, Underwater Harvesters Association.
8. Peter Woodward, Council of Marine Carriers.*
9. Stephen Bassel, Union of B.C. Indian Chiefs.
10. John Revard, Native Brotherhood of B.C.
11. Frank Parnell, Northwest Tribal Council.*
12. Bob Nixon, Sierra Club.
13. David Anderson, B.C. Wildlife Federation.
14. Val Schaffer, Federation of B.C. Naturalists.
15. Josset Wier, Islands Protection Society.*
16. Murray Rankin, Westcoast Environment Law Association.

* Indicates Telephone Interview

AGENCY QUESTIONNAIRE

1. Is your Ministry involved in the Province's Environmental Assessment of planned offshore oil development in Queen Charlotte Sound and Hecate Strait?

Are you represented on any formal committees (etc.) in this regard?

2. Who have you been in contact with in this regard? Often? On whose initiation?
3. Are you providing information to any Provincial agency? Is any Provincial agency providing information to you?
4. Do you have information that indicates that the _____ could be damaged by offshore development? What are your specific concerns in this regard?

Have you expressed these concerns to any Provincial agency?

5. Will your Ministry participate in the upcoming public hearings? In what capacity?
6. Do you see your agency as representing the interests of _____ in your discussion with Provincial agencies?

If so, have you consulted with these groups re: offshore oil? Exchanged information? Have you actively solicited briefs from them? Have you usually initiated this communication or have they? How important are these discussions for your position in consultations with Provincial agencies?

7. Who are the primary _____ in the Queen Charlotte Sound, Hecate Strait area? Which of these are the three most important?

USER GROUP QUESTIONNAIRE

1. Approximately how many members do you have? Are they largely located in one particular area?
2. How often do you meet?
3. Do you maintain a salaried executive?
4. Is your group a registered society?
5. Do you produce a regular newsletter?
6. Is your group receiving any funding from government? Could you?
7. Do you have information that indicates that the _____ could be harmed by offshore development? What are your specific concerns in this regard?

Have you expressed these concerns to any Provincial group?

8. Who have you been in contact with in this regard? Often? On whose initiation?
9. Are you providing information to any Provincial agency? Is any Provincial agency providing information to you?
10. Is your group involved in the Province's Environmental Assessment of planned offshore oil development?

Are you represented on any formal committees (etc.) in this regard?

11. Will your group participate in the upcoming public hearings?
12. Do you see any government agency as representing the interests of _____ in their discussions with Provincial agencies?

