THE BUREAUCRACY AND THE COASTAL ZONE: CONFLICT RESOLUTION IN OFFSHORE HYDROCARBON DEVELOPMENT IN BRITISH COLUMBIA

by

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ABSTRACT

The importance of the coastal zone, and the need to regulate it effectively, have been the subject of a growing debate in Canada for several years. However, conflicts between competing users in this region continue to become more serious. Typical of these problems on the west coast are the congestion and pollution associated with onshore expansion, particularly along the major coastal estuaries; the gradual depletion of the coastal fishery; and the growing concern over the siting of energy facilities. The prospect of a resumption in offshore petroleum development during this decade threatens to intensify these conflicts still further.

Traditionally, one of the most important actors in the decision making process in the coastal zone has been government itself, particularly the bureaucracy. However, relatively little research has been undertaken on this specific component of government in its relationship to coastal zone management along the west coast. In order to examine this particular institutional dimension more thoroughly, a detailed analysis of a specific case study in offshore petroleum development in British Columbia was undertaken.

The study began with a detailed review of the literature of coastal zone management and, since this topic also involved a specific component of the decision making process within government, a careful review of the literature of administrative behaviour. After this preliminary study, a detailed perusal of both the past and the possible future role of the west coast in offshore hydrocarbon development was undertaken, together with a brief summary of the jurisdictional division of power over natural resource management in Canada.

Interviews were conducted with representatives of each provincial and federal agency that was identified as having a potential significant role to play in any future ofshore drilling program in this region. Many more agencies were identified as having a peripheral involvement; these agencies have been categorized and listed. The results of these interviews provided the necessary information to analyze the pertinent administrative characteristics of each level of government more thoroughly and the results were synthesized further in the conclusion.

The findings of this thesis indicate that a large number of provincial and federal agencies are currently involved in the preliminary planning stages of offshore hydrocarbon development in this region. Although inter-governmental contact at the operational level of the bureaucracy was not as widespread as was initially predicted during the period that this research was being conducted, there was, nevertheless, a clear indication that certain lead agencies have been established to coordinate activities within both levels of government and most public servants agreed that greater inter-governmental cooperation would, inevitably, be required in the future. In addition to these findings, significant variations were found in both the quality and the quantity of expertise within the bureaucracy on matters pertaining to offshore hydrocarbon development and, furthermore, each level of government also displayed important variations in the degree of bureau cooperation and bureau conflict, both within each level of government and between each level of government.

In terms of the future of the coastal zone in Canada, there was a unanimous consensus among all levels of government that no single agency could be dominant in the decision making process, especially in offshore petroleum development and that the "sectoral" approach to regulation would most likely continue. However, it was noted that this form of management has tended traditionally to be an *ex post facto* response to conflict resolution and the possibility of specific institutional adjustments, in the form of a coastal zone commission, was discussed.

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TABLE OF CONTENTS

Chapter

Chapter

LIST OF TABLES

LIST OF FIGURES

Figure

LIST OF PLATES

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CHAPTER I

INTRODUCTION

Canada's coastline, which is conservatively estimated at 131,210 nautical miles (243,000 km) in length, is one of the longest and most diverse of any nation in the world (Canada Year Book, 1980-81). Throughout history, the geography of this littoral margin has played an important role in both the location of settlement and, coterminously, in the concentration of commercial and industrial activity. However, the increasing utilization of offshore resources, evinced by the promulgation of the 200 nm (370 km) Exclusive Economic Zone, strongly suggests that this region is now entering a new era of national importance. Unfortunately, the physical, economic and social interface between land and sea, which has traditionally been used to divide administrative responsibilities, has, instead, resulted in incremental and disjointed planning, all too often characterized by neglect and crisis management.

There are a wide variety of activities that can occur along a nation's coastline. Onshore development invariably includes extensive urbanization, together with its concomitant commercial and industrial activity, such as transportation, construction, thermal cooling and pollution. Conversely, common offshore activities may include national defence, commercial fishing, transportation, seabed mining, recreation, and scientific research. Although the complex interrelationship between many of these activities is of great significance, Ketchum (1972) indicates that not all of these users are in direct conflict. Some activities fall into a "multiple use" category, and are non-conflicting, and others can be relocated to another area. Unfortunately, some conflict to such a high degree that they are relegated to an "exclusive use" category.

In Canada, the task of finding solutions to these growing conflicts in the coastal zone has, increasingly, fallen upon government. The primary reason for this is that no single user, or group of users, has

shown either the ability, or the inclination, to resolve these difficulties themselves. However, there are strong indications that the increasing emphasis upon energy self-sufficiency in Canada, resulting in the acceleration of offshore oil and natural gas development, will pose a unique challenge to coastal zone management in this country . Such development only serves to reinforce the need to examine the conflicting issues in the coastal zone more carefully, particularly the decision making processes and the institutional mechanisms that will be the key to their optimum solution.

Although a variety of participants could play an important role in the possible future development of offshore oil and gas along Canada's west coast, a vital component of the decision making process will be the government itself, particularly the bureaucracy. In recent years, geographers have contributed a respectable body of literature to this field through their involvement in resource management. The purpose of this thesis, therefore, is to identify the most significant government agencies that could be involved in the possible future development of offshore oil and gas on Canada's west coast and to examine several of their administrative characteristics. These include: a detailed synopsis of each agency's current involvement in offshore petroleum development; an assessment of their overall technical expertise relative to one another; an identification of the degree of cooperation and, where possible, the degree of conflict, within and between each of these agencies; and, finally, a summary of the perspectives of the bureaucracy towards possible future administrative options to offshore oil and gas development along the west coast, as well as the possible future direction of coastal zone management in general.

THE CONCEPT OF COASTAL ZONE MANAGEMENT

Coastal zone management is an administrative regime, which recognizes the unique physical, economic and social interface between land, sea and air. This regime ideally implies a holistic approach to resource management along the coastline. However, its practical limitations can best be understood by alluding to some of the characteristics that such a concept entails.

Common property resources. Perhaps the most intractable characteristic inherent in regulating any activity along the coastline is that this region is not simply the interface between land, sea and air, but, in addition, it is the interface of private property and common property resources. Unlike private property resources, which can be apportioned by unrestrained competition, common property resources, such as air, water, or a fishery, are so vast that they cannot be possessed by any single person, although they can be used—and abused—by everybody, to varying degrees. Unrestrained access to such a resource can, ultimately, lead to its depletion and what Hardin (1973) has termed "the tragedy of the commons." A second problem is the failure of those who pollute such a resource to internalize these disbenefits into their own costs. This difficulty arises not from removing something of value from such a resource pool, but from injecting something of negative value into it. Finally, economic inefficiency tends to result from the use of common property resources. For example, competing users often over-capitalize in the provision of public goods, thereby foreclosing the opportunity of allocating some of these resources to other users of greater marginal value (Ducsik, 1974). The common property nature of the coastal zone does, therefore, pose a serious challenge, but it is by no means the only one.

Definition. Defining the dimensions of the coastal zone is essential if it is to be regulated successfully. Unfortunately, this task has proven to be exceedingly difficult. Ketchum (1972) describes the coastal zone as "a band of dry land and adjacent ocean space (water and submerged land) in which land ecology and use directly affect ocean

space and vice versa" (p. 4). However, the precise limits of the landward and seaward extent of this band are difficult to define. In Canada's case, Johnston (1975) has suggested that the seaward extent should be out as far as the limits of Canadian jurisdiction and as far inland as considered "Practical and desirable for preliminary coastal zone management studies" (p. 151). There is, consequently, a wide discrepancy between various authorities as to the appropriate delimitations of the coastal zone. This problem stems from the high degree of interdependence of events that occur on land, and activities that occur far out to sea. Anadromous fish stocks are a typical example. Salmon range over a vast expanse of the Pacific Ocean, but, invariably, journey many miles upriver to spawn. Conversely, aquatic or atmospheric pollutants may originate hundreds of miles inland, but can easily be transported thousands of miles out into the world's oceans. The complex interface between land, sea and air does, therefore, pose serious management problems due to the difficulty of accurately determining the appropriate limits of this zone.

Focus. Another such difficulty is in determining the appropriate focus for coastal zone management. It has been suggested that such a focus could be either laissez-faire, regulatory, or corporate in nature, depending on the degree of government involvement (Johnson, 1976). Unfortunately, the laissez-faire approach to coastal zone management has proved traditionally to be highly unsatisfactory and the regulatory approach has now been widely adopted. Harrison (1980) notes, however, that the United States has focussed its regulatory efforts almost exclusively upon defining the coastal zone in legal terms, by promulgating land use controls and permit systems. Conversely, Canada has tended to focus upon specific issues, such as recreation, non-resident land use, and estuary conflicts. However, the establishment of a crown corporation to participate in offshore oil and natural gas development in Canada, suggests that the corporate approach to coastal zone management has already begun to emerge in certain activities.

Fragmentation. Institutional fragmentation is endemic among the wide variety of regulatory agencies that participate in the management

of the coastal zone. In 1972, the Bedford Institute held a symposium on coastal zone management and emphasized the serious jurisdictional conflicts between the different levels of government within Canada, as well as the fragmentation of agencies within each level of government (Government of Canada, 1972). Furthermore, Johnston (1975) has noted the paucity of information on the coastal zone, in addition to the inequities in its distribution—particularly as a result of the traditional focus of the federal government on offshore resources and the provincial governments on onshore matters. Johnston has characterized this issue as a "metaproblem" and, to dramatize its uniqueness, has suggested that more effective horizontal communication of all levels of government would be more effective than the creation of new government agencies, which would only compound the "saturation psychosis" that already exists. However, other issues still remain. Johnson (1976) and Johnston (1976) cite prevarications over the degree of public involvement in coastal zone management, questions over the efficacy of the current environmental assessment methods, and the uncertainty over a possible expansion of the 200 nm Exclusive Economic Zone as examples.

COASTAL ZONE MANAGEMENT IN THE REGIONAL CONTEXT: BRITISH COLUMBIA

Approximately 75% of British Columbia's population lives within close proximity to the coast (Alley, 1977). Extensive urbanization and industrialization onshore, as well as a growing concentration of activities offshore, have stimulated a variety of coastal conflicts in this region—particularly in the Strait of Georgia. However, English (Government of Canada, 1972) notes that such conflicts are nothing new: "For decades, logging has threatened salmon spawning streams, wood waste from booms and mills has smothered oysters and clams, and fishing boats and ferries have caused each other damage and inconvenience" (p. 35). The new factor appears to be the increasing scale at which these conflicts are taking place.

During the 1960s, for example, there was a strong emphasis upon alleviating conflicts in Canada's river basins. The Fraser River attracted considerable attention in British Columbia and Sewell (1965) advocated "the need for long-range, comprehensive planning of the development of British Columbia's water resources" (p. 153). However, as in other densely populated coastal areas of Canada, the 1970s witnessed a continuation of these types of problems onshore, together with the emergence of other, equally intractable problems offshore. Today, the focus upon estuary management exclusively along the Fraser River has been eclipsed by similar problems in smaller estuaries along the coast, such as the Cowichan valley (Cartwright, 1978) and Ladysmith (Alley, 1981). In addition, fishery conflicts have also become more acute at both the local, the national and the international levels (Pearse, 1981). However, substantially larger and more controversial issues have also emerged in the field of energy policy.

The siting of energy facilities along the west coast began on a large scale with the construction of the Roberts Bank superport during the late 1960s. Thomson (1972) suggested that this might well be regarded as "one of the most significant events in the history of British Columbia" (p. 1). Although this coal terminal received wide support from the business community, it received vehement criticism from local residents and environmental groups. However, approximately ten years later, another proposed terminal along the British Columbia coast, at Kitimat, also received heavy criticism. This time, the enquiry did not even complete its study before recommending that plans to build a multi-million dollar oil port be dropped (Thomson, 1978).

Nevertheless, these events are relatively minor by comparison to the possibility of offshore oil and natural gas development along the west coast. Experience in other parts of the world has indicated that offshore developement has a significant impact onshore as well as offshore and, without careful planning, the effects can be very disruptive. Such development poses the most serious challenge to coastal zone management in British Columbia to date and it is doubtful that the current ad hoc

approach to coastal zone policy in this region will be capable of equitably resolving the types of conflicts that are likely to ensue if such development occurs. Mr. Henderson, Director of Chevron Canada Ltd., noted last year that exploration drilling could commence as early as 1983, if the environmental moratorium is lifted (House of Commons Committee, Issue #39, March 24, 1981).

RATIONALE FOR THIS STUDY

Although technology can alleviate many of the pressures in the coastal zone, there is no 'technological fix' that will resolve all of the myriad conflicts that have begun to emerge. It is essentially a dilemma of human systems. The large number of competing users in the region has resulted in a proliferation of institutions to manage each of their putative interests, making institutional conflicts inevitable. The optimum solution lies in a continuation of technological research, combined with the search for more appropriate mechanisms that can alleviate these competing institutional pressures, both equitably and efficiently.

Some of these pressures have already been documented above. However, in summary, a variety of coastal conflicts are apparent along the west coast. They include the congestion and pollution associated with commercial and industrial expansion onshore, particularly as it affects the major coastal estuaries; the gradual depletion of the coastal fishery, primarily as a result of the many competing users, such as commercial, recreational and native Indian fishermen—both at the national and the international levels; and the growing concerns over the siting of energy facilities, which have emerged with increasing frequency over the past decade. Moreover, these interrelated pressures are further compounded by other difficulties, such as international maritime boundary disputes with the United States and uncertainties concerning the expansion of national sovereignty over the resources of the sea as witnessed by the promulgation of the 200 nm Exclusive Economic Zone.*

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*The implications of the 200 nm Exclusive Economic Zone, particularly as it applies to seabed mining, will be discussed further in chap. 3.

From time to time there has been a genuine interest in establishing a more comprehensive approach to the resolution of coastal conflicts in British Columbia. In 1975, for instance, there was an attempt to establish a coastal zone management commission in the region (Alley, 1978). Unfortunately, the concept received little support and the idea was subsequently dropped from the public agenda. Later, a coastal zone symposium in Victoria, in 1978, indicated that there was still a relative disinterest in this concept (Canadian Council of Resources and Environmental Ministers [CCREM], 1978). However, the growing awareness of a possible resumption of offshore oil and natural gas drilling along Canada's west coast, possibly as early as 1983, is attracting growing attention from proponents, who see it as contributing massive economic benefits to the province, and by opponents, who envisage uncertain environmental repercussions. Considerable pressure will soon be applied to governments at all levels, in this environmentally sensitive region, to adopt a regime which will reflect the desires and aspirations of all its residents.

It is clear, therefore, that decision making in the coastal zone will become more complex, as more actors begin to participate. Private corporations, public corporations, government agencies, public interest groups and individual actors at local, national and international levels could all play a vital role in determining the future course of events in this region. However, one of the most important components of the decision making process will inevitably be government itself. Specifically, Pross (in Dwivedi, ed., 1980) notes that it has been the bureaucracy—at both the provincial and the federal levels—that has been most cognizant of the increasing conflicts in the coastal zone in Canada, and it is largely through its interest (or "withinput") that the concept of a holistic management approach has been perpetuated.

Although much literature has been published on coastal zone management in Canada, little detailed research has been performed on the federal and provincial agencies that are involved. Some research into these agencies has been conducted on the east coast, but little has been done on the west coast (Johnston, 1975). Moreover, the agencies examined

in this study were selected specifically with regard to their relevance to offshore oil and natural gas development, a subject that has, thus far, received scant attention on the west coast. It is anticipated, therefore, that in identifying the most significant regulatory agencies that could be involved, and in examining some of their contemporary administrative characteristics, a more comprehensive perspective of the bureaucracy will be obtained.

RESEARCH DESIGN

A wide variety of federal and provincial government agencies could be involved in the possible future development of offshore oil and gas on Canada's west coast. In order to identify agencies involved and to examine some of their contemporary administrative characteristics, it was first necessary to categorize each of the relevant agencies. Categories could have been delineated geographically, such as by differentiating between activities that occur on-site, from site-to-shore, and onshore; by functional specialization; or by some other means. Functional specialization was adopted, because it permitted the use of a much more comprehensive means of classifying a large number of agencies. A separate taxonomy was developed for the provincial government and the federal government respectively.

The categories developed were: On-Site Regulation; Environmental Protection; Infrastructure; Emergency Response; Economic Development; Scientific Research; and Manpower. Each of the relevant provincial and federal government agencies were listed separately in the appropriate category. In certain cases, an agency appeared in two categories, but it usually played a major role in only one. Unfortunately, the number of agencies involved precluded a detailed examination of every agency listed. Therefore, after identifying each agency that could play a role in the future development of offshore hydrocarbons along the west coast, the most significant agencies were then identified and examined in greater detail.

Although each of the categories was considered to be important,

it was felt that those agencies in the On-Site Regulation, Environmental Protection, Infrastructure, and Emergency Response categories were the most important, particularly during the initial stages of offshore development in an environmentally sensitive region such as the west coast. Consequently, the most significant agencies in each of the first four categories were selected for detailed examination. In the provincial government of British Columbia, these agencies include the Ministry of Energy, Mines and Petroleum Resources; the Ministry of Environment; the Ministry of Transportation and Highways; and, finally, the Provincial Emergency Programme (a component of the Ministry of Environment). Federal agencies examined were: the Department of Energy, Mines and Resources; the Department of Environment and the Department of Fisheries and Oceans; the National Energy Board; and, finally, the Canadian Coast Guard.*

Having identified these agencies, several important administrative characteristics were addressed. They included: the extent to which each of the relevant branches within these agencies were currently involved in preliminary offshore petroleum development; the degree of technical expertise within each of these branches, both in terms of its quality and quantity; and the extent to which these branches coordinated their activities within and between each level of government. Areas of conflict and potential conflict have been indicated. As a corollary, the conclusion contains a summary of the bureaucracy's perspectives of possible future administrative options for offshore petroleum development on the west coast, as well as their perceptions of the future of coastal zone management in general.

Although some information on the bureaucracy is available in government reports and in private sources that specialize in government matters, the bulk of this research was undertaken through interviews with carefully selected representatives of the provincial and the federal bureaucracies at the operational level. A questionnaire was used to standardize each interview (see Appendix A).

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*The rationale for selecting these particular agencies is discussed in more detail later in the text, as are the categories of functional specialization.

The questionnaire sample was derived from a careful perusal of the various branches within each of those provincial and federal agencies that were selected for detailed examination. Each branch which was currently playing an active role, or could be expected to play an active role in offshore petroleum development, was included in the sample. Within the provincial government this included the Ministry of Energy, Mines and Petroleum Resources (4); the Ministry of Environment (9); the Ministry of Transportation and Highways (3); and the Provincial Emergency Programme (1). Within the federal government, this included the Department of Energy, Mines and Resources (4); the Department of Environment (3); the Department of Fisheries and Oceans (3); the National Energy Board (1); and the Department of Transport (1).*

Although the size of the federal bureaucracy prohibited as detailed a study as that conducted within the provincial government, this was partially compensated for by supplementing the interviews in Ottawa with interviews with several of the federal government's regional offices in Vancouver and Victoria.** Consequently, there was a total of 34 interviews: 17 with the provincial government and 17 with the federal government, providing both a regional and a national focus.

A SYNOPSIS OF THE CHAPTERS TO FOLLOW

Chapter two consists of a theoretical overview of bureaucracy in general. It explores the characteristics of public administration, with particular emphasis on bureau territoriality, inter-agency conflict and the methods by which co-operation can be achieved. Several models of bureaucratic decision making are also examined. Chapter three is a broad assessment of the past and possible future role of the west coast in offshore mineral development. The mineral potential of the west

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*Each of these branches is listed in the detailed discussion in Chapters five and six, respectively.

**Interviews were conducted in person, except for those in Ottawa and the interview with the provincial Ministry of Environment's Skeena regional office, which were conducted by telephone.

coast is briefly discussed; the various events in offshore oil and natural gas development that have transpired in this region since the late 1950s are documented; and a general description of the various activities associated with this type of undertaking are highlighted. The following section, Chapter four, discusses the legislative framework for resource management in Canada. This discussion concerns the constitutional parameters of natural resource management in general, with an emphasis upon offshore minerals in particular. The Supreme Court's ruling on offshore mineral ownership is examined in this chapter. Chapters five and six examine the perspectives of the provincial and federal bureaucracies, respectively. The agencies selected for detailed examination are discussed with reference to the parameters previously documented. Chapter seven is the conclusion. It summarizes the characteristics of the bureaucracy at both levels of government as they apply to offshore oil and natural gas development. It also examines the implications of these characteristics for possible future offshore hydrocarbon activities, as well as coastal zone management in general.

CHAPTER 2

THE BUREAUCRACY: A CONCEPT OF ITS ROLE, ITS STRUCTURE AND THE BEHAVIOUR OF ITS MEMBERS

The growth of bureaucracy, both public and private, is widely recognized as one of the major social trends of our time. As Downs (1966) notes: "bureaus are among the most important institutions in every part of the world. Not only do they provide employment for a very significant fraction of the world's population, but they also make critical decisions that shape the economic, educational, political, social, moral and even religious lives of nearly everyone on earth" (p. 1). Similarly, bureaucracy is expected to play an increasingly important role in the decision making process regarding Canada's coastal zone. However, since the literature on this subject is so vast, only its most salient features will be examined here. They include a clarification of the definition of bureaucracy, including its historical evolution, as well as some of the models that attempt to explain the behaviour of its participants, particularly with regard to bureau territoriality and conflict.

BUREAUCRACY DEFINED

An organization is defined as any form of human association that is composed of two or more persons and is established for a common purpose (Mooney and Reiley, 1939). Bierstedt (1950) indicates that every human association is characterized by a distribution of power, and Swingle (1976) posits that where such power is widely recognized, it can be thought of as authority. Virtually every form of human association that progresses beyond an elementary stage of social interaction displays these characteristics and as these organizations become progressively larger and more sophisticated, the social phenomenon of bureaucracy begins to emerge.

In the language of the eighteenth century, the word "bureau"—as

well as signifying a writing table—already meant a place where officials worked; the suffix was derived from the Greek word meaning "to rule" (Albrow, 1979). However, Blau (1956) defines bureaucracy as a formally established organization that is designed to maximize administrative efficiency. Although this definition could apply to both the public sector and the private sector, Downs (1966) indicates that the term is normally affiliated with organizations that function in a non-market environment. Moreover, Downs attributes three possible meanings to the word "bureaucracy." He suggests that it can be thought of as either a type of institution, a form of decision making, or a quality of outlook—an invective. The inherent ambiguity in this term, therefore, has led some to recommend its complete elimination (Albrow, 1979). Nevertheless, throughout this study, "bureaucracy" was considered to be a type of institution that functions in a non-market environment, i.e. the public sector.

BUREAUCRACY IN THE HISTORICAL CONTEXT

Max Weber (in Gerth and Wright Mills, eds., 1957) was one of the first scholars to study intensively the structure of organizations. He recognized that within any organization there is an inherent need for a distribution of power which, when universally accepted by the group, becomes authority. Weber identified the most elementary type of authority as being "charismatic authority." Such authority is recognized by a group of followers, according to Weber, if the ruler possesses an extraordinary quality of leadership, such as might be found in a primitive tribe that displays some form of cult veneration. However, Weber indicated that as charismatic authority becomes routinized, a new form of authority begins to emerge—"traditional" or "patrimonial" authority.

Weber hypothesized that traditional or patrimonial authority emerges in response to the permanent establishment of a staff of advisors to the ruler. The power of this institution is soon recognized as the populace communicates to each other their approval of the hegemony. Weber described this obedience as "a psychic attitude set up for the belief in the everyday routine as an inviolable norm of conduct . . .

[such that] when the rulers, disciples, apostles and followers become priests, feudal vassals and, above all, officials . . . the princely prerogatives become patrimonial in nature" (pp. 246-47).

Although Heady (1979) indicates that the origins of bureaucracy can be traced back as early as 10,000 B.C. in the Orient, Creel (1964) notes that it was not until approximately the fourth century B.C. that China possessed a form of bureaucracy with similar characteristics to our own. However, similar administrative patterns re-emerged in other parts of the world, such as Sumeria, Assyria, Persia and, later still, in Greece and Rome. It was upon the ruins of this latter civilization that the foundations of modern Western governments were laid.

Toward the end of the Middle Ages, traditional or patrimonial authority had re-emerged in Western Europe. A combination of an active market economy, the church, and the emergence of the absolutist monarchies of Western Europe, precipitated a trend towards administrative centralization. "The modern state," noted Von Mises (1944), "is built upon the ruins of feudalism" (p. 15). The royal service gradually became the public service; it substituted bureaucratic management of public affairs for the supremacy of a multitude of petty princes.

However, rapid industrial growth throughout the nineteenth century in Western Europe accelerated the demise of traditional authority, through a combination of unprecedented economic, social and political changes. The functions of life, notes Albrow (1979), underwent division and subdivision: the place of domicile was separated from the place of work; those who produced were separated from those who managed; and those who managed gradually became separated from those who owned. Consequently, the traditional aristocracy was challenged by a competitive meritocracy. Observing this, Weber (in Gerth and Wright Mills, eds., 1957) identified the final type of authority in his trilogy—legal authority: "the legitimacy of the power holder to give commands rests upon rules that are rationally established by enactment, by agreement, or by imposition" (p. 294).

Throughout the past century, Western government has continued to grow in response to both the complexity of modern society and to the expectations of its citizens. The "legal authority" vested in modern

government is responsible for a growing number of services, such as the regulation of unfair business practices, the protection of consumers, the provision of subsidized health and welfare programs, and, of significance to this study, a growing involvement in the problems associated with the coastal zone. To achieve the purpose of government, therefore, public administration has been universally adopted, and the most common form of public administration is the bureaucracy. It is the bureaucracy which today enforces, monitors and administers policies formulated by the legislative component of government. As a corollary, the bureaucracy also contributes to the formulation of public policy.

BUREAU BEHAVIOUR: CLASSICAL, NEOCLASSICAL AND MODERN ORGANIZATIONAL THEORY

Numerous models have been developed to promote a better understanding of bureaucratic institutions. They can be broadly classified into three categories of administrative science: classical theory; neoclassical theory, and modern organizational theory (Hicks and Gullet, 1975).

Classical theory: Weber's rational model. As previously noted, Weber (in Gerth and Wright Mills, 1957) was one of the first scholars to explore systematically the phenomenon of bureaucracy. However, he was not only concerned with its historical evolution, but also with the method by which it functioned. He identified a number of specific characteristics of this institution: the principle of fixed jurisdictional areas, each governed by rules; a hierarchy, composed of distinct levels of graded authority; the use of written records, together with a staff of "subaltern officials and scribes"; thorough and expert training; and, finally, a full-time staff. Weber was convinced that those characteristics alone constituted a system that was technically superior to any other system that could be devised: "Precision, speed, unambiguity, knowledge of the files, continuity, discretion, unity, strict subordination, reduction of friction and of material and personal cost—these are raised to the optimum point in the strictly bureaucratic administration" (p. 214). Unfortunately, this rational model of bureau behaviour suffers from several dysfunctions.

Neoclassical theory: Simon's behavioural model. Neoclassical theory does not negate Weber's rational model entirely, but it does suggest that this model is too simplistic. For example, Barnard (1948) intimates that not only do informal organizations exist within larger organizations, but that they are a necessary adjunct to efficiency. Moreover, Crozier (1964) attributes dysfunctions to the centralized decision making within the highly structured hierarchy posited by Weber: those with the authority often lack the knowledge and vice versa. Over-devotion to precedent, lack of initiative, procrastination, duplication of effort and departmentalism are further dysfunctions identified by Strauss (1961). Simon (1948) was one of the first to study those dysfunctions in detail and he offers a more realistic behavioural model to complement Weber's rational model.

Simon (1948) began by drawing an analogy between administrative behaviour and economic man. His research indicated that although bureaucratic decision makers scanned their environment exhaustively for the optimum solution to each problem, they never enjoyed complete access to all the possible sources of information that they required. Moreover, Simon observed that bureaucratic decision makers often selected sub-optimal alternatives, because public policy required such exhaustive tact and compromise. Consequently, rather than solving problems on a purely rational basis, it appeared that bureaucratic decision makers were limited to what Simon called "bounded rationality." He realized that maximizing was utopian and that all decision making became "satisficing." Simon concluded that "rationality does not determine behaviour . . . instead, behaviour is determined by the rational and non-rational elements that bound the area of rationality" (p. 241).

Modern organizational theory: Downs, Tullock, and Argyris. Modern organizational theory explores the decision making process within bureaucracy in greater detail than the earlier neoclassical theory, particularly with respect to the individual within the institution itself. Downs (1966), for example, has developed a model which incorporates the properties of Simon's "satisficing" theory and Lindblom's theory of "disjointed incrementalism." He contends that individuals

within the bureaucracy tend to scan the area within their loci of knowledge and, if a performance gap is perceived, an intensive search is triggered until the gap is either reduced by the necessary improvements, or the level of expectation of the bureaucrat is adjusted downwards until an acceptable "level of equilibrium" is reached. This state is then regarded as the appropriate performance level. Downs also notes that individuals within the bureaucracy may deliberately delay, distort, or destroy information to suit the needs of their own departments. The personal ambitions of the individual bureaucrat can, therefore, interfere with his obligations to society. Tullock further examines this aspect of human behaviour.

Tullock (1965) notes that subordinates within a bureaucracy must make decisions based upon directions from a superior. Therefore, in a perfectly rational environment, "functional rationality" will prevail: instructions that are communicated from above are obeyed. However, Tullock argues that intermediate subordinates often enjoy considerable decentralization and invariably individual bureaucrats make decisions based upon their own perceptions of what a superior wants. Consequently, "substantial rationality" emerges, and Tullock posits that where such behaviour is endemic within a large bureaucracy, "bureaucratic free enterprise" results. He suggests that any society which allows itself to be increasingly dominated by a bureaucracy, ultimately, exercises a declining control over its activities.

Argyris (1968), however, has taken a slightly different approach in his study of bureaucratic institutions. He notes that "formal organizations may well have built into their designs the seeds of many non-productive, dysfunctional, energy-consuming activities at all levels" (p. 315). He contends that the very characteristics that make an organization efficient also result in individuals having a minimum of control over their working lives. Specifically, they are expected to be passive, dependent and subordinate; and they are expected to utilize only a narrow range of their true abilities. Therefore, Argyris suggests that perfect efficiency is impossible within a bureaucracy, because of the fundamental incompatibility of the needs of a large impersonal institution, and those of an individual within its structure.

A SUMMARY OF THE MAJOR CHARACTERISTICS OF ORGANIZATIONAL THEORY

Specialization. Specialization of the workforce was one of Weber's most important criteria if an administration was to be classified as a bureaucracy. As Gulick (1936) has observed, specialization can be divided into four categories: purpose (or function); process; clientele; and area. The first type of specialization is the most common in government, especially at the departmental level, although all four are usually present within departments or agencies. It implies that each segment of the bureaucracy concentrates on the pursuit of fulfilling one major function. The great merit of organizing via major purpose is that the overall goal of the organization is made clear to both staff and clientele alike. Specialization by process, however, involves organization on the basis of a method of production such as the Queen's Printer in Canada. Conversely, in a manufacturing plant in the private sector, one division might produce a variety of tires, while another might be solely responsible for assembling engines. The last two types of specialization—by area and clientele—are self-explanatory; both are common in the private sector and in government.

However, one further type of specialization that is observed in some institutions is the matrix organization. Butler (1973) notes that in some institutions, such as the aerospace industry, highly qualified personnel may be seconded from numerous different departments to participate in a joint project of limited duration in a temporary agency. Although this agency is more common in the private sector, it does appear in the public sector too.

Each type of specialization has several advantages and disadvantages. The most significant are those attributed to specialization by process and purpose. Specialization by process achieves economies of scale that are impossible under specialization by purpose and it also fosters strong interdependence. Unfortuantely, it may create inefficiencies in other units not easy to measure. Specialization by purpose,

on the other hand, may permit a check on efficiency when agency outputs can be identified precisely and measured in some effective way. Coterminously, its drawback—apart from poor economies of scale already mentioned—is that it encourages strong self-containment and this must be compensated for by feedback mechanisms. This is something that is hard to accomplish due to the inherent difficulties associated with departmentalization.

Centralization vs. decentralization. Meyer (1972) indicates that: "The manager must steer between the Scylla of overwork and the Charybdis of disorganization, but this is not an easy task" (p. 50). As a bureaucracy increases in size its marginal efficiency increases, because of economies of scale. However, an increase in delegation is inevitable at the intermediate level to compensate for the inability of the upper level of the hierarchy to oversee the entire bureaucracy. Consequently, a paradox emerges. Increasing efficiency through delegation can trigger inefficiency through poor decision making by less qualified intermediate supervisors. Subramaniam (1966) notes that it is obvious that whenever one seeks to increase efficiency according to the former principle, it automatically decreases according to the latter.

A bureaucracy is said to be centralized if relatively mundane decisions are still made by decision makers at the apex of the hierarchy, or by an unusually small number of delegates at intermediate levels in the structure. However, if there are many intermediate levels within the heirarchy, and the delegation is pervasive, then decentralization is said to exist. The two terms are relative. The former is associated with a relatively flat organization pyramid; the latter has a tendency to be vertical, or elongated.

Decentralization, then, is inevitable as an organization grows, or apoplexy occurs. Meyer (1972) notes that decentralization is common initially among very small businesses, but that centralization becomes dominant shortly thereafter. As the bureaucracy continues to expand, it again begins to decentralize. Although decentralization can be very

cumbersome, it is an effective form of administration if the intermediate supervisors are well qualified to perform their tasks. But, Kraisinga (1964) points out, "the responsibilities of higher levels are altered, they are not extinguished" (p. 18).

There is also a tendency for the intermediate supervisors in a decentralized bureaucracy to be more qualified than their counterparts in a centralized administration, creating what Tullock (1965) calls "Substantial rationality": the temptation for intermediate supervisors to "interpret" the policy that is delegated to them by critically reappraising the organization's policy in light of their own knowledge and experience. Chevalier (1979) has called this "management by interest." In a sense, therefore, the intermediate supervisor often tends to actually transform the rigid policies that are delegated to him and he reinterprets them according to his own practical experience, thereby promoting efficiency within the organization beneath him. Unfortunately, this procedure can have embarrassing repercussions.

However, the intermediate supervisor within a decentralized bureaucracy must still adhere to rules. Generally, the more decentralized the bureaucracy, the more numerous and rigid the rules, to compensate for the lack of direct supervision from the top of the hierarchy. Once again, this corroborates the paradox that seems to continually pervade bureaucracy and undermine Weber's earlier rational model: there are instead of an unequivocal principle, a set of mutually incompatible principles apparently equally applicable to the administration.

