Coastal Zone and Continental Shelf Conflict Resolution: Improving Ocean Use and Resource Dispute Management

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Foreword

On November 13-15, 1984 the papers in this volume were presented at a conference, *Coastal Zone and Continental Shelf Conflict Resolution: Improving Ocean Use and Resource Dispute Management*, at the Massachusetts Institute of Technology. As a convener of that meeting I feel that we were most fortunate to have gained the attention and time of an outstanding group of presenters who volunteered those two most precious commodities of informed and busy people—time and experience. They were stimulated and supported in discussion by a challenging and well-informed audience of participants.

The program officers of the William H. Donner Foundation, Philip Jessup and Janet Maughan, were instrumental in spotting the idea that a conference, which joined the field of conflict resolution to ocean policy issues, would bring about a timely focus on an old need which once again deserved fresh attention—better management of the ocean's resources. They and their Board nurtured the idea to fruition through close inquiry and generous financial support. Essential supplemental support was given generously by the US Environmental Protection Agency, and the Department of Ocean Engineering and the Alfred P. Sloan School at MIT. These grants were critical in enabling us to provide scholarships to participants who otherwise would not have been able to attend, thereby adding richness to the fabric of the discussion.

The fullness and success of the conference itself was a product of the caring of many persons. Weaving together the program—with its alternating components of theory and practice, coastal and continental shelf subject matter, dispute resolution and collaboration aspects—was the joint work of the Director of the MIT Sea Grant Program, Professor Chryssostomos Chryssostomidis, the Program's Communication Director, Ms. Elizabeth Harding and Mr. Nicholas Smith. Ours was a fascinating task of matching the capabilities of our presenters in interesting ways to bring different perspectives on each area of conflict presented in the program. Professor Chryssostomidis' guiding hand, drawing from his experience and knowledge of the issues, provided a particularly gratifying combination of creativity and stability. Hard work and skillful insight was brought to the task of seeking out a rich mix of participants by Ms. Ingrid Bartinique. Professor Lawrence Susskind lent not only a resource of the Harvard Law School's Program in Negotiation's fine participatory negotiation game, but also his irreplaceable skills in conducting and critiquing it. The work of shepherding the authors' products toward the fold in time to include most of them in the preprints and, after the conference, coping with the wayward sheep to bring the papers together in this volume was the skillful work of Beth Harding and her very able helper, Therese Henderson. Ms. Henderson and my secretary, Ms. Jeannie McLaren, attended to the myriad components which without the watchful eyes of caring people are missed in the process and so diminish the whole.

As convener, my heartfelt thanks goes to all the above, and to those that I may have inadvertently omitted, each one of whom contributed to making the conference and these proceedings worthwhile. In the process, they gave both collaboration and conflict resolution a good name.

J.D. Nyhart

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An Overview of Coastal Zone and Continental Shelf Conflicts

INTRODUCTION

J.D. Nyhart

In the last 30 years, new technologies have made it possible for the U.S. and other nations to make greater use of ocean resources. However, development and management have frequently been accompanied by conflicts among many different interests -- including industry and recreational groups, environmentalists, state and local governments. In the U.S., these differences over ocean uses, resources and rights are typically resolved in what can loosely be described as a command-and-control regulatory process coupled with a powerful and easily accessed judicial system. Frequently, vague legislation hands ambitious goals to regulatory agencies to promulgate standards which are most often then challenged in extended litigation. States' interests, grounded in many federal statutes and basic constitutional concepts of federalism, add a layer of complexity to already knotty problems. Further, science and technology, as primary moving forces for development, create a particularly difficult kind of conflict. Much about the impact of prospective uses of the ocean is not "known" in the scientific sense, establishing a high level of uncertainty.

The result has been adversarial confrontation in regulatory agencies and courts in offshore oil lease sales, implementation of offshore oil and gas exploration and exploitation, offshore dumping, effluent piping, boundary determination and environmental preservation, to name a few. One consequence of relying on litigation to solve conflicts is that often neither side is satisfied with the outcome (or one side is so unhappy that it does not accept the problem as resolved). This situation has created formidable obstacles in the formulation of a rational approach to ocean resource management. The costs of lengthy and expensive confrontation have been high to the immediate stakeholders and to society as a whole.

This volume examines some of the alternatives for resolving ocean-related conflicts. Mediation, negotiation, mini-trial, conflict anticipation, and the use of models and quantitative analysis as tools in negotiation are some of the alternative techniques that will be examined for their usefulness in resolving past, present, and future conflicts over the coastal zone and continental shelf.

The timing of the discussion printed here is opportune in several respects. There is now an accumulated body of experience in ocean-related mediation, negotiation, conflict anticipation, and other dispute resolution practice. Representatives of significant groups of stakeholders appear serious about seeking better ways to resolve their differences. Interest in the major federal agencies, the private sector and other interested parties concerned with offshore oil and gas lease sales is perhaps spearheading innovations in the OCS and coastal areas. Other proposed uses of the ocean -- incineration at sea, waste disposal, tidal power -- present existing or future conflicts that are unresolved but appear susceptible to approaches discussed at the conference. New regulations related to misuses, for example oil spills, are being written by the executive branch and further statutory extensions are under consideration by Congress. Conflict management and resolution mechanisms might therefore be usefully applied in the immediate rule-writing processes and/or embodied as part of the new regulatory procedures under development. At a more general level, the ocean community in the U.S. stands once again at a threshold in the evolution of ocean policies in that a new legal regime is evolving internationally with the Law of the Sea convention. Simultaneously, this country is of necessity considering its legal regime outside that global framework. Meanwhile, uses of the ocean and its resources continue to expand, with ongoing argument about uncertain impacts, costs, and benefits.

The publication of these papers brings the state of the art in dispute resolution to bear on the state of policy and decision making in ocean affairs in a blend of theory and practice, experience and innovation, reflection and anticipation. They have been written by experienced mediators, third party facilitators, stakeholders, governmental policy makers, and academics. Papers in the first section review the nature of the conflicts over ocean uses, the opportunities for improving their management, the mechanisms available, and some of the problems to be overcome in arriving at broader usage of those processes. Subsequent sessions will examine past experience in several specific cases in coastal zones and in continental shelf projects, analyzing why negotiations or mediation efforts succeeded or broke down, and what lessons might be drawn to manage conflicts better in the future. In most of these analyses, mediators are paired as co-authors with one or more stake-holders in order to gain wider perspective on the experience.

Tradition and Innovation in Resolving Two Disputes Over the Outer Continental Shelf

Frank K. Richardson, Solicitor
United States Department of the Interior

I. Introduction

This nation's decision to lease the submerged lands off its coast for mineral development has led to many kinds of disputes. The most fundamental has been one of ownership. Since 1937, the State and Federal governments have disagreed on general principles and technical points concerning which sovereign possesses the seabed. Four lawsuits are currently pending before the Supreme Court concerning the location of the State and Federal boundary off the states of Massachusetts, Rhode Island, New York, Mississippi, Alabama, and Alaska. And just last month, a Chamber of the International Court of Justice issued a well-publicized decision setting a boundary between this nation and Canada in the Gulf of Maine. Other types of disputes are: conflicting uses of the territorial sea and the waters above the continental shelf; the effects onshore of development offshore; where rests the final authority to resolve these conflicts; those between the Interior Department and the holders of the leases we issue and regulate (the majority of the disputes in this category are resolved through the Department's internal appeals procedure); and the desire of state and local governments to share in revenues from OCS leasing.

I will discuss two examples of these kinds of disputes. They concern Interior's efforts to hold a sale of oil and gas leases in the seabed south of Georges Bank and its efforts to divide lease revenues with certain coastal states.

I am happy to acknowledge the invaluable assistance of the Assistant Solicitor, Branch of Offshore Minerals and International Law and the Attorney Adviser, Branch of Offshore Minerals and International Law in the preparation of this paper.

However, before I turn to the details of these two examples, I should first explain the decisionmaking scheme of the OCS Lands Act as Congress amended it in 1978. Congress tried to design a scheme to minimize disputes resulting from OCS leasing; and however we regard Congress' results, we can at least applaud its intentions.

II. The Scheme of Decision-making for Oil and Gas Leasing Under the OCS Lands Act

As the Supreme Court explained earlier this year, Congress has divided decision-making concerning OCS oil and gas leasing into four distinct stages, namely leasing program, lease sale, exploration, and development and production. Secretary of the Interior v. California, 104 S. Ct. 656, 669-71 (1984).

The leasing program stage is our label for the creation of the 5-year OCS oil and gas leasing schedule. Section 18 of the Act requires the Secretary to prepare and maintain a "leasing program" consisting of "a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activity which he determines will best meet national energy needs for the 5-year period following its approval or reapproval." 43 U.S.C. 1344(a). This stage has been compared to the base of a pyramid, in that it is here that the Secretary takes the broadest look at energy, economics, and the environment to see "how, when and where oil and gas should be made available from the various Outer Continental Shelf areas." California v. Watt, 668 F.2d 1290, 1297 (D.C. Cir. 1981). When preparing the schedule, the Secretary must solicit the views of federal agencies and the governors of affected states. Before it is adopted, the proposed schedule must be submitted to the President and the Congress.

Once the schedule has been adopted, the next stage begins. It is the lease sale process, and we implement it six to eight times per year, whenever we have a lease sale. This stage contains a series of planning steps leading up to the issuance of leases for tracts on the OCS.

The first planning step involving the public is the "call for information." 30 C.F.R. § 256.23.

*The views expressed in this paper are solely those of the author. They do not necessarily represent the views of the Department of the Interior or the United States.

The call is a document published in the Federal Register asking oil and gas companies to indicate how interested they are in leasing certain tracts or areas within a broad region known as a "planning area." It also asks other members of the public to identify special concerns, such as environmental effects, conflicts with other uses of the ocean, and consistency of future exploration and production with coastal zone management plans. When publishing the call for information, the Department also publishes a notice of its intention to prepare an environmental impact statement under the National Environmental Policy Act (NEPA). This notice begins the process of "scoping" the environmental impact statement. 40C.F.R. 1501.7. Scoping is the act of identifying the environmental issues to be discussed in the impact statement. The public's views are sought.

The next step is an internal one called the "area identification." 30 C.F.R. §256.26. After reviewing the public's response to the call for information and the scoping notice, the Department identifies the area to be studied in the environmental impact statement. In selecting the area, the Department considers "all available environmental information, multiple-use conflicts, resource potential, industry interest, and other relevant information." 30 C.F.R. 256.26(a).

Once the area proposed for leasing has been identified, the Minerals Management Service (MMS) writes a draft environmental impact statement. 40 C.F.R. §1502.9(a). The draft is presented to Federal agencies and the public for comment. The public may comment both in writing and at public hearings.

After the comments are studied, MMS revises its draft and publishes the final impact statement. The Department then decides which of the tracts studied should be proposed for leasing, and under what terms. This decision results in the proposed notice of sale. 30 C.F.R. §256.29. This document is published in the Federal Register, and public comment is invited.

At this point, the OCS Lands Act imposes a special requirement. The Secretary must send a copy of the proposed notice of sale to the Governor of each state which may be affected by the exploration and development resulting from the lease sale. The Governor then has 60 days in which to make recommendations on the size, timing, or location of the lease sale. These recommendations have a special importance. By law, the Secretary must accept these recommendations if he determines "that they provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State." 43U.S.C. §1345(c).

After the Secretary considers the recommendations from the Governors, he decides which tracts to offer for lease and under what terms. This decision is reflected in the final notice of sale, published at least 30 days before the sale is to be held. The Secretary must explain in writing why he accepted or rejected the Governors' recommendations.

When leases are issued, the lease sale stage comes to a close. At this point, lessees are free to perform only a limited range of activities on the lease. Typically, a lessee will perform seismic surveys only. In any event, no lessee may drill a well for oil or gas until he has received approval of his plan of exploration. 43 U.S.C. §1340. The filing of this plan inaugurates the exploration stage. The plan is reviewed by the MMS. Affected states are invited to comment. If any activity described in the plan affects a land use or water use in the coastal zone, the state coastal zone authority must find that those activities will be performed in a manner consistent with the State's coastal zone management plan. The Secretary may disapprove the plan and cancel the lease if he finds that operations on the lease "would probably cause serious harm or damage to life, to property, to any mineral, to the national security or defense, or to the marine, coastal, or human environment." 43 U.S.C. §1334(a)(2)(A).

If the lessee's exploratory drilling is successful, it must file a plan of development and production before installing a production platform. 43 U.S.C. §1351. Here begins the development and production stage. The procedure for approval of this plan is similar in part to the one for approving exploration plans and in part to the one for offering tracts for lease. In particular, the Governors of affected states are asked to make recommendations on the plan. These recommendations must be accepted unless the Secretary finds they do not reasonably balance national and state interests. Here, too, the plan may be disapproved and the lease cancelled.

Before turning to my two examples, I want to summarize Secretary Clark's innovations in the OCS decision-making process. I know of no better way than to let the Secretary speak for himself, so I will quote liberally from his remarks to the OCS Policy Committee in Washington on January 12, 1984:

"As for process, there will be some changes there also.

"The purpose of these changes in offshore leasing will be to increase state and public participation, to identify and resolve issues much earlier, and to better focus on areas where the oil industry truly seeks to search and produce.

"The current 5-year OCS oil and gas leasing program, designed to foster the discovery of offshore hydrocarbon resources, has been operational for about 18 months of those five years. It involves area-wide offerings with related changes in the presale planning process which takes 22 months from the call for information on a prospective lease offering to the actual lease sale.

"We are now at a juncture where the program is maturing, and where we can take advantage of our 18-months' experience to make adjustments.

"Here are the assumptions under which we are operating and the proposals we are considering:

o The basic concept of area-wide consideration still has validity -- there is no reason to depart from it at this time.

o A concerted effort will be made to avoid dragging through the 22-month planning process those areas where the level of industry interest is minimal and where conflicts exist with other uses. We will attempt to resolve state, environmental and military conflict concerns much earlier in the total process.

o We are proposing to make more key decisions in the fourth month of the leasing process which is the stage when the area of leasing interest is defined for analysis and review in a draft environmental impact statement. If a given tract does not meet the essential tests of potential energy value, versus other multiple use values, such as fishing, military concerns or environmental or scenic considerations, then a tract can be dropped from further consideration in that fourth month. If an area does measure up in its early analysis of benefits-versus-liabilities, it would be further analyzed and refined at each decision stage -- or level -- in the 22-month process. This must be done on a case-by-case, sale-by-sale, basis since every area is different, some unique.

o Communication will be strengthened by periodically publishing a listing of planning milestones, by referring to sales by name and number, by reinstituting early "scoping" meetings and by increasing the number of public hearings held on a draft EIS. I pledge to communicate with the states and other affected interests before the sales process begins and then continuously thereafter.

o To facilitate early balancing of hydrocarbon potential with environmental, economic, and defense interests, the oil and gas industry will be urged -- expected -- to tell us more precisely and at the beginning of the leasing process, where they wish to lease. It is essential that we know industry's true priorities. While we recognize their indication of priorities are proprietary and confidential, this information must be made available to us if we are to properly balance the multiple use of the Outer Continental Shelf.

o Industry interest, information gleaned from earlier sales, and MMS analysis of geophysical information will be carefully examined and considered to refine the original area of consideration into smaller but perhaps more precise areas of leasing interest.

o We are continuing to improve our communications with other offices in the Federal establishment involved in OCS activity. Last July, Interior and the Department of Defense entered into a memorandum of agreement. And now, with Secretary Weinberger, I am re-emphasizing our commitment to resolve conflicts and to make the effort to settle conflicts as early as possible in the prelease process.

o Interior's Minerals Management Service has completed negotiations on a Memorandum of Understanding with the Environmental Protection Agency.

"Let's hope that we can reach accord with other agencies, such as NOAA, without prolonged negotiation.

"In short, I believe we all should work closely together for the benefit of our country and for the American people. Wherever bureaucratic walls hinder communication, we must correct that situation....

"In closing, I want to emphasize just a few key points.

"We will give high priority to the Outer Continental Shelf program because it is essential to our national security, to our economic and our environmental future.

"We are making some adjustments in the program so we will have fuller state and public participation, so we will have contributions from all who have concerns, so we can resolve issues earlier and so we can get on with the appropriate exploration and reasonable development.

"We will welcome your advice, and we will work with states, with industry, with Congress and with the full spectrum of interest groups to assure that we achieve OCS energy production, while protecting the environment and the quality of life in our country."

Consideration of two examples of OCS disputes may clarify both the process and the problem. A public relations consultant would no doubt criticize my selection. I could have chosen shining examples of our successes in resolving disputes. Two recent successes are in lease sales 80 off southern California and 87 in the Arctic Ocean, both held without litigation after extensive coordination with state and local governments. Instead, I have selected two examples because of their intractability. I will welcome your insights and suggestions on ways to resolve these two disputes.

III. Dispute Resolution Involving Oil and Gas Leasing in the North Atlantic

An oil and gas lease sale scheduled for the OCS North Atlantic Region in September 1984 presents a useful case study of the broad range of conflicts that have confronted the Interior Department in resolving disputes over offshore oil and gas leasing. The proposed action -- known as Sale 82 -- was a planned "sale" of federal oil and gas leases to private energy companies in an area of the North Atlantic, generally offshore from New York to Maine. A "sale" of leases, I should re-emphasize, by itself does not confer either exploration or development rights on the lessee. Rather, further extensive federal and state review and approval of specific plans of operations are

required after the lease sale before any drilling, production, or transportation may occur.

The dispute over Sale 82 once again ultimately required resolution by the federal courts. In fact, litigation initiated by the Commonwealth of Massachusetts and a coalition of environmental and fishing organizations has led to ten separate judicial opinions since January 1978, all relating to North Atlantic OCS leasing. Significantly, every one of those court opinions has related only to a preliminary injunction phase of litigation. No court has yet to address the merits of a single issue concerning OCS leasing in the North Atlantic.