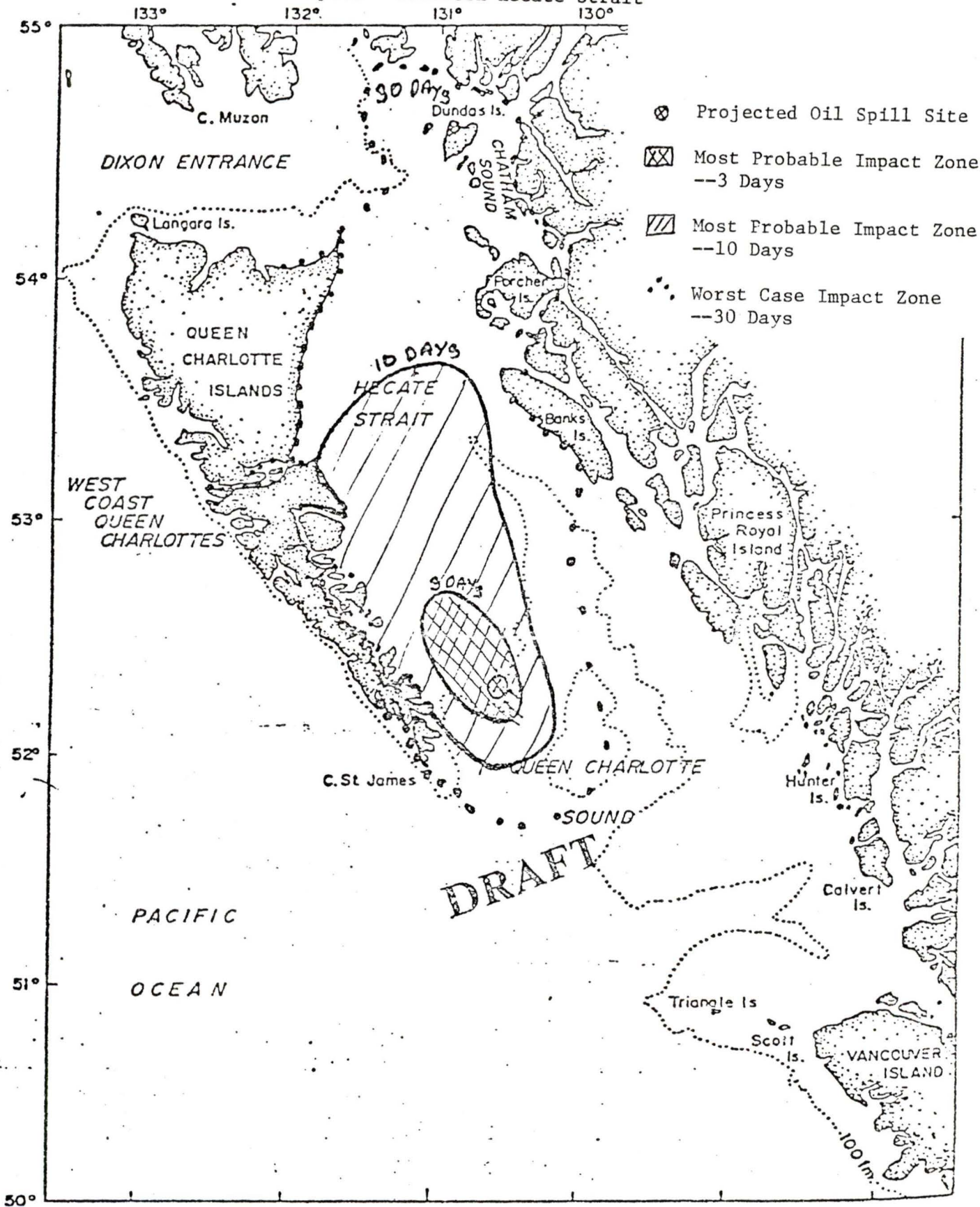
If so, have you consulted with these agencies re: offshore oil? Exchanged information? Have they actively solicited briefs from you? Have you usually initiated this communication or have they? How important do you feel these discussions are for their position in consultations with Provincial agencies?