Self-containment, interdependence and co-ordination. The terms "centralization" and "decentralization" refer strictly to the degree to which the lower levels of the bureaucracy are controlled by the upper levels of the administrative hierarchy. Self-containment and interdependence, on the other hand, are terms that describe the relative degree to which different divisions within departments co-ordinate their activities, primarily through horizontal communication channels. Of course, the type of co-ordination is not unrelated to the amount of centralization or decentralization in the bureaucracy: self-containment

is usually associated with decentralization; interedependence is more prevalent in a centralized bureaucracy.

There are some important characteristics associated with this concept. Self-containment does reduce co-ordination costs; it also facilitates the calculation of profit and loss in the private sector—not unlike specialization by purpose. However, it can trigger considerable disorganization if certain "restorative mechanisms" are not incorporated into the administration. For example, usually self-containment is associated with departments in which personnel are highly qualified, to compensate for the lack of direct overhead control from the top of the administration. Feedback mechanisms are needed, however to preclude too much departmental autonomy and the disaggregation that it can create. Once again, a paradox emerges. Self-containment is encouraged by decentralization, but this, in turn, triggers feedback mechanisms that promote co-ordination and, therefore, centralization.

Lateral communication is also necessary between separate divisions and individual departments. Frequently, this lateral co-ordination is informal (Millet, 1966): regardless of the formal structure of organization, there tends to develop an informal structure of personal relations among individuals in an agency. These informal relations become an important factor in the internal power structure. Willms (1970) notes further that "co-ordination is not a separate activity, but a condition that should permeate all phases of the administration" (p. 137). He also suggests that there is a need for better communication within Canadian government and that it will become even more acute as the number of overlapping issues continues to escalate. This observation appears to be particularly relevant in the case of coastal zone management.

BUREAU TERRITORIALITY:
CONFRONTATION VS. CO-OPERATION

Downs (1966) notes that one of the most intractable difficulties in analyzing inter-bureau relations is the difficulty in determining where one bureau ends and another begins. To understand the basis for

this interaction, it is first necessary to understand the nature of territoriality. Downs's concept of bureau territoriality assumes, for simplicity, that each agency has a unique function, and that each of these functions can be thought of as occupying "policy space" in the overall administrative framework. In occupying any given policy space, therefore, the bureau effectively exercises a high degree of dominance in that particular area of administration. In instances where territorial boundaries are poorly defined, or where they infringe upon the policy space of another bureau, bureau interaction becomes inevitable.

The early classical and neoclassical models of bureau behaviour either do not acknowledge the existence of bureau interaction at all, or give it very cursory treatment. However, modern organizational theory deals with this subject in considerable detail. Eyles (1969) provides a useful territorial framework from which to begin to analyze the phenomenon of bureau interaction in greater detail.

Territorial interaction: Eyles. In general terms, Eyles assumes that the possession of territory is universal and that this provides a basic frame of reference for interaction. Figure 1 depicts this framework. It illustrates two isolated groups which gradually encroach upon each other's territorial domain. Having moved from a position of "no conflict" to a position of "potential conflict," there commences an initial invasion stage, or a "conflict situation," during which the territorial boundaries of each group overlap, as each tries to assert its dominance. The final outcome, according to Eyles's model, is either a stage of "complete dominance" in which one group completely overpowers the other, or some form of compromise, such as "co-ownership." The model clearly indicates that potential conflict can be resolved in two general ways: first, unrestrained competition may erupt into conflict, thereby resolving the dispute by a power struggle for dominance; or second, confrontation may be defused by some form of co-operation. Both options have been examined in more detail in modern organizational theory.

Bureau conflict: Downs. Bergström (1970) notes that the very term "conflict" is singularly ambiguous. Harsanyi (1965), for instance,

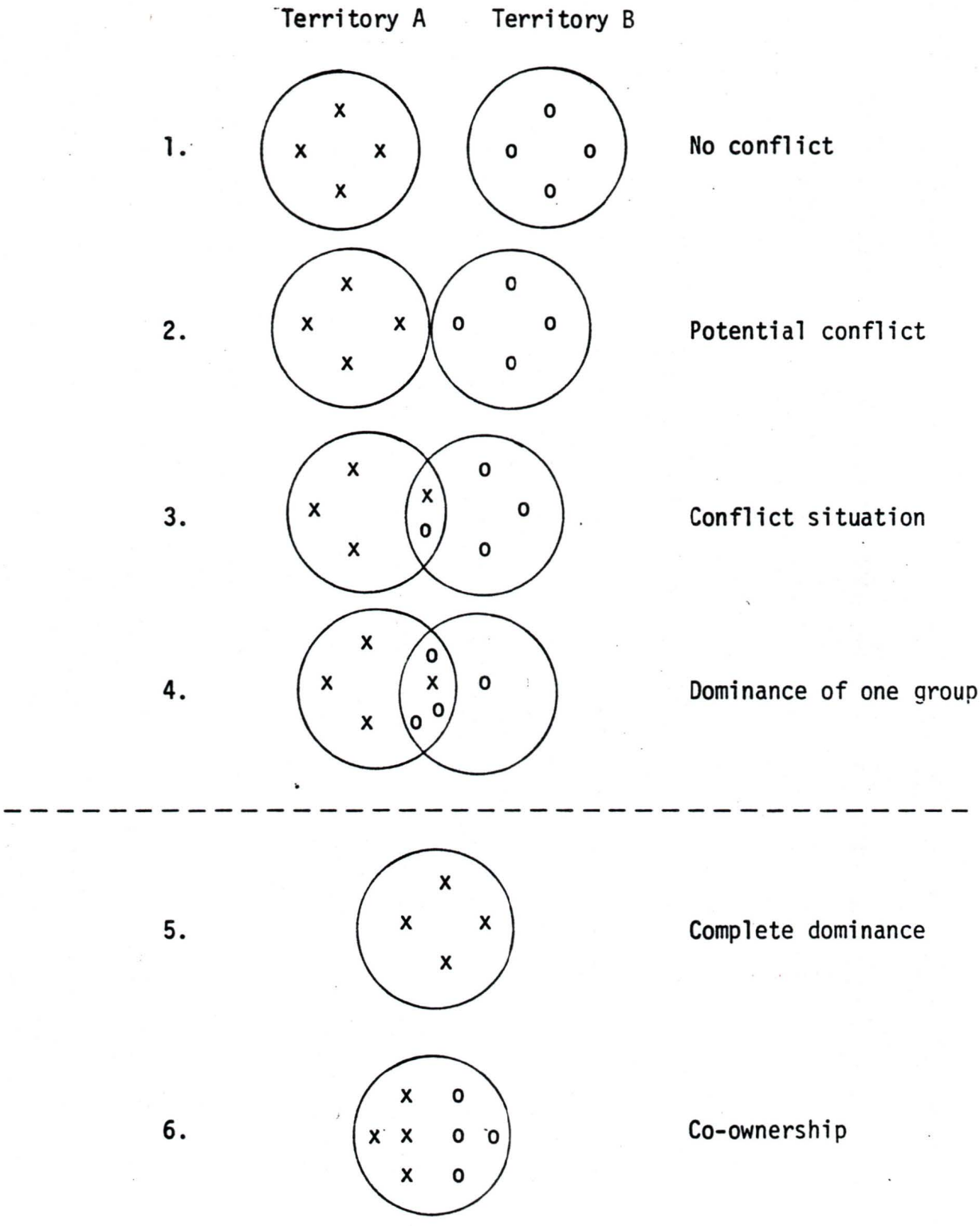

FIGURE 1: TERRITORIAL INTERACTION: A CONCEPTUAL FRAMEWORK.
Source: Modification of Eyles, *Space, Territory and Conflict* (1969, p. 16), mimeograph.

indicates that it could merely be "a simple lack of co-operation" (p. 456), but Boulding (1962) suggests that it is "a situation of competition in which the parties are aware of the incompatibility of potential future positions and in which each party wishes to occupy a position that is incompatible with the wishes of the other" (p. 5). Furthermore, Boulding posits that it is by no means conclusive that conflict is an inevitable characteristic of human behaviour, although Crozier (1964) believes that "crisis is a distinctive and necessary element of the bureaucratic system" (p. 196).

Downs' (1966) model of bureau conflict has certain similarities to that of Eyles' territorial interaction. Downs' model is built upon the assumption that bureaus are continually competing for policy space, resulting in a continuous state of potential conflict. Figure 2 depicts this model. It involves only two bureaus, for simplicity. At the centre of each bureau is the "heartland." This region is, theoretically, impregnable and policies enacted in this domain cannot be influenced by another bureau. However, policies that spill over into the "interior fringe" of each bureau become increasingly subjected to the other bureau's control, as the policy space of each becomes less distinct. Apart from "alien territory," in which neither bureau functions, the area of "no man's land" offers the region for the greatest mutual friction. Since neither bureau is dominant in this policy arena, there is an incessant struggle for control, which Downs calls "inherent dynamism" and in which equilibrium is impossible.*

Unfortunately, the failure of Downs to consider co-operation as a means of controlling unrestrained conflict, certainly detracts from the effectiveness of his model. The only reference that he makes to ameliorating this condition is his belief that certain bureaus will deliberately restrain their field of action to avoid overt confrontation—the "shrinking violet syndrome"—but there will always be others that will blindly continue their unrestrained expansion. Crozier (1964) succinctly

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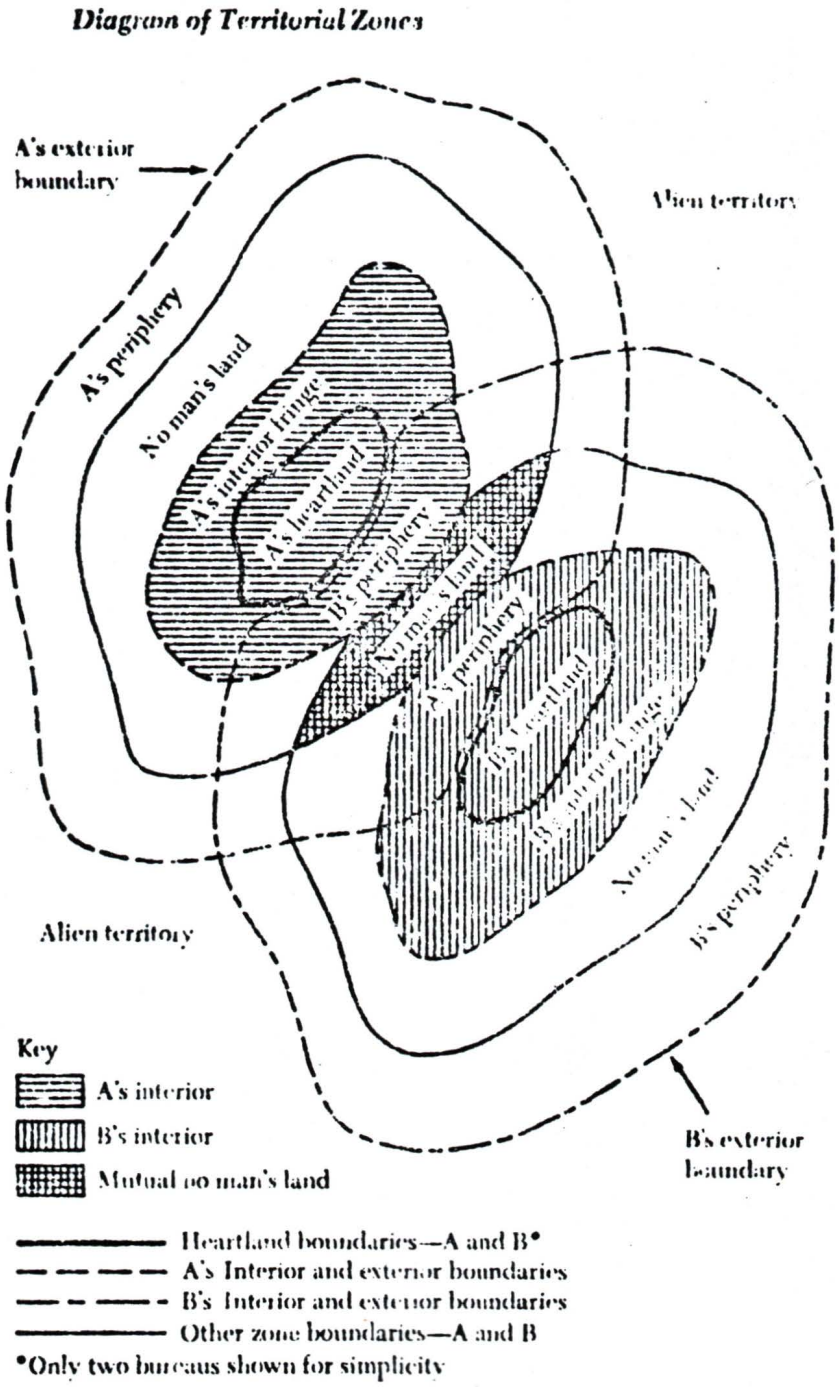
*An analogy could be drawn between this region in policy space and the coastal zone in Canada, particularly as it applies to offshore petroleum development.

FIGURE 2: BUREAU TERRITORIALITY



Source: Anthony Downs, *Inside Bureaucracy* (Boston: Little, Brown and Co., 1966), p. 214.

summarizes this pitfall: "the world of power is only one aspect of the complex relationship . . . the world of consensus and the co-operative game are other important aspects of this basic relationship" (p. 175).

Bureau co-operation: Self, Blau. Self (1974) attributes conflict between bureaus to two causes: "functional duplication" and "policy conflict." The former occurs when different agencies possess similar mandates and conflict arises from a duplication of effort. The latter is common where agencies possess different mandates, but their policies conflict with each other. However, Self is one of Downs most outspoken critics. He notes: "The model assumes a degree of assertive action by agencies, and an absence or weakness of co-ordinative action, which may be quite untrue" (p. 87). Blau (1956), for example, offers several options to conflict. Each option requires an increasing degree of co-operation from the parties concerned. The first option is bargaining. Commenting on bargaining, Lindblom (1955) notes that "the techniques of bargaining, though they are to be found everywhere in and out of government, play a strategic role in creating a useful network of multilateral control in government" (p. 3). By relating this form of co-operation to the laissez-faire economy, he suggests that bargaining is the only alternative to hierarchy in an administration. The second option is co-optation. Merton (1952) defines this as "the process of absorbing new elements into the leadership, or policy determining structure of an organization, as a means of averting threats to its stability or existence" (p. 130). The final option is coalition, or the amalgamation of the decision making components of two or more agencies. Hicks and Gullet (1975) note that the most common form of coalition is seen in the establishment of committees which "permit consolidation of otherwise fragmented power . . . into functional units" (p. 168).

There is ample evidence to indicate, therefore, that conflict is by no means an inevitable result of bureau interaction. However, just as conflict can be extremely costly in both time and energy, so too is co-operation. Co-operation invariably results in a significant division of power, which in turn reduces the flexibility of the decision making process, thereby betraying its own hidden costs.

CHAPTER 3

AN ASSESSMENT OF THE PAST AND POSSIBLE FUTURE ROLE OF THE WEST COAST IN THE DEVELOPMENT OF OFFSHORE OIL AND NATURAL GAS RESOURCES

Since the dawn of history, the sea has provided an abundance of resources—both living and non-living—and about which the Dutch jurist, Hugo Grotius, once apocryphally mused, "[they] can be exhausted neither by fishing nor by navigation, that is to say, in the two ways in which it can be used" (Government of Canada, 1974, p. 5). However, an increase in the traditional uses of the sea, together with the emergence of myriad new concerns, such as offshore mineral development, have generated considerable political stress in the international community. This chapter will briefly examine the international perspective of offshore hydrocarbon development, as it applies to the west coast, as well as assess the known geological potential of this region. It will also present an historical synopsis of west coast offshore hydrocarbon activity to date, together with a description of the various stages of development that could occur if offshore oil and natural gas development resumes.

THE WEST COAST IN THE INTERNATIONAL CONTEXT

General. Traditional support for the 3 nautical mile (5.6 km) territorial limit, which had served man faithfully for centuries, began to weaken at the end of World War II in response to the pressure for greater national control over the resources of the seabed. However, Keto (1978) cites four events as being particularly important in shaping the doctrine of the continental shelf. These events are the Truman Proclamation on the Continental Shelf, 1945; the First United Nations Conference on the Law of the Sea, 1958; the North Sea continental shelf cases heard before the International Court of Justice in

1969; and the continuing Third United Nations Conference on the Law of the Sea.

The first formal indication of political stress appeared in 1945, when President Truman of the United States promulgated a unilateral declaration—the Truman Proclamation—which pre-empted any foreign nation from exploiting the seabed of the continental shelf of the United States, under the claim that it would prejudice the security of the nation by depriving it of valuable petroleum resources. Although this decision set an important precedent in international law, it was soon followed by more ominous claims. Several Latin American countries, for instance, proclaimed a 200 nautical mile (370 km) fishing limit off their coasts in 1952, frustrating American fishing interests for decades (de Blij, 1973).

Initial attempts to resolve this gradual encroachment on the world's oceans began to gather momentum in 1958, when the first United Nations Conference on the Law of the Sea was convened. At the Geneva convention that year, the continental shelf was formally defined as: "the seabed and subsoil of the submarine areas adjacent to the coast, but outside the area of the territorial sea, to a depth of 200 metres, or, beyond that limit, to where the superjacent waters admits of the exploitation of the natural resources of the said areas" (Johnson and Zacher, eds., 1977, p. 10). Although this definition helped to placate the controversy that had been simmering since the Truman Proclamation, it placed no definitive limit upon the extent to which the resources of the seabed could ultimately be exploited, if technological advances were made. However, during the next decade, strong support for a "geomorphological" definition of the continental shelf began to emerge.*

Support for the geomorphological definition was posited upon three premises: first, such a claim was implicit within the 1958 Geneva Convention of the Continental Shelf; second, Canada, as well as ...

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*The "geomorphological" definition posits that a nation's continental shelf is the natural prolongation of a nation's land mass under the sea, extending out as far as the limits of the continental margin itself.

several other maritime countries, had been issuing oil drilling permits as far out as the edge of the continental margin for several years; and third, in 1969, the International Court of Justice had used the geomorphological definition to resolve the territorial claims in the North Sea (Johnson and Zacher, eds., 1977). As the Third United Nations Conference on the Law of the Sea reconvened in 1973, support for the geomorphological definition of seabed sovereignty became more widely recognized by most nations.*

On January 1st, 1977, anticipating a growing international consensus, Canada promulgated a 200 nautical mile (nm) Exclusive Economic Zone to protect its fish stocks along the continental margin (Figure 3). Since then, a similar international consensus has begun to emerge on the definition of the continental shelf for the purpose of seabed mining: "The continental shelf of a coastal state comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance" (Ellis, Pers. Comm., 1982). However, where the continental margin extends beyond 200 nm, the continental shelf "shall not extend beyond 350 nautical miles [650 km] from the baselines from which the territorial sea is measured" (ibid.).** The international consensus that has now emerged on the definition of the continental shelf has significant implications for Canada's west coast.

West coast. Canada's continental margin is extremely narrow along the west coast (Figure 4). It is virtually non-existent to the west of the Queen Charlotte Islands, and it widens to barely 43 nm (80 km) off

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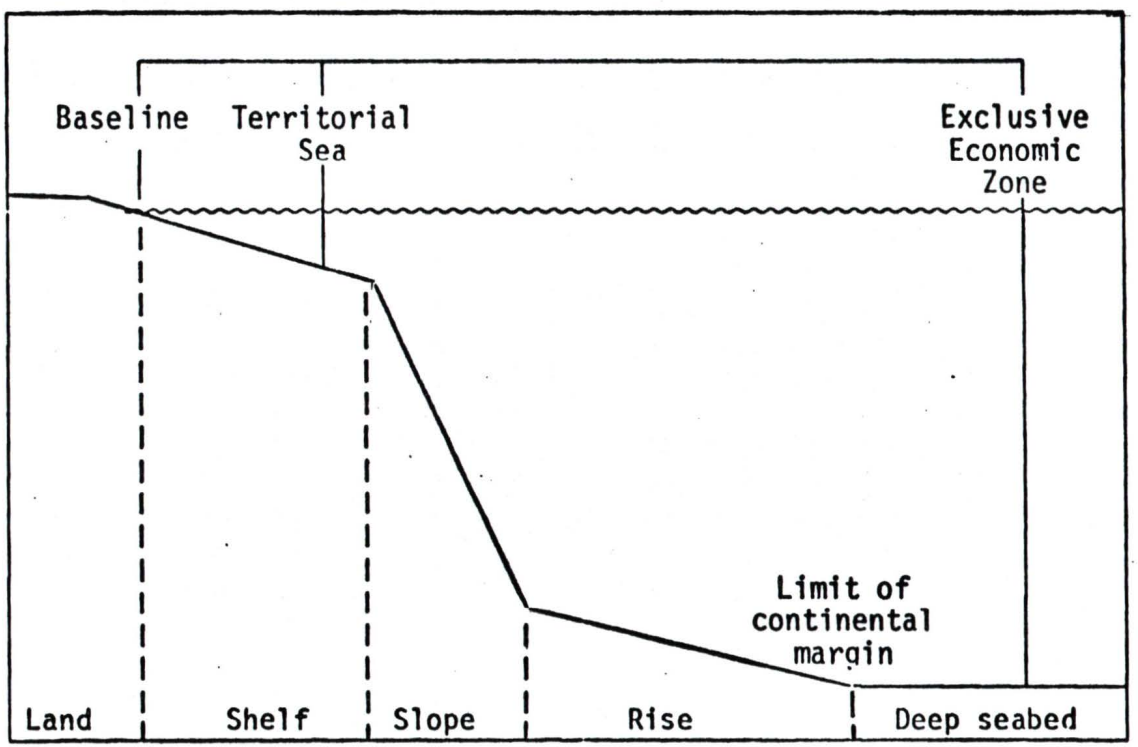
*The restriction that such a clause placed upon deep sea mining ventures precluded the acceptance of this regime by several industrial nations, particularly the United States.

**The Marine Waters Baselines are internationally recognized lines of a nation's conventional territory that are drawn from headland to headland along the mean low water mark of a nation's coastline.

FIGURE 3: THE CONTINENTAL MARGIN AND THE DEEP OCEAN FLOOR



Source: Modification of B. Johnson and M.W. Zacher, eds., *Canadian Foreign Policy and the Law of the Sea* (Vancouver: University of British Columbia, 1977), p. 2.

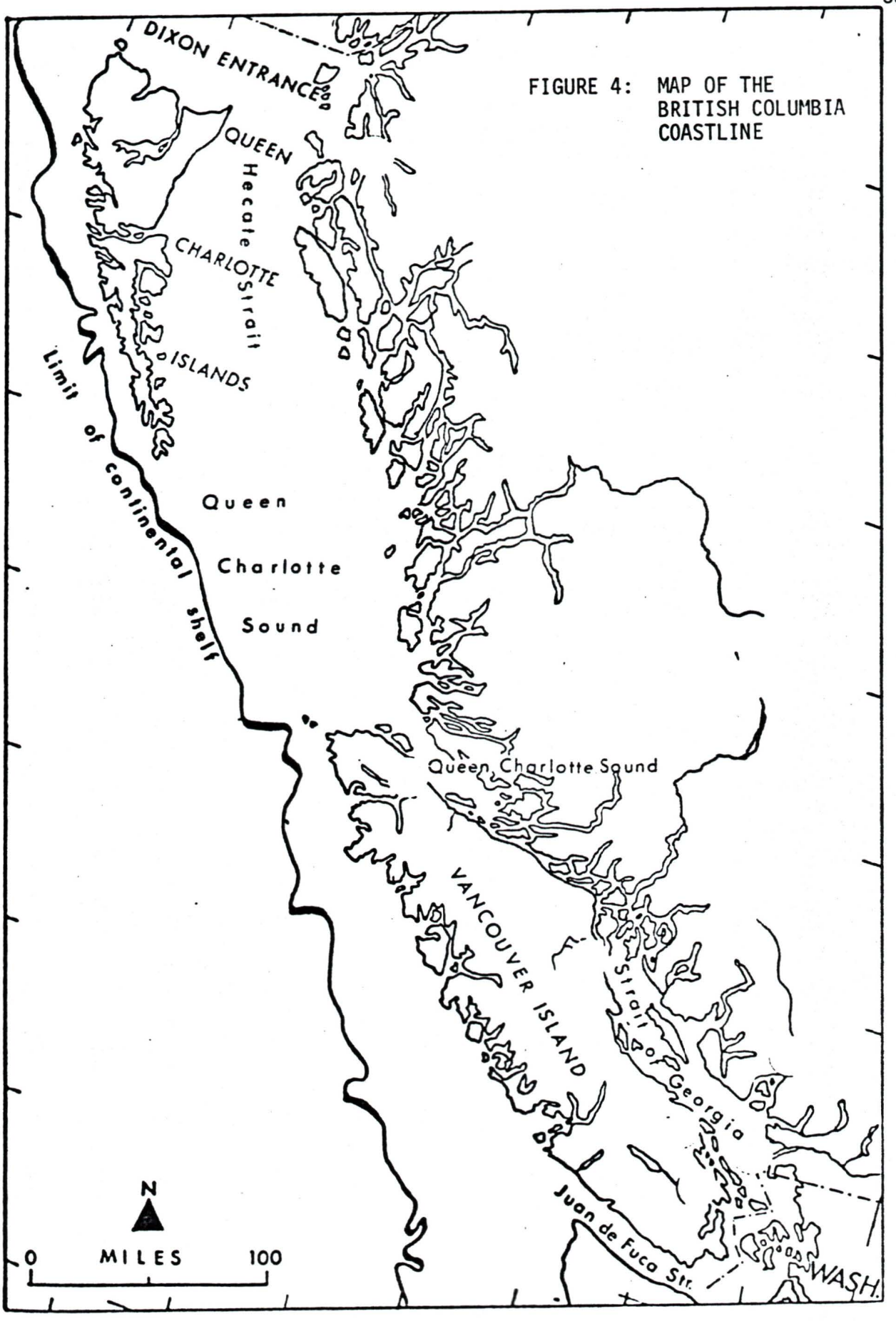


FIGURE 4: MAP OF THE BRITISH COLUMBIA COASTLINE

the southeast portion of Vancouver Island (Chase, Tiffin and Murray, 1975). Moreover, this is relatively narrow by comparison to the east coast of Canada, which in some areas exceeds 650 nautical miles (1,200 km) in width (Johnson and Zacher, eds., 1977). Under international law, Canada currently claims a 12 nautical mile (22 km) territorial sea—drawn from baselines along the west coast of the Queen Charlotte Islands and Vancouver Island—as well as exclusive proprietary rights to all pelagic resources within a 200 nautical mile (370 km) Exclusive Economic Zone.

As a result of the consensus that has now emerged in the final stages of the Third United Nations Conference on the Law of the Sea, Canada will be able to claim exclusive property rights not only to the pelagic resources of superjacent waters out as far as 200 nautical miles, but to the mineral resources of the seabed itself—far beyond the natural prolongation of the continental margin along the west coast (Ellis, Pers. Comm., 1982). However, although the emerging international consensus augurs well for the west coast in general, a simmering dispute remains between Canada and the United States as to the appropriate demarcation of their territorial boundaries at the entrance to the Strait of Juan de Fuca and, similarly, along Dixon Entrance to the north (Figure 4).

THE MINERAL POTENTIAL OF THE WEST COAST

General. Minerals are to be found in three configurations in the world's oceans: in the bedrock itself, both on and beyond the continental margin; on the sea floor, as surficial deposits; and in suspension in sea water.* Although there are a variety of minerals to be found in suspension in sea water, only a handful are economically exploitable. They include salt, magnesium, manganese compounds, bromide and fresh water. Minerals that exist in surficial deposits along the sea floor portend to be more valuable. They include placer deposits, such as gold

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*The following discussion is based upon: United Nations, Department of Economic, Social Affairs, *Mineral Resources of the Sea* (New York: United Nations, 1970).

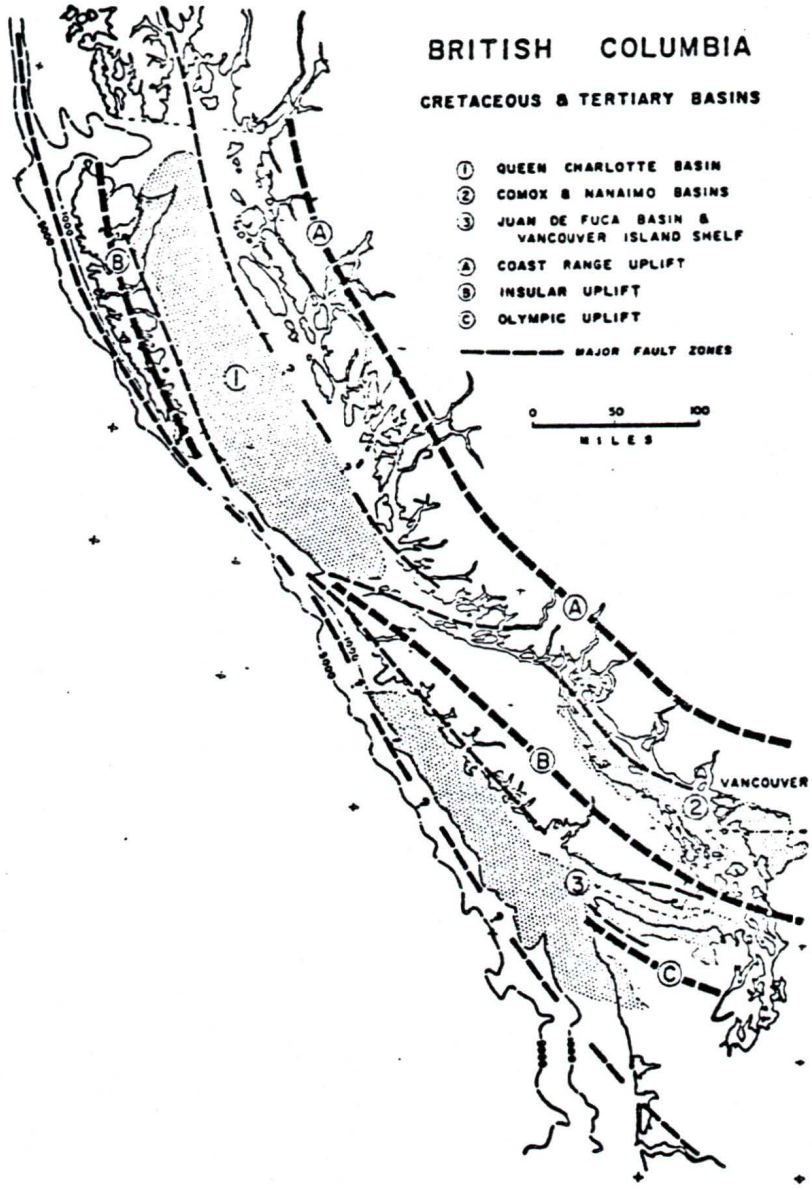
tin, platinum, ilmenite, chromite and iron sands; as well as precipitates, such as phosphorites, siliceous ooze and, most significant of all, manganese nodules. However, minerals embedded in the bedrock itself are of even greater significance.

The continental margin is an extension of the land under the sea. Consequently, its bedrock can be expected to contain many of the same minerals found on land, such as sulphur, salts, potash and iron ores. Sedimentary basins within the continental margin are of great significance; they are known to contain a variety of hydrocarbons, such as oil, natural gas and coal. Most geologists agree, however, that the areas of bedrock beyond the continental margin are much less likely to be of value: "It cannot be expected that the deepsea floor will contain in any quantity those types of ore deposits that are associated with the granitic magma of the continents" (United Nations, 1970, p. 10). At present, it is believed that such areas are restricted to chromite, platinum, nickel, cobalt and kimberlite (ibid.).

West coast. The western continental margin of Canada lies within an active part of the earth's crust, and includes the junction of the Pacific, American and Juan de Fuca plates (Bell, 1967). The region is part of the Eastern Pacific Sedimentary belt extending from southern Mexico to the Aleutian arc of Alaska. Figure 5 depicts the fault lines in this region, which display intermittent tectonism, persisting to this day in the form of regional seismic disturbances.

As previously noted, the continental margin is very narrow along Canada's west coast. Although it widens to approximately 40 nautical miles (80 km) off southern Vancouver Island, it is severely faulted and is overlain with pleistocene sediments (Scrivastava, 1973). There are two sedimentary basins of importance: the Tofino basin, part of the Vancouver Island shelf; and the Queen Charlotte basin, between the Queen Charlotte Islands and the mainland (Figure 5). However, the latter is of greatest geological significance. This particular basin—approximately 216 nautical miles (400 km) long and 54 nautical miles (100 km) wide—underlies Hecate Strait and Queen Charlotte Sound

FIGURE 5: BRITISH COLUMBIA GEOLOGY: CRETACEOUS AND TERTIARY BASINS



Source: *Oilweek*, June 26, 1967, p. 48.

(Stacey, 1974). It is surrounded by an insular volcanic belt whose Mesozoic volcanic sequences have been progressively eroded and deposited into the basin as Mesozoic sediments, but Cenozoic sediments are more prevalent in the northern part of the basin (ibid.)

Although offshore mineral exploration along Canada's west coast is still at a very early stage of development, surficial deposits, particularly placer deposits, are believed to exist. However, the most intense speculation concerns the bedrock geology of the continental margin itself. The geological similarity between sedimentary basins along the west coast and those farther north in Cook Inlet, Alaska, raises the strong possibility that commercially viable deposits of oil and natural gas may well exist in this region. At least one expert in west coast marine geology has recently suggested the likelihood that oil and natural gas will be found along the Tofino shelf, or in the Queen Charlotte basin (Yorath, Pers. Comm., 1981). Moreover, Mr. MacLeod, Senior Vice-President of Shell (Canada) Ltd., has indicated that Chevron of Canada and Shell (Canada) Ltd. have both completed preliminary steps to reactivate offshore exploration along the west coast (House of Commons Committee, Issue #39, March 24, 1981).

AN HISTORICAL SYNOPSIS OF OFFSHORE OIL AND NATURAL GAS DEVELOPMENT ON THE WEST COAST

The first significant reference to offshore oil and natural gas development on the west coast occurred in 1959, when the province of British Columbia suddenly announced the imposition of a crown reserve on all potential offshore petroleum resources within the 3 nautical mile (5.6 km) territorial limit (*Vancouver Sun*, August 14, 1959). The move was taken in response to the success of similar drilling operations off the west coast of California, and the indication that several major oil companies, such as Richfield Oil Corporation, were interested in commencing similar operations off Canada's west coast (ibid.). Unfortunately, this was to mark the beginning of a protracted disagreement between the province and the federal government as to who had proprietary rights to regulate such activities.