The controversy over Sale 82 is particularly troublesome in light of the clear congressional intent in passing the 1978 amendments to the OCS Lands Act. Congress specifically cited the past history of injunctions, which had delayed offshore leasing, and expressed a desire to avoid such litigation in the future. Continuing opposition to OCS leasing, at least with respect to the North Atlantic region, raises a question as to whether the current statutory structure allows sufficient flexibility for the Secretary of the Interior to conduct an important, though preliminary, step in the offshore oil and gas development process.

The range of competing concerns which arose over Sale 82 is quite broad and involves at least seven states, as many federal agencies, the Canadian government, and a broad range of private interests. To provide a framework for analyzing both the disputes that arose and Interior's efforts to resolve them, I propose to examine the "dispute resolution" process in three principal modes: (1) voluntary negotiation between Interior and the states and other federal agencies; (2) actions by Congress involving the legislative process; and (3) litigation through the federal courts and the International Court of Justice.

To better understand the issues that have perpetrated a constant flow of litigation and controversy for the past decade, I first would like to examine the history of the Interior Department's prior efforts at OCS leasing in the North Atlantic. Then, I will focus on several aspects of the recent proposed lease sale which may bear important lessons for the future of dispute resolution in this complex and controversial area of law. I believe that this comparison of Sale 82 with prior North Atlantic sales illustrates two important innovations in the procedures used to avoid the more traditional method of resort to litigation. These are (1) use of Congressional appropriations process to decide certain issues previously left to the Secretary of the Interior and (2) a comprehensive effort by the Secretary to negotiate reasonable solutions with other parties seeking to share joint use of the ocean. As we shall see, however, these two innovations did not avoid resort to the judicial process with regard to Sale 82.

A. Prior North Atlantic Lease Sale Litigation

1. Sale 42. Since 1974, when the Nation embarked on an expanded and accelerated OCS leasing program, no geographic area has been the subject of continuing controversy to the same degree as the North Atlantic. The principal concern expressed by opponents of North Atlantic lease sales has been the need to protect the productive fishery and other important biological resources of Georges Bank and the rest of the North Atlantic OCS area from the perceived adverse effects that might occur from offshore oil and gas drilling. Despite both presidential and congressional directives instructing the Interior Department to make available all frontier areas of the OCS for possible leasing, only one oil and gas lease sale has been held to date in the North Atlantic region. That sale, Lease Sale 42, was held in December 1979 only after several years of detailed environmental studies and pre- sale planning, followed by two rounds of litigation which delayed the sale for another 23 months. As is the case for all proposed lease sales, the Interior Department began by preparing both an Environmental Impact Statement (EIS) to assess the possible effects of its proposed drilling activities throughout the anticipated 30-year life of the project. For Sale 42, the initial proposal was to offer 206 tracts, of approximately 5760 acres each. The Department later withdrew 28 of those tracts, in response to a State Department request, based upon a pending international boundary dispute with Canada in the Gulf of Maine area. Following the removal of these tracts, the remaining conflict focused mainly on the ability of oil and gas drilling to co-exist with fisheries. The U.S. Court of Appeals for the First Circuit later characterized this concern as "the possible impact of oil contamination on the aquatic and onshore environment." Massachusetts v. Andrus, 594 F.2d 872, 874 (1st Cir. 1979).

Massachusetts filed comments in response to the draft Environmental Impact Statement. The State requested removal of certain tracts from the sale, based upon their proximity to the coast, citing as its reason the possible danger of an oil spill. These comments thus identified a precise area of concern.

The first attempt to resolve this dispute was handled through negotiations and correspondence at the administrative level. Secretary Andrus agreed to defer 12 of the 24 tracts nearest the shore, in response to the State's request, but proposed to offer the remaining 12 tracts. In response, the Massachusetts Governor wrote the Secretary "expressing his general satisfaction with progress on the sale but noting three remaining areas of concern." Massachusetts v. Andrus, 594 F.2d at 878. The Governor requested (1) deferral of the remaining 12 tracts, (2) a commitment by Interior to pursue further environmental studies and analysis before the actual development of oil or gas, and (3) a training program for oil industry personnel.

The Secretary, of course, was obligated to consider these recommendations, as well as the comments of the six other states potentially affected by North Atlantic leasing operations.

Based upon his staff's recommendations, Secretary Andrus ultimately deleted 11 of the 12 remaining tracts and agreed to impose a number of lease stipulations in order to provide further environmental protection. Thus, with only one disputed tract remaining out of the original 206 tracts, the Secretary's accommodation to the State's interests seemed virtually complete. The hope for an amicable resolution, however, soon proved false, as the process shifted quickly from one of cooperation and negotiation to one of confrontation and litigation.

Two weeks before the sale, Massachusetts and the Conservation Law Foundation, an environmental organization, filed similar lawsuits to enjoin the sale in its entirety. Plaintiffs alleged that the Secretary had violated six separate federal statutes in proposing to conduct Sale 42. Following a hearing, District Court Judge Garrity granted a preliminary injunction three days before the sale. He found that the plaintiffs were likely to succeed with regard to their claims under the OCS Lands Act, the National Environmental Policy Act, and the Administrative Procedure Act. Interior sought an emergency stay of that injunction, which was denied by the First Circuit on January 30, 1978, just one day before the sale, in effect postponing the sale until the injunction was lifted. The court of appeals did agree to conduct an expedited hearing of the appeal. Despite that promise, the First Circuit did not issue its opinion on Interior's appeal for 13 months. At that time, the court vacated the preliminary injunction on grounds of mootness. A significant intervening event had occurred, according to the court of appeals, with passage of the OCS Lands Act Amendments of 1978. The court of appeals found that the enactment of statutory amendments significantly altered the entire OCS leasing process. In summary, the legislative process rendered the judicial proceedings moot, at least in part. The First Circuit remanded the case to the district court for further hearings.

In order to continue planning for the sale, Interior prepared a draft supplemental EIS in May 1979 and again solicited comments from all interested parties. Following consideration of these comments, a final supplemental EIS was issued in September 1979. A notice of sale was published in early October rescheduling the sale for November 6, 1979. Plaintiffs, however, elected to maintain their strategy of litigation. They raised many of the same claims which they had previously brought, as well as additional claims under the Endangered Species Act. The resolution of the dispute once again was left to the judiciary.

This time, however, District Court Judge McNaught denied plaintiff's motion for a second preliminary injunction. The district court cited the court of appeals opinion, which stated that "it is left to the Secretary to harmonize the interests of the various resources wherever they impinge upon one another....Some adverse effects on fishing in the coastal environs were doubtless anticipated as the legislative establishment of oil spill and fishermen's gear funds indicates; but we think the underlying assumption was that both sets of interests -- those concerned with the preservation of the fishery resource for future use by mankind, and those concerned with securing the extraction of oil and gas -- can be served. Where the two sets of interests conflict, where particular mineral leases threaten particular fishing interests, the Secretary must determine which interests must give way, and to what degree, in order to achieve a proper balance." Massachusetts v. Andrus, 481 F. Supp. 685, citing 594 F.2d at 888. This statement recognized a limited role which courts should play in reviewing policy decisions involving competing or potentially conflicting interests. The thesis of the opinion is that Congress expressly delegated those policy decisions to the Executive Branch, not the Judiciary, and vested the Secretary of the Interior with broad discretion to balance multiple use conflicts through the procedures contained in the OCS Lands Act Amendments of 1978.

Following Judge McNaught's decision on November 5, plaintiffs immediately filed a motion for injunction pending appeal, which the First Circuit denied on November 6, 1979. The court of appeals simultaneously granted a temporary stay of its own order, however, to permit plaintiffs to seek emergency Supreme Court review.

Plaintiffs then obtained a temporary stay from Circuit Justice Brennan during the afternoon of November 6, forcing Interior once again to postpone the sale. The full Supreme Court soon vacated the stay, however, on November 9, 1979. The Supreme Court's action thus cleared the way once again for the sale. Because of the litigation-imposed delay, Interior once again was forced to reschedule the sale, after 30 days notice, for December 18, 1979. Plaintiffs, determined to exhaust every legal remedy, then filed an appeal of Judge McNaught's order denying a preliminary injunction. That final effort was rebuffed by the court of appeals, which denied plaintiffs' appeal of the preliminary injunction on December 17, 1979, just one day before the sale.

Finally, Sale 42 was held on December 18, 1979. One hundred twenty-three tracts were offered and 63 leases issued. The public received cash bonus bids from oil and gas companies in excess of eight hundred million dollars, which were deposited in the United States Treasury. Exploration has occurred on only eight of those leases, each time following careful scrutiny of site-specific exploration plans which were submitted by the lessees and approved by the affected states, including the Massachusetts Coastal Zone Management Office. Ironically, the state which fought so hard to prevent the offering of leases was satisfied that the oil companies could safely drill their proposed 176 wells without harm to the environment or the Massachusetts' coast. The State's decision to allow drilling to proceed proved to be well-founded. Careful monitoring of drilling discharges occurred, and scientific studies have demonstrated, at most, short-term and localized effects from drilling operations. No significant adverse environmental effects have been documented. None of the eight exploratory wells, unfortunately, yielded evidence of a commercial accumulation of oil or gas. The

disappointing results from these wells soon led to a fundamental change in the estimate of available resources for the subsequent North Atlantic lease sale, Sale 52.

2. Sale 52. Following the successful -- if greatly delayed -- completion of Sale 42, the Interior Department continued with preparations for the next North Atlantic Lease Sale, Sale 52. This sale was included in the Five-Year Schedule of oil and gas lease sales which Congress required under Section 18 of the 1978 amendments to the OCS Lands Act. The schedule was designed, among other objectives, to distribute equitably among all coastal regions of the country the possible benefits and risks from the OCS leasing and development program, which is so important to our Nation's national interest and security. The steps in the pre-sale planning process for Sale 52 were generally similar to those taken for Sale 42. The Interior Department issued a draft Environmental Impact Statement in September 1981, received numerous comments, and issued its final statement in April 1982. Based upon the recently completed, but disappointing exploratory drilling results from Sale 42 tracts, Interior substantially lowered its estimates of the most likely available oil and gas reserves to just three percent of the earlier estimates.

Sale 52, originally scheduled for October 1982, was delayed for five months in response to litigation in California over the role of state coastal zone management plans in OCS pre-lease sale activities. Based upon a ruling of the Ninth Circuit Court of Appeals in a case involving a California sale, the Interior Department agreed to prepare "consistency determinations" to address the manner in which OCS leasing and subsequent activities might affect the coastal zone policies of affected states. The preparation of these analytical documents thus provided another opportunity for involvement in pre-sale planning by Massachusetts and the other North Atlantic states.

Following completion of the environmental impact statement, the process of formal consultation with the states commenced. That process was governed by section 19 of the OCS Lands Act. As I explained earlier, section 19 requires the Secretary of the Interior to consult with the Governors of affected states and to ensure a reasonable balance of national and state interests in selecting the size, timing, and location of an OCS lease sale. Sale 52, as initially planned, consisted of 540 separate tracts. In his comments submitted under section 19, the Massachusetts Governor requested removal of 103 of those tracts from the sale. Interior examined this request carefully and agreed to defer 46 of the tracts in question. Nevertheless, based upon promising geologic prospects for hydrocarbon accumulation, Secretary Watt decided to offer 50 tracts in deep water, as well as seven tracts in submarine canyons, which the state opposed for reasons relating to fishing concerns.

Those seven canyon tracts represented the only remaining area of dispute involving the protection of fisheries. Many lease stipulations were included to provide further protection. Thus, negotiation had narrowed significantly the larger scope of the initial disagreement. Nevertheless, the State and the Conservation Law Foundation once again invoked the judicial process to assert their claims. They again filed a lawsuit, seeking to enjoin the sale in its entirety, this time citing four separate statutory violations. Again, a federal district court judge in Massachusetts issued a preliminary injunction on March 28, 1983, just one day before the sale, which was postponed pending the outcome of the litigation. District Court Judge Mazzone found that the environmental impact statement would require a supplement to analyze the costs and benefits of leasing in light of the lower oil and gas resource estimates. Interior again appealed that ruling to the First Circuit, which upheld the district court, with respect to his NEPA finding. The case was remanded to the district court for further proceedings in September 1983.

The timing of the court of appeals' opinion posed a practical problem for the Interior Department. The court of appeals' ruling essentially required that Interior either prepare a supplemental EIS or else proceed to a trial on the merits of the injunction, with a subsequent appeal of the district court's order likely, regardless of the outcome. At the same time, however, Interior already had commenced planning for the third North Atlantic Lease Sale, Sale 82, scheduled initially for February 1984. A new environmental impact statement for that sale already was being prepared. Moreover, Sale 82 would include all tracts in Sale 52. Secretary Watt decided, therefore, to cancel Sale 52, rather than to duplicate effort by publishing two substantially similar environmental documents simultaneously. Following the cancellation of Sale 52, Interior moved to dismiss the pending litigation as moot. Over plaintiffs' opposition the district court granted Interior's motion and dismissed the case in April 1984.

B. Sale 82. Expansion of the Controversy and Innovations Through Legislation and Negotiations

Following the cancellation of Sale 52, Interior concentrated its North Atlantic Lease Sale planning on Sale 82, which was scheduled to be the first lease sale in this area in more than four years. The Department sought to take all steps necessary for a successful sale, without litigation if possible. Massachusetts and CLF, however, renewed their opposition when Sale 82, the first "area-wide" sale in the area, was proposed. Although much of the opposition to Sale 82 was based upon the large area originally proposed for offering, the area-wide leasing concept has been approved in all respects by the District of Columbia Court of Appeals, which upheld the Five-Year Program over the objections of Massachusetts and CLF, among others, in California v. Watt, 712 F.2d 584 (D.C. Cir. 1983). The controversy over Sale 82 no longer was confined principally to the fishing concerns which predominated in the two prior scheduled sales. Both the geographic areas of the sale and the means employed to resolve the looming conflict expanded.

After receiving comments on the geologic potential for finding oil and gas, Interior identified a broad area including 4366 blocks, or about 25 million acres. This area encompassed many other uses of the ocean and its resources. Following the area identification, one of the planning steps I described earlier, Interior began to study possible environmental impacts and published a draft EIS. From within the Executive Branch, Interior soon received requests to remove large areas of the OCS from leasing, based upon possible conflicts with a number of Cabinet-level departments. These discussions were conducted during the pre-sale process through negotiations with the Department of Defense (for submarine transit lanes), the Department of Transportation (for Coast Guard navigation areas), the Department of Commerce (for endangered species and marine fisheries), the Department of State (for the Canadian maritime boundary dispute), and the Environmental Protection Agency (for its concern over general effects of drilling).

In addition, for the first time Congress took an active role in designing the configuration of Sale 82. Through the congressional appropriations process, but without hearings or widespread public debate, Congress enacted a "moratorium" on OCS leasing in a number of areas in the North Atlantic. Congress prohibited leasing of areas within 50 miles of shore, areas in the center of Georges Bank, areas in prime fishing grounds such as submarine canyons and the Great South Channel (also inhabited by whales on the list of endangered species), and vessel traffic navigation areas administered by the Coast Guard. This moratorium not only precluded Interior from offering those areas in Sale 82, it also prohibited Interior even from studying or proposing the possible inclusion of these areas in any future OCS sale in the North Atlantic. Although that moratorium initially was adopted only for fiscal year 1984, it recently has continued in effect through a continuing budget resolution for fiscal year 1985. The use of the legislative appropriations process marked an innovation in the dispute resolution process, although a highly undesirable one from Interior's perspective. For the first time, Congress, not the Secretary, made decisions governing the scope of a North Atlantic lease sale.

An examination of how the Interior Department sought to resolve the many conflicts which arose in Sale 82 presents, I think, an interesting example of the way in which federal agencies increasingly are forced to operate in an era of competing uses for limited resources. In response to Interior's draft environmental impact statement, Massachusetts and the environmental groups had requested that a wide range of additional "alternatives" to the proposed sale be studied. There was no agreement even among these parties, however, as to the appropriate "fisheries" alternative that should be adopted. Environmental groups staked out certain preferred areas, Massachusetts and the other North Atlantic States provided their own suggestions, and Federal agencies responsible for protecting fisheries suggested still further possibilities. Interior analyzed those requests to select a reasonable range of alternatives to be studied in the final EIS.

Meanwhile, Congress enacted the one-year moratorium that restricted OCS leasing in the areas listed above.

Based upon the comments received and the congressional action, Interior revised its EIS and, in November 1983, issued what many critics of the OCS leasing program have described as a comprehensive, excellent analysis of the environmental effects of oil and gas leasing in the North Atlantic over the next 30 years. Of particular note, agencies such as the National Oceanic and Atmospheric Administration within the Department of Commerce and the Environmental Protection Agency both praised Interior's final EIS. Other federal agencies, however, requested deletion of additional areas in an effort to further reduce or eliminate concerns over the area proposed to be offered.

In January 1984, a further series of innovative steps was taken by newly appointed Interior Secretary William Clark in an effort to defuse opposition to oil and gas leasing and promote a balanced OCS program for the future. Even though the Supreme Court ruled in January 1984 that Interior's lease sales were not subject to the "consistency" requirement of the Coastal Zone Management Act, Secretary Clark voluntarily extended a further opportunity to consult with the states and all parties conceivably affected by Sale 82 and several other scheduled lease sales concerning coastal zone and other issues. In particular, he indicated that he would renew consultation with the states and seek a more precise indication of areas and priorities of oil and gas industry interest within the area-wide leasing context.

Interior proceeded during 1984 to consult more extensively than ever before with each of the North Atlantic states, as well as with those representatives from the oil and gas industry which had expressed an interest in OCS leasing in this area. Following a period of several months to accomplish the Secretary's policy objectives, the Department of Defense and Interior negotiated under their formal Memorandum of Agreement to remove certain blocks of importance to submarine operations in the North Atlantic. Interior agreed, at the Department of State's request, to delay any lease offering for blocks subject to international maritime boundary dispute between the United States and Canada, pending the outcome of the International Court of Justice ruling on that issue. Interior also agreed to delete blocks on part of Georges Bank, based on a balancing of fisheries and oil and gas concerns, in response to requests from Maine and Massachusetts. As a result of these negotiations, Interior proposed a reduced lease sale in April 1984, including 2,469 blocks (about 14 million acres).