13. Are the other _____ in the Queen Charlotte Sound, Hecate Strait area? Which of these are the three most important?

APPENDIX III SPILL SIMULATION MAPS

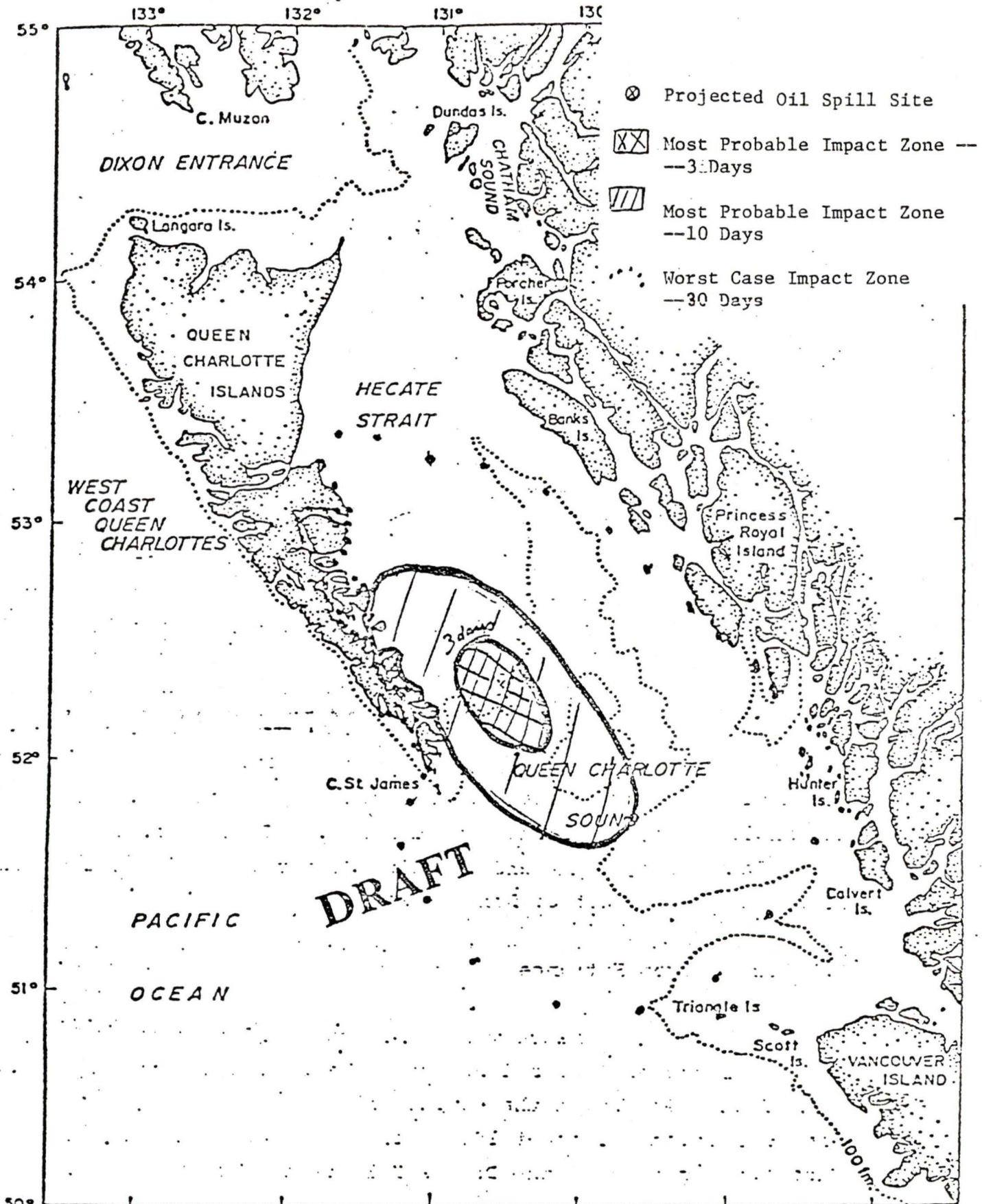
The spill simulation maps attached give a rough approximation of the area that could be affected by a major exploration blowout of 10,000 barrels of oil off southern Moresby Island. The three time periods presented represent stages of decreasing risk due to weathering over time. After three days the spill toxicity will be diminished; after ten the physical impact will be diminished; and after thirty biological impacts will be minimal.

Trajectory Simulation - Potential Winter Blowout or Tanker/Pipeline Spill - Southern Hecate Strait



Source: British Columbia, Ministry of Environment, Initial Environmental Assessment, (Victoria, April, 1982, Draft).

Trajectory Simulation - Potential Summer Blowout or Tanker/Pipeline Spill - Southern Hecate Strait



Source: British Columbia, Ministry of Environment, Initial Environmental Assessment, (Victoria, April, 1982, Draft).

APPENDIX IV MARINE RESOURCES BRANCH LETTER LIST

Marine Resources Letter List

1. Mr. Edwin Neuman, President, Native Brotherhood.
2. Mr. Doug Larden Sr., President, Central Native Fishermens Co-operative.
3. Mr. Louis Souza, Secretary Manager, Fishing Vessel Owners' Association of B.C.
4. Mr. A.E. Wood, Secretary, Prince Rupert Fishing Vessel Owners' Association.
5. Ms. Janet Penland, Secretary Manager, Pacific Gillnetters Association.
6. Mr. Tom Northcott, President, Pacific Trollers Association.
7. Mr. Robert Shumka, Chief Executive Officer, Prince Rupert Fishermens Co-operative Association.
8. Mr. Tony Peterson, President, Pacific Coast Fishing Vessel Owners' Guild.
9. Mr. Ron Gorman, Deep Sea Trawlers Association.
10. Ms. Gina Brillon, Pacific Coast Salmon Seiners Association.

VITA

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A Case Study of the James Bay Delivery System: A Research Design".

National Publications Program (1976).

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June 29, 1982

Date