This internecine conflict continued for several years, with varying degrees of antipathy, as each level of government sought to bolster its *de facto* claim by the widespread issuance of exploration permits—some of which overlapped each other. However, a failure of both parties to resolve this dispute amicably by 1965 led to the submission of this case to the Supreme Court of Canada by the federal government (Black, 1966). The court's decision, announced in 1967, supported the federal case entirely—with the exception of "inland waters," which it failed to clarify adequately at that time (des Rivières and Shipley, eds., 1968). That same year, Shell (Canada) Ltd. announced its intention to conduct an exploratory drilling program along the west coast, in response to favourable indications from its preliminary aeromagnetic and seismic exploration program that had been conducted since 1962 (Little, 1967).

Although Shell Oil Company drilled 14 wells off the west coast between 1967-1969, each was subsequently plugged and abandoned (Figures 6 and 7).* However, shortly after the company announced its decision to cancel its exploration program, the federal government declared a moratorium on all further offshore exploration in response to public concern over the oil spill off Santa Barbara, California in 1970 (*Vancouver Sun*, January 13, 1971). The federal moratorium was followed by a similar provincial moratorium on all inland waters, passed by an Order in Council that same year (ibid.). Consequently for the next decade, the emphasis upon offshore oil and natural gas exploration shifted to the east coast and the Arctic, particularly the Beaufort Sea (Figure 8). Although the events that took place during the next decade do not have a direct impact upon the west coast, they are, nevertheless, highly significant in terms of the future of the decision making process in this region.

As far back as 1968, Prime Minister Trudeau had tabled an arrangement that would allow the coastal provinces to manage all of the mineral resources landward of the line that was to have extended 1 nautical mile (1.9 km) off the coast. Any offshore development beyond this dividing

*See, for example, West Coast Oil Pollution Policies: Canadian Responses to Risk Assessment, by W.R.D. Sewell and N.A. Swainson, in *Resources and Environment: Policy Perspectives for Canada* (Toronto: McClelland and Stewart, 1980).

Well Name	Area	Latitude Longitude	Drilling Unit	Spud Date Rig Released	RT Elev'n Water Depth	Depth (RT) Well Status
Shell Anglo Prometheus H-68	West of Vancouver Island	48° 37' 19.57" 125° 39' 06.54"	Sedco 135-F	67-06-11 67-08-09	34.4 m 55.2	2 335.4 m P & A
Shell Anglo Pluto I-87	West of Vancouver Island	48° 56' 36.73" 125° 57' 01.30"	Sedco 135-F	67-08-11 67-10-12	32.9 60	3 726.2 P & A
Shell Anglo Zeus I-65	West of Vancouver Island	48° 54' 34.25" 126° 09' 09.93"	Sedco 135-F	67-11-07 68-02-05	34.4 98.5	3 042.2 P & A
Shell Anglo Zeus D-14	West of Vancouver Island	48° 53' 01.0" 126° 02' 59.8"	Sedco 135-F	68-02-24 68-03-31	34.1 79.9	2 433.5 P & A
Shell Anglo Tyee N-39	Hecate Strait	53° 18' 54.51" 131° 20' 21.42"	Sedco 135-F	68-04-07 68-05-19	29.3 27.4	3 459.5 P & A
Shell Anglo Sockeye B-10	Hecate Strait	52° 49' 08.53" 131° 00' 44.19"	Sedco 135-F	68-05-21 68-07-22	35.4 31.1	4 771.9 P & A
Shell Anglo Sockeye E-66	Hecate Strait	52° 45' 24.62" 130° 55' 19.44"	Sedco 135-F	68-07-23 68-08-12	34.7 55.8	2 786.5 P & A
Shell Anglo Auklet G-41	Hecate Strait	52° 20' 16.12" 130° 36' 32.77"	Sedco 135-F	68-08-16 68-08-29	34.7 169.5	2 370.4 P & A
Shell Anglo Osprey D-36	Queen Charlotte Sound	51° 35' 06.20" 129° 20' 47.65"	Sedco 135-F	68-09-01 68-09-17	34.1 58.5	2 530.4 P & A
Shell Anglo Harlequin D-86	Queen Charlotte Sound	51° 55' 03.58" 129° 58' 12.35"	Sedco 135-F	68-09-22 68-11-01	34.1 139.9	3 240.9 P & A
Shell Anglo Apollo J-14	West of Vancouver Island	49° 23' 34.60" 127° 02' 04.58"	Sedco 135-F	68-11-23 69-01-23	34.1 141.4	3 094.3 P & A
Shell Anglo Cygnet J-100	West of Vancouver Island	48° 19' 42.3" 125° 43' 03.0"	Sedco 135-F	69-01-26 69-02-20	34.1 147.8	2 459.7 P & A
Shell Anglo South Coho I-74	Hecate Strait	53° 33' 32.6" 131° 25' 48.9"	Sedco 135-F	69-03-12 69-04-05	35.4 21.3	2 780.1 P & A
Shell Anglo Murrelet L-15	Hecate Strait	52° 24' 41.3" 130° 47' 38.0"	Sedco 135-F	69-04-13 69-05-05	33.8 110.9	2 919.4 P & A

FIGURE 6: OIL WELL HISTORY REPORT OF THE WEST COAST (1967-1969). (Key to Figure 7.)

Source: Government of Canada, *Offshore Exploration* (Ottawa: Department of Energy, Mines and Resources, 1979), p. 72.

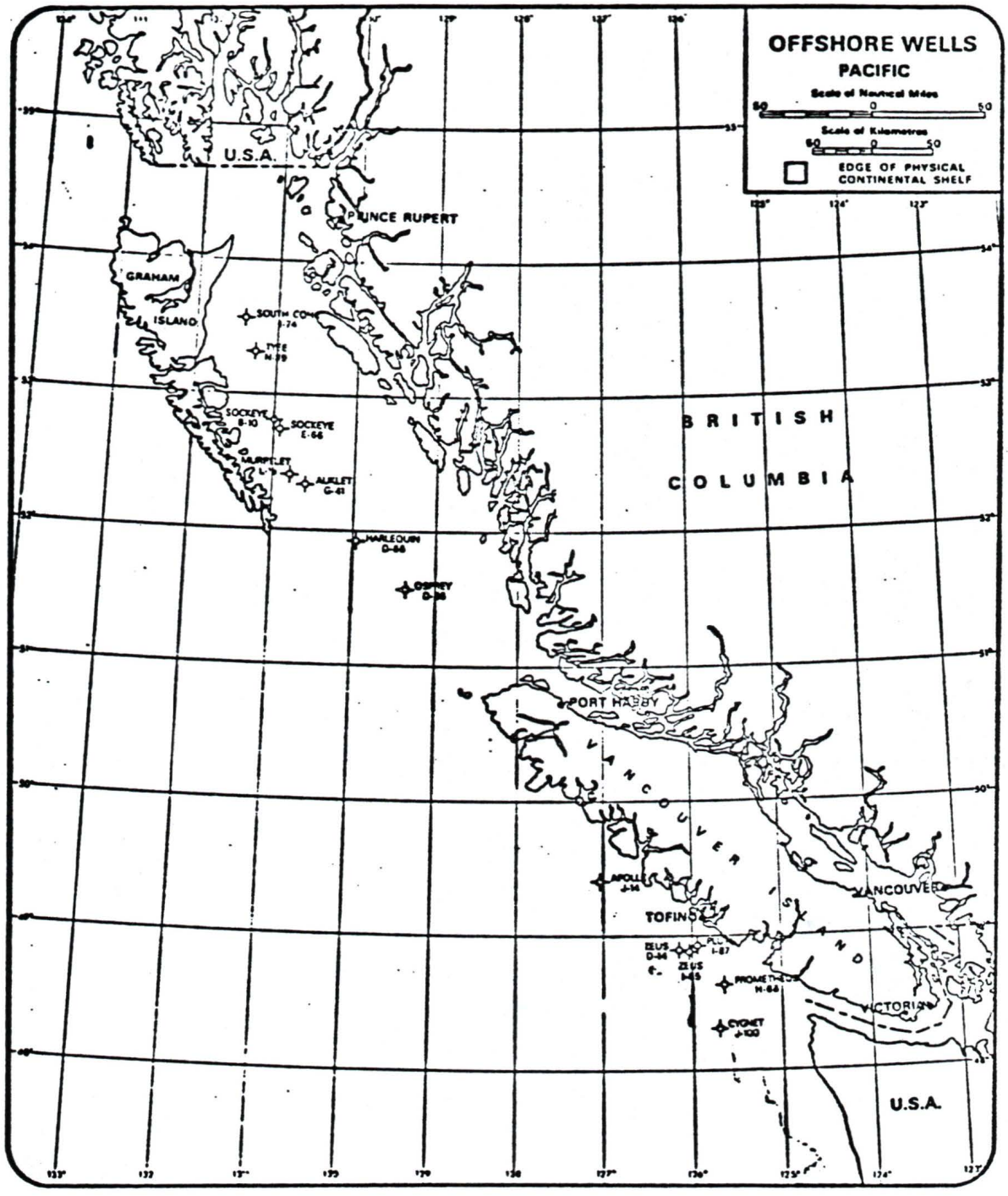
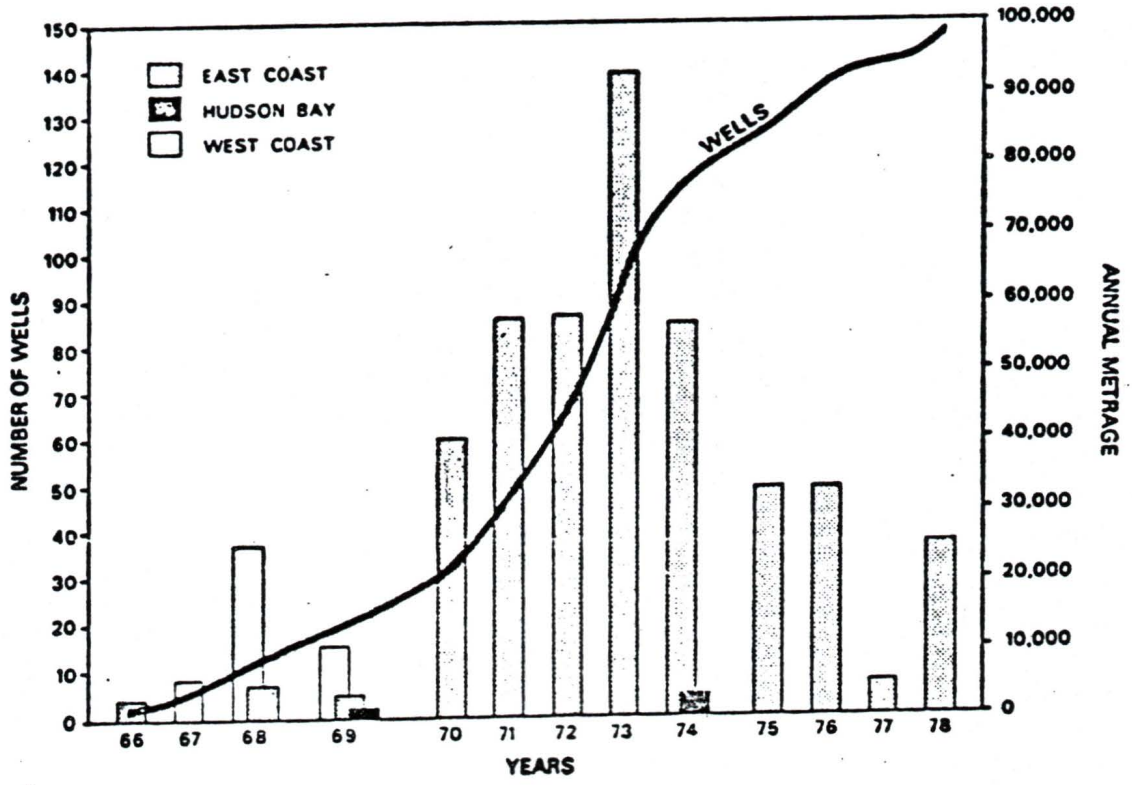


FIGURE 7: LOCATION OF OFFSHORE WELLS ON THE WEST COAST (1967-1969)

Source: Government of Canada, *Offshore Exploration* (Ottawa: Department of Energy, Mines and Resources, 1979), p. 84.

FIGURE 8: OIL AND GAS DRILLING IN THE OFFSHORE: ANNUAL METRAGE AND CUMULATIVE NUMBER OF WELLS (1966-1978)



Source: Government of Canada, *Offshore Exploration* (Ottawa: Department of Energy, Mines and Resources, 1979), p. 47.

line was to have been managed exclusively by the federal government, although the revenue in this region was to have been jointly shared by each level of government (*Vancouver Sun*, December 2, 1968). Unfortunately, this arrangement did little to appease the clamant demands of the coastal provinces, including British Columbia, and in 1977 another scheme was proposed. This agreement, signed on February 1st, 1977, and known henceforth as a "Memorandum of Understanding," was reached by the federal government of Canada and the provinces of Nova Scotia, New Brunswick and Prince Edward Island. It was similar to the previous federal offer, but provided for an extension of the mineral demarcation line to 2.7 nautical miles (5 km) offshore, and incorporated more generous financial provisions for the provinces in the region beyond this line, including the establishment of a joint federal-provincial agency—a Maritime Offshore Resource Board (MORB)—to supervise all offshore hydrocarbon development. However, the federal government insisted that the day-to-day administration of offshore development, beyond the mineral demarcation line, remain under its jurisdiction, resulting in an eventual suspension of talks on this topic (Tarnow, Pers. Comm., 1981).

In 1979, the Conservative government assumed power federally. In October of that year, Prime Minister Clark reaffirmed his support for the transfer of offshore mineral ownership to the coastal provinces, but was defeated before any constitutional changes could be made. However, this intractable issue re-emerged at the Federal-Provincial Conference of First Ministers in September,1980, after the Liberal government had returned to office. The provinces reiterated their demand for complete ownership of all offshore minerals, either by clear constitutional recognition, or by an extension of the onshore mineral regime to the offshore, but the federal government preferred to set aside the question of ownership altogether and strongly recommended the adoption of an administrative arrangement (Tarnow, Pers. Comm., 1981). Although this arrangement would have permitted the coastal provinces to retain 100% of all the revenue accruing to offshore mineral development—until they became "have" provinces—the federal arrangement received a tepid response from the coastal provinces. Moreover, it incorporated legis-

lation that emanated directly from the federal government's highly controversial National Energy Plan (NEP).

The NEP applies to all federally owned lands, or "Canada Lands," including those offshore areas which are still hotly contested by the coastal provinces. The act has important implications for offshore oil and natural gas development in Canada (Government of Canada, 1980). First, there will be much stiffer work requirements in terms of drilling orders, production orders and prior approval of transfer—each of which will have to be carefully negotiated through "Exploration Agreements." Second, Petro-Canada, or another designated crown agency, will be awarded a 25% interest in any new oil and natural gas discovery in the Canada Lands. Third, any company drilling in the Canada Lands will have to be at least 50% Canadian-owned, or be subjected to "back in" provisions in addition to the 25% interest mentioned above. Fourth, any company applying for exploration and production rights must demonstrate how their operation will bring industrial and employment benefits to Canada. Finally, the act is intended to ensure that Canada receives a "fair share" of the economic rent of the resource, by the imposition of a basic royalty of 10% on all oil and natural gas resources and, in addition, a Progressive Incremental Royalty (PIR), based on the profitability of each field. The act is intended to alter radically the earlier offshore mineral regime by stimulating further exploration and thereby achieving the primary goal of the NEP—energy self-sufficiency—by 1990.

The coastal provinces are extremely critical of the NEP. The British Columbia government, specifically, is anxious to resume offshore oil and natural gas exploration, but has voiced strong disapproval that virtually all of the seabed along the west coast, including that in Hecate Strait and Queen Charlotte Sound, should be deemed Canada Lands (Figure 4). The province considers this particular sedimentary basin to be within the purview of inland waters—mentioned in the 1967 Supreme Court ruling—and, *ipso facto*, part of the provincial *solum*. To regulate this putative interest, the province established its own Offshore Administration Branch, in April, 1981. In June, 1981, the

province's Ministry of Energy, Mines and Petroleum Resources indicated, in a news release, that it would begin to issue exploration permits "in the very near future," but that "negotiations would consider the existing interests of the petroleum operators already involved in this area" (Figure 9). However, despite several optimistic indications that this dispute could have been resolved amicably by February, 1982, communication with leading representatives of both levels of government at this time indicated that this dispute was far from over.

A DISCUSSION OF THE POSSIBLE FUTURE STAGES OF DEVELOPMENT ALONG THE WEST COAST

Offshore oil and natural gas development has occurred on a large scale in several areas of the world. Some notable examples are the Gulf of Mexico, the west coast of California, the Persian Gulf, the North Sea and the Far East. In each case, development has passed through several distinct stages: the "Exploration Stage" in which preliminary attempts are made to determine the positive existence of commercial quantities of hydrocarbons; the "Development Stage" in which a suitable infrastructure is then built to gather and transport the hydrocarbons to their ultimate market; and the "Production Stage" in which the hydrocarbons begin to flow from the oil field (Baldwin and Baldwin, 1975).*

Exploration Stage. Before any type of exploration activity can occur, permits are required from the appropriate regulatory authority (Table 1). Depending upon the outcome of the federal-provincial dispute over offshore ownership, those permits could conceivably be issued by both levels of government. The exploration program that follows consists of three distinct phases: regional surveys, to identify promising geological formations; more detailed magnetometer and seismic surveys, upon which to base the evaluation of specific tracts of seabed; and, finally, exploratory drilling, to confirm the presence of oil and natural gas (Heikoff, 1980).

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*Heikoff (1980), however, documented one further stage, the "Shutdown Stage," which may occur anywhere from 10 to 50 years after the commencement of production.

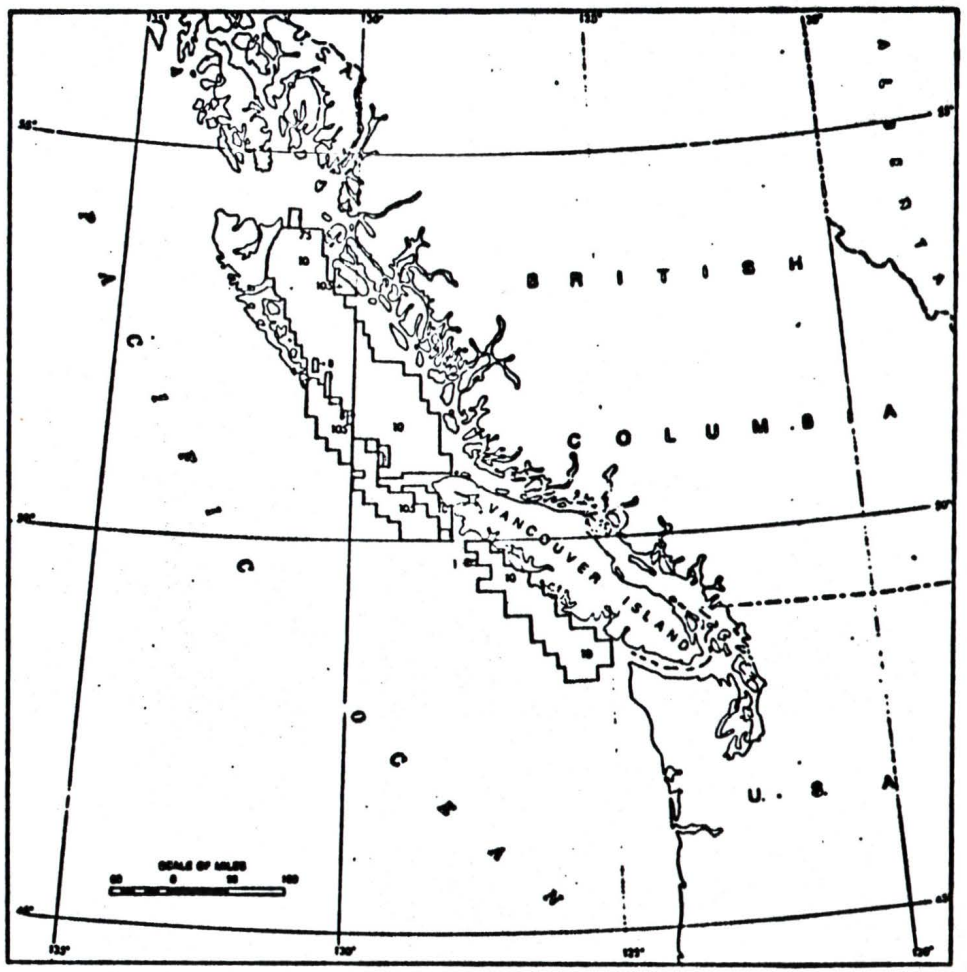
FIGURE 9: MAP OF OIL AND GAS PERMIT HOLDERS ON THE WEST COAST

KEY NO.

1. Lochiel Exploration Ltd.
2. Sedume Oil & Gas Ltd.
3. Hudson's Bay Oil and Gas Company Limited 10%
   Ranger Oil (Canada) Limited 57%
   Bow Valley Industries Ltd. 8%
   Canadian Superior Oil Ltd. 20%
   Sun Oil Company Limited 5%
4. Hudson's Bay Oil and Gas Company Limited 28.57%
   Canadian Superior Oil Ltd. 57.14%
   Sun Oil Company Limited 14.29%
5. Shell Canada Resources Limited 61.96%
   Canadian Superior Oil Ltd. 21.76%
   Hudson's Bay Oil and Gas Company Limited 10.87%
   Sun Oil Company Limited 5.43%
7. Ulster Petroleums Ltd.
8. Ranger Oil (Canada) Limited
9. Chevron Canada Limited
10. Shell Canada Resources Limited 50%
    Shell Explorer Limited 50%
    Production Canada Ltd.
11. B.P. Exploration Canada Limited 60%
    Columbia Gas Development of Canada Ltd. 17%
    Chevron Canada Limited 13%
    Gulf Canada Limited 10%
12. Total Eastern Exploration Ltd. 26.33%
    Amerada Minerals Corporation of Canada Ltd. 16.67%
    Gulf Canada Limited 16.67%
    Aquitaine Company of Canada Ltd. 13.33%
    AGIP Canada Ltd. 10.00%
    Sun Oil Company Ltd. 10.00%
    Total Petroleum (North America) Ltd. 5.00%
13. Gulf Canada Limited
14. Esso Resources Canada Limited
16. Amoco Canada Petroleum Company Ltd.
17. Amoco Canada Petroleum Company Ltd. 50%
    Texaco Canada Inc. 50%
21. Mobil Oil Canada, Ltd.
22. Imperial Oil Limited
23. Star Oil & Gas Ltd.
24. Shell Canada Resources Limited

KEY NO.

28. Texaco Canada Inc.
29. Amerada Mineral Corporation of Canada Limited
30. Dome Petroleum Limited
32. Canadian Superior Oil Ltd.
47. Hudson's Bay Oil and Gas Company Limited
48. Murphy Oil Company Ltd. 50%
    Francana Oil & Gas Ltd. 50%
50. Paddon Hughes Development Co. Ltd. (The)
51. Sagepet Limited 33-1/3%
    Teck Corporation Limited 33-1/3%
    Canadian Homestead Oils Limited 33-1/3%
53. Atlantic Richfield Canada Ltd. 52.6%
    Aquitaine Company of Canada Ltd. 34.2%
    Petrolina 6.6%
    Sagepet Limited 6.6%
54. Aquitaine Company of Canada Ltd.
58. Pan Ocean Oil (Canada Ltd. 45%
    Peyto Oils Ltd. 28%
    High North Petroleums Ltd. 14%
    Norris Holdings Ltd. 13%
64. Sagepet Limited 60%
    Canada Homestead Oils Limited 20%
    Teck Corporation Limited 20%
75. Union Oil Company of Canada Limited
77. Canada-Cities Service, Ltd. 30%
    Hamilton Brothers Canadian Gas Company Ltd. 27.5%
    Mobil Oil Canada, Ltd. 25%
    Siebens Oil & Gas Ltd. 17.5%
78. Amoco Canada Petroleum Company Ltd. 50%
    Imperial Oil Limited 50%
80. B.P. Exploration Canada Limited 60%
    Chevron Canada Limited 18%
    Columbia Gas Development of Canada Ltd. 12%
    Gulf Canada Limited 10%
90. Canadian Homestead Oils Limited
102. Fairholme Development Limited
105. Douglas F. Smith



Source: Government of Canada, *Offshore Exploration* (Ottawa: Department of Energy, Mines and Resources, 1979), pp. 50-51.

TABLE 1: A SUMMARY OF THE STAGES AND ACTIVITIES IN OFFSHORE PETROLEUM DEVELOPMENT

On-Site	Site-to-Shore	Onshore
EXPLORATION STAGE - Issuance of exploration permits - Regional surveys - Magnetometer and seismic surveys - Exploration drilling	- Movement of supply ships - Helicopters transport	- Establishment of harbour supply bases - Administrative headquarters
DEVELOPMENT STAGE - Establishment of permanent production platforms	- Supply ships and helicopter transport continue - Construction of undersea pipelines - Undersea storage facilities, or - Tanker navigation infrastructure	- Establishment of landfalls - Storage facilities - Refineries - Onshore pipelines - Harbour expansion
PRODUCTION STAGE - Issuance of production lease - Cleansing of hydrocarbons - Metering flow ashore	- Pipeline transportation of hydrocarbons begins, or - Surface tanker transportation - Supply ships and helicopter transport continues	- Petro-chemical refining - Distribution and export
SHUTDOWN STAGE - Removal of permanent production platforms (hazards to navigation)	- Movement of supply ships, helicopters and hydrocarbons ceases	- Petro-chemical refining, distribution and export ceases from conventional fields - Preparation made for alternatives to alleviate social and economic stress

Although exploratory drilling has been conducted from barges in water depths of up to 600 feet (180 m) in the Gulf of Mexico, the most common types of drilling platforms today are jack-up, semi-submersibles and drill ships (Kash, 1973). Jack-up platforms are favoured in shallower water (to depths of approx. 300 ft. [90 m]). However, as development has progressed into deeper water, semi-submersibles and drill ships have become more popular. These platforms float above the well to depths of over 5,000 feet (1,500 m) and remain in location by a computer controlled system known as "dynamic positioning." (See Plates 1-3.)

During the Exploratory Stage, supply vessels move back and forth between the drilling platforms and the shore bases. The frequency of this traffic depends upon the size of the drilling platform and the number of platforms in operation. Shell (Canada) Ltd., for example, used only one exploratory drilling platform along the west coast between 1967-69 and this was serviced by two supply vessels and an ocean-going tug (Little, 1967). A resumption of exploration in this decade could result in the use of several drilling platforms and a substantial increase in the number of supply vessels.

Exploratory drilling does have a significant impact onshore, but the effects are less dramatic than those which can occur in the development and the production stages that arise later. Specifically, harbour supply bases, administrative headquarters and oil-related manufacturing are typical of the services that proliferate during the Exploratory Stage of offshore development. Harbours are particularly important, because supplies must be continually shipped to the drilling platforms to ensure continuous operations. Similarly, administrative headquarters often locate nearby and, inevitably, those businesses that can replenish the necessary drilling equipment also find it to their advantage to locate here. A survey of North Sea exploration bases, for example, indicated that substantial development had occurred in 18 English and Scottish coastal communities within two years of the commencement of the exploratory drilling (Cooper and Gaskell, 1966). The survey identified approximately 74 oil-related agencies: 43% were oil-related manufacturers and suppliers; 26% were oil company headquarters; 7% were drilling con-

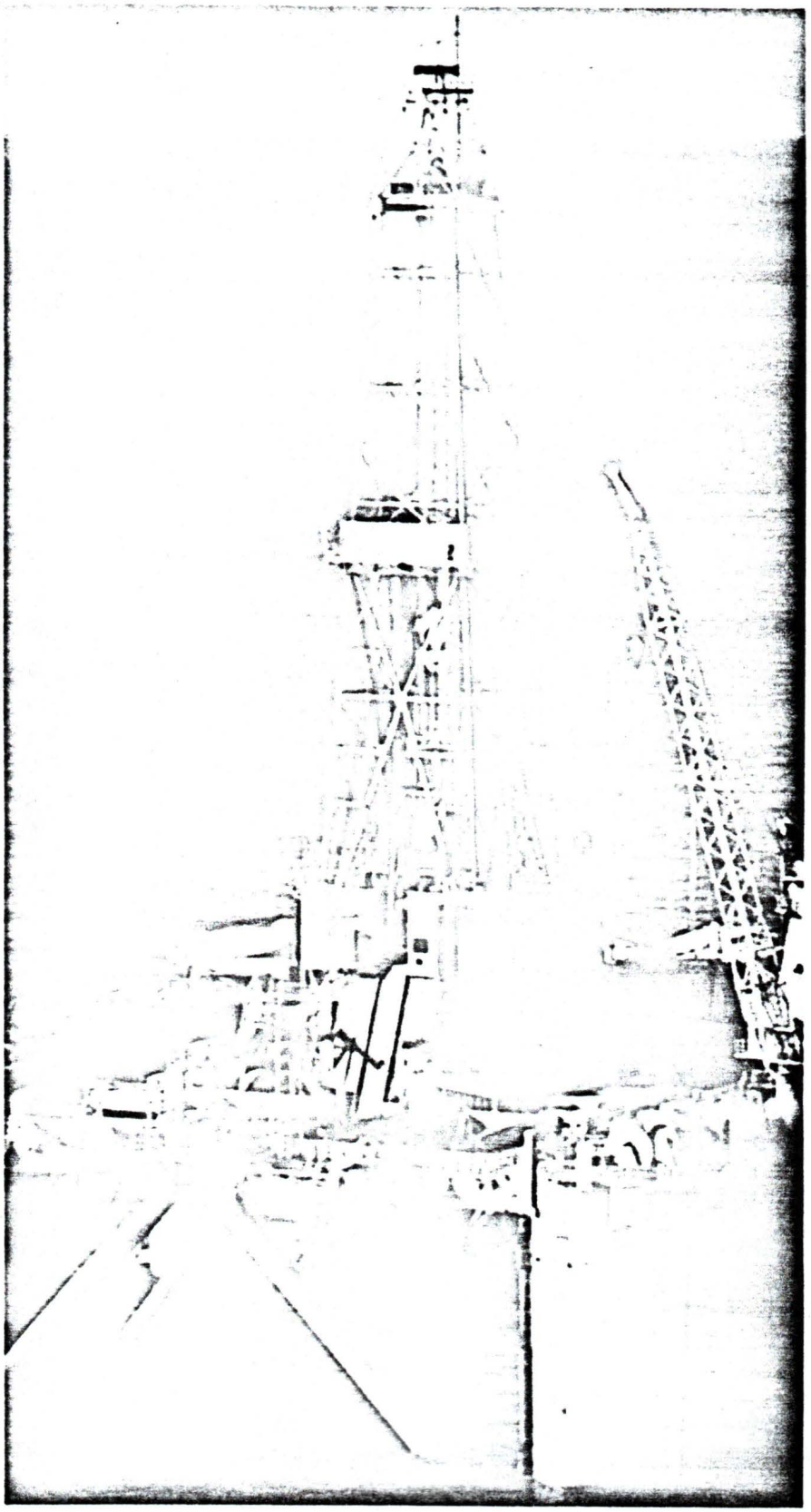


PLATE 1: Conventional drilling platform.

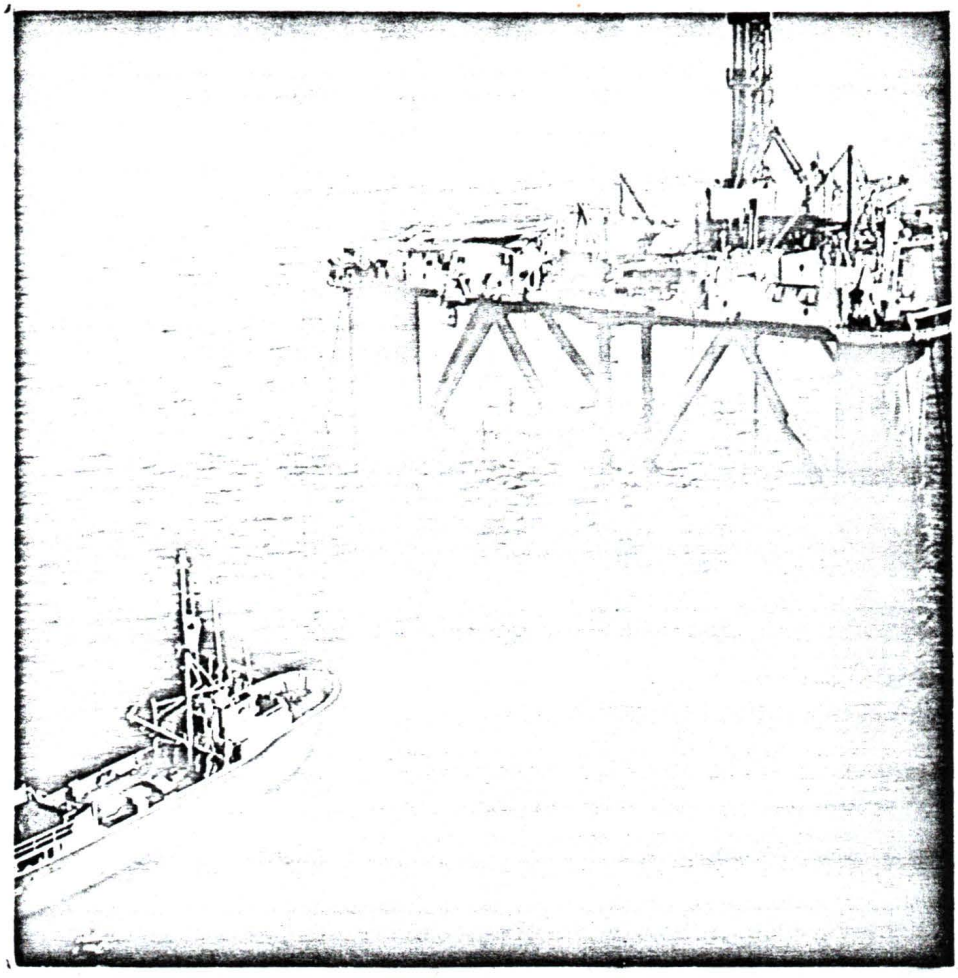


PLATE 2: Semi-submersible drilling platform.