Under section 19 of the OCS Lands Act, of course, the governors then had an opportunity to request further changes in the size, timing, or location of the areas to be offered. Responses from all seven governors were received, considered carefully, and, in almost all cases, ultimately accepted. For the first time, however, Massachusetts requested that hundreds of additional blocks be removed from the sale, so that no leasing could occur in water depths

less than 400 meters. That request, if adopted in full, would preclude any prospect of North Atlantic oil or gas production for many years, as no production has yet occurred in water depths greater than 400 meters in any part of the United States OCS. Interior met with the Governor's representatives on August 7, 1984, in an effort to understand the State's new position and determine whether a compromise could be reached. The State indicated, however, that the Governor's request for deletion of all blocks within the 400-meter "isobath" was final and not subject to negotiation. Interior concluded that there simply was no basis in the record to accept the Governor's request in its entirety. The Secretary did agree, however, to defer 293 blocks at Massachusetts' request, based on a careful balancing of fishing with energy concerns. The only blocks left in the sale were those which the oil and gas industry had identified as being of the highest priority. Moreover, many other "high priority" blocks were deleted from Sale 82 because of the Secretary's decision to favor fishing interests, despite the evidence before him that no significant damage to those interests would occur if those blocks were leased and explored. Interior concluded that the many deferrals already adopted, several additional requests from Massachusetts which were accepted, and the excellent environmental record of the OCS program would provide more than adequate protection for the important fishery resources for the North Atlantic.

As a result of this consultation process, Interior accepted virtually all of the requests by the governors of the other six states. The Secretary also accepted the vast majority of the deferral requests from Massachusetts, as well as all of its suggestions for additional environmental protection, which then were incorporated into the Final Notice of Sale.

As noted, several federal agencies also continued to negotiate with Interior following the Proposed Notice of Sale. The Coast Guard requested that 32 additional blocks be removed from the sale pending the completion of its vessel traffic study in this area. Because the Canadian boundary dispute in the Gulf of Maine was unresolved, the Secretary, as he had promised the State Department in his decision on the proposed notice of sale, split Sale 82 into two parts and delayed any offering of blocks in the disputed area until the ICJ had ruled. Through this lengthy process of accommodation and negotiation, the dispute with Massachusetts had been narrowed to only 149 blocks out of the original sale area of more than 4,366 blocks. In short, of the large North Atlantic area proposed initially for Sale 82, Part I, Interior and the State disagreed only with respect to a small percentage of the blocks in question, and many concessions had been made to protect fisheries. The original area-wide proposal of 4,366 blocks had been whittled down to 1,138 blocks in the sale scheduled for September 1984.

Once again, however, the negotiating process failed to resolve the differences between the parties. Once again, Massachusetts filed suit, along with Conservation Law Foundation, seeking not merely to remove 149 blocks, but to prevent any sale, in any form whatsoever, from occurring. Once again, District Court Judge Mazzone granted this request in full, issuing a preliminary injunction that would prevent Interior from taking any action until, at a minimum, yet another Environmental Impact Statement had been prepared.

Even before the announcement of that injunction, however, another significant and wholly unexpected development occurred. Not a single oil or gas company submitted a bid for any of the 1,138 blocks available in Sale 82. The only bids received by the close of bidding deadline on September 25 were 149 bids from an environmental group, Greenpeace, which is one of the plaintiffs seeking to prevent the sale. Because no company had bid, Interior cancelled the first part of the sale which had been scheduled for September 26, 1984. The future of Sale 82, Part II, involving the blocks previously subject to the international boundary dispute with Canada, is under study.

C. Reflections on the OCS Dispute Resolution Process

The past several years have shown a substantial expansion in the disputes surrounding Interior's OCS leasing efforts, particularly in the North Atlantic. Congress clearly defined the national interest in 1978 by amending the OCS Lands Act to provide multi-staged decision-making and to avoid the stream of lawsuits and injunctions which delayed OCS leasing during the 1970's. That stream, however, has swelled during the last six years. Equally troubling is the recent congressional practice of enacting an appropriations moratorium, usually on an interim or emergency basis, to preclude Interior from leasing and conducting pre-lease planning activity. The first such effort affecting the North Atlantic was for Fiscal Year 1984 and occurred without adequate hearings to consider the consequences. The Interior Department under Secretary Clark has argued vigorously, but so far without much success, against a continuation of this moratorium. One may fairly ask, if Congress is competent to balance the competing interests in the North Atlantic each fiscal year, should it not display the courage of its convictions and perform the balancing fully. That is, after deciding what blocks cannot be offered, it should then direct that the remaining be offered, subject to the safeguards in the Department's regulations and lease stipulations. A Congress wise enough to say "no" should be brave enough to say "yes."

The OCS leasing program must live with a vast array of competing interests for the ocean's multiple uses and resources. The negotiations process generally has worked well between Interior and other federal agencies. The section 19 process with the states also has succeeded in many regions of the OCS. In the North Atlantic, however, the combined effects of a congressional moratorium, unyielding opposition from Massachusetts and certain environmental groups, and the all-too-easy resort to preliminary injunctions by the federal courts have prevented the Interior Department from fulfilling its statutory mandate under the 1978 OCS Lands Act. The dangers of energy complacency in this nation are well-documented by our experience in the 1970's.

The Interior Department and Secretary Clark are prepared to embark on a new era of cooperation to negotiate satisfactory pre-sale resolutions to policy differences. We hope this invitation will be accepted.

IV. Dispute Resolution Involving Revenues from Leases within Three Miles of a State's Submerged Lands

Section 8(g) of the OCS Lands Act concerns the division of revenues from certain leases on the OCS. Disputes over dividing OCS revenues are almost as old as disputes over the ownership of the OCS. In 1953, when signing the Submerged Lands Act, President Eisenhower made clear his view that OCS lands "should be administered by the Federal Government and income therefrom should go into the Federal Treasury." His opposition to sharing revenues, and presumably other factors, prevented earlier proposals to give coastal states 37 1/2% of OCS revenues from being renewed in the debates over the 1953 OCS Lands Act. See e.g., H.R. Rept.. No. 2078, 81st Cong., 2d Sess. (1950) (H.R. 8137). I believe it fair to say that Congress regarded its quitclaim of submerged lands to these states as an appropriate substitute for revenue sharing. In any event, the 1953 OCS Lands Act, in § 9, required that all lease revenues be deposited in the Treasury as "miscellaneous receipts." No revenues were to be shared.

Revenue sharing became an issue again in the mid-1970's as Congress considered amendments to the 1953 Act. For example, in 1974 the Senate Committee on Interior and Insular Affairs reported favorably on the proposed Energy Supply Act, which would have established a "Coastal States Fund" in the Treasury. The Fund was to be funded by 10% of OCS revenues, not to exceed $200 million per year. The Secretary was to award grants "to compensate impacted coastal States for the full cost of any environmental effects and social and economic impacts of offshore oil and gas exploration, development, and production." S. Rept. No. 93-1140, 93rd Cong., 2d Sess. 119 (1974).

But by 1976, the Congress decided not to use the OCS Lands Act as the vehicle for helping States "deal with the impact of offshore development and production," choosing instead to help them through amendments to the Coastal Zone Management Act. H.R. Rept. No. 94-1632, 94th Cong., 2d Sess. 55-56 (1976) (Conf. Rept. on S. 521).

At the same time, the Conference Committee reviewing the proposed amendments to the OCS Lands Act examined a new provision, one applying only to Federal tracts within 3 miles of a state's submerged lands. That provision would have required the Secretary to offer a governor "the opportunity to jointly lease any area...which he concludes, in consultation with the Governor...may contain a field, geological structure, or trap which may be located within both federal and state owned lands." Id. at 17. If the Secretary and Governor could not agree, the Secretary would be free to lease the Federal tracts anyway, but would have to deposit a lease revenues in an escrow account until the Secretary and the Governor agreed on "the proper rate of payments" to the State and Federal Treasuries. Id. at 17-18.

For the purpose of this conference, the most interesting thing about this new proposal was that it provided no mechanism for resolving disputes over how the money should be divided. This point was not lost on Secretary Andrus in 1977. On May 10 of that year he filed a report with the House of Representatives on H.R. 1614, a bill substantially the same as the 1976 bill. The report explained his concern about the joint leasing scheme; he feared it would undermine his authority under the Act. So he proposed revised language eliminating any reference to joint leasing. In its place, the Secretary would be required to offer the Governor an agreement for the "fair and equitable division" of lease revenues from tracts within 3 miles of state submerged lands. If the two could not agree, the Secretary was to place the lease revenues in a special account until they reached agreement, or until a Federal district court determined the "fair and equitable" division of the money. With a few minor changes, Secretary Andrus' May 10 language was enacted by Congress the following year.

The details of the procedure Congress enacted to resolve disputes under § 8(g) are worth considering. The first point to note is that Congress tied the procedure into the Interior Department's procedural steps in planning for a lease sale. Thus, the first step in the 8(g) procedure is for the Secretary to send the Governor a mountain of information "at the time of soliciting nominations for the leasing of lands "1/ As explained earlier, this soliciting of nominations is what Interior does in its "call for information" for a lease sale, and it occurs at the beginning of the lease sale process. 30 C.F.R. §256.23. Next, after receiving nominations from industry and the public, the Secretary must tell the Governor whether he intends to consider including any 8(g) tracts in the lease sale. If so, he must then consult with the Governor to see whether any of the tracts "may contain one or more oil or gas pools or fields" underlying state and federal seabed. If the Secretary then decides to offer any 8(g) tracts containing a pool or field in common with the State's seabed, he must offer the Governor an agreement to divide lease revenues fairly and equitably between the State and Federal government.2/ The Department makes this offer at about the time the Department publishes the proposed notice of sale. See 30 C.F.R. § 256.29.

Once the Secretary has made the offer, the Governor has 90 days to accept or reject it. If he accepts it, lease revenues will be distributed in accordance with the agreement. If he rejects it, the Secretary may still lease the 8(g) tracts; but he must place the revenues "attributable to [common] oil and gas pools" in a separate account in the Treasury where the money can earn interest.

But the procedure does not necessarily end with the lease sale. The Secretary and the Governor can continue their discussions after the lease sale and, upon agreement, can withdraw the money from the special account. Or either official can sue to have a Federal district court

determine the "fair and equitable" division of the money.3/ This, then, is Congress' idea of how one should resolve disputes with a Governor over the fair and equitable division of 8(g) revenues. Experience has shown that this procedure is at best inefficient, frequently pointless, and at worst likely to foster controversy. A summary of that experience may be helpful. Section 8(g) took effect on September 18, 1978, while Mr. Andrus was still in office. The first and principal issue he faced was to determine what a "fair and equitable" division of revenues should be.

Secretary Andrus, of course, had no trouble resolving what the phrase "fair and equitable" meant, for he was its author. He had explained it to the House in his May 10, 1977, letter:

> Under existing law revenues from leasing the Outer Continental Shelf must be paid into the Federal Treasury. However, there are instances in which a part of this revenue may have been derived from oil and gas drained from State land. We believe any loss of resource or revenue by states in such a situation should be remedied. A statutory provision specifically covering this situation would enhance the Federal/State coordination of development in adjacent areas in addition to that provided elsewhere in the amendments. Additionally, it would reduce the likelihood of costly and time-consuming litigation.
>
> We favor a provision which gives coastal states fair and equitable compensation for oil and gas which is produced through wells in the Federal areas adjacent to them, but which is derived from State lands. H.R. Rept. No. 95-590, 95th Cong., 1st Sess. 219-20 (1977).

As Secretary Andrus saw it, the purpose of § 8(g) was to protect the coastal states from "drainage": that is, from having federal wells in common reservoirs produce oil and gas from both sides of the boundary line. The remedy for this problem was therefore quite simple. It called for the use of a legal procedure called "unitization." Simply put, unitization is a procedure for making two or more leases into one lease.4/ As a part of this procedure, the parties agree on a formula for dividing the oil and gas to be produced. The formula makes sure that the State gets the credit--and the money--for the oil and gas from its lands, even when it is brought to the surface by a Federal lessee.

So Secretary Andrus began the practice of offering the Governors before each sale an agreement to unitize any common reservoirs 5/ which may be discovered on the federal tracts to be leased. It should be noted that under a unitization agreement the federal government would never pay the State anything directly. Production would first be divided among the lessees, who would then pay royalties to the State and Federal governments. The State of Alaska agreed to this as fair and equitable in the first Federal sale in the Beaufort Sea in 1979. Six other states, and Alaska since 1979, have declined to accept this offer. As a result, approximately $5.3 billion was in the special 8(g) account in the Treasury as of September 1, 1984.

Two states, Texas and Louisiana, filed suits in Federal courts in July 1979 to have judges determine what a fair and equitable division of revenues should be. These states presented an array of theories to justify their claims to a large share of 8(g) revenues. At the least, they said, they were entitled to compensation for drainage of their oil and gas. But in addition they claimed a right to compensation for the onshore effects of OCS exploration and production. These effects were said to include harm to the environment and stress on the infrastructure of local communities. (Left unmentioned were the beneficial effects to the states of increased employment and taxes.) And, in addition, the states claimed a right to share in the gains (and to be compensated for the losses) resulting from the independent leasing programs of the State and Federal governments.

This last point requires some elaboration. When leasing in the Gulf of Mexico, Texas, Louisiana, and the United States historically have relied heavily on "bonus bidding." Under bonus bidding, each bidder submits a sealed bid offering to pay a "bonus" to get the rights to lease a given tract. The lease goes to the bidder offering the highest bonus. What a bidder will pay as a bonus is influenced by many things, but a bidder generally will not pay more than the present value of the lease to him. The present value is influenced by the amount of oil and gas he expects to produce and sell, by expected prices, interest rates, and costs, and by the probability that he might not find any oil or gas on the given tract.

To assess this probability, the bidder gathers information about the geology of the tract and of the region. Much of this information comes from wells drilled on nearby leased tracts. If the information from the nearby wells suggests oil or gas may be present, the bidder may bid more. If it suggests little or no oil or gas, the bidder won't bid.

Texas claimed that Federal bidders used favorable information from wells on the Texas side of the boundary when bidding on certain Federal tracts. As a result, said Texas, the bidders paid Interior more than they would have without information from drilling on the Texas side of the boundary. Therefore, said Texas, the Federal Government received a windfall by letting Texas lease its neighboring tracts first. This windfall is called "bonus enhancement." Louisiana, on the other hand, emphasizes the opposite phenomenon. It complains that in certain areas Interior leased first, but drilling showed that no oil or gas was present. Consequently, no one would bid on the Louisiana tracts. Louisiana wants to be compensated for the money it might have received if bidders had mistakenly believed oil or gas to be present. This alleged loss is called "condemnation." At this writing, it remains unclear whether the Louisiana court will permit the State to present evidence of condemnation at trial.

Rather than tracing the course of the litigation, let me place it in a different perspective: What situation did Secretary Clark face when the 8(g) issue welcomed him to the Interior Department? The situation by the spring of 1984 was this. The Federal district court for the Eastern District of Texas had recently issued its ruling. The court found that the Federal Government had in fact received a windfall in bids on certain tracts. It gave Texas half of that windfall: $215 million. With interest, the award exceeded $330 million. He denied most of Texas' other claims. Three months later, the court in Louisiana adopted the Texas court's legal rulings, but since no trial had yet been held, no money was awarded then. In the meantime, five other states had potential claims to 8(g) money, and some were hinting they might file suit.

In April 1984, a few days before lease Sale 81 off Louisiana, newly-elected Governor Edwards of that state indicated a willingness to negotiate on the 8(g) offer made for Sale 81. But no agreement could be reached in the short time before the sale. Louisiana filed suit to enjoin the sale. Its effort failed. Three months later, after Governor White of Texas rejected Secretary Clark's offer to give Texas one-sixth of the bonuses from Sale 84, Texas sued to enjoin that sale. It too failed. While both states were unsuccessful, we viewed this turn of events with deep regret. Section 8(g) was turning supporters of the OCS leasing program into opponents.

Because of the importance of the OCS program to this nation's defense and economic security, Secretary Clark made the resolution of the 8(g) issue a top priority. His staff briefed him on the States' legal theories, the litigation risks, the burdens of further lawsuits, the rulings of the two district courts, and other considerations. After weighing these matters, he decided to offer the states the following agreement as a compromise:6/

1. The states would receive 16 2/3% of the bonuses and rentals properly in the special account.
2. The states would share in royalties through unitization agreements generally.

This offer was made on August 8 in letters to the governors of the five states not in litigation. On that day I asked the Justice Department to extend an identical offer to Texas and Louisiana. (Under Federal law the Attorney General has final authority to settle litigation to which the United States is a party.) Later that month I met in Denver, Colorado, with representatives of Alaska, Alabama, California, Florida, Louisiana, and Texas to answer their questions about the details of the offer. On August 31, I sent them "the fine print:" a detailed, 10-page draft agreement for resolving the 8(g) dispute. As of this writing, no state has accepted the offer.

The draft agreement represents our best effort, under the terms of the Secretary's offer, to create a procedure to keep future 8(g) disputes out of court. For as the Secretary told the Governors on August 8, "[t]his [8(g)] litigation promises to continue much longer, demonstrating again that litigation is very slow, very expensive, and very uncertain."

One possibility we considered was to try to estimate the extent to which each state had enhanced Federal bonuses on 8(g) tracts. As you might suspect, given the dozens of factors that affect a bid, this effort would have taken years; and each state could be expected to challenge every assumption our analysts would make. We decided not to travel that tortuous path. Instead, we selected a formula that was as uncomplicated as it was unoriginal: one giving the states one-sixth of bonuses and rentals. This figure was approximately halfway between what we had lost in the Texas trial court and what we expected to lose if the Andrus interpretation were upheld. Furthermore, one-sixth is a traditional royalty rate in Federal and private oil and gas leases. Although, as I noted earlier, no state has accepted this offer, I know from the Denver meeting that all of the states prefer a fixed percentage to the calculations and involved in computing bonus enhancement.

As for the sharing of royalty revenues, the Secretary has offered to share them when needed to compensate the State for drainage. As Secretary Andrus did, we consider unitization to be the preferred device to protect the state from drainage. But we recognize that unitization is not always possible or desirable. So we have also offered the states what we call royalty-sharing agreements. Under these agreements, ownership of oil and gas in common reservoirs would be determined as it would under a unitization agreement, but the Federal Government would pay the State directly. (As explained above, under unitization the Federal Government would not pay the state directly; rather, payment to the State would come from the State's lessee.) We have also proposed what we call royalty-offset agreements to compensate the Federal Government from drainage by the State's lessees.

Drainage, of course, requires extensive geological analysis. We know from our long experience with offshore unitization agreements that geologists, geophysicists, and reservoir engineers can disagree honestly and wildly over the interpretation of the same data. This is understandable when we realize that they must make scientific judgments about the geology of thousands of acres using information from a well that is little wider than my two fists clenched together. So we have proposed binding arbitration to resolve disputes between State and Federal experts. The arbitrator, referred to as "the impartial expert" in the draft agreement, must be a "professional petroleum engineer or geologist, or recognized university professor with a working knowledge of and experience in unitization matters." The method of selecting the arbitrator is familiar:

> The State and the Department will each suggest three names. If agreement cannot be reached on any one of the six names, each party can select two names for elimination from the list. The impartial expert will be selected randomly from the remaining two on the list (flip of a coin, drawing, etc.). (Draft agreement ¶15.)

Most importantly, "the parties agree to accept the findings of the impartial expert as final and binding." (Draft agreement, ¶ 15.)

While I do not suggest that it took a genius to think of these alternatives to the courthouse, it took considerable courage for Secretary Clark to propose them; and they represent an innovation and, in our view, improvement on the procedures created by Congress.

I earlier suggested that section 8(g) was not efficiently designed to suit its goal. This is true whether one agrees with Secretary Andrus or the State of Texas over what is "fair and equitable." For if the purpose is to compensate the state for drainage, through pre-lease agreements rather than litigation, is not a statutorily specific formula a more effective mechanism for pre-lease sale agreements? Ordinarily, we need not begin talking and trading information until the Federal lessee files his plan of development and production. And if the purpose is to let the State share in bonus enhancement, we shouldn't waste our time negotiating until after the Department accepts the bids. Until the bid is accepted, there is no bonus to be enhanced or shared. Furthermore, the statute ought to require, at the least, that the state and Federal Government share information about the results of bidding. Currently, it says nothing about bids or bonus enhancement.

The imprecision of section 8(g) has left certain coastal states free to petition the courts for what Congress refused to give them 6 years ago: a general OCS revenue-sharing scheme. And if OCS revenue-sharing in some form is thought to promote the welfare of the republic, its purpose and amount should be determined by the Congress. I concur with much of Judge Parker's assessment in the Texas case when he wrote:

> "The court finds as a matter of fact that the OCSLA imposes an onerous burden upon a district court; taxing to its maximum limit, the Court's ability to function as a fact finder. Cases like this one are exceptionally inscrutable, requiring an exhaustive and detailed examination of labyrinthian technical data. The confidence of the Congress in the sophistication of district courts and their ability to reach a "fair and equitable" solution provides little solace while the Court is immersed literally for months, in a swirling morass of petroleum engineering, geology, economics, history, and statistics, superimposed over principles of equity. Moreover, these difficulties are inherent to the nature of the subject, and would not be appreciably reduced if the Court only had to calculate a "fair and equitable" division of 8(g) revenue insofar as drainage is concerned. And though appointment of a Special Master, pursuant to Rule 53, Fed.R.Civ.P., might be thought to provide a solution to this problem, it is but an illusory remedy. It is simply unrealistic to expect a district court to find a single individual, willing to serve as a master, who is sufficiently well versed in economics, petroleum engineering, geology and statistics.
>
> Political considerations aside, based upon the evidence produced in this case, it is irrefragable that an alterative method of dispute resolution in these 8(g) cases is necessary. To that end, compulsory unitization by which bonus, royalty and other revenue could be divided, pursuant to a statutorily identified formula, would provide a much better, more practical, solution. Texas v Secretary of the Interior, 580 F. Supp. 1197, 1223-24 (E.D. Tex. 1984), appeal filed July 20, 1984."

I applaud the purpose of this conference in seeking alternative dispute resolutions in coastal zone and continental shelf matters. I give it to you as the experience of more than 45 years as lawyer and judge that the courtroom, with all of its limitations of pleadings, and parties, and restrictions of remedies is neither the place nor the way to solve many of the issues which arise in the coastal zone and continental shelf areas. I commend you for trying in a professional way to seek and find a better way.

NOTES:

1/ "(1) At the time of soliciting nominations for the leasing of lands within three miles of the seaward boundary of any coastal State, the Secretary shall provide the Governor of such State--

> (A) an identification and schedule of the areas and regions proposed to be offered for leasing.
> (B) all information concerning the geographical, geological, and ecological characteristics of such regions;
> (C) an estimate of the oil and gas reserves in the areas proposed for leasing; and
> (D) an identification of any field, geological structure, or trap located within three miles of the seaward boundary of such coastal State. 43 U.S.C." §1337(g)(1).

2/ "After receipt of nominations for any area of the outer Continental Shelf within three miles of the seaward boundary of any coastal State, the Secretary shall inform the Governor of such coastal State of any such area which the Secretary believes should be given further consideration for leasing. The Secretary, in consultation with the Governor of the coastal State, shall then determine whether any such area may contain one or more oil or gas pools or fields underlying both the outer Continental Shelf and lands subject to the jurisdiction of such State. If, with respect to such area, the Secretary selects a tract or tracts which may contain one or more oil or gas pools or fields underlying both the outer Continental Shelf and lands subject to the jurisdiction of such State, the Secretary shall offer the Governor of such coastal state the opportunity to enter into an agreement concerning the disposition of revenues which may be generated by a Federal lease within such area in order to permit their fair and equitable division between the State and Federal Government." 43 U.S.C. § 1337(g)(2).

3/ "Within ninety days after the offer by the Secretary pursuant to paragraph (2) of this subsection, the Governor shall elect whether to enter into such agreement and shall notify the Secretary of his decision. If the Governor accepts the offer, the terms of any lease issued shall be consistent with the provisions of this subchapter, with applicable regulations, and, to the maximum extent practicable, with the applicable laws of the coastal State. If the Governor declines the offer, or if the parties cannot agree to terms concerning the disposition of revenues from such lease (by the time the Secretary determines to offer the area for lease), the Secretary may nevertheless proceed with the leasing of the area."

"Notwithstanding any other provision of this subchapter, the Secretary shall deposit in a separate account in the Treasury of the United States all bonuses, royalties, and other revenues attributable to oil and gas pools underlying both the outer Continental Shelf and submerged lands subject to the jurisdiction of any coastal State until such time as the Secretary and the Governor of such coastal State agree on, or if the Secretary and the Governor of such coastal state cannot agree, as a district court of the United States determines, the fair and equitable disposition of such revenues and any interest which as accrued and the proper rate of payments to be deposited in the treasuries of the Federal Government and such coastal State." 43 U.S.C. § 1337(g)(3) and (4)

4/ "'Unitization' is an agreement between lessees (approved by the lessors) to treat the area above a common reservoir as one lease, i.e., as a 'unit.'" The separately owned lease interests are combined or consolidated for purposes of joint exploration to share the cost and liabilities of production and to divide the oil and gas they produce under the terms of a 'unit agreement.' By this arrangement the lessees can limit the number of wells drilled, drill in the most efficient locations, and control the rate of extraction, so as to maximize production and minimize costs." Solicitor's Opinion M-36927, 87 Int. Dec. 616, 618-19 (1980).

5/ A reservoir is an accumulation of oil or gas within porous rock. It is like the soda in a soda glass which can be drained by one or more straws put in the glass

6/ The Interior Department has not departed from Secretary Andrus' interpretation of section 8(g). This remains its position in court. There is always a concern that by offering to compromise a dispute, one will prejudice one's case in court. Under Rule 408 of the Federal Rules of Evidence, however, "evidence of (1) furnishing or offering . . . a valuable consideration in compromising or attempting to compromise a claim which was disputed as to either validity or amount is not admissible [in court] to prove liability for or invalidity of the claim or its amount. Evidence of conduct or statements made in compromise negotiations is likewise not admissible."

USING ALTERNATIVE DISPUTE RESOLUTION TECHNIQUES TO RESOLVE COASTAL ZONE AND OCS CONFLICTS

Lawrence Susskind and Scott McCreary

Political and legal battles over the use of coastal resources (CZM) and the outer continental shelf (OCS) have tended to sort themselves into three categories: conflicts over **policy priorities** (i.e. should we stress oil exploration and de-emphasize the development of the fishery?); conflicts over the **use of fixed resources** (i.e. should that bit of wetland be filled or protected from development?); and conflicts over particular development or environmental protection **standards** (i.e. what level and type of ocean dumping should be permitted?). Generally, in the United States, we rely on legislative processes to resolve policy disputes, and administrative and judicial processes to handle disputes over the use of fixed resources and disputes over standards. If you believe that these three methods of resolving CZM and OCS conflicts have been successful, you will probably not be interested in the rest of what we have to say. If, however, you feel that we can and should improve our ability to deal with these conflicts more efficiently, fairly, and wisely, then what we have to say may be of interest.

When there is a dispute among conflicting interests, what is a good outcome? First, any method of dispute resolution should seek to satisfy the **interests** of all the parties involved. If only one side "wins", the losing parties will want to shift the conflict to another arena or seek revenge in an unrelated situation. Second, a good outcome should stress the selection of an elegant solution, an **option** that insures that all possible joint gains have been secured. This usually requires a process of relatively unrestrained invention, or joint problem solving. Third, a good dispute resolution process should produce a definitive result, a set of implementable **commitments**. All parties should be encouraged to make only those promises that they can keep. Fourth, a good outcome is one that ensures **legitimacy** in the eyes of all those affected by a decision. No one should feel taken and everyone should feel that a good precedent has been set. Fifth, a good outcome especially in science-intensive policy disputes, is one that **deals wisely with uncertainty** and what is known about the natural and technical systems involved. Sixth, a good outcome is one that is reached as quickly as possible. This usually requires efficient **communication**. Finally, a good outcome is one that leaves the parties in a better position to deal with their differences in the future, one that improves **relationships**.

Unfortunately, our traditional approaches to dealing with conflicts in the coastal zone and the outer continental shelf often fail to produce good outcomes as we define them. Indeed, in some instances they fail miserably. The legislative, administrative, and adjudicatory mechanisms upon which we typically depend are designed to select winners and losers, often ignoring legitimate claims on all sides. They tend to generate less than optimal outcomes -- often leaving potential joint gains unexplored. They sometimes degenerate into tests of will -- shifting the focus to the people rather than the problems involved. In many instance, traditional dispute resolution mechanisms produce decisions that turn out to be unenforceable or that require still further legal action to implement. In some instances they undermine relationships or encourage an escalation of adversarial behavior. While less adversarial, non-adjudicatory forms of dispute resolution are not always appropriate (i.e. in two party, zero-sum negotiations, for instance), they are often quite appropriate in the multi-party, multi-issue disputes typical of OCS and CZM decision-making. Consensual approaches to dispute resolution might be tried more often. Five, in particular, that deserve closer scrutiny are: **unassisted**

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negotiation, policy dialogues or collaborative problem solving (sometimes called facilitation), mediation, mini-trials, and non-binding arbitration. While it is beyond the scope of this paper to describe these approaches in detail, it might be helpful to say at least a few words about each:

unassisted negotiation: parties in dispute can be encouraged to talk through their differences and to search for win-win outcomes. If the parties have been trained in negotiation, they may have the skills needed to transform confrontation into side-by-side problem solving.

facilitation: parties in dispute may have reached a point of confrontation. In such situations, non-partisan "helpers" can often play an important role. Even when the parties have not reached an impasse, trained facilitators can sometimes transform incipient conflicts into joint problem solving opportunities.

mediation: when conflicts have ripened and communication has broken down, a non-partisan "outsider" selected by all sides, can sometimes re-establish communication (by serving as a go-between) or help to effect a reconciliation. Mediators with appropriate substantive knowledge can, in some instances, be the source of ingenious proposals that turn out to be acceptable to all sides.

mini-trials: prior to incurring the costs and delays of going to court, parties to a dispute may find that "mock-trials" in front of a panel of experts or "rented judges" can encourage a more realistic appraisal of the chances of winning in court and thus lead to negotiated settlements.

non-binding arbitration: this approach to dispute resolution serves some of the same purposes as a mini-trial, but tends to yield more definitive outcomes. Moreover, non-binding arbitration can be used in situations where court is not the likely alternative to no agreement.

In the remainder of this paper we offer four illustrations of successful uses of non-adjudicatory techniques to resolve CZM and OCS disputes. While the four cases that follow do not illustrate all five approaches, they do suggest a range of situations in which less adversarial, non-adjudicatory techniques might be effective. We have not been able as of yet to identify OCS or CZM cases in which mini trials or non-binding arbitration have been used.

Massachusetts Tidelands Case: An Example of Facilitation

Since 1647, Massachusetts has granted private interests the right to use the tidelands -- the flats and submerged lands just seaward of the high water mark. Many such grants, made to promote harbor development, have been in conflict with the public's right to fish, fowl, and navigate. For the most part, tidelands have been allocated under a licensing procedure set forth in the Massachusetts Waterway Statute, Chapter 91 of Massachusetts General Laws. Licenses have typically been granted by state regulatory agencies, but some irrevocable grants have been made to individual applicants by the legislature.

In the 1950's, the revocation of a tidelands license provoked substantial concern in financial and legal circles. Although the revocation was an unusual occurrence, the ongoing revitalization of waterfronts in a number of Massachusetts cities focussed attention on the issue. Attorneys for several developers, seeking to give lending institutions a greater sense of security, requested special acts of the legislature to insure the irrevocability of tidelands licenses. Forty-five irrevocable license bills were enacted between 1959 and 1969. The legislature continued to consider such bills through the 1970s.

Criticism of the licensing process began to mount. Under Chapter 91, the legislation focussed narrowly on the structural safety of new construction. When the Massachusetts Coastal Zone Management (CZM) office was created, its staff point out that licenses were being granted with little or no regard for the purposes being served by these licenses. Irrevocable tidelands bills are requests for the allocation free public land in perpetuity. The Attorney General and the Massachusetts Environmental Lobby pointed out that other states offer fixed term licenses and garnered million of dollars in the process. There some interested groups pointed out that legislative grants afforded no opportunity for public review or comment.

Work began on new legislation to address these concerns. Developers and conveyancers fought back, arguing that the proposed regulations would be too strict, undercutting their chances of securing financing, and causing costly delays. Environmentalists worried that the proposed regulations could sanction a "giveaway" of public lands.

Staff in the CZM office foresaw that direct dialogue among the contending interests would be needed to break the deadlock and build a constituency for legislative change. CZM staff Counsel, William Lahey, recommended that a facilitated workshop might be the key to producing a consensus. Lahey's plan was to begin with a historical and technical briefing, but then move to a discussion that would reveal the underlying interests of each of the key parties. He wanted to discover what the parties might agree to, heading off further controversy, and perhaps generating an agreement.

Lahey recommended hiring two facilitators: Lawrence Susskind, Executive Director of the Program on Negotiation at Harvard Law School and Robert Knecht, Senior Fellow at Woods Hole Oceanographic

Institution. These individuals were chosen for their expertise in dispute resolution, their familiarity with the issues, and their perceived non-partisan status.

A first step in organizing a joint problem solving session was to prepare a detailed presentation of technical and procedural concerns. A panel was organized with individuals who could present an overview. Then, CZM staff prepared a list of stakeholding interests, along with individuals who might represent these interests most effectively. The list was circulated to the panel and the facilitators for review. Finally, CZM staff prepared a series of short memoranda summarizing what had already been written on the subject of tidelands development and protection in Massachusetts.

The workshop began with an overview by CZM staff and the attorney general's office. Two developers' attorneys then reviewed their concerns about land title issues. Next, the facilitators asked the fifty attendees to imagine that they had the power of the legislature to define the "public interest in tidelands". One overarching consideration emerged almost immediately: the public would be best served by restricting licenses to water-dependent projects. Other criteria for gauging the public interest in specific cases were proposed: net benefit-detriment, extent of change in use, relationship to already adopted plans, and compensation to offset losses to the public. Participants focused on the definition of irreversibility, the notion of "once-and-for-all-permits" and particular proposed uses.

The group attemped to distill its discussion of the public interest, focussing on the need to (1) map potential tidelands areas; (2) limit specific activities to certain tidelands, (3) insist that "proposers" demonstrate how navigation would be maintained; (4) create a process for evaluating net benefits; and (5) exclude certain non-maritime uses from all tidelands. A great deal of time was spent describing various administrative processes by which these five objectives could be met. The participants recommended that "net benefits" assessment consider situational uses and coastal interests, coastal use value, long term environmental value, social benefit and water dependency. Towards the end of the workshop discussion turned to the design of an agency (or agencies) or to assess these values and negotiate the terms of individual leases.

The workshop accomplished the desired objectives. The parties in conflict discussed issues of mutual concern and identified overlapping interests. Consensus was reached on several key issues: the overarching importance of water dependency as a screening criterion, the need for a net benefits test, the desirability of collecting fees and the need to designate some excluded areas. The facilitated discussion provided a model for on-going deliberation.

Within two months of the workshop, the legislature amended Chapter 91, enacting a revised process for tidelands licensing. As CZM staff and others negotiated the details of the bill, both the substance and tone of the October workshop were invoked.