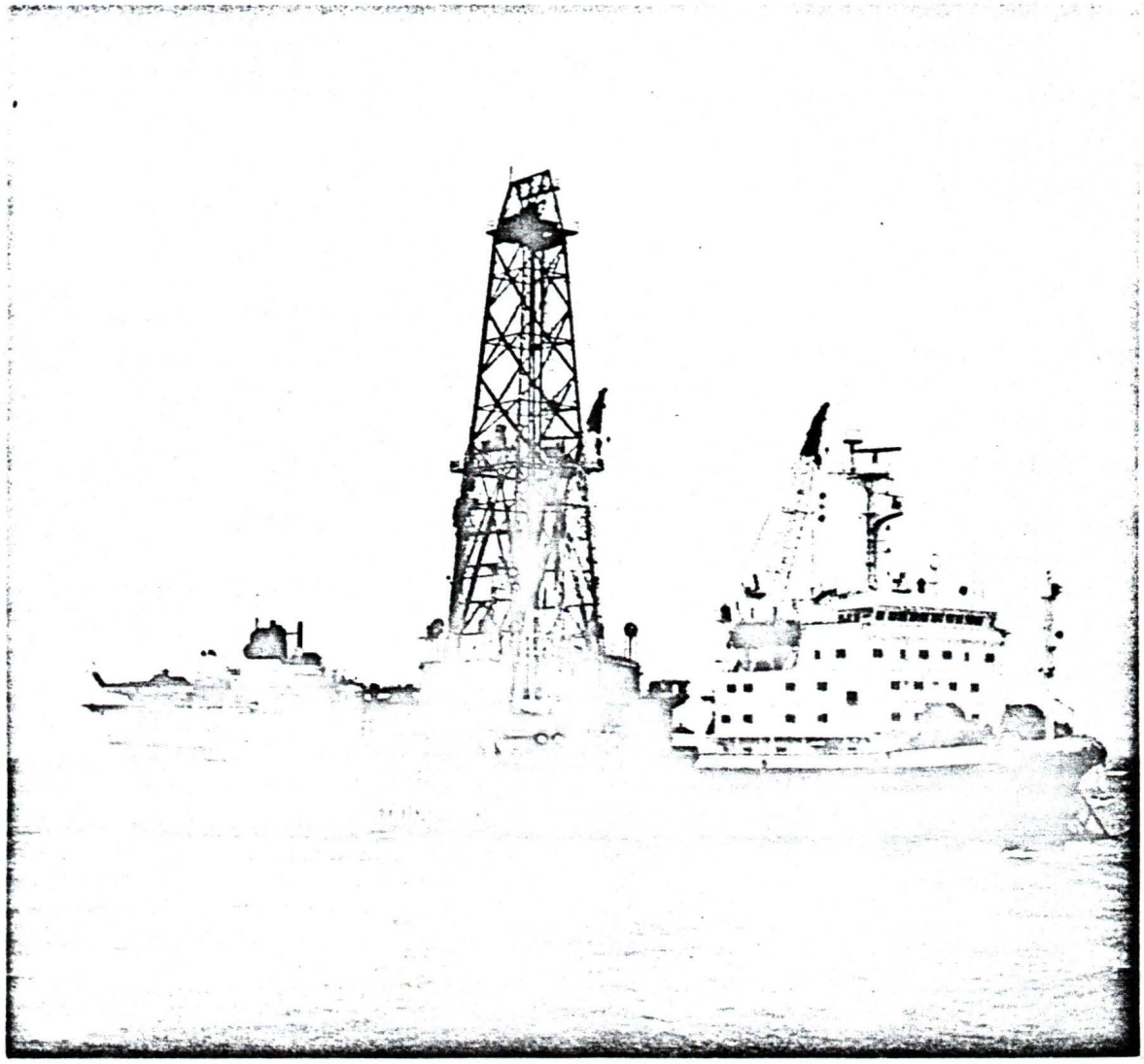


PLATE 3: Drill ship.

tractors; 6% were petroleum consultants; and 18% fulfilled a variety of functions from helicopter transportation to equipment storage.

Development Stage. When a commercially viable oil or natural gas field has been positively identified, the temporary drilling platforms must be replaced by a permanent infrastructure that will gather the hydrocarbons efficiently and transport them to the onshore facilities (see Figs. 10-12). The on-site infrastructure has, traditionally, consisted of a conventional fixed platform, resting on the seabed and capable of operating to depths of up to 1,000 feet (300 m)(Kash, 1973). More recently, the subsea completion system has evolved. Although still being perfected, this system can eliminate virtually all the surface platforms by tapping the contents of the undersea oil field via a series of satellite fixtures on the seabed (English, 1981). However, temporary systems have also been devised to extract the hydrocarbons while a permanent fixture is being constructed. These facilities include buoyant production rises and semi-submersible platforms.

Oil and natural gas may be transported from site-to-shore by tankers or pipelines. Tankers are more effective for small oil fields or over long distances, but pollution risks are greatly reduced with pipelines (Heikoff, 1980). This particular advantage often results in their adoption as a means of transportation and experts predict that the popularity of this mode of transport will continue (Kash, 1973). However, if tankers are used, offshore storage may be required to provide a buffer between the continuous production of the offshore wells and the discontinuity of tanker operations due, for example, to inclement weather. Storage systems vary, but they generally are comprised of either a floating tanker, or a series of subsea tanks (ibid.).

A major offshore oil and natural gas find has important implications onshore, particularly as the Exploratory Stage is superseded by the Development Stage. Landfalls must be established for the undersea pipelines, and refineries, storage tanks and deep water loading facilities are needed to complete the infrastructure. Although the landfalls are relatively inconspicuous, the location of tanker farms and refineries pose environmental and aesthetic problems that can be a planner's night-

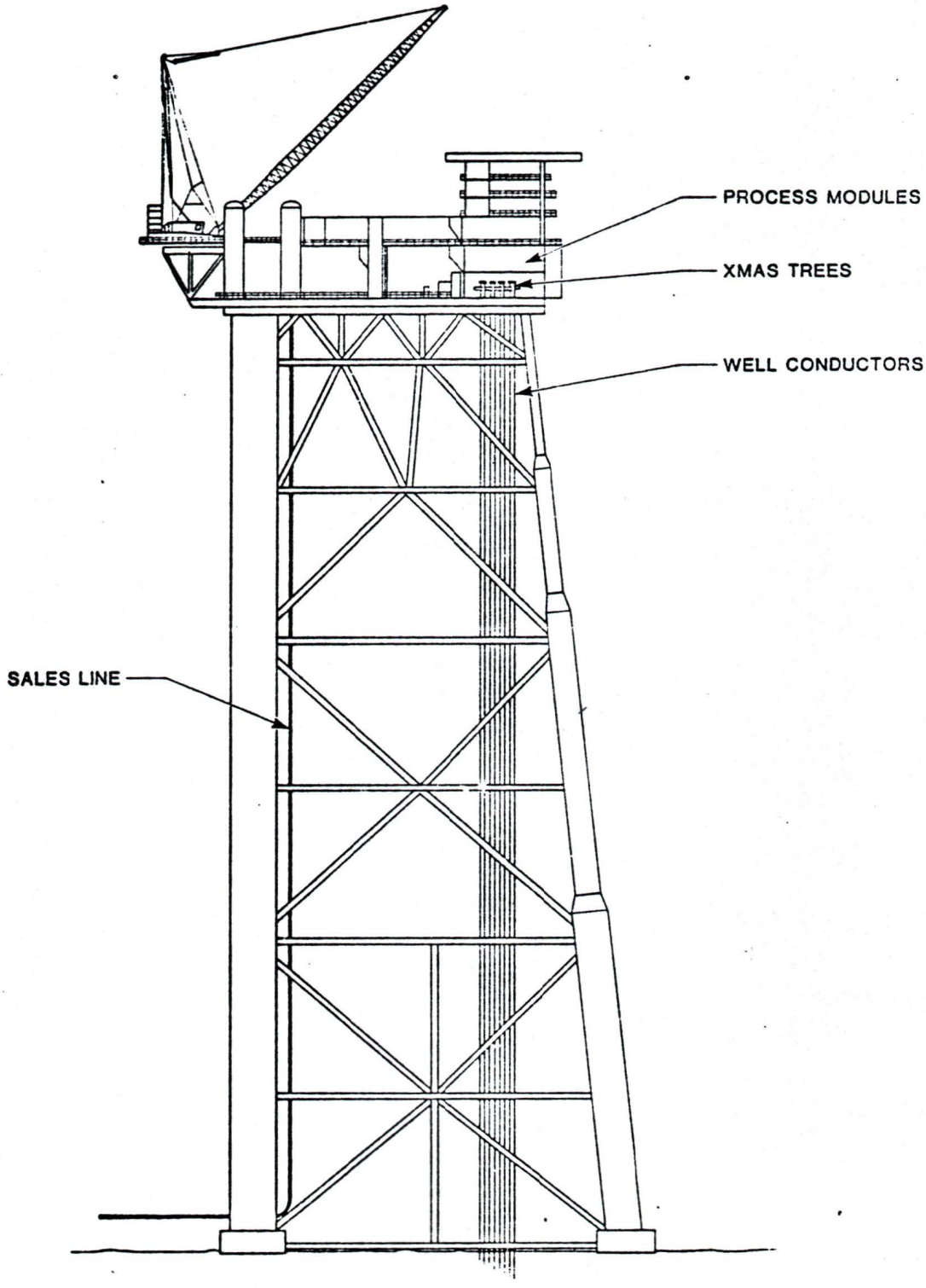


FIGURE 10: Conventional platform completion.

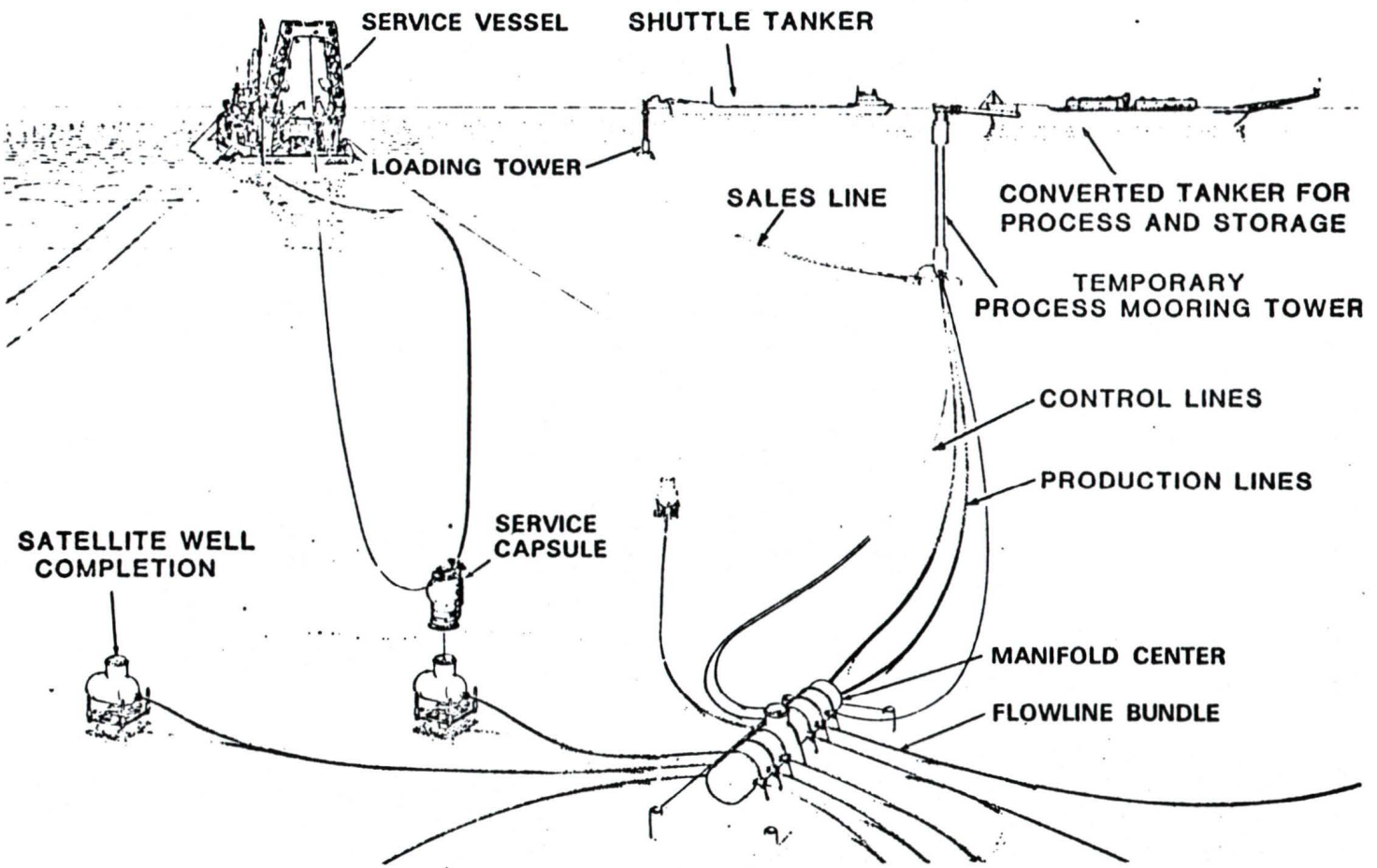


FIGURE 11: Subsea completion system.

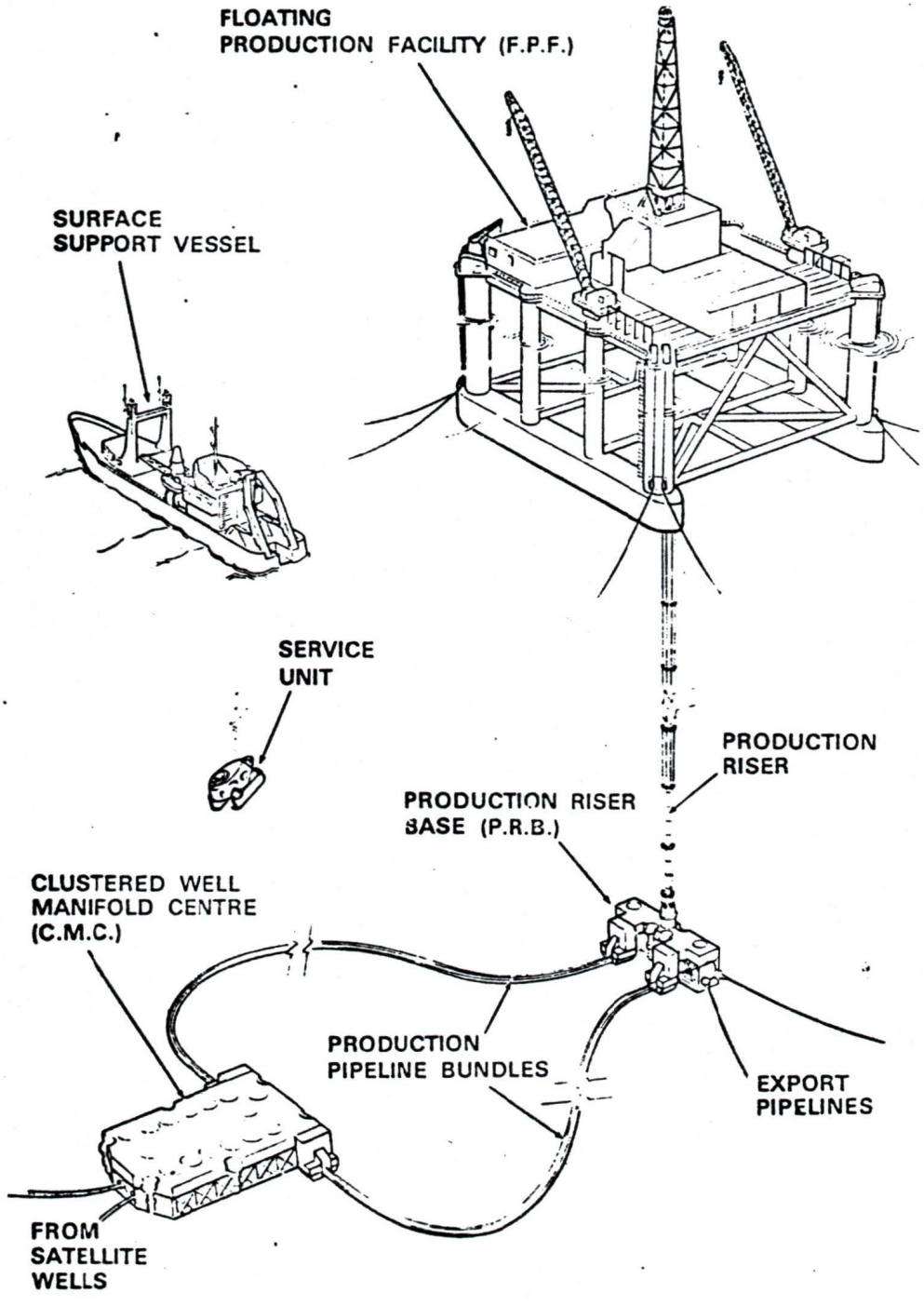


FIGURE 12: Deep water production system.

mare (Baldwin and Baldwin, 1975). Moreover, if the hydrocarbons are to be exported, deep water ports, such as the one recently proposed—and later rejected—at Kitimat, British Columbia, become necessary (Thomson, 1978).

A recent study in Nova Scotia indicated that if no commercial quantities of oil were to be found off its coastline, investment would probably peak at about $1.7 billion with about 6,500 temporary jobs. Conversely, a major strike could increase this estimate to $4.9 billion, with the creation of almost 20,000 new jobs (*Vancouver Sun*, June 26, 1981). However, some analysts caution against this optimism, noting the capital intensive nature of the investment. Furthermore, others have indicated that the expectations of local business can be quickly disrupted by outside competition, which can usually supply the necessary goods and services to the oil industry much faster and more efficiently (*Vancouver Sun*, May 8, 1981). Nevertheless, the Development Stage of the cycle is the most intensive period of economic growth, and, simultaneously, can be characterized by periods of intense social and political upheaval if careful planning is not undertaken.

Production Stage. Before production can commence, a lease, or production license, must be obtained from the appropriate regulatory authority. Normally, this step will be completed between the Development Stage and the Production Stage, but it is not certain yet as to which level of government will exercise this responsibility on the west coast. Once the Production Stage is finally reached, liquid hydrocarbons begin to flow from the wellhead to the various treatment facilities. Ostensibly, a series of valves separate the hydrocarbonsfrom contaminants, such as sand, gravel and water, and the contents are then metered before being transferred ashore.

As the hydrocarbons begin to flow ashore, either by tanker or pipeline, there is an increase in certain onshore activities and a decline in others. For example, financial revenues from onshore development reach their peak during the years of high level production, but as major construction projects begin to decline, particularly the construction of drilling platforms and pipelaying activities, unemploy-

ment can ensue. Baldwin and Baldwin (1975) note, for example, that an oil refinery employs approximately 2,000 people during construction, but only 300 are required for its operation. Nevertheless, in some cases, sites which have outlived their usefulness can serve other purposes: construction sites can be transformed into marinas, or sewage treatment facilities; and harbours that were enlarged to accommodate the needs of the oil industry may be more effectively utilized by the fishing industry. However, the Production Stage generally signals the end of the construction boom, although with careful planning, industrial expansion can continue.

One activity in particular that can flourish onshore during the Production Stage is the petrochemical industry. Extensive refining and processing of petroleum can produce myriad different by-products, including liquid petroleum gas, gasoline, kerosene, heating oil, jet fuel, diesel fuel, grease, lubricants, oils, wax and asphalt (Canadian Petroleum Association, 1969). Similarly, natural gas is a fuel of almost limitless uses. Dry gas, or methane, is used extensively for home heating, refrigeration and air conditioning; and wet gas can produce ethane, butane, and propane, which can be used as new materials in a long list of products ranging from perfumes and explosives to shoe soles and jet fuels. Furthermore, if the natural gas has a high sulphur content, it can be used in the manufacture of sulphuric acids and as an important ingredient in the pulp and paper industry (ibid.). Careful planning prior to the Production Stage, therefore, can promote industrial expansion and minimize the effects of a slow-down in the major construction projects.

In assessing the various stages that may occur in the possible future development of offshore oil and natural gas off Canada's west coast, it would be pertinent to conclude with several of the findings of Baldwin and Baldwin (1975) concerning the North Sea experience. They note that onshore activity is an inevitable result of offshore development, and that it triggers both immediate and long-term changes in the social, economic and political fabric of coastal regions—particularly in smaller communities. They also note that oil operators and their

related industries do not focus on community needs and that co-ordinated private and public planning is necessary. Finally, they note that there is an inevitable conflict between the emphasis upon rapid development at the national level, and the more traditional local planning prerogatives. This conflict may prove to be particularly intractable on the west coast, in view of this area's traditional, environmental sensitivity.

CHAPTER 4

THE JURISDICTIONAL DIVISION OF POWER OVER NATURAL RESOURCE MANAGEMENT IN CANADA: FEDERAL-PROVINCIAL WARFARE

Canada has a federal form of government with a British tradition of parliamentary democracy. The constitution, based upon a written document and upon the unwritten law of convention, allocates powers to the federal government and to each of the ten provinces, respectively. Each level of government possesses a legislature, which makes laws; an executive, which puts those laws into effect; and a judiciary, which is responsible for resolving legislative ambiguity and alleviating political conflicts. However, a component of the executive, which has assumed great importance in policy making, is the administrative apparatus—the bureaucracy itself. Before examining the bureaucracy in detail, this chapter will clarify the legislative framework of natural resource management in Canada, particularly as it applies to offshore mineral development.

The management of natural resources in Canada is governed by the provisions of the British North America (BNA) Act of 1867. The proprietary rights of each level of government that pertain to natural resource management are stipulated in sections 91, 92, 95 and 109 of this Act. Ostensibly, section 91 deals specifically with those areas of jurisdiction that fall within the purview of the federal government. Three of the 31 items refer directly to the management of natural resources: "sea coasts and inland fisheries"; "navigation and shipping"; and "Indian lands." Section 92 refers to those functions which fall within the provincial orbit. Specifically, the provinces exercise proprietary rights in matters such as "municipal institutions"; "property and civil rights"; "the management and sale of public lands"; and "local works," except for rail, canal and shipping lanes which traverse interprovincial and international boundaries. Section 95 of this Act apportions the

management of agricultural resources to both levels of government with federal paramountcy, but section 109, again, refers to the exclusive proprietary rights of the provinces. This final section provides for complete provincial control of all "lands, mines and mineral resources" within provincial boundaries.

Conceptually, this would seem to make the division of responsibilities in natural resource management clear and unequivocal. However, in practice, the management of natural resources in Canada is predicated upon two legislative components: the *de facto* ownership of specific resources; and, of great significance, the *de jure* authority, or the right to legislate upon matters that may, indirectly, infringe upon the ownership prerogative of another level of government (MacNeill, 1971). As Thomson and Eddy (1973) note: "Enough has been written to make it clear that the framework of power over natural resources in Canada is a complex one and that no single government has a resource management policy entirely on its own" (p. 80).

There are, for example, many instances in which the federal government has exercised a partial involvement in virtually every type of natural resource, even where its management has been specifically delegated to the provinces. This results from the federal government's direct control over: "transportation and commerce"; "external affairs"; and problems relating to major "emergencies." Incorporated into the BNA Act, furthermore, is the pervasive power of the federal government in such matters as banking, taxation, and the management of fiscal policy, each of which impinges upon the province's proprietary rights to manage its natural resources. In addition, a "declaratory" clause and a proviso pertaining to "peace, order and good government," both enable the federal government to claim jurisdiction over virtually any work if it is in the national interest. However, other difficulties are apparent.

Policy conflict, for example, arises in situations in which both levels of government manage specific resources that are constitutionally

independent, but operationally interdependent. For instance, even though the management of forests is a provincial concern and fishery protection is a federal matter, the two are interrelated, because anadromous fish stocks can be severely depleted by poor logging practices. Consequently, optimal development strategies in one industry can have a serious deleterious impact upon another. Similarly, functional conflict can arise in instances where joint management of a resource has been constitutionally recognized, but institutionally fragmented, resulting in a duplication of effort and, consequently, administrative inefficiency. Both policy conflict and functional conflict are endemic in coastal zone management in Canada.

Yet, despite these difficulties, several new areas of responsibility in natural resources management have evolved since Confederation. They include the acquisition of national parks by the federal government; the allocation of recreational resources, excluding national parks, to the provinces; and, of particularly importance to coastal zone management, the emergence of a joint federal-provincial strategy for the management of fisheries and water resources (Dwivedi, ed., 1980). Unfortunately, offshore minerals are not specifically mentioned in the BNA Act and this omission—albeit understandable—has resulted in several decades of intense debate as to which level of government in Canada should exercise the proprietary rights to this valuable resource.

Prior to the Supreme Court of Canada ruling in 1967, British Columbia based its claim to offshore minerals ownership on both the BNA Act itself, and the terms under which it entered Confederation. Specifically, Black (1966) notes that the province considered that section 109 not only referred to provincial "lands, mines, minerals and royalties" onshore, but to those offshore as well. In addition, the province believed that it had retained its claim to offshore minerals when it entered Confederation in 1871: "We have not obtained our mineral rights from Canada, we obtained them from Great Britain as a separate entity a long time before joining confederation (*Oilweek*, Jan. 7, 1963, p. 14).

The federal government remained reticent on its claim to ownership at this time. However, Black (1966) cited several possible arguments by which it might pursue its claim. First, an expanded interpretation of the federal powers of "trade and commerce" assisted, perhaps, by "navigation and shipping." Second, persuading the courts that the postwar decision on offshore ownership in the United States, in favour of the federal government, was a valid precedent for Canada. Third, invoking section 91 of the BNA Act, proclaiming such a decision as being in the interest of "peace, order and good government." Finally, it is Canada that has paramountcy in negotiating international treaties (although it does not necessarily have paramountcy in their implementation). Nevertheless, shortly before the Supreme Court of Canada delivered its verdict on the ownership of offshore minerals along Canada's west coast, Black commented: "no matter what its decision might be, the federal government appears to have rather slight legal claim to ruling under the offshore waves as well as over them" (p. 603). However, the Supreme Court of Canada disagreed.

The Supreme Court was asked to deliberate upon two specific sets of questions regarding the ownership of offshore minerals.* The first

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*The discussion that follows is based upon the *Canada Law Reports*, eds., F. des Rivières and M. Shipley (Ottawa: Queen's Printer, 1968), pp. 792-822.

set pertained to all mineral resources of the seabed that lay between the low water mark and the limits of the territorial sea:*

(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?

The second set of questions pertained to mineral resources of the seabed beyond the territorial sea:

(a) Has Canada or British Columbia the right to explore and exploit the said minerals and other natural resources?

(b) Has Canada or British Columbia legislative jurisdiction in relation to the said minerals and other natural resources?

With regard to the first set of questions, the court argued that British Columbia could only succeed in this aspect of the case if it could prove that the *solum* was situated in British Columbia at the time it entered Confederation. Citing a legal precedent in England concerning *Reginald v. Keyn,* the justices argued that since the territory of England ended at the low water mark in 1876, so too did that of British Columbia and, therefore, it could not have brought this claim into Confederation in 1871. They also noted that the province had not acquired ownership since that date. Furthermore, the court indicated that the role of the federal government in the sovereign state and as the recognized party in all international agreements pertaining to offshore resources, had a propitious influence upon their decision. Finally, the court cited the absence of a tangible reference to offshore minerals in section 92 of the BNA Act, and, therefore, the relevance of the "residual" clause in section 91, favouring federal ownership. Consequently, the court

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*At this particular time, Canada exercised a 3 nautical mile (5.6 km) territorial sea and a 12 nautical mile (22 km) fishing zone off its coastline.

answered the first set of questions in favour of the federal government.

With regard to the second set of questions, the court briefly noted that since the area beyond the territorial sea was legally defined as the continental shelf, pursuant to the 1958 Geneva Convention on the Continental Shelf, the federal government exercised paramount authority in both cases, because the continental shelf was outside British Columbia and, therefore, Canada was the internationally recognized sovereign state. As a result, the second set of questions were also answered in favour of the federal government.

The Supreme Court's decision was announced in March 1967, and came as a disappointment not only to British Columbia, but to all of the coastal provinces. However, although the Supreme Court's decision certainly mollified the jurisdictional dispute, it did not completely resolve the issue, because the justices had excluded such areas as "harbours, bays, estuaries and other similar inland water" in their deliberation (des Rivières and Shipley, eds., 1968, p. 796). Consequently, in 1976, the province forwarded a request to the British Columbia Court of Appeal to determine whether or not lands covered by the Strait of Juan de Fuca, the Strait of Georgia, Johnston Strait and Queen Charlotte Strait were considered part of the provincial domain, i.e., *inter fauces terrae*, or an adjunct to the federal *solum*. In a 3-2 decision, announced in June 1976, the justices adjudicated in the province's favour (Miller, 1977). A federal spokesman recently commented that although an appeal had been filed at this time, the federal government had never proceeded with it (*Vancouver Sun*, June 3, 1981).

As far as the province of British Columbia is concerned, the ownership of offshore minerals along the west coast is still far from being satisfactorily resolved. At the Federal-Provincial Conference of First Ministers in September, 1980, British Columbia, together with each of the other coastal provinces, reaffirmed its claim for offshore mineral ownership by constitutional recognition. The provinces suggested that this could be achieved either by adding a new clause to section 109 of the BNA Act, as well as incorporating a parallel amendment to section 92

(since ownership and jurisdiction are not synonymous), or by extending the provincial boundaries seaward to the edge of the continental shelf. The first approach was preferred as a legal technique. However, the federal government expressed strong disapproval of provincial ownership and proposed an administrative regime that would have permitted joint federal-provincial management—but not ownership—by a constitutional amendment. Unfortunately, no province indicated its approval of the federal proposal, as defined, but there was an indication from some coastal provinces that if an arrangement could be devised that would confer to the offshore the equivalent benefits of those traditionally enjoyed with regard to onshore resources, then such a solution might constitute a satisfactory alternative to ownership.

Although no legislative changes have occurred since this conference, several important events have occurred. The disclosure of the federal government's National Energy Program (NEP) in late 1980, has resulted in the designation of all offshore coastal waters as being "Canada Lands" and, therefore, subject to federal control (Government of Canada, 1980). The constitutional ambiguity inherent in this decision prompted the province of British Columbia to establish an offshore administration branch in April, 1981, and to declare all waters inside the Marine Waters Baseline to be "inland waters" and, consequently, subject to provincial jurisdiction (Figure 13).* However, although British Columbia is continuing to fight for control of its "inland waters" and is reiterating its claim to the seabed beyond, at least one coastal province—Nova Scotia—has acquiesced to a joint federal-provincial agreement on offshore development under the terms put forward by the federal government at the Federa-Provincial Conference of First Ministers in September 1980 (*Victoria Times-Colonist*, March 2,

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*Since Marine Waters Baselines are internationally recognized lines of enclosure that delineate the outer edge of a nation's "inland waters," the province argues that any waters inside such lines must, by implication of the 1967 Supreme Court of Canada ruling concerning the ownership of "inland waters," fall within the provinces' jurisdiction.

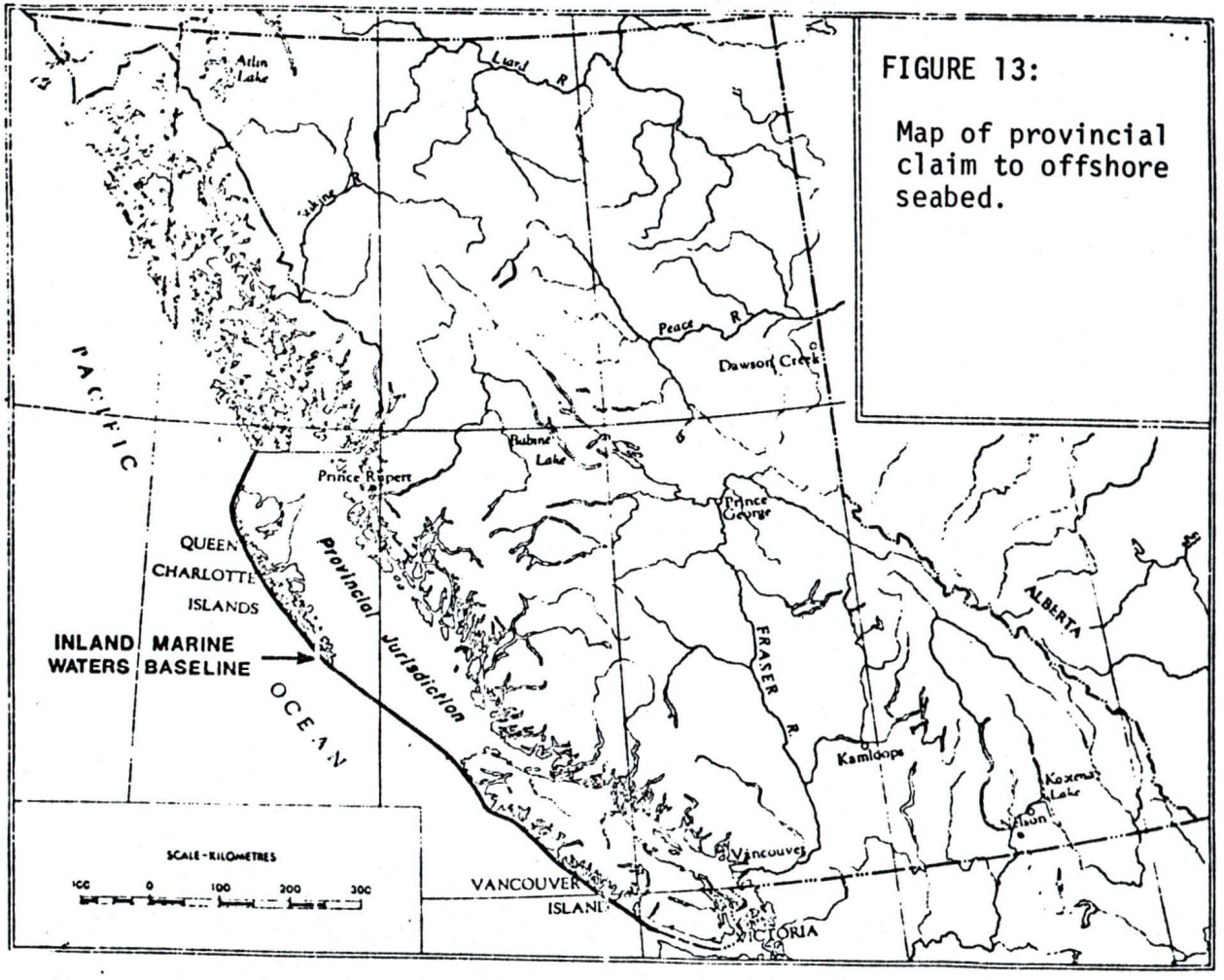

FIGURE 13:

Map of provincial claim to offshore seabed.

1982). In the interim, the federal government has submitted the Hibernia ownership dispute to the Supreme Court of Canada.

CHAPTER 5

THE PERSPECTIVES OF THE PROVINCIAL BUREAUCRACY

Many provincial ministries, crown corporations and other miscellaneous agencies could play a vital role in the future development of offshore oil and gas resources along Canada's west coast. As previously noted, these agencies may be grouped into several distinct categories of functional specialization. The purpose of this chapter is to examine the extent to which each of the relevant branches within these agencies is currently involved in preliminary offshore petroleum development; the degree of technical expertise within each branch both in terms of its quality and quantity; and the manner in which each of these branches coordinates its activities within and between each level of government. Areas of conflict and potential conflict have been indicated. The most significant agencies in the following categories have been examined in detail: On-Site Regulation; Environmental Protection; Infrastructure; and, finally, Emergency Response. Agencies that fall into other categories of functional specialization have been listed. These categories include: Economic Development; Scientific Research; and Manpower.

ON-SITE REGULATION

On-site regulation refers to all those agencies which could monitor activities at the drill site, before, during and after resource extraction occurs. In the provincial government, there are several, semi-independent agencies involved in energy related matters. However, each reports to the legislature through the Ministry of Energy, Mines and Petroleum Resources (EMPR). Consequently, EMPR supersedes each as the paramount provincial agency that would be directly responsible for the on-site regulation of any offshore petroleum resources that fall within provincial jurisdiction.

EMPR has undergone considerable reorganization since its inception as the Department of Mines in 1874. However, reorganization has been particularly noticeable in recent years. In 1953, for example, the Department of Mines took over the administration of the Petroleum and Natural Gas Act and the Coal Act from the Department of Lands, and by 1960 it had become known as the Department of Mines and Petroleum Resources. In 1973, the promulgation of the Department of Mines and Petroleum Resources Act further reorganized the department into a Mineral Resources Branch and a Petroleum Resources Branch, each reporting to a separate Assistant Deputy Minister (ADM). However, still more changes occurred in October 1978, when this agency, now a ministry, assumed the responsibility for all energy related matters in the province. The current mandate of EMPR is "to administer the laws and regulations governing the entire mineral industry [in British Columbia] . . . as well as the development and management of [its] energy policy" (Government of British Columbia, 1979-80, p. 85).

Figure 14 illustrates the present organizational structure of this important ministry. Apart from four semi-independent agencies, which report directly to the minister, EMPR Is currently divided into four divisions according to specialization by purpose. There is a Mineral Resources Division, which regulates the development of all non-petroleum minerals in the province; an Energy Resources Division, which is responsible for managing energy policy; a Petroleum Resources Division, which oversees all petroleum and natural gas development; and, finally, a Finance and Administration Division—responsible for administrative functions within the ministry. Each division is composed of a series of branches and each branch reports directly to the appropriate ADM in its division. The organizational chart indicates that each ADM reports to the Deputy Minister and the Minister, respectively. This hierarchy consists of five distinct tiers and this relatively compact structure suggests a relatively high order of centralization. The

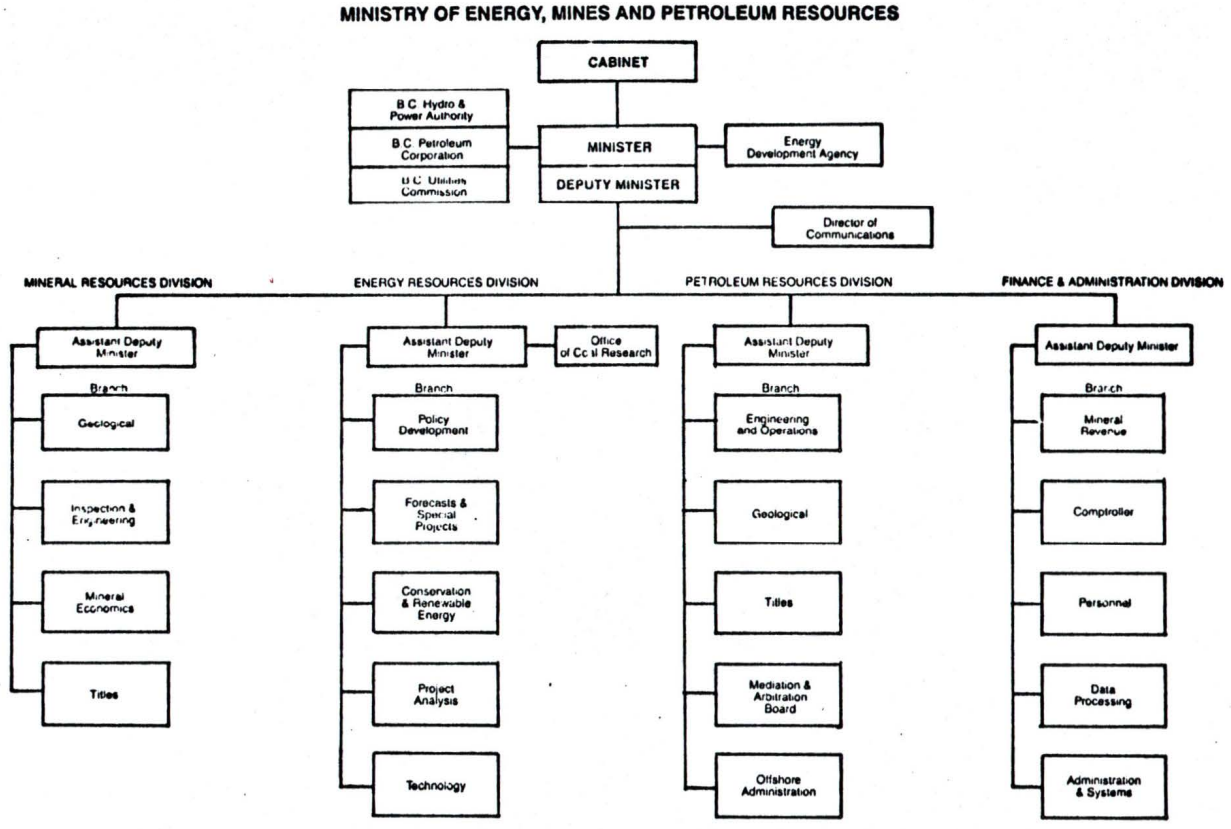

FIGURE 14: Flowchart of the organization of the Ministry of Energy, Mines and Petroleum Resources in British Columbia. [Source: *Organization of the B.C. Public Service* (Victoria: Queen's Printer, 1982), p. 80.]

detailed study of EMPR that follows concerns the Petroleum Resources Division.*

Petroleum Resources Division

The Petroleum Resources Division is responsible for the regulation of all petroleum and natural gas development within the province. Although its contemporary responsibilities are primarily concerned with onshore matters, its precursor was active in the regulation of offshore exploratory drilling during the early 1960s, particularly in the allocation of exploration leases and in the sale of drilling permits. However, the establishment of the Offshore Administration Branch within this division in 1981, clearly indicates that not only has political pressure been applied to the bureaucracy in the form of an administrative change, but that this particular division of EMPR will certainly figure prominently in any future offshore activity along the west coast.

The Petroleum Resources Division is currently divided into five branches, each reporting directly to the ADM: the Engineering and Operations Branch; the Geological Branch; the Titles Branch; the Mediation and Arbitration Branch; and the Offshore Administration Branch (Figure 14). At the present time, only the Offshore Administration Branch, the Geological Branch and the Titles Branch can each be expected to participate in the future regulation of this resource, if it falls wholly, or in part, within provincial jurisdiction.**

Engineering and Operations Branch. The Engineering and Operations Branch is responsible for the enforcement of all regulations pertaining

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*Although the Energy Resources Division is presently conducting preliminary research into offshore oil and natural gas development, it has not been included in this study for detailed examination, because any on-site regulatory role will almost certainly be pre-empted by the Petroleum Resources Division itself.

**The Mediation and Arbitration Board, which is responsible for resolving the conflicts of interest between landowners that control the surface rights to the property, and drilling companies, who lease the sub-surface rights for exploration, will not be involved in offshore development.

to petroleum drilling, conservation and safety. It conducts reservoir analyses of oil and natural gas pools, including production rates and potential reserves; it is also responsible for the publication of drilling and production statistics. The branch consists of three sections: a Reservoir Engineering Section, which determines the level of allowable production, promotes conservation and estimates potential petroleum reserves; a Development Engineering Section, which records rig licenses, well authorizations and statistical information on drilling production; and a District Operations Section, which is active in the field, promoting liaison between the division and the drilling industry at the local level. There are eight professional engineers in the branch; two are assigned to the district offices in northeastern British Columbia. One of the engineers holds a master's degree, the remainder have bachelor's degrees.

Geological Branch. This branch is responsible for geological and geophysical data, reports and maps, relating to petroleum and natural gas exploration within the producing and non-producing areas of the province. The branch is divided into two sections: a Reservoir Geology Section, which is responsible for the coordination of projects concerned with regional mapping and the assessment of known petroleum resources; and an Economic Geology Section, which is responsible for similar duties with regard to potential petroliferrous areas. The branch has six professional staff members, each of whom is trained to the baccalaureate level in either geology (5) or geophysics (1).

Titles Branch. The function of the Titles Branch is to administer the laws pertaining to the acquisition and disposition of all petroleum and natural gas rights within the province. It selects and approves parcels of land for posting and accepts or rejects the tenders received. The branch has several clerical staff members, but only one professional appointee—the branch director. He has no specific university training.

Offshore Administration Branch. The Offshore Administration Branch is the most recent addition to the Petroleum Resources Division. It was established in 1981 to administer petroleum exploration in those

offshore areas that the province considered to fall within its own jurisdiction. Its mandate involves the orderly development of this resource in cooperation with other ministries to achieve the optimum socio-economic and environmental benefits. The branch presently consists of three professional staff members. The director holds a doctorate in political science, and the remainder have master's degrees in economics and public administration, respectively.

Organizational behaviour in the Petroleum Resources Division. Research indicates that there is extensive communication between each of the four branches studied in the Petroleum Resources Division. There is a particularly strong link between the Engineering and Operations Branch and the Geological Branch, both of which represent the traditional operational arm of the division, but the Titles Branch contacts each of these branches less frequently, as it is not directly involved in the day-to-day operational role of monitoring petroleum extraction. Similarly, the Offshore Administration Branch is also more independent at the present time; it appears to have a stronger link with the ADM of the division, suggesting that its current decision making role is, understandably, more centralized. Moreover, the emergence of this new branch to oversee offshore petroleum development may well prove to be a source of internal friction, since it is already expanding in size, its staff is highly qualified, and it has a much closer link with the ADM than with the more traditional branches within the division. However, no formal scientific research is undertaken within the Petroleum Resources Division, although extensive integration and interpretation of data occurs between the Engineering and Operations Branch and the Geological Branch; the field offices of the Engineering and Operations Branch are also used by staff of the Geological Branch.

The Petroleum Resources Division is in frequent contact with several other ministries of the provincial government. The most common contacts are with the Ministries of Lands, Parks and Housing; Forestry; and the Environment. Such contacts are necessary to alleviate conflicts between current land use practices and possible future infringement by

petroleum development. The Offshore Administration Branch indicated that its most frequent contacts are currently with the Ministry of Industry and Small Business and the Ministry of the Environment; it noted that communication with the latter tended to be more formal, suggesting that policy conflict between the Offshore Administration Branch and the Ministry of Environment may already be developing. Several significant inter-ministerial committees were identified. The division has direct input to the Environment and Land Use Committee (ELUC) and, in addition, the Offshore Administration Branch has established two working groups to coordinate preliminary activities in offshore oil and gas development (Tables 2 and 3). Joint projects with other ministries are rarely undertaken, although data and advice are shared when the need arises.

TABLE 2: ENVIRONMENT-LAND USE WORKING GROUP

Lands, Parks and Housing	→ Land Use Planning Branch
Transportation and Highways	→ Transportation Policy Branch → Design and Surveys Branch
Intergovernmental Affairs	→ Constitutional Affairs Advisor
Municipal Affairs	→ Senior Planning Coordinator
Energy, Mines and Petroleum Resources	→ Offshore Administration Branch
Provincial Secretary and Government Services	→ Heritage Resources Board
Environment	→ Environmental Emergency Coordinator → Water Management Branch

Each branch of the Petroleum Resources Division does occasionally have contact with the federal government, primarily the Department of Energy, Mines and Resources. Such contacts are usually undertaken to transmit statistical data to complete federal records. However, no joint committees exist between the Petroleum Resources Division and the

TABLE 3: TAX AND FISCAL POLICY WORKING GROUP

Energy, Mines and Petroleum Resources	→ Energy Resources Division → Mineral Revenue Branch → Petroleum Resources Division
Finance	→ Tax and Fiscal Policy Branch
Industry and Small Business Development	→ Economic Analysis and Research Branch

federal government, nor is any research undertaken for any federal agency, although the Engineering and Operations Branch indicated that it has assisted the National Energy Board in the past, by submitting information for federal hearings on energy related matters. Moreover, only the Offshore Administration Branch has been in contact with the federal government on matters relating specifically to offshore petroleum development. These contacts usually involve the Department of Environment, particularly the regional offices in Vancouver, but communication has also been established with the Environmental Protection Service and the federal Environmental Assessment and Review Office in Ottawa. No specific data have been sent by this branch to the federal government and talks have, thus far, been very informal. Perhaps most significant of all, no contact was identified at the operational level between the Offshore Administration Branch and its federal counterpart in Ottawa, the Canadian Oil and Gas Lands Administration. The absence of communication between these two important agencies appears to be directly related to the political conflict at a higher level.

ENVIRONMENTAL PROTECTION

This category of functional specialization involves agencies that could exercise a regulatory role in safeguarding environmental quality. It will be a very important component of any offshore oil and natural

gas development on Canada's west coast. The present moratorium on offshore drilling was imposed for environmental reasons at the beginning of the last decade and lifting this ban remains one of the most formidable hurdles in any future drilling program. However, although environmental management in the province has been almost exclusively related to onshore matters in the past, the provincial government does have considerable expertise in coastal resource protection. Moreover, regardless of which level of government plays a more dominant role in offshore environmental protection, the development of an onshore petroleum infrastructure is inevitable and the province will probably play a major role in this undertaking.

The Ministry of Environment (MOE) has the primary responsibility for environmental management within the province of British Columbia. Created in 1975 to amalgamate several existing services of the provincial government, a further reorganization in 1978 added the responsibilities of fresh water fish, wildlife, marine resources, the Provincial Emergency Program and environmental engineering. In addition to the above, the ministry's responsibilities also include the management of water resources, environmental protection, resource analysis, and surveys and mapping.

Figure 15 indicates the present organizational structure of the Ministry of Environment. It is currently divided into four divisions according to specialization by purpose and area: the Administration Division, responsible for personnel, finance and computing services; the Environmental Management Division, which translates existing legislation into day-to-day policies and regulations; the Regional Operations Division, through which MOE has decentralized much of its mandate to several regions in the province; and the Assessment and Planning Division, which collects and interprets environmental data, and provides an assessment and strategic planning service to the entire ministry. Each branch is responsible to the ADM within its division, who is, in turn, responsible to the Deputy Minister and the Minister, respectively. Unlike EMPR, the organizational chart of MOE indicates a high order of

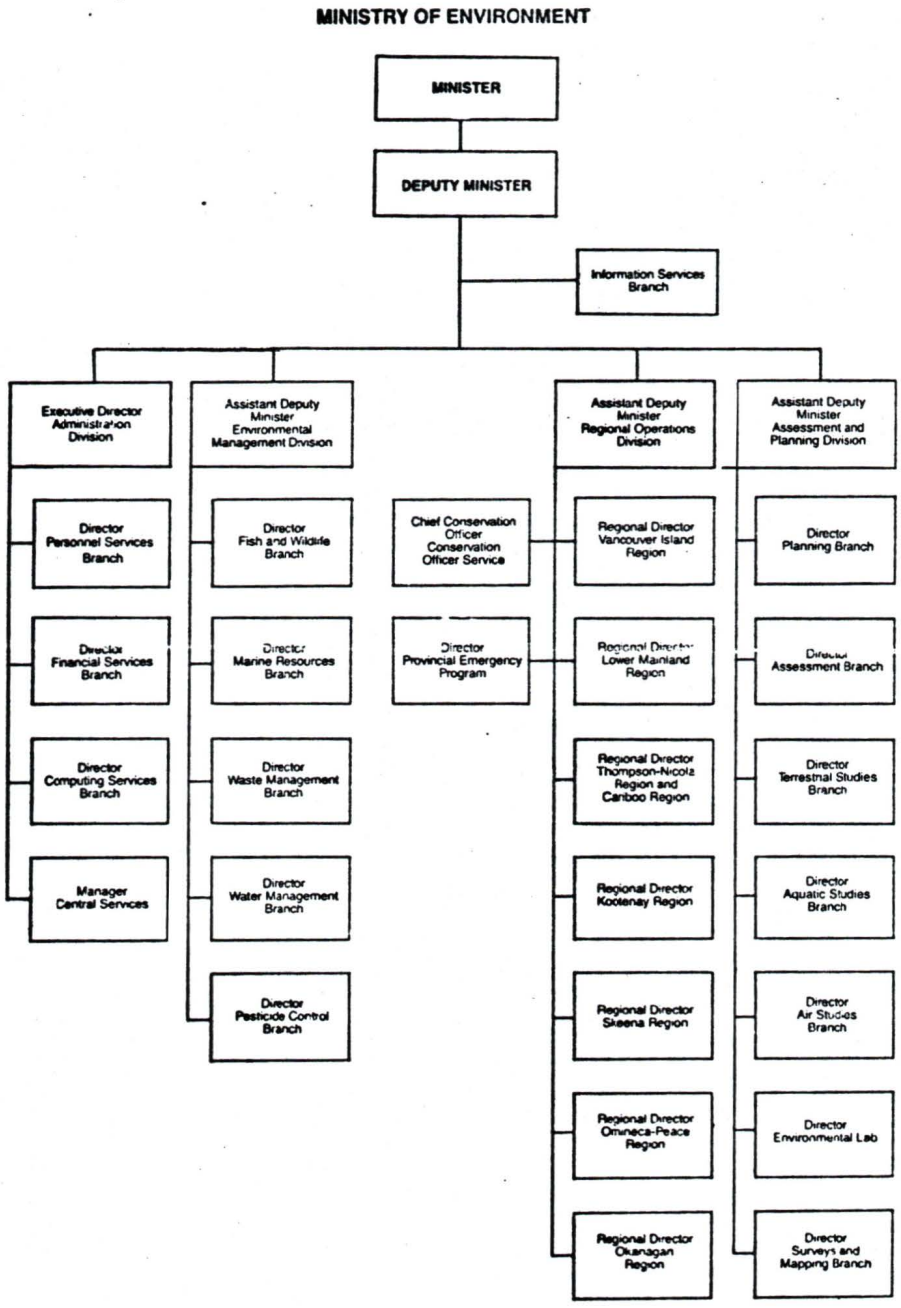

FIGURE 15: Flowchart of the organization of the Ministry of Environment in British Columbia. [Source: *Organization of the B.C. Public Service* (Victoria: Queen's Printer, 1982), p. 93.]

decentralization through its regional districts. The following analysis pertains to those specific branches within MOE that could be expected to play an important role in any future offshore oil and natural gas development.*

Environmental Management Division

The Environmental Management Division presently consists of five branches; each reports to the ADM of the division: the Fish and Wildlife Branch; the Marine Resources Branch; the Waste Management Branch; the Water Management Branch; and the Pesticide Branch. Of these five branches, the Fish and Wildlife Branch, the Marine Resources Branch and the Waste Management Branch could each play an important role in offshore petroleum development. However, only the Marine Resources Branch and the Waste Management Branch are presently involved in preliminary offshore petroleum planning.

Fish and Wildlife Branch. The function of the Fish and Wildlife Branch is to maintain and enhance the fish and wildlife resources of the province of British Columbia. The branch is responsible for the management of all fresh water fish and wildlife in the province, including two anadromous fish stocks—steelhead and cutthroat trout—which are delegated to the province by the federal government. However, migratory wildlife and some sea mammals are jointly managed. The Victoria branch is divided into three sections: a Fish Section; a Wildlife Section; and a Habitat Section. There is a professional staff of approximately 32 in the Victoria Branch and almost all are biologists. Ten have bachelor's degrees, and 22 have post graduate training.

Marine Resources Branch. The Marine Resources Branch regulates fish processing, mariculture, marine plants and certain species of shellfish. The branch is divided into three sections: a Finfish Section; a Marine Plant Section; and a Shellfish Section. There are 20 professional biologists in the branch: 15 possess bachelor's degrees, the remainder have master's degrees.

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*The Administration Division has been omitted from this study.

Waste Management Branch. The function of the Waste Management Branch is to control the quantity and the quality of the discharge of waste material in such a way that there is no substantial damage to the natural environment of the province. The branch is divided into several sections: a Pollution Control Section, which monitors the discharge of pollutants into the biosphere; an Environmental Safety Section, which examines issues pertaining to the transportation and disposal of hazardous wastes; a Resource Recovery Section, responsible for assisting the public in recycling waste material; and, finally, a section which salvages auto wrecks throughout the province (SAM). The branch has approximately 34 professional staff members in Victoria, mostly engineers, although there are several biologists and chemists in the branch. Approximately three-quarters of the branch hold bachelor's degrees; the remainder have post graduate training.

Organizational behaviour in the Environmental Management Division. The Fish and Wildlife Branch, the Marine Resource Branch and the Waste Management Branch are in frequent contact with each other on a daily basis. The Fish and Wildlife Branch receives almost 1,500 applications for pollution permits each year and although many of these are handled by the regional staff throughout the province, frequent contact is required between the Victoria offices of the Fish and Wildlife Branch and the Waste Management Branch. The Marine Resources Branch frequently contacts both branches; the former on matters pertaining to habitat protection, the latter on coastal pollution issues. However, no significant internal committees could be identified within the division. Furthermore, although each branch shares the environmental laboratory of MOE, little joint research is undertaken, as these branches perform specialized regulatory functions.

Research indicates that this division is in frequent contact with a variety of other provincial ministries. Those commonly consulted include the Ministries of Lands, Parks and Housing; Forestry; Agriculture; EMPR; and Transportation and Highways. The Marine Resources Branch also indicated a strong link with the Ministry of Industry and

Small Business. Each branch makes extensive use of various committees. Examples include the Coal Guidelines Steering Committee, the Meares Island Logging Committee, and the Fraser River Task Force. Both the Marine Resources Branch and the Waste Management Branch currently have representation on the Environment/Land Use Working Group, which is conducting a preliminary examination of offshore oil and gas development along the west coast. However, the Fish and Wildlife Branch is absent from this committee (Table 2) and there were growing indications of policy conflict that may have accounted for this omission.

The Environmental Management Division has an extensive network of informal communication with the federal government. The most frequently contacted agencies are the Department of Fisheries and Oceans (Habitat Protection), and the Department of Environment (Environmental Protection Service). The Waste Management Branch indicated a further link with the Department of Transport, because of its involvement in estuary management. Committees are widely used in federal-provincial contact. The Fish and Wildlife Branch, for example, has extensive contact with the federal government through the regional component of the salmonid enhancement projects. Several inter-governmental committees also exist in the Marine Resources Branch, including the Marine Plant Working Group, the Shellfish Studies Committee and the Herring Advisory Board. The Waste Management Branch, too, maintains a close link with the federal government through various task forces, such as the Fraser River Task Force and the Federal-Provincial Hazardous Waste Disposal Committee. However, no joint federal-provincial committees currently exist to manage offshore oil and gas development, although each branch noted that it has, in the past, regularly transmitted data to the federal government on such matters as marine plant acreage, pollution incidents and discharge permits. The Fish and Wildlife Branch also indicated that it was never completely certain as to precisely what information the federal government possessed, suggesting that there is still a partial tendency to monopolize information. This could be intentional—thereby establishing a stronger mandate in certain policy areas—but it is more

likely to be a combination of bureau invasion at the sensitive peripheral areas of contact (Figure 2) and the overall lack of effective horizontal communication for streamlining data transfer between different levels of government.

Regional Operations Division

MOE has several regional offices and each appears on the organizational chart as a separate branch, reporting to the ADM of the Regional Operation Division (Figure 15). The regional offices are: the Vancouver Island Region; the Lower Mainland Region; the Thomson-Nicola and Cariboo Region; the Kootenay Region; the Skeena Region; the Omineca and Peace Region; and the Okanagan Region.* Although none of the regional branches of MOE are presently active in preliminary offshore petroleum development, two regions could soon be involved. They are the Skeena Region, bordering Queen Charlotte Sound, and the Vancouver Island Region, which lies adjacent to the potential oil field off the west coast of Vancouver Island. The following analysis pertains to one of these regions: the Skeena Region.

The Skeena Region. The primary function of the regional office is to perform the overall mandate of MOE at the regional level. The Skeena Region is divided into four sections: a Fish and Wildlife Section; a Water Management Section; a Waste Management Section; and a Conservation Section. There are approximately 10 professional staff members in the Skeena Region, including 7 biologists and 3 engineers. All possess bachelor's degrees, with the exception of 3 biologists who hold master's degrees. This is the smallest professional staff of all the regional offices of MOE.

Organizational behaviour in the Regional Operations Division. Evidence indicates that the regional offices communicate extensively with each other. For example, the Skeena Region indicated that it frequently

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*The organizational chart indicates two other branches in this division: the Conservation Office Service and the Provincial Emergency Program. The former is not considered relevant to this study; the latter will be discussed later, under the section on Emergency Planning.

contacts the Vancouver Island regional office. However, it noted that any studies that are undertaken tend to be done independently, suggesting a relatively high order of autonomy.* It was also noted that although the Fish and Wildlife Branch has delegated its authority to the regional branches, the Waste Management Branch and the Water Management Branch have not yet completed this transition and conflict may well emerge within those latter branches as the need to decentralize becomes more pronounced. In the interim, the fact that some of these branches are decentralized, while others remain relatively centralized, can only serve to inhibit the decision making process and promote further functional conflict within MOE itself.

The Skeena region contacts many of the same provincial ministries as those branches within the Environmental Management Division in Victoria. Those most frequently contacted include the Ministries of Forestry; Lands, Parks and Housing; Transportation and Highways; Municipal Affairs; and EMPR. Where possible, initial contact is made through the regional offices of each ministry. However, it was noted that conflict has arisen, in the past, between EMPR and MOE, because the former has a relatively centralized decision making administration, whereas the latter is more decentralized through its field offices, resulting in disproportionate levels of authority in their mutual contacts. Evidence indicates that the Skeena region is involved in several committees. A typical example is the South Moresby Resource Planning Team, a task force on land use planning along a portion of the coastal zone between Vancouver Island and the mainland. This region also noted that although it rarely does studies specifically for other ministries, cooperative projects are frequent. The Ministry of Forestry was given as an example.

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*Although the Skeena region conducts the bulk of its regulatory activities independent of the Victoria office, offshore oil and gas development was cited as an example of an instance in which the region would call for greater guidance from the headquarters office.

Communication between the regional units of MOE and the federal government is very common. It frequently occurs without any formal notification to the headquarters office in Victoria, and is a further indication that these regional offices are highly decentralized, autonomous units. The most frequently contacted federal agencies include the regional offices of the Department of Fisheries and Oceans (Habitat Protection) and the Department of Environment (Environmental Protection Service). Occasional contacts are also made with the National Energy Board, regarding pipeline construction and their possible infringement upon fish and wildlife habitat. No joint committees were identified on offshore oil and gas development yet, but the federal government is currently participating in coastal zone studies with the South Moresby Resource Planning Team. The region noted, however, that it rarely provides information directly to the federal government, because its capabilities are limited by its small size. Such requests are usually directed to the headquarters office in Victoria.

Assessment and Planning Division

The Assessment and Planning Division is responsible for supporting the orderly management of environmental resources in the province by developing appropriate assessment and planning guidelines. As well as taking a leading role in strategic planning within MOE, it also acts as a resource unit for the Environmental Management Division and the Regional Operations Division by virtue of the wide variety of environmental data that it has at its disposal. The division is divided into several branches: the Planning Branch; the Assessment Branch; the Terrestrial Studies Branch; the Aquatic Studies Branch; and the Atmospheric Studies Branch. The ministry's Environmental Laboratory and Surveys and Mapping Branch are also appended to this division (Figure 15). The Planning Branch and the Assessment Branch provide overall guidance to the various programs of MOE; the other branches perform specialized functions in data collection and dissemination. Only the Assessment Branch has been involved in preliminary planning for offshore

oil and gas exploration thus far. However, the following analysis concerns all those branches that could be expected to play an important role in future offshore oil and gas development.

Planning Branch. The functions of the Planning Branch are to develop general planning policies and processes for MOE; to assist both the operational arm of the headquarters and the regions in strategic planning; and, finally, to conduct socio-economic analyses for the ministry via an operational and strategic planning unit, and a socio-economic analysis unit. The branch has a professional staff of 14, including 4 biologists, 5 economists and 4 geographers. Approximately half the branch members have post graduate degrees.

Assessment Branch. The Assessment Branch is responsible for developing, administering and reviewing appropriate assessment, surveillance and monitoring guidelines that are designed to protect the environment from activities that could be potentially harmful. There are two sections within the branch: an Evaluation Section, which conducts an environmental assessment on specific projects; and a Guidelines and Review Section, which ensures that the appropriate guidelines already developed are correctly applied to each project. Of the 20 professional staff in the branch, 14 are biologists and 6 are geographers. Approximately half of these have post graduate training.

Terrestrial Studies Branch. The Terrestrial Studies Branch has two basic functions: to collect and disseminate data pertaining to geology, soils, vegetation and wildlife to all provincial ministries and, occasionally, to federal departments; and to assist the Assessment and Planning Division in its overall mandate of strategic planning. Although much of the branch's work is done in Victoria at the headquarters office of MOE, a major portion of its mandate is done at the Kelowna office in the interior. There is a professional staff of approximately 45 in this branch, representing a wide variety of disciplines, including pedologists, biologists, geologists, botanists, chemists and geophysicists. Approximately 80 percent of this branch have post graduate training.

Aquatic Studies Branch. The function of the Aquatic Studies Branch is to promote the optimum level of environmental quality for water resources within the province. The branch is primarily responsible for fresh water resources, but it also has some responsibility for estuary management. The branch is divided into two sections: a Littoral Section, which is responsible for the foreshore, or benthic regime; and a Service Unit, which monitors fresh water quality in general. The branch has approximately 50 professional staff members in Victoria. Although the majority are biologists, there are 10 oceanographers in the branch. Approximately 70 percent of the branch have bachelor's degrees; the remainder have post graduate training.

Air Studies Branch. The Air Studies Branch performs three functions: it takes a leading role in all air management programs under provincial jurisdiction; it provides specialized data and advice to the Environmental Management Division and the Regional Operations Division; and it supplies atmospheric information and advice to other ministries, to the general public, and in certain instances to the federal government. The branch has three sections: an Engineering Section, which collects air pollution data; a Meteorology Section, which measures climatic variables, particularly those monitored in each of the regions; and, finally, a Climatology Section, which maintains long range statistical records on climatic data. There are 13 professionals in this branch; most of them are geographers and engineers; 8 of them have post graduate training.

Organizational behaviour in the Assessment and Planning Division. As strategic planning units, the branches within the Assessment and Planning Division are in constant contact with one another and several internal committees were identified. The directors of the branches meet regularly to discuss division policy; and the Assessment Branch noted a Shore Programme Coordinating Committee, to facilitate coastal zone planning. Although the division does not conduct formal scientific research, all the data that are collected and analyzed are available to each branch within MOE. The environmental lab and the Surveys and

Mapping Section are also utilized by each branch within the ministry.

Communication with other ministries of the government of British Columbia is very heavy. Those ministries most frequently contacted include EMPR; Forestry; Agriculture; Lands, Parks and Housing; Transprotation and Highways; and Industry and Small Business. Crown corporations such as British Columbia Hydro and Power Authority, are also frequently contacted. Although committees are widely used at the interministerial level, many also involve federal participation, and will be identified below. However, there is no direct representation of this division on the Environment/Land Use Working Group for offshore oil and gas development at the provincial level. Since the Assessment Branch has already completed a preliminary report on the environmental impact of petroleum exploration along the west coast and is, therefore, already involved in the decision making process, its omission does serve to illustrate a possible growing conflict of interest between MOE and EMPR on this issue.

The federal government is frequently contacted by the Assessment and Planning Division of MOE. The most frequently contacted departments are: Fisheries and Oceans (the Habitat Protection Division); Environment (the Lands Directorate and the Inland Waters Directorate of the Environmental Conservation Service); Transport; Public Works; and Energy, Mines and Resources. The division has established a variety of inter-governmental committees. The Assessment Branch, for instance, noted its past involvement with the Roberts Bank Environmental Review Committee and various other federal environmental assessment and review panels. Moreover, the other branches identified a variety of committees, ranging from the estuarine habitat conflicts to hydrometeorological matters. However, no joint committees on offshore oil and gas development have yet emerged, although the Assessment Branch has contacted several of the federal agencies identified above during the compilation of its preliminary report on the environmental assessment of petroleum exploration along the west coast; comments were also solicited from the federal Department of Environment upon its completion.

INFRASTRUCTURE

The number of provincial agencies that could be involved in every aspect of the infrastructure of offshore petroleum development, including those that regulate the transfer and processing of hydrocarbons, as well as other ancillary activities, is extensive.* Consequently, this section focusses on only one major component of the infrastructure: the transportation of the hydrocarbons. Such a transfer could occur by tanker, by pipeline, or a combination of both methods. However, since the provincial government has limited control of shipping activities, its most likely involvement at the present time would be if a pipeline were used to bring the hydrocarbons ashore.** Moreover, a pipeline would certainly be the most likely means of transport across the province—assuming that it was destined for a North American market, and not for export.

Although interprovincial and international pipelines are subject to federal control, the Ministry of Transportation and Highways (T&H) has primary responsibility for regulating all pipelines within the province of British Columbia. This ministry was originally established in 1871, as the Lands and Works Department, but the highways function was not constituted as a separate agency until 1955. Extensive reorganization has since led to the establishment of the present strucutre. In addition to regulating oil and gas pipelines within the province—a relatively minor function—the ministry also manages: the provincial highway system; weigh scale stations; highways; ferries; motor vehicle branch offices; government telephone exchanges; and government aircraft.