Further steps remained after the law was enacted. Regulations had to be worked out. The key players agreed to draw up a list of issues and continue working together. Here, the model of facilitated dialog proved helpful. A Tidelands Advisory Committee (TAC) was chosen from the attendees at the original workshop. The legal staffs of CZM and the Department of Environmental Quality Engineering (DEQE) convened fortnightly meetings. Responsibility for facilitating the sessions rotated between the directors of the two agencies. These negotiations have continued for nine months and are on the verge of reaching closure. Almost all of the original workshop participants have expressed satisfaction with the process.

Resolving California Wetlands Disputes Through a Joint Problem Solving Process

The scope and productivity of California's coastal wetlands have been reduced substantially over the past century. Though smaller than east coast wetlands, California's wetlands are valued for their fish and waterfowl nursery function and their scientific and educational importance. The 1976 California Coastal Act set out stringent guidelines for protecting wetlands, requiring local governments to prepare coastal protection plans in conformance with statewide policies. In Southern California, Los Angeles and Orange Counties in particular, the disposition of degraded wetlands have provoked numerous conflicts, blocking state approval of local plans.

The Coastal Conservancy, a companion agency to the better known California Coastal Commission, has responsibility for restoring the natural functions of wetlands. In an effort to advance this goal in the Los Cerritos and Bolsa Chica wetlands, the Conservancy has relied on a joint problem solving process. In both instances, landowners and local governments were aligned against the Coastal Commission, locked in disputes over the amount of acreage to allocate for development. These disputes arose, in part, because both sides believed that only one configuration of land uses would satisfy their respective interests.

Owners of the property containing the Los Cerritos wetland in Long Beach currently pump oil from their land, but look forward to commercial development of their 244 acre site. Their initial development plan would have eliminated 96 acres of scattered wetlands, keeping just 33 acres intact. The City of Long Beach endorsed the plan, but the Coastal Commission denied it. Convinced that an impasse had been reached, the Long Beach

Council asked the Conservancy to bring landowners and the Commission together to develop a satisfactory plan.

The Conservancy's work proceeded in three phases: an initial "shuttle diplomacy" effort between the two sides, an intensive site planning exercise involving community interests, and a final round of negotiations. The Conservancy spent relatively little time on process design, devoting much of its effort to devising technical solutions acceptable to both sides.

The Conservancy suggested consolidating the scattered wetlands, creating both a larger, more viable wetland and a contiguous parcel of developable land. The landowners agreed.

The Conservancy retained a team of engineers, biologists, and site planners to work with a Citizens Advisory Committee in drawing up site plan alternatives. The biologists sought ways of retaining existing wetland types wherever possible and creating habitat acreage to support endangered species. Buffers were proposed as a means of separating development from wetlands. In all, fourteen alternative wetland configurations were prepared. The Advisory Committee and agencies, with assistance from the Conservancy, arrived at three acceptable configurations: a one wetland concentration, a two wetland concentration, and a corridor concentration.

Conservancy staff worked through a series of cash flow analyses with the landowners. These suggested that the corridor configuration would leave each of the two major landowners with developable property. However, this configuration left less room for a buffer, causing Commission staff to balk. A final round of negotiation helped to iron out a buffer design. The result was unanimous approval by the Coastal Commission.

Bolsa Chica in Orange County presented a similar, but more contentious, conflict. The 1700 acre Bolsa Chica site consists of a 1400 acre mosaic of ponds, tide gates, and oil roads flanked by mesas and bluffs. The dispute over wetlands disposition dates back more than 20 years. A 1973 agreement resolved competing ownership claims, allocating a portion of the wetland to the state and the largest portion to the Signal Oil Corporation. That agreement did not address future land uses or the ultimate mix of development and protected wetlands.

In 1982, after several years of work, Orange County submitted a land use plan for the Bolsa Chica region. The LUP identified areas for wetland restoration, areas for residential and marina development, and an ocean entrance. The Coastal Commission denied the LUP. From the Commission's perspective, the County, together with Signal, were asking for too dense a development pattern and proposing too little restored wetland. The Department of Fish and Game and a citizens' group, the Amigos de Bolsa Chica, supported the Commission's action. The County withdrew the LUP and attemptedto revise it but with little hope of Commission approval given the inability of competing interests to agree on land use designations.

A group of coastal legislators introduced a bill enabling the Conservancy to help with the LUP. This bill was opposed by the County as an unwarranted intrusion into local plan making. The County did agree, however, to a compromise bill through which the County requested the assistance of the Conservancy in drawing up a Habitat Conservation Plan (HCP). The HCP was to be presented to the Commission in conjunction with the new LUP.

The Conservancy began intensive negotiations with Signal Oil and the Commission. These were followed by broader negotiations involving the County, the Department of Fish and Game, other public agencies, and the Amigos. During the first phase of negotiations, the Conservancy presented Signal Oil with alternative land use configurations, engineering concepts, and cash flow analyses. Conservancy economist Peter Epstein realized that Signal's estimate of expected revenues was 15 years out of date. He built a new cash flow model, using alternative assumptions supplied by Signal and his own staff. Conservancy hydrologist Philip Williams and biologist John Zentner teamed up to develop new proposals regarding the location of the ocean entrance, the marina, and the location of restored habitats.

Although the Conservancy staff was making progress, negotiations bogged down when attorneys representing Signal failed to take the new proposals seriously. Conservancy Executive Officer Joseph Petrillo complained about this intransigience to senior project managers at Signal. He threatened to introduce a new bill adopting the HCP as drafted if Signal refused to negotiate in good faith. This tactic broke the deadlock. Signal and the Conservancy moved quickly to resolve their remaining differences. Signal's engineers "won" on the design of the ocean entrance while the Conservancy prevailed on the phasing of restoration prior to development.

When the HCP was presented to the Amigos and various resource management agencies, two major objections were raised. The location of the marina would have forced a major realignment of Pacific Coast Highway. (A new citizens' organization quickly formed in opposition to the realignment.) The Department of Fish and Game argued that the realignment would bisect part of the restored wetland.

The Conservancy convened intensive site planning workshops with all the parties. The neighbors to the project came up with a major design improvement: using the bluff on the northeast corner of the property as a "ramp" for a bridge over the ocean entrance. This

eliminated the need for the highway realignment and meant that no road would divide the wetland. The cost to Signal would be much reduced.

The final site plan includes over 900 acres of functioning wetland -- an increase of 300 acres over the County's initial plan. Signal will construct residential development on about 484 acres, along with a marina and a navigable ocean entrance.

Implementation of the Los Cerritos and Bolsa Chica plans is several year off, since oil drilling must cease before development proceeds. The Bolsa Chica HCP probably faces several more rounds of review before it can be implemented. The Conservancy succeeded in breaking the deadlocks in each case though aggressive facilitation and active preparation of site plan alternatives.

Mediating Disputes Between The Fishing Industry and the Oil Industry

Southern California's fishing and oil industries have been at odds since at least the 1969 Santa Barbara oil spill. Controversy has followed active drilling and exploration in the Santa Barbara Channel and the Santa Maria Basin. Fishermen complained that crew boats and geophysical surveys interfered with fishing. They approached John Richards, the Sea Grant marine advisor for help.

Anecdotal information about gear loss suggested that some fisherman had lost 25% or more of their crab pots. One individual claimed to have lost all of his traps to accidental damage by survey boats. A halibut fisherman reported that a once-productive fishing ground had become almost barren after surveys started. Fishermen said they had difficulty identifying the responsible individuals. Gradually, Richards' advice-giving role was transformed. When staff of the Mediation Institute, a non-profit center based in Seattle, offered assistance, Richards suggested the conflicts between the fishing and oil interests might be mediatable.

A meeting was convened to discuss the conflicts. The fishermen raised three concerns: they complained about chronic trap damage and the difficulties of maneuvering while oil service boats worked nearby; they argued that seismic test caused behavioral changes in fish -- including dispersion; and they worried that testing had a negative physiological impact on eggs and juvenile fish. The fishermen had only limited anecdotal evidence to support their claims, but they were united in their opinion that seismic testing had a negative impact on their livelihood.

Oil company representatives lacked the data to refute these claims. They suggested that the allegations were exaggerated, stressed that seismic testing was essential, and complained that fishermen were difficult to contact.

As the dialogue progressed, it became clear that the dispute hinged largely on difficulties of communication and issues of fact. Neither side had the resources to assess and avoid the harmful impacts of seismic surveys and rig support boat traffic.

Each subsequent step in the dialogue was negotiated by the parties with the assistance of Mediation Institute staff, principally Alana Knaster. Groundrules for discussion had to be established. An important step was to decide who should sit at the negotiating table. Each side chose eligible negotiators and alternates to represent their interests. They agreed that the agencies responsible for offshore leasing and fishery management should join the discussion: the Mineral Management Service, the State Lands Commission, the National Marine Fisheries Service, and the California Department of Fish and Game. It was agreed that press would not be invited to meetings, but that a press release would be issued jointly at the conclusion of each meeting.

Alana Knaster chaired a follow up meeting to draw up a more precise agenda. Attention was first directed to the "at sea" problems: damage to traps, and the maneuverability of fishing boats while oil service boats were plying the same waters. A second topic for immediate discussion was the changes in fish behavior induced by seismic testing.

Early in the discussion, the notion of a liaison office staffed by a neutral third party was introduced. Both sides saw this as an excellent mechanism for improving communication and freeing up their time. Over a six month period, the structure and function of the liaison office were negotiated. The job description and actual hiring of staff were negotiated. The Joint Committee settled on Dr. Craig Fusaro, a biologist with oil company experience. Fusaro called his interviews with mixed teams of negotiators "the most unique and grueling thing I've ever been through for a contract." Funding for the liaison office was obtained from the California Coastal Operators' Group (C/COG), a non-profit association formed by oil companies for the purposes of public education. C/COG contracts with the joint committee. In turn the Joint Committee hires contracts and manages the Liaison Office.

Another point of contention was the fishermen's perceived need to compile a vessel traffic map, delineating traffic lanes for oil service vessels. That map was negotiated through three drafts, and was distributed to members of the two user groups.

To provide guidance in further discussions of fish behavior, the negotiators agreed to convene a panel of experts on fish behavior and acoustics. That group worked with the Seismic Steering Committee to prepare a detailed study plan. Several species were selected as likely candidates for such a study, including salmon, halibut, rockfish and barracuda. The panel of science experts

focused on rockfish, a species that would be the most tracable, providing a preliminary indication of the feasibility of doing studies on the potential effects of seismic acoustic signals on fish behavior.

The Mediation Institute facilitated a three day workshop to prepare a plan for studying for effects of seismic testing on rockfish behavior. Funding for the meeting was provided by Sea Grant, the West Coast Fisheries Development Council, and oil and geophysical consulting firms. Participants included an anchovy specialist, an expert in acoustics the Director of Hubbs Research Center, and the Associate Director of Scripps. Dr. James Case, Chair of the U.C. Santa Barbara Biology Department, guided the group through the complex material. Alana Knaster's job was to keep the panel and negotiators moving towards consensus. By the end of the three - day session, the oil and fishing industry representatives along with the scientists had outlined a statement of work.

The next step was to secure funding for the study itself, and to identify qualified consultants to complete the work. The oil companies, recognizing that the findings of the study could help answer questions that frequently arose in regulatory hearings, agreed to fund the study. A request for proposals was developed based on workshop findings, and list of fifteen acceptable firms was prepared. Five responses were received, and the firm of Greenridge Sciences was chosen by the negotiators. Charles Green, principal of the firm, had been one of the panel members at the workshop, but the groundrules stated that panel membership would not disqualify prospective consultants.

Ms. Knaster continued to facilitate negotiations even after the contractor was selected, focussing on the scope of the final report, and the timing and nature of its release. The agencies threatened to withdraw unless findings were made public. Oil company negotiators agreed. All parties agreed that the findings should be used to write new regulations governing exploration. The study is underway, and should be completed in November, 1984.

A parallel process is now underway to probe the assertion that seismic testing harm eggs and fish larvae. Barry Keene, a California legislator from the Northern California coast, had watched the round of negotiations on fish dispersal. He introduced a bill requiring that a mutually agreeable standard be negotiated to avoid seismic harm to juvenile fish. Once again, the scope of work, contractor, and method of releasing findings will all be negotiated.

The most difficult subject that will be tackled in negotiations may be an economic description of damage that has occurred. The National Marine Fisheries Service is responsible for processing claims to be paid out of a $3 million Fishermen's Contingency Fund. The fund was established at the federal level to reimburse fishermen for gear damage/loss and economic damages caused by oil and gas activities on the OCS (which cannot be attributed to a particular operation).

Response to the dispute resolution activities has been mixed. Both the fishing an oil industries seem reasonably pleased, but are witholding final judgment until the reports are completed. Jody Giannini, the principal negotiator for the Santa Maria basin fishermen, calls the decision to create the liaison office an "excellent" one.

But Giannini and Craig Fusaro note that the two user groups will have "their hands full" in the next few months as the findings of the studies are released and compensation for damage to gear is negotiated. Legislators have been quite supportive of the Mediation Institute's efforts, while the County of Santa Barbara has reserved comment. The press -- particularly the L.A. Times environmental reporter -- has not been pleased by the decision to keep the negotiation sessions closed.

Columbia River Estuary Negotiation

Efforts to resolve conflicts among development and conservation interests in the Columbia Estuary date back to 1974. That year, local governments in Washington and Oregon formed CREST, the Columbia River Estuary Taskforce. CREST completed a long-range management plan in 1979. The plan designated areas for development and resource protection, and spelled out development standards. State and federal agencies participated in drawing up the plan.

Conflict between local and state interests arose when the CREST plan was submitted for review by Oregon's Land Conservation and Development Commission (LCDC). Under Oregon law, local plans must be reviewed by the LCDC. If found consistent with statewide goals for estuarine resources, local plans are approved (or "acknowledged"). Otherwise, the plans are denied, and must be revised. CREST proposed extensive industrial development along the south shore of the Columbia Estuary -- industry that was not water-dependent. The LCDC, arguing that this was inconsistent with state goals denied the plan. Revisions were required but there was disagreement about the appropriate location and scope of port development as well as appropriate compensation for environmental damage.

During the late 1970s, the Mediation Institute's predecessor, the Office of Mediation (OEM), presented two workshops on mediation techniques for CREST members. By 1980, CREST staff began to explore the idea of mediation seriously. A year later, the CREST Council requested assistance from the Institute for Environmental Mediation "to resolve some of the remaining issues preventing approval of the Columbia River Estuary Regional Management Plan by the Oregon

Land Conservation and Development Commission. Verne Huser and Sam Gusman, mediators from the Institute, along with representatives of local interests produced a "Statement to the Institute for Environmental Mediation."

Exploration continued as the mediators met with the staff of state and federal resource agencies, local government members of CREST, environmental group represenatives, and others.

Process design was next. One challenge was to persuade the Corps of Engineers, The LCDC, and the Division of State Lands to sit at the negotiating table with local government representatives. A special category of "Review Advisor" was created to allay the fears of regulatory agencies that direct participation in negotiations might compromise their subsequent ability to do their jobs.

Huser and Gusman devoted two two-day sessions to pre-negotiation activities. Several issues were negotiated: which parties would participate, in what capacity, on what issues, and with what expectations of resolution. Boundaries needed to be set for the discussion. The LCDC and the Department of Land Conservation and Development (DLCD) provided guidance on appropriate locations and acreages for water-dependent development. The mediators and negotiators all agreed to a strict June 31 deadline.

Discussions took a positive turn as an agreement was reached for Tongue Point, the first proposed development site. Negotiators drafted findings designating appropriate land uses, and drew up detailed conditions to govern site development.

Coalitions formed among the "resource agencies" and the "development interests", with most local interests lining up on the development side. Even with these coalitions, and some "non-aligned" negotiators, the pattern of Tongue Point continued. Land uses and development conditions were negotiated on each of the four remaining sites.

The fourth session, scheduled just days before the imposed deadline of June 31, was devoted to working out detailed subarea policies. Negotiators prepared a 36 page summary detailing the agreements. The parties signed. The document outlined appropriate development at each site, designated areas where development was off limits, and specified limits for dredging and filling.

Unlike the Santa Barbara process, the CREST effort afforded press access to all formal negotiating sessions. The mediators believed that press coverage facilitated the discussions. Recalcitrant negotiators were apt to be shown in a poor light by the media. For most negotiators, appearing reasonable was more important than appearing hard-headed. The mediation effort also provided opportunities for public participation in the negotiations, although few people were inclined to attend or speak.

Implementation of the mediated agreement has come in stages. By the end of the first summer, all agencies and elected bodies had endorsed the agreement signed by their representatives. By 1982, the agreement was incorporated into the local comprehensive plans for the cities of Astoria and Warrenton in Clatsop County. The City of Hammond modified its plan in 1983 to include the terms of the agreement.

The plans for all the localities have been acknowledged by the LCDC. The County's plan has also been acknowledged except for four disputed areas, and efforts to resolve those minor disagreements are nearly complete.

At least one LCDC planner feels that the mediation exercise has increased local acceptance of the plan, and has helped to smooth relationships between permit applicants and the state. No permits have yet been issued in the 100 acre area of Clatsop County within the scope of the agreement. The negotiation effort failed to identify an eagle habitat on Tongue Point -- a factor that may have argued for less development than the level approved in the agreement. Beyond that minor criticism, the CREST negotiation appears to have held up well since it was signed.

Analysis

The cases we have described are unusual, Most CZM and OCS conflicts either end up in court or persistuntil one of the parties gives up politically. Consensual approaches to dispute resolution tend not to cost as much as litigation (appealed to its final conclusion). They do not take longer than administrative or legislative decision-making given the typical aftermath of attempts to act by fiat. They do not preclude the possiblity of falling back on more traditional methods of dispute resolution if consensus can not be reached. Why, then, are consensual approaches to dispute resolution used so frequently?

There seem to be four barriers to more widespread use of non-adjudicatory, less adversarial forms of dispute resolution. The first is widespread unfamiliarity with their availability. It has only been in the past seven or eight years that practitioners of facilitation, mediation, and other forms of environmental dispute resolution have become visible. Foundation support has made it possible for non-profit, free-standing centers such as the Institute for Mediation to emerge. As more people become aware of these options, this barrier will be stripped away.