Figure 16 indicates the organizational structure of T&H. The ministry consists of four branches and each is divided into a series of

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*Other activities that could be included in this category of functional specialization are the expansion of harbour facilities, the construction of refineries, the improvement of highways and the establishment of new housing facilities for the expanding labour market.

**It should be noted that a variety of ships, other than tankers, would be involved in offshore hydrocarbon development. The provincial government is concerned that any shipbuilding associated with offshore development should be undertaken in British Columbia.

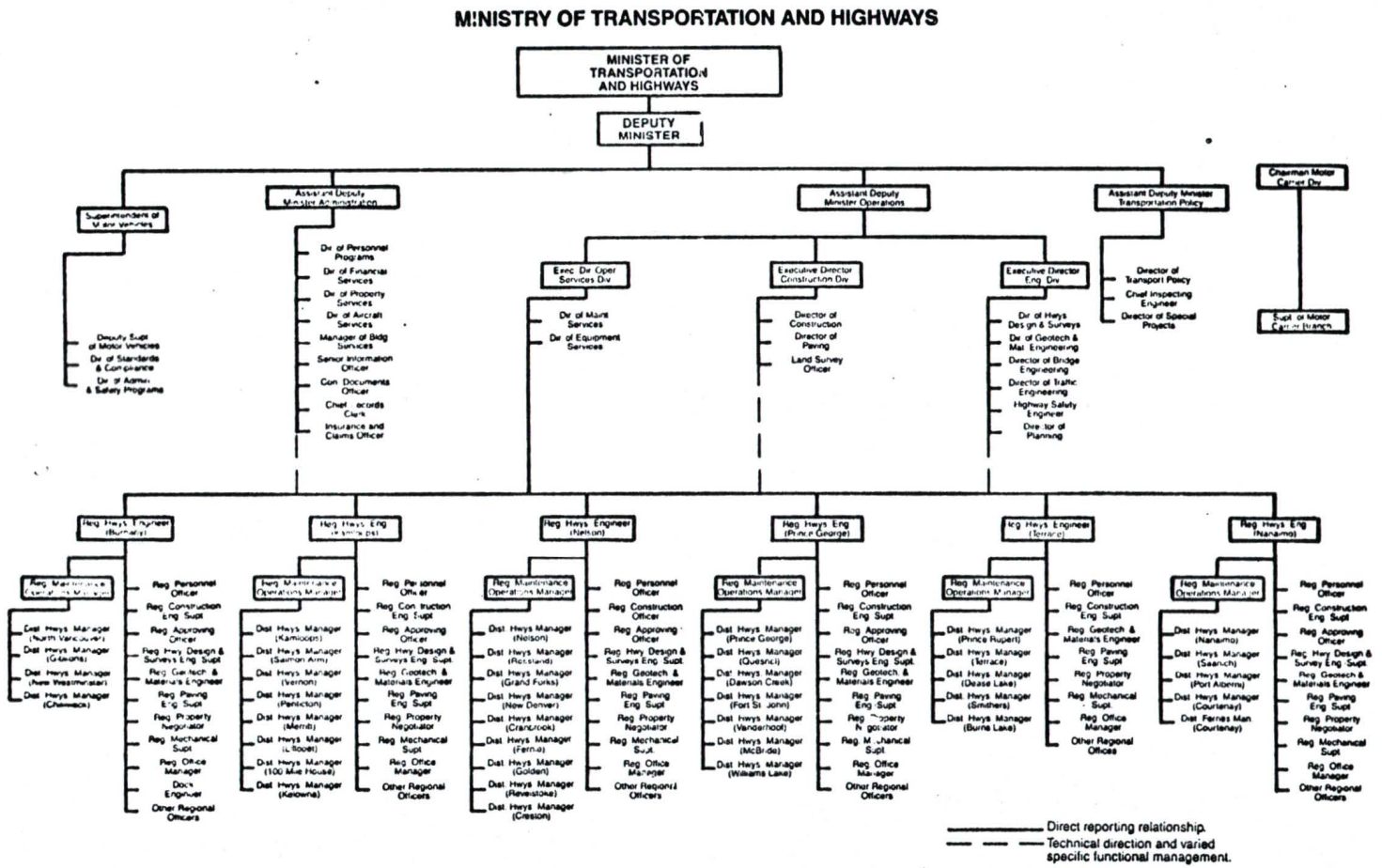

FIGURE 16: Flowchart of the organization of the Ministry of Transportation and Highways in British Columbia. [Source: *Organization of the B.C. Public Service* (Victoria: Queen's Printer, 1982), p. 238.]

divisions. Each branch is accountable to an ADM who, in turn, is responsible to the Deputy Minister and the Minister, respectively. The four branches depicted on the organizational chart are: the Administration Branch, responsible for personnel, finance and computer services; the Operations Branch, which maintains the condition of provincial highways; the Transportation Policy Branch, which conducts research into various types of transportation and regulates a variety of non-highway modes of transport, including pipelines; and, finally, the Motor Vehicles Branch, responsible for managing commercial and non-commercial traffic on the provincial highways. The organizational chart indicates that the Operations Branch is highly decentralized, with several regional offices throughout the province, but the remainder of T&H is relatively centralized, with its offices either in Victoria or Vancouver. The following analysis pertains to the Transportation Policy Branch of T&H, with particular attention to its role as the primary regulatory agency for oil and gas pipelines within the province.

Transportation Policy Branch

The Transportation Policy Branch is responsible for a variety of research and regulatory functions relating primarily to non-highway modes of transportation in the province. It is divided into three divisions: the Transport Policy Division; the Engineering Division; and the Special Projects Division. Of particular importance is the branch's role in planning, regulating and inspecting oil and natural gas pipelines throughout the province. Although only the Transport Policy Division is currently involved in preliminary planning for offshore petroleum development, the remainder of the branch will almost certainly be involved in the inevitable onshore petroleum or petrochemical infrastructure.

Transport Policy Division. The Transport Policy Division is primarily responsible for evaluating a variety of proposed transportation projects for their economic feasibility. It reviews policies, regulations and user charges; it also undertakes surveys by region and

transport mode to identify potential deficiencies in economic development. Common research topics include air, railway, marine and pipeline transportation, as well as common carrier trucking operations and joint federal-provincial projects. There are currently 6 professional analysts in this division—3 economists and 3 engineers. Four members of the division have post graduate training.

Engineering Division. This division is responsible for inspecting aerial tramways, pipelines and railways under provincial jurisdiction. Plans and technical data for all structures and equipment used in these industries are also processed through this division prior to construction and operation. The division has 4 professional engineers on its staff—each trained to the baccalaureate level—and 16 inspectors, each of whom have received technical training.

Special Projects Division. This division monitors the Engineering Division with respect to the day-to-day administrative, legislative and regulatory control of matters concerning the Railway Act, the Pipelines Act and the Mining Right of Way Act. It also monitors railway safety in the province. The Special Projects Division employs one professional staff member, and his academic background is in business administration.

Organizational behaviour in the Transportation Policy Branch. Research indicates that contacts between each of the three divisions within the Transportation Policy Branch are relatively infrequent; the Transport Policy Division is the most insular. No formal committees exist within the Transportation Policy Branch, except for occasional executive meetings, which examine the recommendations of outside consultants. The only other contact within the remainder of T&H is with the Engineering Division of the Operations Branch, a division that is primarily concerned with highway design, planning and safety. It appears, therefore, that the Transportation Policy Branch functions relatively independently of the remainder of the ministry and the three divisions within this branch are also relatively insular.

The Transportation Policy Branch has frequent contact with several other provincial ministries. These contacts include: EMPR; MOE;

Forestry; Lands, Parks and Housing; Municipal Affairs; Industry and Small Business; Tourism; and Finance. Much of this communication is important in order for the Transportation Policy Branch to monitor pipeline construction, oil spill prevention, and approval of rights-of-way. The Engineering Division noted that it also makes frequent contact with the Ministry of Labour. This contact is necessary, because the Ministry of Labour is responsible for the transportation of oil and gas when the pressure drops to less than 100 pounds per square inch (6.39×10^5 Pascals) usually within urban areas. The Engineering Division also indicated that it makes extensive use of committees, such as the Inter-Ministerial Committee for the Transport of Dangerous Goods and the Energy Project Certificate Committee. Furthermore, the Transport Policy Division is currently representing this branch on the Environment/Land Use Working Group which is concerned with preliminary offshore oil and gas development on the west coast.*

Due to the ubiquitous nature of the transportation industry, there tends to be considerable inter-governmental contact between the Transportation Policy Branch and the federal government. Frequent contacts include the Department of Transport in land, sea and air modes; the Canadian Transport Commission, particularly in matters pertaining to railway crossings; and the National Energy Board, the federal counterpart of the province's Transportation Policy Branch. In addition, several federal-provincial committees exist. The most common types are joint federal-provincial groups which examine the recommendations of outside consultants. Conversely, the Canadian Standards Association is composed of both industrial and governmental representatives, and it attempts to foster the standardization of units of measurement between T&H, the Ministry of Labour, the National Energy Board and the Canadian Transport Commission, each of whom regulates oil and gas pipelines to some degree in the province. Nevertheless, functional duplication in

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*The Transport Policy Division is currently examining the means by which the province could benefit from the indirect effects of offshore petroleum development on the transportation industry in general—such as through shipbuilding.

pipeline regulation in Canada, appears to be very pronounced. Moreover, inter-governmental conflict has occurred in the past and it is difficult to see how it could be avoided in future offshore petroleum development, where jurisdictional mandates will inevitably overlap.

Other Provincial Agencies Involved in Infrastructure

Ministries: Agriculture; Forests; Lands, Parks and Housing; Municipal Affairs.

Crown corporations, boards, agencies and commissions: B.C. Harbours Board.

EMERGENCY RESPONSE

Emergency response to an oil spill is an *ex post facto* attempt to reduce pollution damage and it is far less successful than effective preventative techniques, such as stringent drilling regulations.* Nevertheless, contingency plans to counteract a major oil spill are an important adjunct to any drilling operation, particularly in such an unstable environment as coastal waters. However, the primary responsibility for oil spill countermeasures in the past has rested with the federal government, under the aegis that it is this level of government that has traditionally exercised the broadest mandate in offshore matters. The coastal provinces are quick to recognize, however, that once an oil spill impinges upon the beach, it becomes a serious provincial concern. Although the British Columbia government has limited resources to counteract an oil spill along its coast, it could play a significant role in clean-up operations through the Provincial Emergency Program, an administrative arm of MOE.**

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*Although this section is primarily concerned with oil spills in the marine environment, toxic spills could, conceivably, occur on land and in the atmosphere, from pipelines and refineries.

**The Provincial Emergency Program is a *sui generis* component of the Regional Operations Division of MOE (Figure 15); the remainder of this ministry was discussed in detail above under Environmental Protection.

Provincial Emergency Program. The function of the Provincial Emergency Program (PEP) is to evaluate various possible provincial emergencies, such as tidal waves, earthquakes, fires, floods and toxic spills; and to coordinate effective emergency response with other ministries and other levels of government. The agency maintains a continuous emergency reporting and information system, which is administered throughout the province via six regional headquarters: Kamloops, Nelson, Prince George, Prince Rupert, Abbotsford and Victoria. Although the headquarters staff in Victoria has a total of approximately 15 people, only 2 of these can be considered full-time professional appointments with specialized emergency response training. However, government figures indicate a total of approximately 123 full- and part-time employees throughout the province, who coordinate an estimated 15,000 volunteers (Government of British Columbia, 1979-80).

Organizational behaviour in the Provincial Emergency Program. Research at the headquarters office of the PEP in Victoria, indicated that this branch functions relatively independently of MOE, although the organizational chart indicates that it is directly accountable to the ADM of the Regional Operations Division. However, a spokesman for the branch indicated that it does, occasionally, communicate with the Environmental Management Division of MOE, particularly the Fish and Wildlife Branch, the Marine Resources Branch and the Waste Management Branch, as well as the Assessment and Planning Division—usually through the Assessment Branch. Such contacts are necessary to ensure effective environmental emergency planning and response. No intra-ministerial committees could be identified and PEP does not conduct studies for other divisions in MOE, other than the compilation of an emergency equipment list and toxic spill reports for general use.

Similar to most of the branches within MOE, PEP communicates with a variety of other provincial ministries. Typical contacts include T&H, particularly the Engineering Division, as well as the ministries of Municipal Affairs and Lands, Parks and Housing. Many of these contacts are to assist in the establishment of appropriate contingency plans in

urban areas throughout the province. PEP participates in the Interministerial Committee for the Transportation of Dangerous Goods and it also has representation on the Environmental/Land Use Working Group, which is studying preliminary offshore oil and gas development along the west coast. PEP noted that it participates in a variety of other committees, but it indicated that many tend to be rather short-lived, suggesting that this agency—like MOE in general—is highly organic in structure.

PEP frequently contacts the federal government. These contacts include Emergency Planning Canada; the Department of the Environment (Environmental Protection Service); the Department of Transport (Canadian Coast Guard); and the Department of Fisheries and Oceans (Habitat Protection Division). Contact is usually with the regional offices, either in Victoria or Vancouver, and a variety of committees exist to facilitate the interface of federal-provincial emergency responsibilities. They include the CANUS PACT, an international committee to coordinate the emergency response to oil spills along the south coast; and the Burrard Inlet Working Group, a committee to examine the emergency response to the release of toxic wastes in Vancouver harbour. However, no federal-provincial committees were identified on offshore petroleum development, although PEP does maintain a detailed list of emergency equipment and toxic spill mishaps. This information is made available to both the federal government and the U.S. government via a joint computer information system known as the National Emergency Equipment Location Service (NEELS).

ECONOMIC DEVELOPMENT

Ministries: Finance; Industry and Small Business Development.

Crown corporations, agencies, boards and commissions: B.C. Development Corporation.

SCIENTIFIC RESEARCH

Ministries: Education; Universities, Science and Communications.

Crown corporations, agencies, boards and commissions: B.C. Research Council.

MANPOWER

Ministries: Labour.

Crown corporations, agencies, boards and commissions: nil.

A SUMMARY OF THE PERSPECTIVES OF THE PROVINCIAL BUREAUCRACY

The involvement of the provincial government in offshore petroleum development along the west coast is currently in its early stages. Nevertheless, a detailed examination of several of the most prominent government agencies indicates that some branches are already engaged in preliminary assessment and planning. Foremost among these are the Offshore Administration Branch of EMPR; the Marine Resources Branch, the Waste Management Branch, the Assessment Branch and the Provincial Emergency Programme of MOE; and the Transportation Policy Branch of T&H. Other agencies are also involved at the provincial level (Table 4). However, the creation of the Offshore Administration Branch within EMPR to administer petroleum exploration in offshore areas within provincial jurisdiction, in cooperation with other ministries, clearly indicates that this agency has been instructed to take the lead. Moreover, the two working groups, which have been designed to coordinate inter-ministerial activities on this issue, were established, and are presently coordinated, by the Offshore Administration Branch itself. It appears, therefore, that there is a definite trend towards establishing a lead agency in this particular functional area of coastal zone management for which the provincial government feels itself to be legally responsible.

In terms of the technical expertise of the provincial bureaucracy, there is little doubt that this level of government is an important

TABLE 4: A SUMMARY OF ALL THOSE PROVINCIAL AGENCIES THAT COULD BE INVOLVED IN OFFSHORE PETROLEUM DEVELOPMENT ON THE WEST COAST

Provincial Agency \ Category of Functional Specialization	On-site Regulation	Environmental Protection	Infrastructure	Emergency Response	Economic Development	Scientific Research	Manpower
Agriculture			x				
Education						x	
Energy, Mines and Petroleum Resources	x						
Environment		x		x			
Finance					x		
Forestry			x				
Industry and Small Business					x		
Labour							x
Lands, Parks and Housing			x				
Municipal Affairs			x				
Transportation and Highways			x				
Universities, Science and Communications						x	
B.C. Development Corp.					x		
B.C. Harbours Board			x				
B.C. Research Council						x	

actor in current coastal zone policies by virtue of its overall size and the quality of training of its personnel. This is summarized in Table 5. It appears that the largest professional staff is to be found in the category of Environmental Protection; conversely, the smallest, full-time professional staff is in Emergency Response. Academic disciplines vary considerably, but there is a noticeable bias towards natural science and engineering. The greatest academic diversity is to be found within MOE, but EMPR has become more diversified since the establishment of the Offshore Administration Branch, a branch which is exclusively composed of social scientists, as opposed to the more traditional staff of engineers and geologists. However, it is important to note that although the personnel within each of these agencies have considerable expertise in onshore matters, their technical capabilities beyond the water's edge decline sharply.* Nevertheless, the level of education of these professionals is very high. Virtually every branch examined within MOE, for example, had at least some personnel with post graduate training; similarly, branches studied within EMPR and T&H were also well qualified academically. PEP was exclusively comprised of personnel with technical training.

An examination of the provincial agencies in this study indicates that inter-ministerial and inter-governmental contact is widespread (see Table 6). MOE has had by far the greatest number of contacts with other government agencies, particularly with those within the federal government, and many involve joint studies on matters such as coastal zone management. In contrast, EMPR appears to be the most insular of all the provincial agencies examined, although inter-ministerial and inter-governmental communication has become more widespread in recent months in response to its growing involvement in offshore petroleum development. Moreover, there is evidence that inter-governmental contact has taken place over offshore petroleum development between the Offshore Administration Branch of EMPR and Environment Canada, as well as between the

*One exception is the Aquatic Studies Branch of MOE, which has 10 oceanographers on its staff.

TABLE 5: A SUMMARY OF THE TECHNICAL EXPERTISE OF THE PROVINCIAL BUREAUCRACY				
Provincial Agency		Professional Staff	Academic Discipline	Level of Education
E M P R	Engineering & Operations Branch Geological Branch Titles Branch Offshore Administration Branch	8 6 1 3	Engineering Geology/Geophysics — Poli.Sc./Economics/Public Admin.	■■ ■■ ■ ■■■■
M O E	Fish & Wildlife Branch Marine Resources Branch Waste Management Branch Skeena Regional Branch Planning Branch Assessment Branch Terrestrial Studies Branch Aquatic Studies Branch Air Studies Branch	32 20 34 10 14 20 45 50 13	Biology Biology Engineering/Biology/Chemistry Biology/Engineering Biology/Economics/Geography Biology/Geography Pedology/Biology/Botany/Geography Biology/Oceanography Geography/Engineering	■■■■ ■■ ■■■ ■■■ ■■■■ ■■■■ ■■■■ ■■■ ■■■■
T & H	Transportation Policy Division Engineering Division Special Projects Division	6 4 1	Engineering/Economics Engineering Business Administration	■■■■ ■■ ■■
P E P	Provincial Emergency Program	2	Technical Training and Emergency Response	■

■ Technical training (non-university)
■■ University degree only
■■■ Some post graduate training
■■■■ Predominantly post graduate training

TABLE 6: A SUMMARY OF THE MOST FREQUENT INTER-MINISTERIAL AND INTER-GOVERNMENTAL CONTACTS FOR SEVERAL PROVINCIAL AGENCIES SELECTED FOR DETAILED STUDY

Provincial Agency	Provincial Agencies										Federal Agencies							
	Agriculture	Energy, Mines & Petro Resources	Environment	Finance	Forestry	Industry & Small Business	Labour	Lands, Parks & Housing	Municipal Affairs	Transportation & Highways	Energy, Mines & Resources	Environment	Fisheries & Oceans	Public Works	Transport	Cdn. Transport Commission	National Energy Board	Emergency Planning Canada
EMPR																		
Petroleum Resources Division			■		□	■		□			□	■						
MOE																		
Environmental Management Division	□	□			□	□		□		□		□	□		□			
Regional Operations Division		□			□			□	□	□		□	□					
Assessment & Planning Division	□	□			□	□		□		□	□	■	■	□	□			
T&H																		
Transportation Policy Branch		□	□	□	□	□	□	□	□						□	□	□	
PEP																		
Provincial Emergency Program								□	□	□		□	□		□			□

■ - Contact relating specifically to offshore petroleum development

□ - Contact relating to other matters

Assessment Branch of MOE, the Department of Environment, and the Department of Fisheries and Oceans (Table 6). Thus far, these contacts have been very informal.

Several areas of bureau friction, and potential conflict, have been indicated. The emergence of the new and relatively progressive Offshore Administration Branch within the older and traditionally more conservative Petroleum Resources Division, as well as the sharp disparities in the degree of decentralization of certain branches within MOE, are examples of possible areas of friction within two of the provincial agencies studied. However, there is also evidence of policy conflict. Several important branches within MOE have not been included in the offshore petroleum working groups established by EMPR, and EMPR has indicated that its relationship with MOE tends to be rather formal at this time. Functional conflict is also evident, particularly between the provincial government and the federal government. EMPR, for example, has reported virtually no communication at all with its counterpart in Ottawa—the Canada Oil and Gas Lands Administration—at the operational level. Conversely, although MOE has traditionally exercised a high degree of cooperation with its federal counterpart, at least one branch noted that it was not always certain as to precisely what information the federal government possessed, suggesting, perhaps, that there is still a partial tendency to monopolize information. Finally, the potential for functional conflict was noted among those agencies involved in pipeline regulation. Functional duplication was pronounced in this category within the provincial government, and contact with the federal government has traditionally been very limited.

CHAPTER 6

THE PERSPECTIVES OF THE FEDERAL BUREAUCRACY

A wide variety of federal agencies could be involved in the future development of offshore oil and natural gas on Canada's west coast. However, only the most significant agencies will be examined in each of the following categories of functional specialization: On-Site Regulation; Environmental Protection; Infrastructure; and Emergency Response. In addition, agencies that are classified into the following important groups will be listed: Economic Development; Scientific Research; and Manpower. Similar to the previous chapter, this discussion will examine: the extent to which each of the relevant branches within these agencies is currently involved in preliminary offshore petroleum development; the degree of technical expertise within each branch; the methods by which they coordinate their activities; and, finally, an indication of the areas of conflict, and potential conflict, that exist within and between the agencies discussed.

ON-SITE REGULATION

The regulation of energy matters in the federal government is shared by a variety of agencies, including the Department of Energy, Mines and Resources (EMR); Petro-Canada; the National Energy Board; and, more recently, the Canada Oil and Gas Lands Administration. However, in southern Canada (south of 60° N latitude), EMR is the most dominant component of the federal government in energy policy and each of the above semi-independent agencies reports to Parliament through the Minister of EMR.* It is this department, therefore, which exercises

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*The Canadian Oil and Gas Lands Administration also reports to the Department of Indian and Northern Affairs, which is responsible for regulating offshore drilling in the Arctic.

paramount control over all energy policy on Canada lands in southern Canada, and, consequently, along that portion of the west coast that falls within the federal orbit.

EMR is one of Canada's youngest federal agencies, but, not unlike its provincial counterpart, it has undergone considerable reorganization since its inception. Until recently, EMR consisted of four operational sections: an Energy Section; a Mineral Policy Section; an Economic and Policy Analysis Section; and a Science and Technology Section. However, administrative changes, precipitated by a renewed emphasis upon energy self-sufficiency, have altered this department considerably and no organizational chart is currently available. Ostensibly, the agency within EMR that was once responsible for offshore oil and gas development—the Resource Management Branch—has since been removed from the Energy Section and amalgamated with a similar branch that once performed the same function in the Arctic for the Department of Indian and Northern Affairs (DINA). This new branch is known as the Canada Oil and Gas Lands Administration. It functions as a semi-independent agency and it reports to Parliament through the ministers of EMR and DINA. The detailed study of the on-site regulatory agency that follows pertains to the Canada Oil and Gas Lands Administration.

Canada Oil and Gas Lands Administration

The purpose of Canada Oil and Gas Lands Administration (COGLA) is to regulate the development of offshore oil and natural gas on all Canada lands. These consist of all land north of 60° N latitude, as well as the seabed off the east coast, the west coast and in Hudson Bay.* COGLA's authority stems directly from the Oil and Gas Production and Conservation Act, and Bill C-48, the Canada Oil and Gas Act, which form a major element of the National Energy Plan (NEP). It has the authority to control the pace of oil exploration and production, to designate

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*The federal government still considers virtually all waters off the west coast to fall within its mandate; it has never given any clear indication as to which areas it considers to be "internal waters," i.e. provincial *solum*.

rights of exploration and production to various oil companies, to control and inspect exploration and development activities, and to ensure protection of the environment, as well as Canadian industrial and employment benefits.

Figure 17 illustrates the current organizational structure within COGLA. It consists of two divisions, each comprised of three branches. One division includes the Engineering and Control Branch, the Resource Evaluation Branch and the Land Management Branch; the other consists of the Environmental Protection Branch, the Intergovernmental Relations Branch and the Canada Benefits Branch. Both divisions have their own Deputy Administrators, each of whom is responsible to the Administrator of COGLA who, in turn, reports to the ministers of EMR and DINA. Although COGLA does have some regional representatives, it appears at present to be a relatively centralized organization. The following analysis pertains to the Engineering and Control Branch, the Resource Evaluation Branch, the Lands Management Branch and the Environmental Protection Branch. The remainder of COGLA is not yet fully operational.

Engineering and Control Branch. The function of the Engineering and Control Branch is to exercise regulatory control over exploration, drilling and production on all Canada lands. It has the final technical authority over each company's drilling programs. The branch has several sections: a Reservoir Section; a Production Section; an Offshore Structures Section; a Drilling Section; and a Pipeline Section. In addition, the branch has regional representation in St. John's, Halifax and Yellowknife. This branch has approximately 20 professional staff members in Ottawa—the majority are trained to the baccalaureate level in engineering. There are approximately 10 more professional staff members in the regions.

Resource Evaluation Branch. The purpose of the Resource Evaluation Branch is to advise the Land Management Branch on strategies for granting and administering exploration and production rights; and to advise the Engineering and Control Branch as to the geological safety of drilling operations based upon the geological information supplied to it by those

CANADA OIL AND GAS LANDS ADMINISTRATION

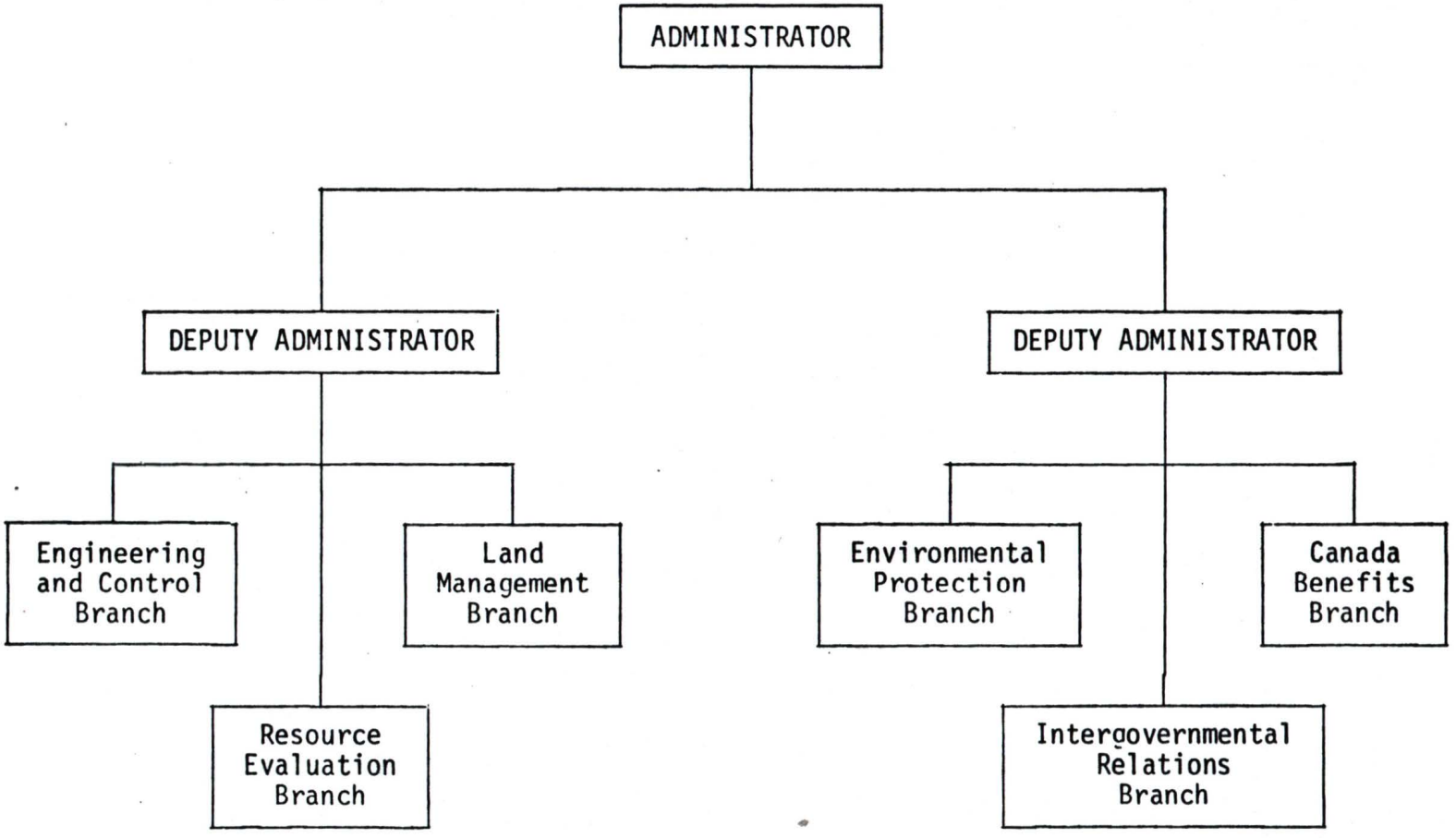

FIGURE 17: Flowchart of administration of the Canada Oil and Gas Lands Administration (COGLA). [Source: Harrison, Land Management Branch, pers. comm., Ottawa, 1982.]

companies drilling on Canada lands. The branch consists of several sections: an Offshore Evaluation Section; a Northern Evaluation Section; and an Ocean Mining Section. The branch currently employs approximately 12 professional staff members. All are trained in either geology or geophysics, and approximately half have post graduate training.

Land Management Branch. The Land Management Branch is responsible for negotiating exploration agreements with oil companies, as well as issuing production licenses on Canada Lands. The branch has several sections: a Registry Section; a Leasing Section; an Accounts Section; a Negotiating Section; and a Public Lands Section. There are approximately 10 professionals in the branch, from a variety of professional disciplines. The majority are trained to the baccalaureate level.

Environmental Protection Branch. The function of the Environmental Protection Branch is to assess the potential hazards of oil spills, gas leaks, and pipeline construction on the environment; and to prepare contingency plans to minimize the damage on Canada Lands. This branch is relatively small at the present time, with only 4 professional staff members. However, each has post graduate training in biology, oceanography, geography and meteorology, respectively.

Organizational behaviour in the Canada Oil and Gas Lands Administration. Each of the branches within COGLA appear to have frequent daily communication with each other, particularly the Engineering and Control Branch and the Resource Evaluation Branch. Although no internal committees were identified, the directors of each branch meet regularly to coordinate joint policies with the agency. However, COGLA does little joint research because, similar to its provincial counterpart, it functions primarily as a regulatory body.

COGLA has extensive communication with other federal agencies, particularly EMR and DINA, through which it reports to Parliament. EMR is a particularly important contact for the Resource Evaluation Branch, which frequently communicates with the Geological Survey of Canada, the Earth Physics Branch and the National Energy Board. However, other important contacts of COGLA include: the Departments of Environment (DOE);

Fisheries and Oceans (DFO); Transport (DOT); Regional and Economic Expansion (DREE); Industry, Trade and Commerce (ITC); and External Affairs. Two important committees pertaining specifically to offshore oil and gas development are the Resource Management Environmental Committee (RMEC), which coordinates federal policy at the national level; and the Inter-departmental Environment Review Committee (IERC), which performs a similar function in the Arctic. The former is chaired by the Environmental Protection Branch of COGLA, and includes DFO and DOE (the Atmospheric Environment Service, the Environmental Conservation Service and the Environmental Protection Service). The latter is directed by DINA. Nevertheless, despite the appearance of adequate cooperation between each of these federal agencies, strong disapproval has been voiced by a variety of critics in Ottawa, that the NEP has given too much control to EMR and not enough to the other participants on RMEC. Policy conflict between EMR and both DOE and DFO appears to be intense, despite the former minister of EMR's assurances that these two agencies will be the principal advisors (House of Commons Committee, Issue #49, May 14, 1981, p. 16).

Thus far, COGLA has had very little contact with the provincial government of British Columbia at the operational level. However, the Land Management Branch and the Environmental Protection Branch did indicate that they have had some contact on offshore petroleum matters with their provincial counterparts in EMPR and MOE. The Land Management Branch, for example, indicated that it had contacted EMPR with respect to information on the current status of offshore petroleum leases along the west coast and the Environmental Protection Branch has contacted MOE on several occasions on the environmental aspects of offshore development. Unfortunately, no inter-governmental committees have yet been established and the transfer of information between COGLA and the province appears to have been very minor. This substantiates the findings in the previous chapter that inter-governmental contact between the two most significant on-site regulatory agencies is minimal at the present time. The political conflict does, therefore, appear to

manifest itself in the form of territorial sensitivity within the bureaucracy.

ENVIRONMENTAL PROTECTION

As noted in the previous chapter, environmental protection will be a vital component in any offshore oil and natural gas development on the west coast. Although the primary federal agency responsible for monitoring the environmental safety of drilling operations on-site is the Environmental Protection Branch of COGLA, the Department of Environment (DOE) is also an extremely important administrative component by virtue of its expertise in a variety of specialized environmental matters. However, of perhaps greater importance is the Department of Fisheries and Oceans (DFO). DFO will undoubtedly play an important regulatory role in offshore development with respect to both the provision of advice on fish habitat protection and in the application of pertinent oceanographic data to ensure that safe design factors such as tides, currents and wave heights, are incorporated into all offshore drilling structures. The following discussion pertains to the administrative characteristics of these two regulatory agencies.

Department of Environment

DOE was created by the Government Organization Act of 1970, to amalgamate major federal responsibilities concerning the protection, preservation and enhancement of environmental quality and related renewable resources. Added to the original fishery and forestry elements were: the Canadian Meteorological Service; the Air Pollution Control Division; the Public Health Engineering Division; the Water Sector of EMR; the Canada Land Inventory of the Department of Regional and Economic Expansion; and the Canadian Wildlife Service (CWS) of DINA. The Federal Environmental Assessment and Review Process (FEARP) was established by cabinet in 1973, and reports to Parliament through the minister of DOE. However, in 1979, with the proclamation of the Government Organization Act, DOE was split into two departments: the DFO and

DOE. Later that same year, Parks Canada was transferred to DOE from DINA.

Figure 18 indicates the present organizational structure of DOE. It is divided into five operational branches, according to specialization by purpose and area: the Environmental Protection Service (EPS); the Environmental Conservation Service (ECS); the Canadian Forestry Service (CFS); the Atmospheric Environment Service (AES); and, finally, Parks Canada.* Each of the headquarters components reports directly to the ADM who, in turn, reports to the Deputy Minister and the Minister of DOE, respectively. DOE has five regional offices: the Pacific and Yukon Region; the Western and Northern Region; the Ontario Region; the Quebec Region; and the Atlantic Region. Each reports to a Regional Director who, in turn, reports to the ADM, the Deputy Minister and the Minister, respectively. However, the regional component of EPS, and the Lands Directorate of ECS both report directly to their own Regional Director General, bypassing the ADM of the service, and communicate directly with the Deputy Minister and the Minister, respectively. In summary, DOE displays a relatively high order of decentralization. Moreover, EPS, ECS and AES are each involved in offshore petroleum development at the national and at the regional level. The following analysis pertains to these three components of DOE.

Environmental Protection Service. The function of EPS is to formulate and manage national policies, objectives and programs to protect the quality of the natural enviornment. EPS has already begun to conduct a preliminary investigation into offshore oil development along the west coast, through its Pacific and Yukon Regional Office in Vancouver. The headquarters component in Ottawa consists of several sections: a Policy, Planning and Assessment Directorate; an Air Pollution Directorate; a Water Pollution Control Directorate; a Toxic Chemical Management Directorate; and, finally, a Finance and Administration Branch. The

*The Finance and Administration Service is a non-operational unit; and the Federal Environmental Assessment and Review Office (FEARO), which reports directly to the Deputy Minister, is an independent advisory agency.

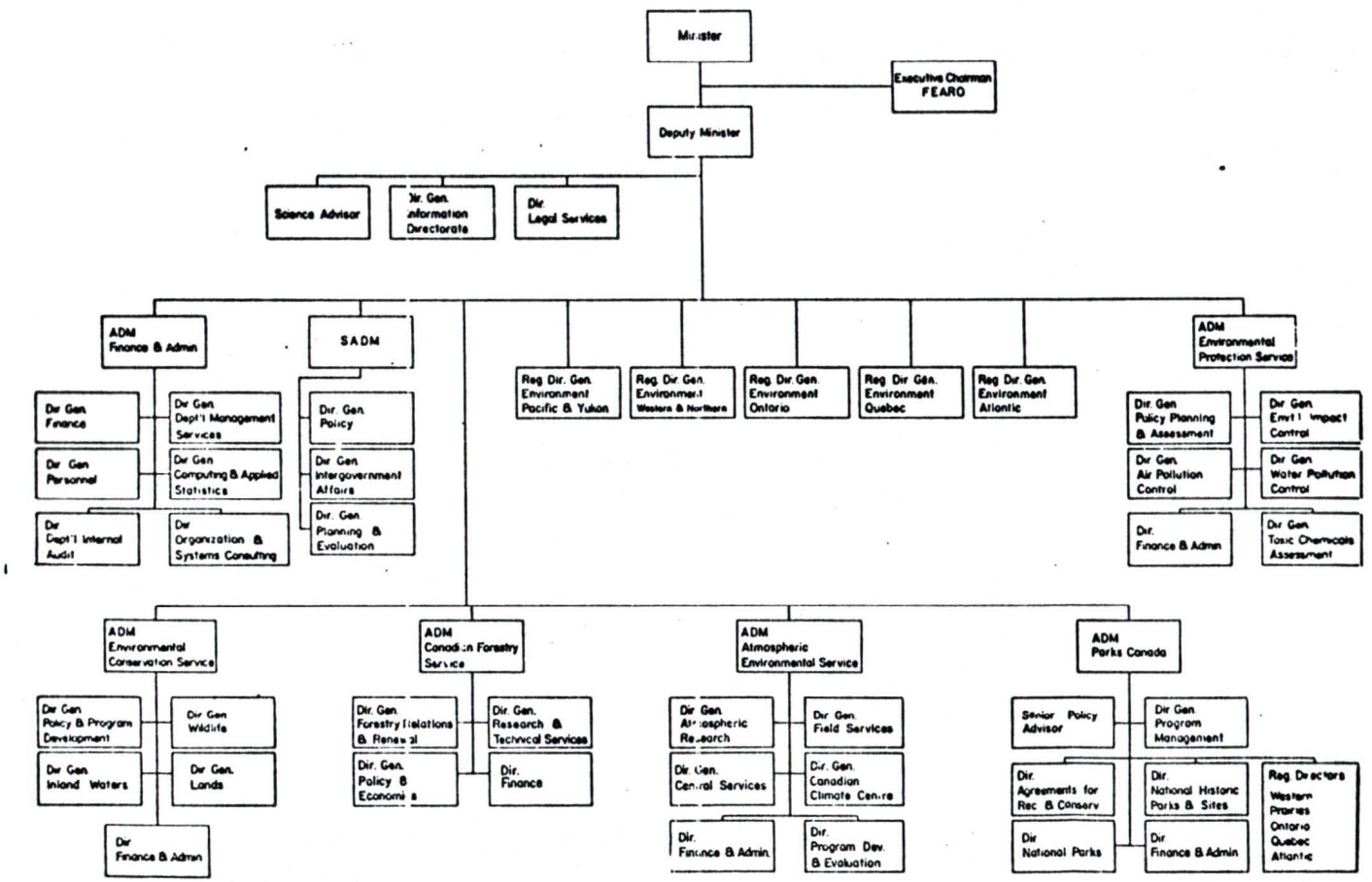

FIGURE 18: Flowchart of administration of the Department of Environment. [Source: Environment Canada, Ottawa, 1981.]

headquarters office has a staff of several hundred professional employees, mostly engineers, trained to the baccalaureate level. The regional office in Vancouver has approximately 33 professional staff members, with training in engineering, biology and geography. The majority are also trained to the baccalaureate level, although several possess post graduate training.

Organizational behaviour in the Environmental Protection Service. EPS makes frequent contact with virtually every component of DOE, particularly ECS, AES, and FEARO. However, contact with ECS is the most frequent, especially with the Lands Directorate and the Canadian Wildlife Service (CWS). Although there are several informal committees within EPS, the majority involve other federal departments and are listed below. Moreover, scientific research is not conducted within EPS, because its function is primarily regulatory in nature. In general, the headquarters office in Ottawa is responsible for national coordination, and the regional units are responsible for on-site operational matters.

Contacts with other federal departments are extensive, particularly with DFO, EMR, DINA, DOT and DREE. DFO is especially important in the regional office in Vancouver, although contact with EMR, including COGLA, has been relatively infrequent thus far. A variety of interdepartmental committees exist in EPS at the regional level. Some of the most important have involved the Thompson and Fraser River estuaries, as well as those involving waste disposal, such as the Regional Ocean Dumping Advisory Committee. Moreover, several committees were identified to facilitate preliminary planning in offshore petroelum development. EPS is a participant on the national coordinating committee, RMEC. It is also involved in two regional committees: the Regional Screening and Coordinating Committee (RSCC) and the West Coast Oil Development Committee (WESTCOD), each includes several regional components of DOE and DFO. However, despite the paucity of evidence of any direct conflict between EMR and DOE, a report has not been circulated by DOE, which indicated a significant "lack of environmental consciousness

exhibited by EMR" (Fulton, House of Commons Committee, Issue #67, June 18, 1981, p. 36). EMR and DINA have also been accused of having no coherent policy because there have been fourteen ministers in these two departments in the last decade (Hendersen, ibid., Issue #39, March 24, 1981, p. 4).

Although the headquarters office of EPS rarely communicates directly with the provincial government of British Columbia, the regional component of EPS in Vancouver has extensive contact with the province. The most frequent contacts are with the Waste Management Branch, the Marine Resources Branch and the Fish and Wildlife Branch of MOE, particularly over such matters as effluent discharge permits, which must be approved by EPS in certain circumstances. One member of EPS noted that territorial sensitivity is particularly pronounced between EPS and the Waste Management Branch of MOE, due to functional duplication and the inevitable conflict that it creates. However, many of the federal committees at the regional level also involve the provincial government. Typical examples include those that have been promulgated to streamline estuary management, such as the Fraser River Task Force. Unfortunately, no joint federal-provincial committees presently exist to coordinate offshore petroleum development. Nevertheless, informal discussions have taken place on this subject between EPS and MOE, especially with the Assessment Branch, as well as with the Offshore Administration Branch of EMPR. There was no indication that any information on offshore development had yet been transferred by EPS to the provincial government on this matter, other than comments upon MOE's preliminary assessment report on offshore development and a clarification by EPS of their own current activities in this regard. However, much information and advice has been shared in the past on such matters as water quality data, toxic spill reports and emergency equipment inventories.

Environmental Conservation Service. The function of the ECS is to formulate and manage federal policies, objectives and programs in land, water and wildlife management throughout Canada. Similar to EPS, it is

currently involved in the preliminary planning stages of offshore development at both the national level and the regional level on the west coast, through the Lands Directorate and CWS. The headquarters component in Ottawa is divided into several sections: a Finance and Administration Branch; a Policy and Program Development Directorate; a Wildlife Directorate (CWS); a Lands Directorate; and an Inland Waters Directorate. The total number of professional staff at the headquarters was not available, however, at the regional office on the west coast, the CWS and the Lands Directorate currently have approximately 22 professional staff members. The former are exclusively biologists; the latter are from a variety of disciplines. Post graduate training is predominant in both agencies. The following analysis pertains to the CWS and the Lands Directorate.

Organizational behaviour in the Environmental Conservation Service. The ECS contacts a variety of other agencies within DOE, particularly FEARO, the Canadian Forestry Service (CFS) and EPS. Although a number of internal ad hoc committees exist, the bulk of the committees involve other federal departments and will be discussed below. A spokesman for the headquarters office indicated that although some studies are undertaken for other agencies within DOE, the most common form of association was through informal working relationships on different projects.

Contact with other federal departments is extensive: DFO, EMR, DOT, DINA and the Department of Agriculture are the most frequent contacts. Similar to other federal agencies, a variety of committees exist to coordinate much of the inter-departmental activity, such as the Inter-departmental Committee on Land, which advises the government on the appropriate disposition of federal lands at the national level. However, several also exist to coordinate offshore petroleum development. CWS has representation on RMEC in Ottawa, to coordinate national policies on offshore petroleum activities. In addition, regional components of ECS also participate on the RSCC in Vancouver. Furthermore, the Lands Directorate also has representation on the TERMPOL Committee, which facilitates the siting of liquid natural gas plants along the west coast.

In addition to these committees, there is also evidence that personnel from ECS have been seconded to other departments to improve inter-departmental coordination. The regional office of the CWS, for example, has sent a representative to DFO's Institute of Ocean Sciences, on Vancouver Island, to evaluate the marine birdlife along potential drilling areas of the west coast. However, despite the appearance of adequate coordination between ECS and EMR, conflict is apparent. For instance, DOE, particularly ECS, has the greatest experience of any federal agency in coastal zone management in Canada (Johnston, 1975). Yet, over 100 recommendations from both DOE and DFO were ignored in the drafting of the NEP. DOE was not even present during the committee reading of this bill in Ottawa (Fulton, House of Commons Committee, Issue #67, June 18, 1981, p. 30).

ECS has, traditionally, had frequent contact with the provincial government. This is most pronounced at the regional level, particularly with the ministries of Lands, Parks and Housing; Agriculture; and Forestry. However, the most important provincial agency is MOE, especially the Terrestrial Studies Branch and the Waste Management Branch. Moreover, several joint federal-provincial committees exist. These include the Informal Technical Review Committee on Coastal Resources and the Ecological Committee on Land Classification, both of which involve the Lands Directorate of ECS and various provincial agencies. There are no joint federal-provincial committees on offshore petroleum development at the present time, but informal discussions have taken place between ECS and the provincial government on petroleum development, particularly with MOE. Although no specific information has been transferred to the province on offshore development, there has been an interchange of information involving many aspects of coastal zone management in the past.

Atmospheric Environment Service. The function of AES is to formulate and manage national objectives, policies and programs to provide weather, climate and ice services to the public, to all segments of the Canadian economy, and to provide the scientific basis for protecting the

quality of the atmospheric environment. AES is currently providing advice to offshore drilling operations on the east coast by virtue of its expertise in meteorology, ice movement and sea states, and it could, presumably, play a similar role on the west coast. AES is presently divided into several components: the Atmospheric Research Directorate; the Field Services Directorate; the Central Services Directorate; the Canadian Climate Centre; the Program Development and Evaluation Branch; and, finally, the Administration Branch. In addition, the headquarters office has six regional offices: the Pacific Region; the Western Region; the Central Region; the Ontario Region; the Quebec Region; and the Atlantic Region.* The total number of professional staff at the headquarters office was not available. The Pacific Region of AES has approximately 37 professional employees and the majority have post graduate training in physics, mathematics, or meteorology.

Organizational behaviour in the Atmospheric Environment Service. AES contacts a variety of components within DOE, particularly EPS, ECS and CFS. EPS is, however, the most important and coordination on matters relating to atmospheric pollution is common. However, few major internal committees exist; most involve other federal agencies and will be listed below. Moreover, AES rarely performs studies specifically for other agencies within DOE, but it does coordinate its activities with them in certain areas, and it provides advice on matters of mutual concern.

Contact with other federal departments is frequent, particularly with DOT, DFO, EMR and, occasionally, the Department of Public Works (DPW). The headquarters office participates in RMEC, as well as IERC, which were both previously identified as being national committees that are designed to facilitate offshore petroleum development. In addition, the regional component of AES in Vancouver also participates in the regional environmental screening committee, RSCC, as well as TERMPOL, previously noted for its role in standardizing the selection of

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*These regions differ slightly from the remainder of DOE: the headquarters office is also located in Toronto, not Ottawa.

potential liquid natural gas sites along the coast. Some joint projects are undertaken with other federal departments, and the occasional use of the computer facilities of the Institute of Ocean Sciences (DFO), by the regional office of AES in Vancouver, was cited. However, the tendency for AES to be more closely involved in weather prediction than environmental protection, *per se*, suggests that policy conflict between AES and EMR is less pronounced. Indeed, no evidence to the contrary could be found.

Similar to most of DOE, AES has traditionally had contact with a variety of provincial ministries in British Columbia, particularly MOE, Agriculture and Forestry—usually through the regional office in Vancouver. Several federal committees also exist, including the British Columbia Fire Weather Committee and the British Columbia Agrometeorology Subcommittee. However, no joint committees have yet been established to facilitate offshore petroleum development. Furthermore, no informal discussions, or transfer of information pertaining to such development, could be identified, although AES has, in the past, provided the provincial government with extensive meteorological information for a number of purposes.

Department of Fisheries and Oceans

As indicated above, DFO will also play a major role in the development of offshore petroleum along Canada's west coast. As present, DFO is composed of two organizational components: Fisheries; and Oceans and Aquatic Sciences. The former is responsible for the management of Canada's commercial fishery; the latter is primarily concerned with the research and development of Canada's marine environment. Throughout much of the past decade, DFO was amalgamated with DOE, but these two agencies were separated by the Government Organization Act of 1979.

Figure 19 indicates the organizational structure of this department. DFO has five major components, each is divided according to specialization by purpose and area: Pacific and Freshwater Fisheries; Atlantic Fisheries; Economic Development and Marketing; Oceans and Aquatic Sciences; and, finally, Management Services. However, there

DEPARTMENT OF FISHERIES AND OCEANS

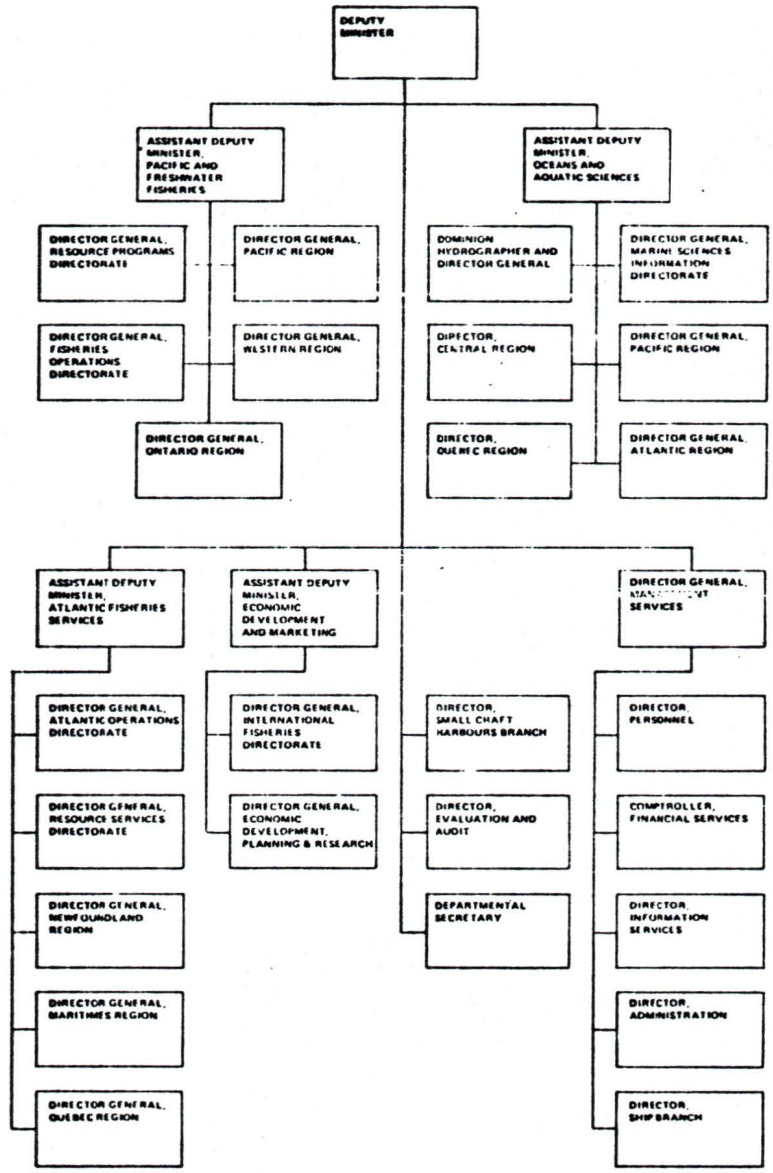

FIGURE 19: Flowchart of administration of the Department of Fisheries and Oceans. [Source: *Canadian Government Programs and Services*, CCH Canadian Ltd., 1981.]

are also several nondescript agencies: Small Craft Harbours; Evaluation and Audit; and a Departmental Secretary. Each of the five major components reports to the appropriate ADM who, in turn, reports to the Deputy Minister and the Minister, respectively. The regional headquarters for fisheries management are located in Vancouver, Winnipeg, Quebec City, Halifax and St. John's. The regional headquarters for the oceanographic component are located at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, and the Institute of Ocean Sciences, Sidney, British Columbia. Similar to DOE, therefore, DFO is relatively decentralized in its organizational structure. Moreover, both components of this department are also involved in planning for offshore petroleum development. The following analysis pertains to the Habitat Protection Branch of the Fisheries Section; and the Marine Sciences Information Directorate, and the Institute of Ocean Sciences of the Oceans and Aquatic Sciences Section.

Fish Habitat Protection Branch. The function of FHPB is to monitor the quality of marine and freshwater habitat throughout Canada. This is the most important agency within DFO that is responsible for environmental protection and FHPB is currently involved in offshore petroleum development at both the national level and at the regional level on the west coast. There are 7 professional staff members at the headquarters office in Ottawa, all of whom are biologists with post graduate training. The regional component of the branch in Vancouver has approximately 20 professional employees; almost all are biologists trained to the baccalaureate level.

Organizational behaviour in the Fish Habitat Protection Branch. The FHPB is highly decentralized. The headquarters office is primarily involved in programs of national importance, but the regional offices are more operational and investigative in nature—whence their larger staff. The most frequent contact at the national level is with the Marine Sciences Information Directorate of the Ocean and Aquatic Sciences component of DFO, primarily for pertinent data on marine ecology. The regional office in Vancouver contacts several components

of the Fisheries Section, such as the Nanaimo Biological Station and the Institute of Ocean Sciences. One important internal committee identified was the National Advisory Group on Fish Habitat (NAGOF), which facilitates the coordination of branch policy at the national level.

The FHPB also has extensive communication with several other federal agencies, including DOE, EMR, DOT, DINA, DPW and the National Energy Board. Several committees were identified. The branch has representation at the national level on RMEC, previously identified as a nucleous of federal departments engaged in environmental planning for offshore development, as well as two similar regional committees—RSCC and WESTCOD. The branch noted that it rarely conducts studies for other departments, but it does provide information and advice on fish habitat protection. In addition, the regional office in Vancouver indicated that it shares laboratory facilities with EPS. However, great dissatisfaction was expressed in Ottawa during the reading of Bill C-48, because DFO's recommendations were ignored in the drafting of this important bill.* But the former Minister of EMR, M. Lalonde, attempted to defuse any allegation of conflict: "I do not think it is a disagreement on the . . . importance of the environment . . . it is a disagreement on the organizational structure fundamentally" (House of Commons Committee, Issue #67, June 18, 1981, p. 62).

FHPB has traditionally communicated with a variety of provincial agencies through its regional office in Vancouver. They include MOE, particularly the Fish and Wildlife Branch and the Water Management Branch; and the Ministries of Lands, Parks and Housing; Transportation and Highways; Health; and Municipal Affairs. Similar to DOE, a large number of inter-governmental committees have evolved to coordinate environmental policy. Typical examples include the Thompson and Fraser river estuary task forces. No joint committees have yet evolved to

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*As a specific example, the Secretary Treasurer of the Canadian Labour Comgress, D. Montgomery, expressed the view that fishermen's compensation, in the event of an oil spill, should be determined by DFO, not solely by EMR (House of Commons Committee, Issue #42, March 31, 1981, p. 32).

coordinate offshore petroleum development. Nevertheless, it appears that the regional office of FHPB has exchanged a great deal of environmental data with the provincial government in the past, particularly MOE, although there was no indication that any such exchange had occurred specifically on the subject of offshore petroleum development. Unfortunately, the regional office commented that it was not always certain as to precisely what information the province actually possessed. This suggests that the provincial government also has at least a partial tendency to monopolize its own information, but it is uncertain whether this is done intentionally, to broaden its territorial mandate, or whether it is simply a function of the lack of effective horizontal coordination between the two levels of government.

Marine Sciences Information Directorate and Institute of Ocean Sciences. Oceans and Aquatic Sciences performs its mandate at both a national and a regional level. Regional establishments such as the Institute of Ocean Sciences (IOS), collect and analyze oceanographic data; the Marine Sciences Information Directorate (MSID) in Ottawa then stores and disseminates this information to other government departments, to industry, and to the public. The Oceans and Aquatic Sciences Section is currently involved in supplying oceanographic data on wind, currents, tides and ice movement to offshore oil and gas operators on the east coast.* The MSID has approximately 30 professional employees; all are trained to the post graduate level in either engineering, oceanography, or law. IOS has approximately 50 professional employees, the majority of whom also have extensive post graduate training in either oceanography, hydrography, physics, chemistry, biology, or engineering.

Organizational behaviour in the Oceans and Aquatic Sciences Section. MSID in Ottawa, which compiles and disseminates oceanographic data collected in the regional institutes, has frequent contact with IOS; the Bedford Institute; FHPB; and the Pacific Biological Station of the Fisheries Section on the west coast. However, IOS is the operational arm

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*IOS has already begun to compile all the known oceanographic data on the west coast with regard to offshore petroleum development.

of Ocean and Aquatic Sciences on the west coast, functioning as a matrix organization within its respective divisions.* However, it also displays a relatively high order of compartmentalization, probably resulting from both a high order of administrative decentralization and, concurrently, a highly specialized scientific research staff. Although much of the research at IOS is devoted to long term scientific matters, contact with other components of DFO is common, particularly MSID; FHPB; and the Pacific Biological Station. In addition, there are several internal committees in the Oceans and Aquatic Sciences Section. Two internal committees for offshore petroleum development at the regional level are WESTCOD, identified earlier, and the Working Group on Offshore Bathymetry, a committee which is examining the hydrographic aspects of offshore petroleum development. Moreover, research equipment such as computer facilities and research vessels, is shared by every division within the institute.

Contact with other federal agencies is extensive. Both MISD and IOS make frequent contact with DOT, EMR, DOE, DINA and the Department of National Defence (DND). MSID communicates with them at the national level; IOS communicates with them primarily through their regional offices on the west coast. Several committees are used to facilitate policy making at the inter-departmental level.** MSID is represented on RMEC at the national level. IOS is represented on two inter-departmental committees for offshore development: TERMPOL, previous identified as a body that recommends standards for the prevention of pollution at marine terminals; and RSCC, the regional screening committee. IOS indicated that it does occasionally conduct joint projects with other departments and staff from these agencies have been seconded to the Oceans and Aquatic Affairs Section, such as the addition of a CWS

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*Operational divisions include: Oceanographic Information; Hydrography; Ocean Physics; Ocean Chemistry; and Ocean Ecology.

**A spokesman for IOS indicated that at one time scientists in their division were expected to attend 26 committees and that this seriously interfered with their ability to conduct scientific research.

representative from DOE to assist IOS in conducting a preliminary impact study of offshore petroleum development on west coast birdlife. In addition, facilities at IOS are widely used by other federal departments, such as the Pacific Geoscience Centre of EMR, which shares the same building as IOS. However, the Oceans and Aquatic Sciences Section has had virtually no input into the drafting of the NEP, despite the profound significance of this agency to offshore petroleum development. The former Minister of EMR responded to the criticism of inter-departmental conflict by noting that "we could [have] put almost the whole Cabinet into this bill for one aspect or another" (Lalonde, House of Commons Committee, Issue #49, May 14, 1981, p. 34).

MSID and IOS seldom contact the provincial government of British Columbia, although occasional contact has occurred between IOS and MOE, primarily via the Marine Resources Branch and the Fish and Wildlife Branch. However, no significant inter-governmental committees exist at this time, although there have been informal discussions between IOS and MOE on the possible resumption of offshore petroleum drilling on the west coast. Moreover, IOS did assist MOE, particularly the Assessment Branch, in compiling its report on the preliminary impact assessment of offshore petroleum development along the west coast.*

Other Possible Federal Agencies in Environmental Protection

Departments: nil.

Crown corporations, agencies, boards and commissions: Environmental Advisory Council; COGLA; FEARO.

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*A spokesman for IOS emphasized the difference between environmental management onshore and offshore; and he was dubious of the provincial government's full appreciation of this distinction. He noted, however, that IOS was ready to assist the province at any time with oceanographic information. Although MOE has made some use of the scientific expertise at IOS, EMPR has had no contact whatsoever with IOS at this time.

INFRASTRUCTURE

The role of the federal government in the infrastructure associated with offshore oil and gas development could be extensive, particularly in the site-to-shore transfer phase. However, the onshore infrastructure may also involve a variety of federal agencies, depending upon the ultimate delineation of federal-provincial responsibilities. The purpose of this section is to examine the most important federal agency in one particular aspect of the infrastructure—pipeline regulation. As discussed in the previous chapter, pipelines may well be used to transfer oil or gas from site-to-shore, but they will almost certainly be used to carry the hydrocarbons from the initial landfall to the refinery, and to their ultimate market. The National Energy Board (NEB) could play an important federal role in this particular aspect of the infrastructure offshore, and possibly onshore as well.

NEB was created in 1959 to administer the National Energy Board Act. It is directly responsible to Parliament through EMR and has two specific functions: "[first] to regulate specific areas of the oil, gas and electrical utility industries in the public interest; and [second] to advise the government on the development and use of energy resources" (Government of Canada, 1981, p. 4). The regulatory function of NEB encompasses several fields, including the issuance of certificates of public convenience for inter-provincial and international pipelines; orders respecting modifications to such pipelines; authorizations for pipeline utility crossings; pipeline safety; the issuance of energy licenses; and the regulation of pipeline tolls, tariffs and accounting practices. The involvement of NEB in pipeline regulation is, therefore, extensive, although it has thus far had only a minor involvement in offshore petroleum development.

Figure 20 indicates the organizational structure of NEB in Ottawa. It consists of a board and several advisory branches, each of which is characterized by specialization by purpose. They include a Law Branch; an Economics Branch; an Engineering Branch; a Financial and Regulatory Branch; an Administrative Services Branch; an Energy Resources Branch;

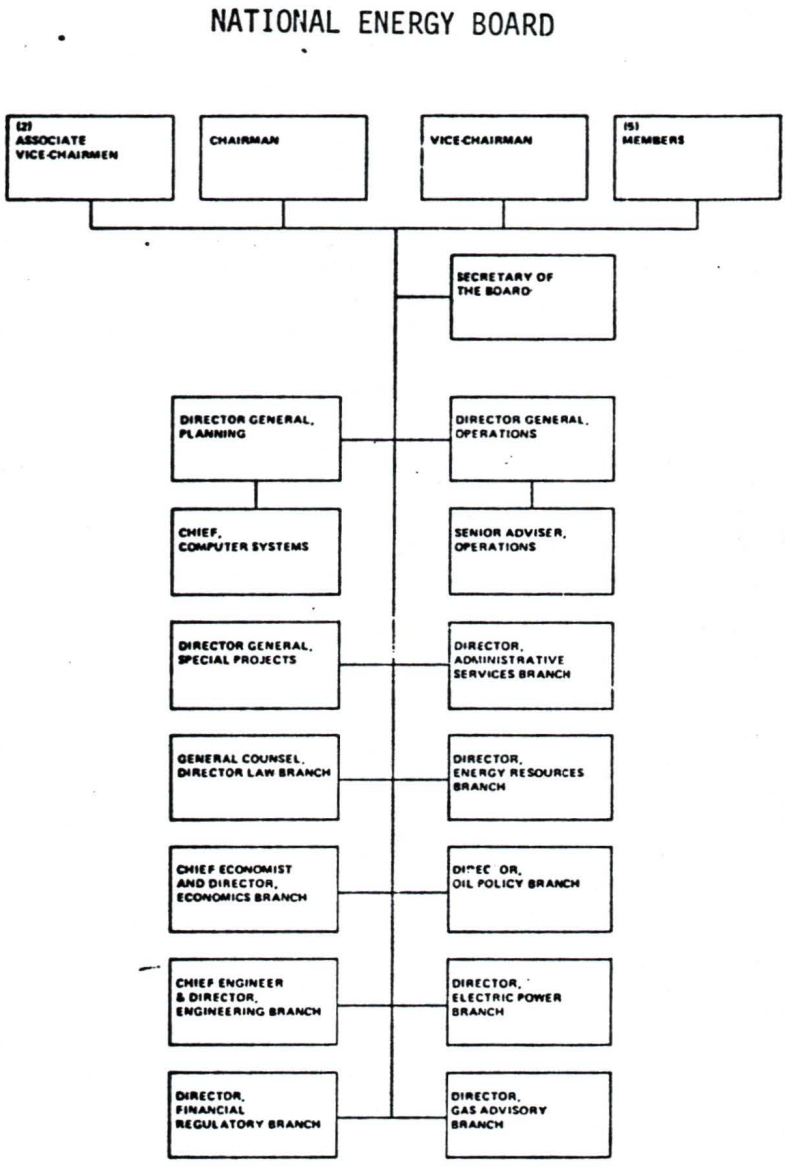

FIGURE 20: Flowchart of administration of the National Energy Board. [Source: *Canadian Government Programs and Services*, CCH Canadian Ltd., 1981.]

an Oil Policy Branch; an Electric Power Branch; and, finally, a Gas Advisory Branch. The following analysis pertains specifically to the Engineering Branch, with particular emphasis upon its role as the primary regulatory branch for oil and gas pipelines under federal control.

Engineering Branch

As previously noted, pipelines that operate solely within a province are provincially regulated, but pipelines which traverse interprovincial and international boundaries are regulated by the federal government. This latter responsibility has been delegated to the Engineering Branch of NEB. The function of the Engineering Branch, therefore, is to advise NEB on matters relating to the cost, the construction and the inspection of various conventional, Arctic and offshore pipelines; to devise appropriate environmental safety regulations; and to record each utility crossing and right-of-way encroachment along the federal pipeline system.* The branch currently consists of the following sections: a Gas Pipeline Section; an Oil Pipeline Section; an Environmental Section; a Right-of-Way Section; and, finally, a Northern Pipeline Section (responsible for monitoring the Northern Pipeline Agency). The branch has a total professional staff of 45, the majority of whom are engineers, and most of the personnel in the Engineering Branch are trained to the baccalaureate level, although 8 have post graduate training.

Organizational behaviour in the Engineering Branch. Research indicated that the Engineering Branch is characterized more by a matrix organization than by specialization by purpose, as suggested by the organizational chart. Communication with other branches with NEB is frequent. Although no committees were identified, panels comprised of

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*However, it should be noted that the Canadian Transport Commission retains sole responsibility for regulating commodity pipelines and, in addition, must approve all pipeline construction across railways.

board members and technical support staff (such as the Engineering Branch) are frequently used to make recommendations to the federal government on matters pertaining to energy policy. The Engineering Branch provides advice to all such panels on pipeline regulation and conducts extensive research in relation to all such submissions.

Communication with other federal departments appears to be much less frequent. However, the Engineering Branch has occasional contact with EMR, primarily the Oil and Gas Group; it has also given advice to DINA on the Arctic pilot project, concerning the shipment of liquefied natural gas from Melville Island, and to ITC on the Canadian manufacturing content in energy construction projects. The Engineering Branch does not participate in any major departmental committees and research undertaken for other federal departments is limited to the provision of technical advice only.

Contact between the Engineering Branch and the province of British Columbia does occur periodically. Agencies most frequently contacted include the British Columbia Petroleum Corporation, the British Columbia Utilities Commission and the provincial counterpart of the federal Engineering Branch—the Engineering Division of T&H. The only joint federal-provincial committee identified was the Canadian Standards Association (CSA), previously mentioned, which facilitates the standardization of pipeline engineering units among the multifarious pipeline regulatory agencies across the country. However, no studies are undertaken for the province on pipeline matters and no significant transfer of data or information was identified other than the occasional request by the province for specialized advice. Moreover, the Engineering Branch's current involvement in offshore oil and gas planning appears to be very limited. Although no evidence of conflict was apparent between NEB and the other government agencies, the functional duplication in pipeline regulation is considerable, and this provides fertile ground for future altercations.

Other Possible Federal Agencies Involved in Infrastructure

Departments: Communications; Public Works; Transport; Fisheries and Oceans.