The second barrier is a general concern on the part of government agencies that they may be compromising their statutory authority if they participate in mediation or other consensual forms of dispute resolution. The third barrier is the problem of financing non-traditional forms of dispute resolution. The

fourth barrier is the difficulty of translating informally negotiated agreements into formally binding commitments. The cases described in this paper suggest ways in which the last three of these barriers can be overcome.

Case Findings

The Massachusetts Tidelands case suggests that the normal procedure for sorting out policy disputes through the legislative process can be supplemented effectively by facilitated dialogue among the contending parties. Highly structured interaction among carefully selected representatives of key stakeholding interests can create a mandate and a constituency for legislative action. Public agencies can provide an auspices for facilitation without binding themselves ahead of time to particular results. Facilitation can produce ahead of time to particular results are conversant with the technical and scientific issues involved.

The California Coastal Conservancy played a key role in structuring a joint problem solving process. The Conservancy staff and consultants did more than facilitate discussion -- they helped to generate a richer array of options aimed at satisfying the competing interests of the parties involved in the wetlands disputes. The Conservancy did not use professional facilitiators or mediators (although they might have). It did use its legislative clout to pressure recalcitrant parties into making a good faith effort to search for consensual solutions. Scientific and technical concerns were not traded away in an effort to reach political accord. In fact, the agency used its financial resources to probe scientific issues in more detail that was afforded by the regulatory process alone.

The effort to mediate the differences between fishing and oil industry interests in Southern California seems to have avoided expensive litigation and improved relationships. The attempt they are currently making to work together on a study of the impacts of seismic testing provides an important illustration of joint fact-finding. Every effort to avoid what we call "adversary science" helps to ensure the wise decisions will be made. The Mediation Institute has, by this time, amassed a great deal of experience that can now be used to organize mediation in a wide variety of situations. The availability of agency and private funding was crucial to the success of the Southern California effort.

The Columbia Estuary case offers a very impressive example of environmental mediation. The mediators did not come to the situation with a regimented approach to helping the parties deal with their differences. Instead, they focused on a collaborative and self-conscious effort to design specific procedures that fit the situation. The invention of a special status for the government agencies, allowing them to participate directly was quite significant. Finally, the ability of the parties to translate their informal agreements into formal LCDC acknowledgment of local plans solved the problem of binding the parties to their commitments.

In all four cases, face-to-face interaction among the key parties (and not their hired advocates) produced agreements that all sides could endorse. The process of consensus building did not involve extracting successive concessions the way it often does in the labor relations field. Instead, the parties searched for ways of capitalizing on their overlapping interests and trading across issues that they valued differently. They engaged in what Professor Howard Raiffa has termed "the search for joint gains."

Conclusions

While great care must always be taken in generalizing from only a few (non-random) cases, we do feel that several suggestive conclusions can be drawn from the illustrations we have presented:

1. What appear to be win-lose situations can often be transformed into win-win outcomes if the parties in dispute can be brought together in a process of face-to-face negotiation.

2. Consensual decision-making requires careful attention to the processes of identifying interests, generating options (or packages), spelling out commitments, jointly evaluating the uncertainties and the scientific evidence available, and framing written agreements. Such processes often require the assistance of non-partisan facilitators or mediators.

3. The process of generating informal agreements must at some point be linked to the formal processes of government decision-making. No elected or appointed official should be expected or encouraged to relinquish his or her statutory authority.

4. What might be considered power imbalances among the parties in a negotiation are often illusory. The presence of a non-partisan facilitator, the availability of funds to support joint fact finding, and the option that all parties have of walking away at any time, produce a balance of negotiating power even when political power away from the bargaining table remains imbalanced.

5. Even when dispute resolution efforts fail to produce consensus, it rarely hurts to bring parties in dispute together to hear each other's concerns. At the very least, this can narrow the scope of their differences or at least explicate the causes of conflict.

We look forward to a time in the future when we will be able to share with you the results of a much larger number of cases.

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NEW TECHNIQUES AND COGNITIONS FOR EFFECTIVE DISPUTE RESOLUTION

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From the beginning of time man has had to make decisions, and in the course of making them disputes have arisen. There is nothing new about deciding and quarreling as a human activity, but there is a great deal that is new and deserves our attention with regard to the consequences of bad decisions and intransigent disputes. The difference is in our increased technical power, and the consequences of using this power that that are so much greater and so much more difficult to correct. This paper examines the current status of our ability to deal with disputes given this changing environment, and looks at the cognitive resisting forces of negotiators that hamper our ability to achieve optimal conflict resolution.

It is appropriate to open our discussion with some observations about the changing quality of decisions and disputes. The first and over-arching observation is that it was in comparatively recent times, probably about the middle of this century, that we as a species first began to influence our environment almost as much as it has always influenced us. Throughout most of history, we have been at the mercy of floods and famines, mysterious epidemics, and the confines of our terrestrial habitat. We were also the beneficiaries of virtually unlimited resources: clean air and water, abundant minerals, and seemingly unlimited land into which to expand. Our only limitations seemed to be our technical ability to exploit this cornucopia of resources, an ability that also seemed to be expanding at an exponential rate.

These new powers gave us the means to control floods, to prevent and cure an expanding list of diseases, and to extend our reach beyond the envelope of our atmosphere. But in exercising these same powers, we have introduced new dangers. We can now alter the composition of the atmosphere we breathe, to cause as well as to cure epidemics, and to pollute and over-populate the environment in which we live. It is more important than ever that the decisions we make be based on as much rationality and analysis as possible.

This is not to say that we should seek to replace human decision making with a mechanistic rationality. Those of us who are searching for constructive ways to use computers in decision making are often accused of trying to dehumanize the process. Rather, what we are seeking to do is to elevate the level of understanding on which the human qualities of decision making can operate. We are looking for aids to help us consider the multiple effects of our actions more effectively and precisely than our unaided minds can possibly do. Nor is this an argument for the replacement of bargaining or the political process with reason and analysis alone. What is being argued is that the bargaining and political processes should take place on a platform of as much reason and analysis of which we are capable rather than, as is now more often the case, in an arena of disputes over facts and predicted outcomes, and of hunches and intuitions rooted in partial information and single-issue zeal.

Because we now can and do affect so many qualities of our environment, the factors which we must consider whenever we contemplate an action are huge in number and highly complex in their interrelationships. Good judgment and experience is essential, but these alone are insufficient to manage and understand such complexity. And so, we need to avoid the Scylla of trying to avoid complexity through intuitive oversimplification and the Charybdis of too much faith in rationality and logic.

Uncertainty and risks will always be present. Never was this better expressed than in the report of the Licensing Board (in the matter of Consolidated Edison Co.) that heard one phase of the Indian Point No. 2 plant dispute involving an atomic plant on the banks of the Hudson River:

> No one knows in detail what activites of life go on in the unseen depths of the Hudson River nor what the future response to changing inputs is going to be. Under these conditions the experts are free to choose those assumptions which best fit their

> beliefs about what may go on, and the arguments that follow produce thousands of pages of testimony and documents without providing answers that can be agreed upon, or that can give clear guidance to a Board.
> (Public Interest Law, p. 187, 1978)

We will be considering both in this session and in this conference as a whole, which strategies and which of the newer technical tools can best help us manage an overload of complexity and technical information in order to increase our understanding of how a system works and thus to reach a better decision--meaning a decision based on better information and more complete analysis than would otherwise be the case.

It might seem obvious that we, as decision makers, would first want to understand the nature of the system and the consequences of alternative actions as completely as possible before we select a particular course of action. But as obvious as this statement may sound, in practice it is more the exception than the rule. Even the definition of "we, the decisions makers" raises some difficult questions. Who are we? The oil companies? The government authorities? The fishermen in the area? The citizens along the adjoining shores? The ultimate consumers of energy far away from the scene of drilling?

It could be argued, and it might even be true, that in the long run the interests of everyone could be served by a single, carefully chosen course of action. But clearly this is not true in the short run, and short-run considerations generally take precedence in the choices that are made. These differences in short-run interests contribute to the intransigence of many disputes and interfere with the implementation of skillful long-range planning.

What might be argued with more success is that everyone's interests will be best served if the maximum possible understanding of how the system works were reached before opinions were formed as to what actions should be taken. Then, even as the differences in short-term interests become revealed in more detail and in stark contrast, the tradeoffs and compensations necessary for an equitable, acceptable, and ecologically sound decision can be negotiated on the base of a higher level of understanding.

This observation of course draws attention to the difference between reaching a decision when all those engaged in the process have similar interests, and negotiating a decision when there are various interests involved. In practice, and reflecting our adversarial culture, there is a tendency to assume that when there are various interests, one side will gain only from the loss of the other side. Thus, negotiations are more often adversarial than collaborative, as we have already recognized. The art of negotiation in a zero-sum game is a necessary skill, and it is one that has been well developed. Our focus is instead on the necessity, as we perceive it, to adopt as a normal practice a preliminary phase of collaboration to define and understand the issues and how the system that concerns us works, before entering into an adversarial effort to win.

This would require behavior on the part of all participants which amounts to a fundamental shift which might be defined as follows:

> In the interest of everyone, including ourselves, it is better first to seek a full understanding of how the system works before trying to choose a favored solution and seeking to win its acceptance. This should be done, even if it involves collaboration with one's perceived enemies.

This runs against long and deeply rooted traditions and cultural patterns. Most of the new procedures which have been developed for managing complexity, including computer modelling, have been used primarily as weapons for winning rather than as tools for understanding and reaching decisions. To collaborate with those who are perceived to have different interests requires the kind of fundamental shift we have just defined and is certainly difficult to achieve. But it may also be essential to achieve it if we are to control, for our long-range benefit, the power that our technical ingenuity has unleashed.

Of course, within any one organization, or within a group of persons with similar interests, the proposition of understanding before acting is more readily acceptable providing that the means for understanding complexity are available. And yet, to a surprising extent, there is a tendency to shortcut the decision process and to make decisions before full analysis.

Even when more complete analysis is undertaken, it is generally performed within an organization. Industrialists perform theirs and reach their decisions, and so do environmental organizations, government agencies, and other citizen groups. The result is often a "Tower of Babel" of opinions and favored solutions, and when computers are used, a kind of "battle of the printout" ensues. When this occurs, all too often a decision is reached as a result of political pressures alone, with very little understanding and analysis of the probable impacts. As in the quotation above: "the experts are free to choose those assumptions that best fit their beliefs."

What could occur, if the suggested fundamental shift were to be applied, would be a preliminary phase of collaborative study and analysis for the purpose of understanding the system before engaging in the adversarial political and bargaining

processes. One method for accomplishing this is computer assisted negotiations (C.A.N.) C.A.N. provides a framework and a potential for reducing adversarial attitudes and for achieving more rational decisions. It proceeds through the following steps:

1. The parties agree that it is in their self-interest to seek an understanding of the system before trying to develop and fight for specific solutions.

2. They agree to collaborate in the design of a computerized model of the system. This requires a definition of the issues, selection of the data, and agreement on a set of assumptions. Where full agreement cannot be achieved, mediation efforts can be used to narrow the differences and to clearly define, by consensus, a definition of the residual differences that remain.

3. A computer model is built which incorporates the preceding agreements, clearly indicates the remaining differences, and what are their consequences in predicted outcomes.

4. Adversarial bargaining can then begin, with reference to the previously designed and collaboratively built model, for testing different alternatives.

When used in this manner, computers can contribute the following benefits to decision making:

1. The parties are assisted by the power of the computer to manage complexity and an overload of data and information.

2. Once the participants agree to collaborate in the design of a model, they are forced to think objectively and not emotionally, and they become engaged in the task of <u>understanding</u> before that of <u>winning</u>.

3. Computer capability can, with proper design, permit examination not only of the intricate details of a system, but also holistically of the whole system. The parties can zoom from detailed examination and bargaining over interim changes in one part of the model to a macro perspective to see how these interim changes will affect the whole or other parts of the system.

4. Experiments in both the laboratory and in live negotiations have shown that when adversaries become engaged in the joint design and construction of a model, communications between them improve, adversarial attitudes are reduced, and there is a clearer understanding of each others' goals and aversions. (Straus and Clark, 1980)

But just as the collaborative use of computers can contribute to a better quality of decision and less damaging controversies, so can adversarial use of computers result in a higher level of confrontational behavior, confusion, less analysis, and a poor quality of decisions. Under these circumstances, computers are typically designed to prove an already chosen set of solutions, and the facts are selected to bolster the argument rather than to reveal the truth. When different computer models are brought into adversarial negotiations, a "battle of the printout" will occur. The reasons for the different projections are obscured within the programs and seldom revealed or even discussed. Under these conditions, analysis and reason are subordinated to power and rhetoric.

There are, however, deep-seated cognitive patterns held by negotiators which serve as barriers to the use of technical advances such as the constructive use of computers for negotiation and other strategies that encourage negotiators to reach mutually beneficial agreements. Most would accept the argument that negotiators should not bypass mutually beneficial solutions. Yet substantial evidence exists that our cognitive patterns systematically distort judgment in ways that lead to this result. The remainder of this paper examines a sample of three cognitive distortions that lead to this effect and then explores the responses that are available to debiasing the negotiator.

<u>The Framing of Negotiations</u>

Consider the following oversimplified example of a negotiation: You are negotiating with another party the percentage of a body of water to which each of you will have exclusive rights. When you negotiate this transaction, do you try to maximize the portion of the water that you have the rights to or minimize the portion of the water over which you will not have the rights? Without going into a number of scenarios that call for the sharing of rights (which we will discuss later), the obvious answer to the question is "Both." The question appears to be asking whether you want the cup half full or half empty. Recently, however, Kahneman and Tversky (1979, 1982; Tversky and Kahneman, 1981) have suggested that important differences exist in how individuals respond to questions framed in terms of losses versus gains. This difference is critical in describing negotiator behavior.

Tversky and Kahneman (1981) presented the following problem to a group of subjects:

> The U.S. is preparing for the outbreak of an unusual Asian disease which is expected to kill 600 people. Two alternative programs are being considered. Which would you favor?
> 1. If Program A is adopted, 200 will be saved.
> 2. If Program B is adopted, there is a one-third probability that all will be saved and a two-thirds

probability that none will be saved.

Of 158 respondents, 76% chose Program A, while only 24% chose Program B. The prospect of being able to save 200 lives for certain was valued more highly by most of the subjects than a risky prospect of equal expected value. Thus, most subjects were risk-averse.

A second group of subjects received the same cover story and the following two choices:

1. If Program A is adopted, 400 people will die.
2. If Program B is adopted, there is a one-third probability that no one will die and a two-thirds probability that 600 people will die.

Out of the 169 respondents in the second group, only 13% chose Program A, while 87% chose Program B. The prospects of 400 people dying was less acceptable to most of the subjects than a two-thirds probability that 600 would die. Thus, most subjects given these alternatives were risk-seeking.

Careful examination of the two problems finds them to be objectively identical. However, changing the description of outcomes from lives saved (gains) to lives lost (losses) was sufficient to shift the majority of subjects from a risk-averse to a risk-seeking orientation. This result is inconsistent with utility theory, which predicts the same response when objectively identical problems are presented. These well-replicated findings, however, are consistent with Kahneman and Tversky's (1979) prospect theory, which predicts risk-averse behavior when individuals are evaluating gains and risk-seeking behavior when individuals are evaluating losses.

To exemplify the importance of framing to the domain of conflicts in this conference, consider the following elaboration of the scenario depicted above: Each side claims that it needs and deserves at least 70% of the rights, and that anything less represents an unacceptable loss. What if each side had the opportunity to accept a 50-50 split? Since each side is viewing the conflict in terms of what it has to lose, following Tversky and Kahneman's (1981) findings, each side is predicted to be risk seeking and unwilling to take the certain settlement (the sure thing), preferring to risk this guaranteed agreement in favor of the risky strategy that the other side will yield further. Changing the frame of the situation to a positive one, however, results in a very different predicted outcome: If both sides view the conflict in terms of the percentage of water rights that they will gain, then risk aversion will dominate and a negotiated settlement (the sure thing) will be likely. Using experimental contexts conceptually similar to the one depicted in the scenario above, Bazerman, Magliozzi, and Neale (in press; Neale and Bazerman, in press) found that negotiators with positive frames are significantly more concessionary and better problem solvers than their negatively framed counterparts.

These results about the frame of negotiations have important implications for the practice of negotiation. First, the common negative frame adopted by most negotiators is likely to result in little search for creative solutions (since you are willing to wait for the other party to "cave in") and missed opportunities for mutually beneficial agreements. Second, framing has important implications for tactical behavior. In order to induce concessionary behavior from an opponent, a negotiator should always present arguments in terms of what the opponent has to gain. In addition, negotiators should make it salient to their opponents that they are in a risky situation in which a sure gain is possible. Finally, the impact of framing has important implications for mediators and other third parties who are facilitating the negotiations. To the extent that the goal is a better solution for both negotiators, a mediator should strive to have both parties view the negotiation in a positive frame.

Ideally, this should be done with both parties conscious of the difference between negative and positive framing, and understanding that a positive view by both sides will lead to a better solution for both. But of course the mediator could undertake a positive frame definition of the issue that would be different for each party. Since this should result in a win/win result, this would be a perfectly ethical procedure for the mediator to follow. But if it is done as a measure to achieve resolution rather than as one to promote collaborative rather than adversarial attitudes, one can speculate on its effectiveness for sophisticated negotiators. Once the "trick" is recognized, it can be used as a negotiating ploy by each side, thus cancelling its effectiveness.

The Mythical Fixed-Pie

Integrative agreements are nonobvious solutions to conflict that reconcile the parties' interests and yield higher joint benefit than a simple compromise could create (Bazerman, in press; Pruitt, 1981; Walton and McKersie, 1965). To illustrate, consider Follett's (1940) frequently repeated story of the compromise between two sisters who fought over an orange. The two sisters agreed to split the orange in half, allowing one sister to use her portion for juice, and the other sister to use the peel of her half for a cake. The two parties overlooked the integrative agreement of giving one sister all the juice and the other sister all the peel.