Crown corporations, agencies, boards and commissions: Pacific Pilotage Authority; Canadian Transport Commission; COGLA; Harbours Board of Canada.

EMERGENCY RESPONSE

As noted in the previous chapter, emergency response is an *ex post facto* attempt to mollify pollution damage and, particularly in offshore waters, has been almost exclusively regulated in the past by the federal government. Such spills could originate from offshore hydrocarbon development either on-site, such as during exploratory drilling; during the transfer of the hydrocarbons, either by a tanker collision or by a pipeline rupture; or as a result of a mishap at a petro-chemical installation onshore. Consequently, several federal agencies are involved in oil spill clean-up operations in Canada and the lead agency depends upon where the spill originates.

Federal energy legislation delegates the primary responsibility for oil spill clean-up to the persons or company responsible (Government of Canada, 1980). However, where such persons fail to satisfy the federal government that they are fulfilling their responsibilities, a federal agency can assume complete control. Specifically, an uncontrollable spill at the drill site is managed directly by EMR, through the Environmental Protection Branch of COGLA. Conversely, a spill that originates from a ship, such as a tanker or drill ship in transit, is managed by the Canadian Marine Transportation Administration of DOT, through the Canadian Coast Guard (CCG). However, coastal spills that originate from onshore installations are managed by DOE, in conjunction with the province. The following discussion pertains specifically to the CCG, since this is most likely to play a leading role in virtually any offshore oil spill by virtue of its experience and equipment capability.

The Canadian Coast Guard is a component of DOT, a federal agency that has the overall responsibility for regulating transport policies throughout Canada. DOT was originally created in 1936, by an Act of Parliament, and it took over the functions of the Department of Marine, the Department of Railways and Canals, and the Civil Aviation Board of the Department of National Defence. DOT currently consists of a Planning and Development Section, which provides strategic planning and coordination; a Service Section, responsible for personnel, finance and public affairs; an Operations Section, which consists of an Air Transport Administration, a Marine Transport Administration, and a Surface Transport Administration; and, finally, a miscellany of crown corporations which report to Parliament through the Minister of DOT. CCG is a component of the Canadian Marine Transport Administration.

Figure 21 depicts an organizational chart of CCG. It is organized into 12 divisions, according to specialization by purpose, but the chart also depicts 5 regional offices, indicating that specialization by area is also present. Each division is responsible to the Deputy Commissioner and the Commissioner of CCG, respectively, but there are 3 more levels of authority between the Commissioner and the Minister of DOT. CCG is, therefore, a highly decentralized agency. However, although a variety of dividions within CCG are currently active in various aspects of offshore hydrocarbon development, only the Emergencies Division is specifically charged with contingency planning for the clean-up of toxic waste in Canada's navigable waterways.

Emergencies Division. The primary function of the Emergencies Division is to establish policies and general standards for the removal of oil spills that result from shipping accidents in all navigable Canadian waters, including spills that may result from a drill ship that is in transit. This particular division is currently involved in offshore petroleum planning in the Arctic, and it has already begun to involve itself in matters on the west coast. Although the headquarters office in Ottawa is non-operational—it is involved mostly in long range research, planning and training—there are five regional offices across

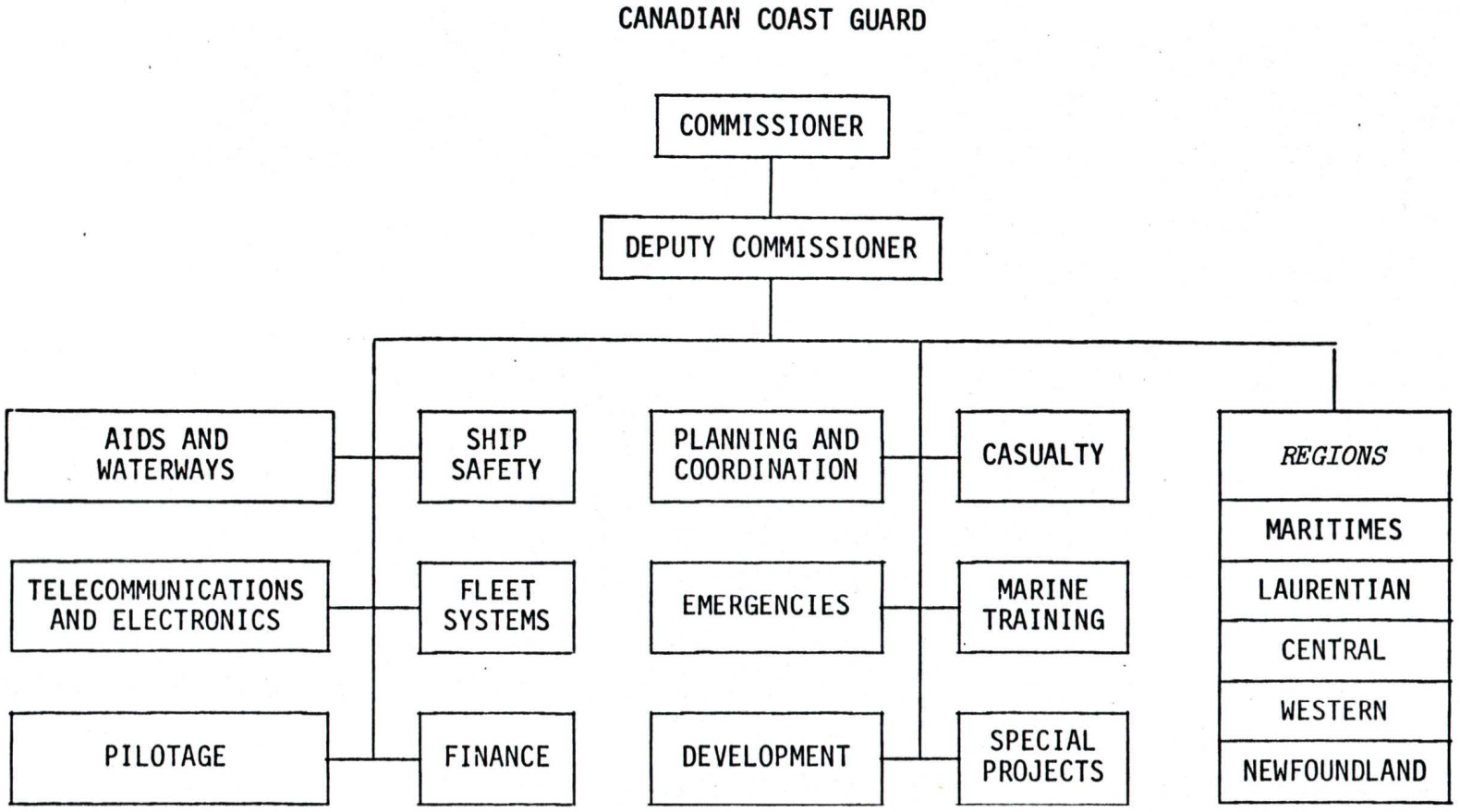

FIGURE 21: Flowchart of administration in the Canadian Coast Guard. [Source: Transport Canada, *Organizational Manual Tp101*, Ottawa, September 1979.]

Canada: the Maritimes Region; the Laurentian Region; the Central Region; the Western Region; and the Newfoundland Region. The headquarters office has a professional staff of 7, including a number of Certified Master Mariners and biologists. However, the Western Region office in Vancouver has only 2 professional staff members; both hold professional certificates in the marine industry. In addition, the Western Region has a representative of the Emergencies Division in Victoria and Prince Rupert.

Organizational behaviour in the Emergencies Division. The Emergencies Division maintains a close liaison with each of the other divisions within the CCG, but this tends to be less pronounced at the operational level in Vancouver, where contacts with the Search and Rescue Division are the most frequent. Committees within the CCG are primarily ad hoc in nature and organic in structure. However, directors meetings are frequently held at both the headquarters level in Ottawa, and at the regional level, to coordinate the activities of the various divisions. Although emergency planning is undertaken at the regional level, this research is carefully monitored at the headquarters office.

Research indicates that the Emergencies Division of CCG contacts a variety of other federal departments. Agencies commonly contacted include DINA, DOE, EMR, DFO and DND at the headquarters level; the most frequent contacts in the Western Region include DINA, DOE, DFO and Emergency Planning Canada (EPC); these are usually made through their regional representatives in Vancouver. Evidence indicates that this division participates in several important national committees, including the Arctic Waters Advisory Committee (AWAC) and the Arctic Marine Oil Pollution Committee (AMOP). RSCC, TERMPOL, the Harbours Board Emergency Plan and the Burrard Inlet Working Group are important committees at the regional level. RSCC and TERMPOL, both identified earlier, will play an important role in any future hydrocarbon development along the west coast and are designed to permit a maximum of administrative flexibility at the operational level. However, with such a wide variety of federal agencies involved in emergency response, in addition to CCG, it is difficult to envisage a major accident that

will not be characterized by a certain amount of functional conflict.

Communication with the provincial government occurs primarily at the regional level, but it is far less frequent than the inter-departmental communication within the federal government. The regional office of the Emergencies Division noted that it has occasionally contacted MOE, primarily PEP, as well as T&H, principally the Transport Policy Branch. Several inter-governmental committees exist—the Burrard Inlet Working Group is a typical example. Moreover, both the Emergencies Division of CCG and MOE have access to the National Emergency Equipment Locator System (NEELS), which provides information on toxic spills, the location of emergency equipment and manpower availability. However, no joint committees presently exist specifically for offshore petroleum development, nor has any information been transferred to the province on such matters. In addition, it should be noted that although joint contingency plans to counteract potential oil spills from tanker traffic have been in existence for some time, their effectiveness in the event of a major oil disaster has never been fully tested.

Other Possible Federal Agencies Involved in Emergency Response

Departments: National Defence.

Crown corporations, agencies, boards and commissions: Emergency Planning Canada; COGLA.

ECONOMIC DEVELOPMENT

Departments: Economic Development; Finance; Industry, Trade and Commerce; Regional Economic Expansion; Revenue Canada.

Crown corporations, agencies, boards and commissions: Economic Council of Canada; Federal Business Development Bank; Construction Industry Development Council; Machinery and Equipment Advisory Board.

SCIENTIFIC RESEARCH

Departments: Ministry of State for Science and Technology.

Crown corporations, agencies, boards and commissions: National Research Council of Canada; Science Council of Canada; Natural Science and Engineering Council; Fisheries and Oceans Research Advisory Council.

MANPOWER

Departments: Labour; Employment and Immigration.

A SUMMARY OF THE PERSPECTIVES OF THE FEDERAL BUREAUCRACY

Similar to the provincial bureaucracy, the involvement of the federal government in offshore petroleum development along the west coast is in its early stages. However, a comprehensive examination of the federal bureaucracy indicates that several agencies at the national level have been involved in the planning of offshore development for some time, and that several of their regional components are now conducting similar activities on the west coast. Foremost among these agencies are: COGLA; EPS, ECS and AES of DOE: FHPB, MSID and IOS of DFO; the Engineering Branch of NEB; and, finally, the Emergencies Division of the CCG (Table 7). Nevertheless, the creation of COGLA to administer offshore petroleum development on all Canada Lands—almost to the exclusion of every other federal body—is unquestionably an indication that the federal government intends this agency to be the most dominant in the decision making process. Although COGLA currently has no regional representation on the west coast, it will presumably be the lead agency to administer petroleum development in all such areas that the federal government considers to fall within its jurisdiction.

Table 8 summarizes the technical expertise of each agency examined within the federal bureaucracy. However, with the exception of COGLA and the Engineering Branch of NEB, this table refers only to the regional components of each agency, since they will play the most significant role on the west coast. DOE and DFO, for example, have an enormous staff in Ottawa. However, similar to the provincial bureaucracy, the category of

TABLE 7: A SUMMARY OF ALL THOSE FEDERAL AGENCIES THAT COULD BE INVOLVED IN OFFSHORE PETROLEUM DEVELOPMENT ON THE WEST COAST

Federal Agency \ Category of Functional Specialization	On-site Regulation	Environmental Protection	Infrastructure	Emergency Response	Economic Development	Scientific Research	Manpower
Communications			x				
Economic Development					x		
Employment and Immigration							x
Energy, Mines and Resources (COGLA)	x	x	x	x			
Environment		x					
Finance					x		
Fisheries and Oceans		x	x				
Industry, Trade and Commerce					x		
Labour							x
National Defence			x				
Public Works			x				
Regional and Economic Expansion					x		
Science and Technology						x	
Transport (CCG)			x	x			
Economic Council of Canada					x		
National Research Council of Canada						x	
Science Council of Canada						x	
Harbours Board of Canada			x				
Pacific Pilotage Authority			x				
Federal Business Development Bank					x		
Canadian Transport Commission			x				
Machinery and Equipment Advisory Board					x		
National Energy Board			x				
Construction Industry Development Council					x		
Environmental Advisory Council		x					
Fisheries and Oceans Research Advisory Council						x	
Natural Sciences and Engineering Research Council						x	
Emergency Planning Canada				x			

TABLE 8: A SUMMARY OF THE TECHNICAL EXPERTISE OF THE FEDERAL BUREAUCRACY

Federal Agency		Professional[1] Staff	Academic Discipline	Level of Education
COGLA	Engineering & Control Branch	8	Engineering	■■
	Resource Evaluation Branch	6	Geology/Geophysics	■■■■
	Land Management Branch	1	Multi-disciplinary	■■
	Environmental Protection Branch	3	Biology/Oceanography/ Geography/Meteorology	■■■■
DOE	Environmental Protection Serv.	33	Engineering/Biology.Geography	■■■
	Environmental Conservation Serv.	22	Biology/Geography	■■■■
	Atmospheric Environment Serv.	37	Physics/Mathematics/Meteorology	■■■■
DFO	Fish Habitat Protection Branch	20	Biology	■■
	Institute of Ocean Services	50	Oceanography/Hydrography Physics/Chemistry/Biology	■■■■
NEB	Engineering Branch	45	Engineering	■■■
CCG	Emergencies Division	2	Marine Technology	■

■ Technical training (non-university)
■■ University degree only
■■■ Some post graduate training
■■■■ Predominantly post graduate training

[1]Except for COGLA and NEB, this includes regional staff only.

Emergency Response has by far the smallest regional staff of any of those examined. In addition, this table also indicates a great variety in academic disciplines within those agencies studied. COGLA's staff, for instance, is largely multidisciplinary; DOE and DFO also indicate a wide variety of academic disciplines, although physical science predominates; and those agencies examined in the categories of Infrastructure and Emergency Response consist primarily of engineers and marine technologists. Although several of these agencies have considerable technical skill in onshore activities, their expertise in offshore matters, particualrly oceanography and meteorology, is probably unsurpassed anywhere else in the country, making them virtually indispensible to effective coastal zone management beyond the water's edge. The overall quality of this expertise is perhaps best demonstrated with reference to their level of education. The staff of virtually every agency examined displays extensive post graduate training.

Inter-departmental and inter-governmental contact within each of the federal agencies examined is extensive (Table 9). These contacts are most widespread within DOE and DFO, which make use of a wide variety of committees to facilitate their mandates at both the national and the regional levels. The Engineering Board of NEB appears to be the most insular of all of the categories of specialization examined. In terms of the degree of inter-agency contact on offshore petroleum development, it is clear that contacts initiated by COGLA are far more numerous than its provincial counterpart, despite the allegations that its mandate provides for no input from other federal departments, such as DOE and DFO. Although contact with the provincial government on this matter has been far less significant, communication between several federal agencies has occurred within both EMPR and MOE. In the case of EMPR, this was to clarify certain aspects of the present regime of exploration permits along the west coast; contacts with MOE have been largely done through the regional offices and have involved discussions on the present state-of-the-art of environmental protection with respect to offshore drilling as well as the soliciting of comments from the federal government with

TABLE 9: A SUMMARY OF THE MOST FREQUENT INTER-MINISTERIAL AND INTER-GOVERNMENTAL CONTACT FOR SEVERAL FEDERAL AGENCIES SELECTED FOR DETAILED STUDY

Federal Agency	Federal Agencies												Provincial Agencies							
	Agriculture	Energy, Mines & Resources	Environment	External Affairs	Fisheries & Oceans	Indian & North. Affairs	Industry, Trade & Commerce	National Defence	Public Works	Regional Economic Expan.	Transport	National Energy Board	Emergency Planning Canada	Agriculture	Energy, Mines & Petro Resources	Environment	Forestry	Lands, Parks & Housing	Municipal Affairs	Transportation & Highways	B.C. Petroleum Corporation	B.C. Utilities Commission
COGLA		■	■	■	■	■	■			■	■				■	■						
DOE																						
Environmental Protection Serv.	□	□			□	□				□	□			□		■	□	□				
Environmental Conservation Serv.		□			□	□			□		□					□						
Atmospheric Environment Serv.		□			□											□						
DFO																						
Fish Habitat Protection Branch		□	□			□			□		□	□				□		□	□	□		
Institute of Ocean Science and Marine Sciences		□	□			□		□			□					■						
Information Directorate																						
NEB																						
Engineering Branch		□				□	□														□	□
CCG																						
Emergencies Division		□	□		□	□		□					□			□				□		

■ - Contact relating specifically to offshore petroleum development

□ - Contact relating to general matters

respect to the province's environmental assessment report on possible future drilling operations.

Agency conflict is apparent in several areas of the federal bureaucracy. COGLA, for example, has generated a considerable amount of bureau stress, because of its extensive control over offshore petroleum development on all Canada Lands, almost to the complete exclusion of every other federal agency. However, despite attracting heavy criticism, this newly created agency does appear to be consulting a wide variety of federal departments and participation is incorporated into its decision making policy through the Resource Management Environmental Committee in Ottawa. In addition, possible friction may also be seen in at least two other areas of the federal bureaucracy: the multiplicity of agencies involved in pipeline regulation, and the duplication inherent within those agencies associated with Emergency Response. The addition of several provincial agencies into both these two categories of functional specialization merely compounds the administrative complexity still further. Finally, with respect to inter-governmental conflict itself, the most significant observation is the limited amount of communication that COGLA currently has with its provincial counterpart, EMPR. In this instance, a lack of communication between these two agencies—in a matter of such universal importance—can only be interpreted as being symptomatic of their mutual, territorial sensitivity, which is, in turn, a reflection of the political conflict at a higher level. Nevertheless, functional sensitivity is apparent elsewhere within the government, such as between the Environmental Protection Service of DOE and the Waste Management Branch of MOE—although at a considerably reduced level—and DFO indicated that it was not always certain as to precisely what information the provincial government possessed, tending to substantiate a similar opinion within the provincial government.

CHAPTER 7

CONCLUSION

GENERAL CONCLUSIONS

The importance of the coastal zone, and the need to manage it efficiently, are widely recognized in Canada, but conflict between competing users continues to escalate. Foremost among these conflicts on the west coast are the congestion and pollution associated with the commercial and industrial expansion onshore, particularly along the major coastal estuaries; the gradual depletion of the coastal fishery; and the growing concern over the siting of energy facilities. However, the prospects of a renewal in offshore petroleum development during this decade is certain to place an even greater degree of stress upon the institutions that have regulated this important region in the past. One of the most significant components of the decision making process has been, and will continue to be, government itself. This thesis has examined several of the administrative characteristics of the most important government agencies that could be involved in offshore oil and gas development, in an attempt to explore the institutional dimensions of coastal zone management more thoroughly.

A number of provincial and federal agencies have already begun to play an important role in the preliminary planning of offshore petroleum development along the west coast—and many more have been identified as having potential significance. However, two agencies stand out as being singularly important. These are the Offshore Administrative Branch of EMPR, and COGLA of EMR. Evidence clearly indicates that both are currently acting as lead agencies in the administration of offshore petroleum development and both presently coordinate their activities—to varying degrees—with other agencies within their respective governments in an umbrella-type structure, with themselves at the apex.

It is important to note that this observation is not entirely compatible with Downs' (1966) earlier model (Figure 2). He contends that the "inherent dynamism" that is created at the centre of policy space by bureau interaction will persist until either one agency expands its "interior fringe" or until a new agency is created, thereby eliminating any further bureau invasion. However, evidence in this thesis clearly indicates that no one agency can manage the entire coastal zone, nor can any single agency ever regulate offshore petroleum development by itself. Alternatively, the prospect of a variety of agencies participating equally in the decision making process on a purely cooperative basis, as suggested by some observers more recently, is also somewhat unrealistic, since this tends to undermine accountability. It is evident, therefore, that the findings of this study indicate the establishment of lead agencies in offshore petroleum development along the west coast.*

In addition, the theory documented earlier clearly indicates that informal communication channels are used extensively within any bureaucracy. However, little evidence was available in the literature as to how such contacts develop or progress between the bureaucracies of two levels of government within a federation, when political contact at the apex of both governments, in certain polity areas, has virtually ceased. This study has shown that although inter-governmental contact is evident in preliminary offshore petroleum development on the west coast, it is not as widespread as was initially predicted. The greatest inter-governmental contact appears to have been between those agencies falling into the category of Environmental Protection. However, inter-governmental contact between the two lead agencies in the category of On-Site Regulation was negligible, suggesting that the political conflict has permeated these agencies at the operational level.

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*Although offshore petroleum development is one such functional area in the coastal zone, this activity can also be divided into other sub-functions or categories, as previously indicated, each of which could involve other lead agencies to facilitate coordination.

SPECIFIC CONCLUSIONS

In addition to these two observations, other important findings have emerged. For example, the technical expertise within each level of government is very high. The federal government has by far the largest number of professional employees in most of the categories of functional specialization identified, but the size of their regional components—those agencies most closely involved with offshore petroleum development on the west coast—were not significantly greater than those of the provincial government itself. In both cases, the largest professional staff was in the category of Environmental Protection; the smallest professional staff was found to be in Emergency Response, which is virtually non-existent on the west coast. Furthermore, the professional training of the bureaucracy displays great academic diversity, particularly in the category of Environmental Protection. However, there is clear evidence that although the provincial government has a greater expertise than the federal government in many onshore matters that could relate to offshore development, the federal government has had much more experience at regulating activities beyond the water's edge, including the regulation of offshore petroleum drilling, hydrography, ocean physics, ocean chemistry, marine biology and maritime transportation.* Moreover, the level of education of the federal bureaucracy equals or exceeds that of the province in almost every category examined.

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*Nevertheless, it should be noted that neither COGLA nor NEB have any regional representation at all on the west coast at this time.

In addition to the horizontal communication between the two levels of government on matters pertaining to offshore petroleum development, horizontal communication has, traditionally, been widespread in other areas of government, despite the lack of any formal constitutional mechanism to facilitate such behaviour. This form of cooperation was most noticeable in the category of Environmental Protection, particularly in areas such as coastal zone management; and Emergency Response, where each level of government has recognized the need to streamline their contingency planning in the event of accidental toxic discharges. These contacts occur through a variety of committees and ongoing projects; the sharing of research facilities; and, occasionally, the temporary transfer of personnel from one agency to another. However, agencies examined within the other categories of functional specialization are more insular. This was particularly noticeable in EMPR at the provincial level and NEB in the federal government.

Although communication and coordination are widespread throughout the Canadian bureaucracy, several areas of conflict, and potential conflict, have been identified. Policy conflict, for example, is evident within each level of government. However, it is more pronounced at the federal level, where 100 recommendations of DOE and DFO were omitted in the drafting of the NEP. The former Minister of EMR, Marc Lalonde, mollified these allegations of conflict by emphasizing the requirement for COGLA to seek advice from other federal agencies. Nevertheless, without a legislative mandate to provide such advice, the effectiveness of such an arrangement is highly questionable. Similar difficulties were also detected at the provincial level, although to a lesser degree. Here, friction was evident between certain components of MOE and EMPR, both in terms of their traditional working relationship and over matters relating to preliminary offshore petroleum development itself; their relationship was described by the Offshore Administration Branch as being "formal."

However, this study also has shown evidence of functional conflict. The lack of communication at the operational level between the two leading agencies in On-Site Regulation is the prime example and is a strong indication that the conflict over offshore oil and gas ownership at the political level is equally evident within the bureaucracy itself. Moreover, functional duplication between those agencies in the categories of Infrastructure and Emergency Response is also present, both within and between each level of government, and it is difficult to foresee how jurisdictional disputes could be avoided in these important areas in the future. Furthermore, even though a decade has passed since the introduction of the concept of coastal zone management in Canada, there is still evidence that both levels of government are unclear as to precisely what information the other possesses.

IMPLICATIONS

In terms of the perspective of the bureaucracy towards the future, administrative options for the development of offshore oil and gas along Canada's west coast, virtually every public servant interviewed in this study agreed that joint federal-provincial cooperation would inevitably be required. Although the final administrative arrangement will depend largely upon the outcome of a political dispute over the ownership of offshore mineral rights, several administrative options were proposed and public servants were asked to comment upon the likely efficacy of each (see Question 12 in Appendix A).*

Although joint management of offshore oil and gas by pooling the administrative resources of both levels of government was accepted as possibly the ideal arrangement, it was criticized for being too impractical, given the current level of bureau sensitivity both within and between each level of government. However, the second option—joint management by dividing the legislative responsibilities of both governments—received much wider support. Some suggested that this could be

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*These theoretical options are based upon the model of P. Self in *Administrative Theories and Politics* (London: Allen and Unwin, 1972).

done either geographically, such as by allowing each level of government to own and regulate a designated portion of the seabed, thereby cooperating on that basis; or by allowing each level of government to regulate specific aspects of the resource independently, thereby making both levels of government indispensable, regardless of which government actually owned the mineral rights themselves.

The last three options were more controversial. For example, the federal government is a strong supporter of the principle that it not only owns all offshore minerals, but that it should also be responsible for their development. They have long advocated the establishment of a Maritime Offshore Resource Board (MORB)—with both federal and provincial participation—but the province has rejected this on the grounds that it does not provide for provincial participation in the day-to-day regulation of the industry and, therefore, renders them virtually powerless. Understandably, federal public servants, particularly those in Ottawa, widely advocated the principle of federal ownership and management, with the provincial government providing advice. However, several federal representatives at the regional level advocated the reverse concept: provincial ownership and management, with the federal government providing technical advice only. This latter arrangement was widely supported by many provincial public servants, but few appeared to appreciate the complex nature of offshore petroleum drilling and, perhaps most significant of all, the paucity of technical expertise within their own government to safely regulate such operations at the present time.* Finally, the last option presented—the delegation of the management from one level of government to the other, irrespective of ownership—received little support from any of the public servants in either level of government, because it was felt that such an option would inhibit the high degree of joint cooperation that was required.

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*When this was brought to their attention, it was emphasized that such expertise could be easily acquired. However, one federal spokesman indicated that it would take up to a decade for the province to rival the federal government's experience in regulating the offshore petroleum industry.

Regardless of what administrative arrangements eventually emerge to regulate the offshore petroleum industry, every member of the bureaucracy conceded that it was highly unlikely that a large super-agency would ever emerge to regulate the entire coastal zone in this region, due to its jurisdictional complexity. Most stressed the likelihood of a continuation of the present "sectoral approach" to policy making. Such a concept is characterized by the collective involvement of a variety of government agencies from both levels of government in determining the appropriate solutions to existing problem areas along the coastline. Unfortunately, this has traditionally been an *ex post facto* approach to coastal zone policy. The serious question must be raised as to whether such an approach can continue to be employed in resolving the institutional conflicts of the large number of competing users in this complex region. One possible adjustment that has been proposed to facilitate long term planning is the establishment of some form of coastal zone commission.

The ultimate solution to most of the conflicts in the coastal zone depends upon the establishment of a cooperative relationship between each level of government and, concurrently, between each of the competing users within this zone. Rather than simply establishing one more agency to assume new responsibilities, thereby competing for scarce financial resources, a coastal zone commission has been proposed. Pross (in Dwivedi, 1980, p. 123) emphasizes that such an institutional adjustment would not "impose a new superstructure on an already complex situation," but would provide a formal and much needed link between existing administrative structures. With reference to Canada's east coast, Johnston (1975) has suggested that such a commission could include representatives from both levels of government, the private sector and the universities. On the west coast, this could also include input from the fishing industry and, possibly, from recreational and environmental interest groups as well. Its primary responsibility, therefore, could be to enunciate a higher degree of inter-governmental and inter-agency cooperation in the development and implementation of coastal zone policy and, in addition, its role could be further facilitated by research, advisory and

liaison duties, particularly with regard to the objective appraisal of known or potential problem areas in the region. The former could be promoted via a close link to the Cabinets of both levels of government, possibly via a Cabinet committee of shore zones, and the latter could be brought about by including a diverse selection of public servants, industrial representatives and scholars in the commission's staff.

Offshore petroleum development portends to be one of the largest and the most controversial activities ever undertaken on the west coast. Although the potential conflicts generated will be nothing new, their magnitude could be enormous. However, this study indicates that the "sectoral approach" to managing the coastal zone will most likely continue, despite the fact that both levels of government are becoming more cognizant than ever before of the need to identify potential conflicts in the coastal zone. It is too early to determine whether or not offshore petroleum development will provide the catalyst for any institutional adjustments in coastal zone management, but it is certain to place additional stress upon the conventional methods of policy making in this region. However, until the current political dispute over offshore mineral rights is clarified further, it is unlikely that any substantial changes will be made to current policy.

POSTSCRIPT

The provincial government anticipated that the federal-provincial dispute over the ownership of offshore minerals on the west coast could have been resolved amicably by February, 1982. However, this deadline passed without incident and although informal discussions have continued at the senior level of both governments, no definitive resolution is yet in sight. Meanwhile, the federal government followed through with its earlier intentions to submit the 1976 Supreme Court of British Columbia ruling, which was intended to clarify the definition of "inland waters," to the Supreme Court of Canada. This appeal was heard in October, 1982, but the results are still pending, as is the Hibernia ownership dispute on the east coast.

In addition, although the organizational structure of agencies in the provincial government that were discussed in this study have remained unchanged, it was announced in June, 1982, that several federal agencies were to undergo restructuring. The domestic component of ITC is to be amalgamated with DREE and will be known as the Department of Regional and Industrial Expansion (DRIE); and the international component of ITC will be incorporated into the Department of External Affairs. These changes are now in progress.

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APPENDIX A

SAMPLE QUESTIONNAIRE

(1) What is the function of the *Offshore Administration Branch*?

_____

(2) Please indicate the approximate number of professional staff members in the *Offshore Administration Branch* who fall into each of the following academic disciplines:

Biology ____	Geology ____
Chemistry ____	Geophysics ____
Commerce/Bus. Admin. ____	Law ____
Economics ____	Oceanography ____
Engineering ____	Physics ____
Geography ____	Political Science ____

Other (please specify) _____

(3) Please indicate the approximate level of training/education of the professional staff of the *Offshore Administration Branch* as a percentage:

High school diploma	____%
Technical school diploma	____%
University training—no degree	____%
Bachelor's degree	____%
Master's degree	____%
Doctorate	____%
Other (specify)_____	____%
TOTAL	100 %

(4) With which other *branches* within the *Petroleum Resources Division* does your *branch* most frequently communicate? Are there any *sections* within this (these) *branches* that are of particular importance? _____

(5) Where committees exist, or have existed, could you please name them, together with all those *branches* participating?

_____

Would you comment upon the extent to which your *branch* conducts research for and/or shares research facilities with other *branches* within the *Petroleum Resources Division*.

(6) With which other *ministries* of the *B.C. government* do you frequently communicate? Are there any *divisions/branches* within these *ministries* that are of particular importance?

(7) Where committees exist, could you please name them, together with all those *ministries* participating?

Would you comment on the extent to which your *branch* conducts research for and/or shares research facilities with other *ministries* within the *B.C. government*.

(8) With which other *department of the federal government* does your *branch* communicate? Are there any particular *divisions/branches* that are of importance?

(9) Where committees exist, could you name them, together with all those *departments* participating?

Would you comment upon the extent to which your *branch* conducts research for and/or shares research facilities with other *department* within the *federal government of Canada*.

(10) Could you please indicate what general types of data/information are collected, processed and analyzed by each of your *sections*?

Does the *branch* use any packaged/computerized information/data systems on a regular basis (e.g. WATDOC, MEDS, etc.)? If so, what?

(11) Has your *branch* supplied any *department of the federal government* with any technical data/information/advice on a regular, or sporadic basis recently, and could you specify the nature of the information and to whom it was given? _____

_____

(12) If joint federal-provincial management of offshore oil and gas on the west coast is a possibility, the following are some theoretical options. Could you please comment upon the perceived likely effectiveness of each.

a) Joint management by pooling the administrative resources of both levels of government. _____

b) Joint management by dividing the legislative responsibilities between each level of government. _____

c) Federal ownership and management, with the province of B.C. providing advice for the most effective development of the resource. _____

d) Provincial ownership and management, with the federal government of Canada providing technical advice for the most effective development of the resource. _____

e) Delegation of the management from one level of government to the other, irrespective of ownership. _____

(13) Do you foresee the establishment of a large, super-agency to manage Canada's offshore resources in the next 25 years, or do you feel that some other system will materialize? _____

APPENDIX B

GLOSSARY OF ACRONYMS

ADM	Assistant Deputy Minister
AES	Atmospheric Environment Service
AMOP	Arctic Marine Oil Pollution Committee
AWAC	Arctic Waters Advisory Committee
CCG	Canadian Coast Guard
AFS	Canadian Forestry Service
COGLA	Canadian Oil and Gas Lands Administration
CSA	Canadian Standards Association
CWS	Canadian Wildlife Service
DFO	Department of Fisheries and Oceans
DINA	Department of Indian and Northern Affairs
DND	Department of National Defence
DOE	Department of Environment
DOT	Department of Transport
DPW	Department of Public Works
DREE	Department of Regional and Economic Expansion
ECS	Environmental Conservation Service
EMPR	Ministry of Energy, Mines and Petroleum Resources
EMR	Department of Energy, Mines and Resources
EPS	Environmental Protection Service
FEARO	Federal Environmental Assessment and Review Office
FHPB	Fish Habitat Protection Branch
IERC	Interdepartmental Environmental Review Committee
IOS	Institute of Ocean Sciences
ITC	Department of Industry, Trade and Commerce
MOE	Ministry of Environment
MORD	Maritime Offshore Resources Board
MSID	Marine Sciences Information Directorate
NAGOF	National Advisory Group on Fish Habitat

NEELS	National Emergency Equipment Locator Service
NEP	National Energy Program
PEP	Provincial Emergency Program
RMEC	Resource Management Environmental Committee
RSCC	Regional Screening and Co-ordinating Committee
TERMPOL	Terminal Pollution Co-ordinating Committee
T&H	Ministry of Transporation and Highways
WESTCOD	West Coast Oil Development Committee

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Author [redacted]

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