Why did the sisters miss the integrative solution? The likely culprit is the fixed-pie assumption of most negotiators. We argue that the tendency to view negotiation in a win-lose framework represents a fundamental cognitive bias

shared across most negotiators. This cognitive pattern leads negotiators to ask the question, "How much of the orange can I get?" rather than the question, "How can I best understand the way in which this orange can be divided?" This win-lose orientation is manifested objectively in our society in athletic competition, academic admissions, promotion systems, etc. Unfortunately, individuals tend to overgeneralize this lesson learned in fixed-pie contexts to many other domains in which an expandable pie exists.

Experimental results show that individuals do learn to find integrative solutions, but only after they are experienced in the specific domain in which the negotiations occur (Bazerman, et al, in press). Even experienced negotiators in novel domains forego the mutually available benefits of integrative solutions. Unfortunately, the very nature of the conflicts that are represented in this conference suggest that novelty will be a common characteristic. This increases the concern for eliminating the fixed-pie assumptions that can be predicted to exist.

Returning to the water rights scenario described in the previous section, many agreements are possible through mutually beneficial trade-offs. For example, there are likely to be a number of ways in which the water rights to parts of the disputed area can be available to both parties. However, these trade-offs can only result after the parties in the negotiations understand sufficiently how the system works to enable them to accept the notion of an expandable pie. While experienced professionals are aware of the need for such trade-offs, we believe the fixed-pie assumption continues to negatively affect our ability to creatively develop solutions and our willingness to use the conflict resolution techniques that now exist.

If the parties could be persuaded to enter into C.A.N. before they engage in hard bargaining, it might be possible to have them explore together how the system works, and in so doing, discover the potentials of an expandable pie.

The Escalation of Negotiation

There are many examples of ocean conflicts in which the actors can become trapped into costly courses of action. The escalation of commitment to a failing course of action has recently become a topic of interest among decision researchers (Bazerman, Giuliano, and Appelman, 1984; Brockner and Rubin, in press; Staw, 1976, 1981; Teger, 1979). Individuals and groups who are personally responsible for actions that have led to the current situation consistently and nonrationally commit added resources to that course of action. America's involvement in Vietnam is often cited as a classic example of escalation (e.g., Teger, 1979). Policymakers of that time gradually increased the nation's commitment in such a manner that no major political force could retrospectively argue that the actions taken were rational. Similarly, it can be argued that in the Malvinas/Falklands conflict, once Argentina had suffered the initial loss of life, it had the information necessary rationally to pursue a negotiated settlement. The negotiations literature, in contrast, accurately predicts the behavioral patterns that the United States and Argentina pursued.

One of the primary approaches to the study of the nonrational escalation of conflict has centered around the dollar auction (Shubik, 1971). To illustrate the dollar auction, imagine yourself in a room with thirty other individuals. A person in the front of the room announces:

> I am about to auction off a dollar. You are free to participate or just watch others. You will be invited to call out bids in multiples of five cents until no further bidding occurs, at which point the highest bidder will pay the amount bid and win the dollar. The only feature that distinguishes this auction from traditional auctions is a rule that the second-highest bidder must also pay the highest amount that they bid, although he/she will obviously not win the dollar. For example, if Bill bid 35¢ and Jane bid 40¢, and the bidding stopped, I would pay Jane 60¢ ($1-40¢-60¢) and Bill, the second-highest bidder, would pay me 35¢.

Would you be willing to bid 15¢ to start the auction? Many people would. After someone else bid 20¢, would you bid higher? What would you do if no one else entered the auction? We have run this auction with students and executives. The pattern is always the same. The bidding starts out fast and furious, until the bidding reaches the 50-75¢ range. At that point, everyone except the two highest bidders drops out of the auction. The two bidders then begin to feel the escalatory trap. One bidder bids 80¢ and the other bids 85¢. The 80¢ bidder must either bid 90¢ or accept an 80¢ loss. The uncertain situation (that might even produce a gain if the opponent quits) appears more attractive than the sure loss. He/she bids 90¢. This continues until you have bids of 95¢ and $1.00. Strangely, the decision to bid $1.05 is very similar to all previous situations. You can accept a 95¢ loss or continue and reduce your loss if the other party quits. Of course, the rest of the group gets a good laugh as the bidding goes over a dollar--which it always does!

It is easy to see the process of nonrational commitment unfold in the domain of the conflict under examination in this conference. Negotiation processes commonly lead both sides to initially make demands that are based on a fixed-pie view of negotiation. Once the negotiators make,

and become committed to, these positions, they can be predicted to nonrationally hold to these positions. This keeps the attention focused on the wrong questions for the formation of the integrative solutions that effective dispute resolution typically necessitates. Further, if both sides incur losses as a result of a lack of agreement (e.g., the temporary loss of the use of the water rights), their commitment to their positions is expected to increase due to the added commitment of resources, and their willingness to search for creative solutions is expected to decrease.

Bazerman, Beekun, and Schoorman (1982) and Rubin (1980) have identified a number of recommendations for avoiding escalation that are relevant to negotiators. These include:

1. Continue to evaluate the costs and benefits of maintaining a conflict in its current form. When we are competing, we often lose perspective of our goals. Rather, we seek victory. The active consideration of your interests avoids this destructive change in objective. The tools discussed in the front portion of this paper can provide the training that moves negotiators in this direction.

2. Awareness of escalation. Escalation often takes the form of creeping incrementalism--"the other side will give in within a week." The strongest safeguard against this incremental escalation is awareness.

3. Recognize sunk costs. Most of us try to recoup any losses that we have suffered. Unfortunately, this increases conflict (particularly if both parties have suffered losses) and distracts from rational behavior which focuses on future costs and benefits.

CONCLUSION

The section on the cognitive distortions of negotiators attempted to show the impact of judgmental deficiencies on the likelihood of negotiators to adopt integrative strategies--such as the use of computer assisted negotiation. While the identification of why negotiators may be inhibited from using conflict resolution advances is necessary, extensive research (Lewin, 1947; Schein, 1980; Goodman, Bazerman, and Conlon, 1980) has demonstrated that creating sustained change in individuals, groups, and organizations is very difficult. Two major problems are resistance to change and the tendency to revert to comfortable methods of operation. Given the extensive institutionalization of our existing negotiation strategies, changing behavior from fixed-pie behavior to integrative behavior through the use of computer-assisted negotiation is likely to be particularly difficult.

On the other hand, paradoxically, one use of C.A.N. might be to overcome the resistances to the use of C.A.N.! For example, if the players of the dollar auction cited above had first been given an opportunity to explore how the system worked, their behavior in the game would undoubtedly have been different--if indeed they could have been persuaded to play the game at all. Now suppose that the participants in a complex negotiation were first introduced to the dollar auction, and then by analogue persuaded that self-destructive behavior is a likely outcome whenever there is an inadequate understanding of how the system works. Might the outcome be less resistance from the negotiators to enter into a collaborative computer assisted effort to understand the system as a prelude to the actual negotiations?

Lewin (1947) has suggested three necessary steps for creating change and making it last over time. First, it is necessary to get the existing system (e.g., fixed-pie behavior within an individual) to "unfreeze"; that is, the individual must be receptive to change. This frequently requires some education that demonstrates to the individual that some change is necessary. Thus, the use of alternative dispute-resolving techniques (e.g., computer assisted negotiation) must demonstrate its ability in comparison to existing mechanisms. Second, once the individual's current strategies are unfrozen, the content of the new strategy must be provided to the negotiator. Third, the change must be "refrozen," making the change part of the negotiators' standard repertoires. If the change is not institutionalized, the negotiator is likely to revert to past comfortable strategies. In the negotiation context, institutionalizing this change is likely to include the joint consent of both parties to the negotiation. This is likely to be particularly true when we are talking about a specific technique--such as computer assisted negotiation. Institutionalization is most likely to occur when, and only when, negotiators actually begin to use new techniques as a standard part of their conflict-resolution procedures. The explicit development of a planned changed effort that incorporates all these steps of Lewin's change model is necessary for overcoming the decision biases that confront negotiators and for moving negotiation into alternative formats.

In conclusion, this article has argued that the complexity of issues that confront contemporary society are changing the tasks of negotiators and that we need new conflict resolution aids to confront these changes. Unfortunately, our cognitive biases are likely to impede our implementation of necessary changes that would encourage integrative negotiations. Future efforts are needed that integrate the improvement of negotiator judgment with the implementation of normative tools for more effective dispute resolution.

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USE OF THE MINI-TRIAL IN OCEAN RELATED DISPUTES*

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[The following discussion is taken primarily from VARIETIES OF DISPUTE RESOLUTION by Stephen B. Goldberg, Eric D. Green & Frank E.A. Sander, to be published in 1985 by Little, Brown & Co. Research for this book was supported by a grant from The National Institute for Dispute Resolution. This excerpt draws on Green, Marks & Olson, Settling Large Case Litigation: An Alternative Approach, 11 Loy. of L.A.L. Rev. 493 (1978); Green, The CPR Mini-Trial Handbook, in Corporate Dispute Management (Matthew Bender & Co. 1982); and Green, Growth of the Mini-Trial, 9 Litigation 12 (1982).]

The Mini-Trial is a dispute resolution hybrid process that structures private negotiation by combining elements of negotiation, mediation, and adjudication in a new way. It is used most often in business disputes when the parties are at impasse because of a good faith disagreement about the likely outcome if the dispute is litigated; the existence of emotional barriers to resolution caused by the parties' (or, sometimes, the lawyers') personal antagonism; or the parties' inability to fashion a settlement that is responsive to all of their needs and rights. These are common barriers to successful negotiation which the Mini-Trial is designed to overcome in specific ways. The Mini-Trial can be applied to disputes involving ocean use and resource allocation issues, although it may have to be adapted to meet the needs of particular cases.

A Mini-Trial can overcome a negotiation impasse by:

(a) Focusing the negotiation on the merits of the dispute, thus overcoming the barrier to resolution caused by the parties holding widely differing assessments of the likely outcome of the case in court; and

(b) Reconverting into a business or policy problem what has often been transformed by the litigation process into a technical, lawyers' fight. This reconversion is achieved by bringing in new negotiators, usually high level, nonlegal managers who are not emotionally involved in the dispute, but who have authority to settle the case, and who can view the dispute in a broader context in which imaginative, integrative solutions are more likely to be found. The presence of these nonlegal representatives of the clients also brings together the true parties in interest who often are better able than the legal representatives to assess the strategic risks and overall importance of the case to the client.

The Mini-Trial Approach to Complex Litigation. Although the specific procedures of a Mini-Trial may vary depending on the case and the parties' desires, most Mini-Trials contain these key elements:

1) The parties to the Mini-Trial voluntarily agree to conduct a Mini-Trial. There is no statutory, regulatory or (usually) contractual obligation to participate in a Mini-Trial. Parties may terminate the Mini-Trial at any time.

2) The parties negotiate and sign a "protocol" or procedural agreement that spells out the steps and timing of the Mini-Trial process. This agreement usually specifies the parties' obligations and responsibilities in the Mini-Trial process, their right to terminate the process, and certain legal matters such as confidentiality of the proceedings and the effect of the process on any pending or future litigation. This agreement may be quite short and simple or it may resemble ad hoc, private rules of civil procedure.

3) Prior to the Mini-Trial, the parties informally exchange key documents, exhibits, summaries of witnesses' testimony, and short "Introductory Statements" in the nature of briefs. If necessary, the parties may engage in shortened, expedited depositions and other discovery without prejudice to their right to take full discovery later if the Mini-Trial does not settle the case.

4) In most Mini-Trials, the parties select a mutually acceptable "Neutral Advisor" to preside over the Mini-Trial. Unlike an arbitrator or judge, the Neutral Advisor has no authority to make a binding decision, but at the Mini-Trial the Neutral Advisor may ask questions that probe the strengths and weaknesses of each party's

case, and after the Mini-Trial, the Neutral Advisor may be asked by the parties' representatives to advise them on what the likely outcome would be if the case went to trial. Selection of a respected Neutral Advisor with credibility to the opponent is thus very important for each side--one of the principal goals of the participants if they cannot obtain a favorable settlement in direct negotiations with the other side is to persuade the Neutral Advisor to advise the other side that it would be better off settling than taking the case to trial.

In most Mini-Trials, the parties select a former judge as the Neutral Advisor because they believe that a person with prior judicial experience is best able to give them sound advice on likely trial outcomes. But parties generally try to select a former judge who recognizes the difference between the adjudicative function and the advisory role the Neutral Advisor plays at a Mini-Trial. In some Mini-Trials, especially those that turn on the resolution of a technical or economic issue, the parties may select a nonjudicial expert in the subject matter as the Neutral Advisor. In other Mini-Trials, the parties dispense with the Mini-Trial altogether and rely solely on their business representatives to preside over the Mini-Trial and to conduct the negotiations privately. Another approach used at some Mini-Trials is to have a less active facilitator set up the Mini-Trial and chair it, but not advise the parties as to likely trial outcomes. In other cases, the parties want the Neutral Advisor to attempt to mediate a resolution of the dispute. The function the Neutral Advisor is expected to perform will determine the kind of person best suited for the role. But practically, it may be difficult to know in advance what will be required of the Neutral Advisor. Thus, the most successful Neutral Advisors have been those who are sensitive to these nuances and capable of playing the roles of advisor, mediator and facilitator as the situation dictates and the parties ultimately determine.

5) At the Mini-Trial itself, the parties' lawyers make concise, summary presentations of their "best case." Mini-Trials may last from one-half to three or four days (two days is average). Thus, presentations are usually limited to a maximum of six hours for each side, depending on the complexity of the issues. Generally, each party retains complete discretion over how it will use its allotted time. In some cases, the entire presentation is made by the lawyers, similar to an appellate or closing argument. In others, the lawyers call key witnesses to explain parts of the case. Often, key documents are used to explain the case. Quite often, the parties' experts testify on the technical issues. At other Mini-Trials, parties have used movies, views of the scene, and other imaginative devices to communicate the essence of their case in the short time allotted to them.

At the Mini-Trial, rules of evidence do not apply. Thus, if there is testimony by witnesses, it tends to be in a narrative form under informal questioning by counsel, rather than in the precise question and answer form of trial examination. In most Mini-Trials, time is set aside for rebuttal. This may include an opportunity for questions to opposing counsel, witnesses, and experts, again in an informal, modified cross-examination format, and an open question and answer session in which expert may question expert, lawyer may question lawyer, and client may question client, or any variation of these combinations.

Thus, although Mini-Trial formats may vary considerably, the common goal is to employ a procedure that effectively gets out the strengths and weaknesses of each side--including the persuasiveness of counsel and witnesses--in a short time.

6) Mini-Trial presentations are made to high-level representatives of the parties who have clear settlement authority. In most cases, the representatives are nonlawyers who have not been involved in creating or trying to resolve the underlying dispute, but who have authority, or at least persuasive power, over the decision whether or not to settle. In cases involving businesses and government agencies, the party representatives are generally at least one level higher in the corporate or administrative hierarchy than the people who have been involved in the case prior to the Mini-Trial.

At the Mini-Trial, the nonlegal party representatives listen, observe, and ask questions to clarify points, much like a judge or arbitrator would, but they do not sit with or assist the advocates. Immediately after the parties' adversarial presentations on the merits of the case, the nonlegal representatives meet privately and attempt to negotiate a resolution. The theory behind the Mini-Trial is that the party representatives, armed with a crash course on the merits of the dispute (but without any emotional or face-saving motivations), and aware of the larger interests of their side, will be better able than the advocates or lower level party representatives to appraise their positions and negotiate a mutually beneficial settlement.

7) If the nonlegal representatives are unable to negotiate a settlement immediately after the Mini-Trial, they may schedule further talks or presentations. They may also call in the Neutral Advisor and ask for the Advisor's views on likely trial outcomes. In the negotiation terminology of Fisher and Ury (Getting to Yes), the Neutral Advisor's opinion gives both sides an expert's opinion of its BATNA--"Best Alternative to a Negotiated Agreement." Armed with these data, the nonlegal representatives may negotiate further. If a settlement is reached, the dispute is over, as with any negotiated settlement, and any pending litigation is dismissed. If the case is not settled, the parties are free to resume any other dispute resolution process including adjudication. Most Mini-Trial agreements specify, however, that the entire

Mini-Trial process, including any statements made in the course of it and the opinion of the Neutral Advisor, are confidential and inadmissible in any proceeding. The parties also agree that the Neutral Advisor may not testify or consult with any party in that case.

The hybrid nature of the Mini-Trial should be apparent from this description. For example, the Mini-Trial provides the parties the opportunity to present proofs and arguments on the merits of the case (Lon Fuller's classic definition of adjudication), but in a process that has a greater capacity to arrive at "win/win" results (negotiation) because the nonlegal representatives can work out their own integrative solution. The parties set their own rules of procedure and select a third party to help them resolve the dispute by considering the proper outcome (arbitration). But the third party has no binding decision-making capacity (mediation). The procedure is private (arbitration, mediation, negotiation), but is usually carried on within the structure of an on-going adjudication, and the goal is agreement rather than consistency with substantive law (negotiation and mediation).

The first Mini-Trial was held in 1977 to resolve a legally and technically complex patent infringement case. Since then it has been used to settle product liability, commercial, contract, distributor termination, insurance, construction, employee grievance, toxic tort, antitrust and trade secret cases. Most of the Mini-Trials have involved two business entities locked in long-term litigation, but some have involved multi-party disputes and some have involved cases between individual plaintiffs and businesses. Others have involved governmental entities.

Cases Suitable for Mini-Trials. The following factors should be considered to determine whether a Mini-Trial might be employed, and the exact form it might take:

* Stage of the dispute.
* Types of issues at the heart of the dispute.
* Motivations and relationship of the parties.

Stage of the dispute. Some Mini-Trials have occurred prior to commencement of any litigation. More often, however, a Mini-Trial takes place after enough pre-trial discovery and sparring have been conducted to educate the parties somewhat in the disputed issues of the case and bring home to them the cost of continuing litigative combat. Obviously, the earlier in the dispute the Mini-Trial can occur, the greater are the cost-savings that can be achieved. Deciding when to do a Mini-Trial requires each party to make a cost/benefit analysis of the value of obtaining additional information before talking settlement.

Types of issues. Experience, to date, indicates that best results are obtained in Mini-Trials of cases involving complex questions of mixed law and fact (for example, patent, products liability, contract, antitrust, unfair competition)--the kinds of cases in which litigation is often intractable and costly. For example, the Mini-Trial seems well-suited to resolving an antitrust case where the sticking point to settlement is the scope and definition of the relevant market; an unfair competition case where the crucial issue is the propriety of certain disputed business practices; a products liability case where the issue is whether a specially built component part met the required standard of quality, or a contract case where the issues are whether the terms of the contract were fulfilled or nonfulfillment was excusable.

By contrast, where a case turns solely on legal issues, traditional summary judgment procedures are likely to provide a better means of resolution. In addition, where a case turns primarily on factual disputes involving credibility, the Mini-Trial may not be any more effective in resolving the case than traditional settlement negotiations or arbitration unless the witnesses whose credibility is in issue appear at the Mini-Trial to tell their stories and be confronted by the other side. The flexibility of the Mini-Trial enables the parties to structure the process to the issues in the case. For example, where the factual disputes are technical ones, requiring expert analysis and promising a battle of the experts at trial, a modified Mini-Trial involving a neutral expert can be employed. If, for example, the performance of a product is at issue, a joint testing procedure carried out by experts for each side and a neutral expert might well provide sufficient data to foster a settlement either before or after a Mini-Trial. Or, in an antitrust case that turns on complex economic analysis, the parties might agree to appointment of an expert to undertake this analysis early in the litigation. The expert's findings, which could be reported at a Mini-Trial and/or admissible at trial, will at least serve to narrow the issues in the case, and may be a substantial additional spur to settlement.

Parties. The motivation and relationship of the parties will have a substantial impact on the responsibility of successfully initiating and implementing a Mini-Trial. Where the litigation is brought or resisted for tactical reasons rather than out of a good faith sense of a wrong suffered or an accusation wrongly made, a Mini-Trial is unlikely to succeed. Similarly, where delay greatly favors one side or another, a Mini-Trial probably cannot be initiated. On the other hand, a long-term relationship between the parties will increase the parties' motivation to try a Mini-Trial.

Motivating influences that might make a Mini-Trial attractive to management, in-house counsel, or the retained lawyers include: (1) uncertainty caused by the litigation, such as in a resource allocation situation where the existence of the dispute casts a shadow over investment choices; (2) a rapidly approaching deadline which operates like a short fuse to a potential bomb (often this is a trial date); (3) accumulating costs of litigation, especially as they are

projected through trial; (4) internal corporate or agency politics, such as a desire to shift or focus responsibility for the outcome of the litigation; and (5) a sense that the parties are just not getting their cases across to the other side--that someone is simply mistaken about the likely outcome if the case goes to trial. Motivation is a complex issue, however. The five factors mentioned above sometimes operate in contrary or contradictory ways. There is no textbook approach. Sensitivity and timing are often critical.

The fact that the parties are adamant in their positions does not necessarily preclude a Mini-Trial. The Mini-Trial has worked even in cases in which communication between the parties had broken down and compromise through traditional settlement negotiations did not appear possible. What was crucial in these cases was that the executives and lawyers on both sides, conscious that there remained some remote possibility of creating an avenue of communication, did not simply throw up their hands and begin to gird for trial, but were willing to risk using a novel procedure of their own design. To the extent that some catharsis was necessary to unblock the parties, the Mini-Trial provided an opportunity for just enough animosity to exist, yet within a cooperative framework. The information exchange portion of the Mini-Trial permitted the negotiations to be refocused on the merits of the dispute; and the involvement of problem-solving businesspersons who were "above the fray" increased the chances of finding a "win/win" integrative solution.

Costs. Mini-Trials vary in cost, depending on the amount of preparation required, the duration of the Mini-Trial, and whether or not a Neutral Advisor is used. Even the most elaborate Mini-Trials appear, however, to cost less than one to three months of the legal fees incurred in moderately active litigation. Moreover, most of the parties who have engaged in Mini-Trials report that even if the case does not settle after the Mini-Trial, very little of the money expended is wasted. This is because the Mini-Trial forces each side to organize rigorously the mass of facts and legal arguments which have been gathered over many years of discovery and legal maneuvering, just as they will have to do to prepare the case for trial. Also, the "Introductory Statements" that have to be written and exchanged prior to the Mini-Trial are short versions of what might ultimately be submitted as trial briefs. Thus, the procedure demands preparation by counsel and experts which will be directly useful at trial if the case does not settle.

The only Mini-Trial expenditures not related to activities which will be incurred in any case for trial, and thus lost if the Mini-Trial does not lead to a settlement, are those relating to the negotiations which lead to the Mini-Trial protocol, and those for the time spent at the Mini-Trial itself. One party to a Mini-Trial of a large case estimates that these approximated 25% of total Mini-Trial expenditures and that total costs to judgment would have been approximately ten times greater. In that case, because management considered that it was risking a relatively small amount to avoid an otherwise certain expenditure of a great deal more, it viewed the investment as well worth the risk.

Moreover, because of the necessity for organizing the case in a short time, connections between relevant facts, and between facts and legal theories that might not otherwise be made until pretrial or trial, are made significantly earlier. If the litigation continues, this fosters more focused discovery and pretrial preparation. In sum, even if a Mini-Trial does not settle the dispute, the intensive time spent by counsel in preparing for it may be worth significantly more to the client than the same amount of less-focused time spent during the long pre-trial phase of the case.

Application to Ocean Use, Resource Allocation, and Coastal Zone Disputes. Although apparently no pure Mini-Trial has yet been used to settle an ocean use or resource allocation dispute, Mini-Trials have been used to settle shipbuilding disputes, and Mini-Trial variants have been used in resource allocation cases.

In the shipbuilding case, a Mini-Trial successfully resolved, in a few weeks' time, a bitter, five-year-old lawsuit between two oil companies based on huge cost overruns and delays in the construction of two Alaska oil trade tankers. The parties report that they were very satisfied with the process because "it saved a fantastic amount of time" and avoided public disclosure of confidential information.

In another case, a Mini-Trial variant was used to resolve a marine fishing dispute between an American Trust Territory in the Pacific and a large multi-national fish cannery company. At issue were the rights to operate the cannery in the Territory in the future. The government had a strong, national interest in obtaining fair compensation for the fishing rights, so it brought in experts to assist it in negotiating with the cannery. The government's negotiators conducted an intensive review of the cannery's financial statements and economic position, and then conducted a Mini-Trial kind of "Information Exchange" before government officials on the one hand, and the CEO, senior executives and the cannery's lawyers on the other side. No Neutral Advisor was used. The process was successful in resolving the dispute, and both sides report satisfaction with the process. Even though the cannery paid more for the fishing rights than it had initially contended was fair, the process signalled that responsible business practices would be used by the government in the future, and the company established an excellent relationship with the people and leaders of the island.

In another case, another Mini-Trial variant--essentially involving mediation--was used to resolve a dispute within the Massachusetts environmental community over the position it should take on the then-proposed Massachusetts Coastal

Zone Management Program. An environmentally sensitive state government had proposed extensive regulations pursuant to federal statute, but the federal implementing regulations had not yet been promulgated, and funds had not yet been appropriated. Some members of the Massachusetts environmental community felt that environmentalists should sue to block promulgation of the Massachusetts program until the federal structure was completely in place. Others felt that the proposed state program was very favorable, that the state officials in charge of Coastal Zone Management were highly capable and trustworthy, and, thus, that the proposed program should be actively supported. The dispute threatened to split environmental groups that normally worked together closely.

To resolve the dispute, the legal staffs of the disputing environmental groups got together for an "Information Exchange" in which they each made succinct presentations of their positions before leaders of the environmental community and the Chairman of the Legal Committee of the New England Chapter of the Sierra Club who organized the procedure and served as facilitator. The Assistant Secretary for Environmental Affairs in charge of Coastal Zone Management also participated by explaining the proposed state regulations and program and by answering questions.

As a result of this process, the Massachusetts environmental community was able to reach a consensus and form a united front generally supporting the proposed state regulations, but voicing concerns over some aspects of the federal-state relationship.

In another case pending in the federal court for the Western District of Michigan, Judge Richard Enselin has used a similar procedure. This case involves three federally recognized bands of Chippawa and Ottowa Indians who have asserted various fishing rights in the Great Lakes under the Treaty of Ghent and the Treaties of 1836 and 1855 between the United States and those tribes. The Sixth Circuit Court of Appeals held that the Indians have rights to fish based upon those Treaties which cannot be regulated by the State of Michigan except under circumstances where the state shows, by clear and convincing evidence, that the fishing resource is being severely depleted. Currently, the Interior Department, as Trustee for the tribes, and the tribes themselves, are seeking an allocation of the fishing resource between themselves and the State of Michigan. Petitions for intervention have been filed by non-Treaty commercial fishers and several groups of sports fishers. Judge Enselin appointed Professor Francis McGovern as Special Master of this dispute to: (1) assist the parties in devising an ADR mechanism for handling the long-term allocation issue; and (2) develop a system for reducing and agreeing on facts for judicial resolution, if necessary. Judge Enselin also suggested the possibility of appointing a neutral expert in marine biology and economics to assist Professor McGovern.

In devising a long-term dispute resolution mechanism, Professor McGovern is considering, with the parties, establishing a Mini-Trial procedure for resolving intermediate allocational disputes that will arise from time to time because of the dynamic nature of the fishery. At the same time, this Mini-Trial process will be used to narrow the issues and reduce disputes of fact in order to minimize the need for judicial intervention.

These cases and the non-ocean-related cases in which the Mini-Trial has successfully resolved complex, costly litigation, demonstrate its potential for effectively resolving many ocean use and resource allocation disputes. Although not a panacea to be applied blindly to every case, the Mini-Trial should be considered as one alternative dispute resolution method.

Experience in Coastal Zone Management Conflict

INTRODUCTION

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What is most important about the dispute resolution approaches reviewed in this collection of papers are the results: how well have these processes actually improved the ability of individuals and groups with different perspectives and often competing interests to reach agreements in complex and controversial environmental issues?

The three papers which follow describe two cases in which those involved were able to reach a consensus, when continued controversy might have seemed the more likely outcome. These cases are important both in and out of themselves and because they illustrate some of the practicalities of consensus building and conflict resolution. Both cases involved similar kinds of regional, estuarine planning issues, but the process of reaching agreement took different forms in part because they took place at different stages of the decision-making process. The first case-study describes the Chesapeake Bay Program, a seven or eight year-long effort to study and make recommendations on management of the Chesapeake Bay and its resources. The second case concerns the Columbia River Estuary Study Task Force (CREST) and its efforts to draft a management plan for the Columbia River estuary. In the Chesapeake Bay Program, a three-tiered process brought officials from three states, scientists and technical experts, and resource users together during the planning process to build a consensus on Chesapeake Bay management issues. A similar consensus building process for the Columbia River estuary brought together a task force of representatives of local government from both the Washington and Oregon sides of the river. The members of the task force worked with each other and with state and federal agencies to build consensus on the plan, but at the end of the process disputes remained about five potential port development sites on the Oregon side of the river. After preliminary conversations with concerned individuals and groups, a mediator helped the key parties--in this case four federal agencies, four state agencies, and four units of local government--resolve the remaining issues.

Earlier papers provide a brief introduction to a range of innovative ways to resolve natural resource management and environmental controversies. Even though readers may have a wealth of experience in coastal zone management and Outer Continental Shelf issues, it may not be obvious how to match this array of dispute resolution approaches with the issues that they face. The words negotiation, mediation, arbitration, mini-trials, and policy dialogue represent a variety of approaches to resolving disputes under different circumstances. Some utilize independent mediators or facilitators; some do not. In some processes, the individual taking the neutral role renders a decision or recommendation; in other cases, the neutral mediator or facilitator assists the participants in reaching their own decisions. In some cases, the result is a binding agreement; in others, it is a recommendation to decision makers who are not at the table. All of these processes, however, seem to share three basic characteristics: 1) they all are voluntary processes, 2) in which the parties meet face to face, 3) with the objective of reaching a mutually agreed upon decision.

To place all this in a larger context, I recently took a look at ten years of experience with mediated environmental dispute resolution alternatives. The results of this study will be published in Resolving Environmental Disputes: A Decade of Experience, released by The Conservation Foundation in Spring 1985. The objective of this study was to document and to assess what the results using environmental dispute resolution approaches actually have been. What kinds of issues have been mediated? Who have the parties been? How often did they reach agreement? The cases show great diversity. The largest number of the cases involved land-use. Many cases involved natural resource management issues, most of which involved the use and management of public lands. Seven of these involved fishing rights and resource management, six involved coastal zone management issues, and three included offshore oil and gas exploration. Other cases included water resource disputes, energy issues, air quality, and toxics. In about three-quarters of the cases studied, the disputes were over site-specific issues. About a quarter of the cases were dialogues on environmental policy issues.

Surprisingly, the stereotype that environmental disputes are disputes between industry and environmentalists is not necessarily true. In only 33 percent of the cases were environmental groups involved directly in the negotiations. Similarly, private companies were involved in about 33 percent of the cases. Environmentalists and industry representatives faced each other, however, in only 18 percent of the site-specific cases in this study. In contrast, 81 percent of the cases involved government agencies.

Mediators have been involved in over 160 environmental disputes over the past ten years, with the number of cases per year growing rapidly. These efforts have been remarkably successful, with parties reaching agreement in 78 percent of the cases studied. Little difference in the rate of success for site-specific disputes and policy dialogues is evident. The implementation record for agreements reached in policy dialogues, however, is noticeably lower than for site-specific cases. For site-specific disputes, excluding those cases in which implementation is still in progress, agreements were fully implemented 80 percent of the time, partially implemented in 13 percent, and not implemented in only 7 percent of the cases studied. Of the policy dialogues in which the parties reached agreement and implementation results are known, agreements were fully implemented in only 41 percent of the cases; partially implemented in 18 percent, and not implemented in 41 percent.

On the basis of this experience, what has been learned about the factors that increase or decrease the likelihood of success? From the evidence available, the likelihood of success is not clearly affected by the issues in dispute, by the number of parties involved, or by procedural characteristics such as whether the parties were in litigation or whether there was a deadline. One of the most significant factors appears to be whether those with the power to make and implement decisions were at the table. Often this meant government agencies. When the parties at the table had the authority to make and to implement their agreements, they were able to reach an agreement in 82 percent of the cases studied. Whereas, when the agreements took the form of recommendations to a decision-making body that did not participate directly in the negotiations, the parties reached agreement 74 percent of the time. The effect on implementation rates is more striking. When those with the authority to implement decisions were directly involved in the negotiations, 85 percent of the agreements reached were fully implemented; when they were not, only 67 percent of the agreements reached were fully implemented.

But enough context. The papers that follow focus on specific cases and the results that participants achieved. Readers may remember that in his state of the union address in January 1984, President Reagan mentioned the Chesapeake Bay and the importance of protecting this natural resource. Those involved report that the prominence given to the bay was the result of the remarkable consensus that had been reached through the Chesapeake Bay Program. The author of the first paper, Virginia Tippie, was the Director of the Chesapeake Bay Program for the last two years of the effort. After the program was concluded, and the agreements between Pennsylvania, Maryland, Virginia, and the District of Columbia were signed, she became the technical director of the EPA Chesapeake Bay Liaison Office. Her paper presents the context for the Chesapeake Bay Program and what they tried to achieve. Then, Gerald Prout, Director of Public Affairs for the FMC Corporation and a member of the Resource Users Management Task Force, will discuss the process from the perspective of a participant. Following these two papers, Verne Huser, a mediator for The Mediation Institute in Seattle at the time he was involved in the CREST dispute and now with Western Network in Santa Fe, New Mexico, will discuss CREST and the more formal mediation process that took place in that case.

CHESAPEAKE BAY PROGRAM MANAGEMENT COORDINATION AND CONSENSUS PROCESS

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1. INTRODUCTION

The Chesapeake Bay has recently received unprecedented national attention due to a growing public concern for the health of this nation's largest and most productive estuary. In fact, for the first time in history, the President of the United States made a national commitment to "clean up" a specific estuary in his state of the union address. What factors contributed to this overwhelming public and political consensus on a course of action? Certainly, key political leaders played a critical role in focusing national attention on the Bay. However, these political leaders would not have charged forward unless there was a public consensus to take action. In the case of the Chesapeake Bay, the growing public support appears to have evolved from EPA's Chesapeake Bay Program Management Coordination and Consensus Effort.

2. A HISTORICAL PERSPECTIVE

In 1975, the U.S. Congress authorized a 5 year, $25 million study of Chesapeake Bay. The directives of the Congress were fairly specific:

- Assess the principal factors having an adverse impact on environmental quality;
- Establish mechanisms for collecting; storing, analyzing and disseminating environmmental data;
- Analyze available environmental data and implement methods for improved data collection;
- Propose alternative control strategies for long-term protection of the Bay;
- Evaluate Bay management coordinating mechanisms (U.S. Senate Report No. 94-326, 1975).

In response to the U.S. Congressional directives, EPA established the Chesapeake Bay Program Office and an organizational structure to coordinate activities.

At the outset, EPA recognized the need to involve state officials, scientists and citizens in the process (Table 1). Accordingly, the program established a Management Committee to provide advice on management issues; a Technical Advisory Committee to assist in selecting research areas; and a Citizen Advisory Committee to provide a process for public input. A Policy Advisory Committee comprised of the Regional Administrator, the Program Director and the Chairmen of the Technical Advisory Committee and Citizen Steering Committee provided direction to the program.

In addition to citizen involvement in the coordination structure, the CBP funded public education activities through the Citizens Program for the Chesapeake Bay (CPCB). Educational briefs, newsletters, and graphic displays increased public awareness of the Bay while workshops and conferences encouraged a public dialogue on Bay issues. Concurrently, the publication and dissemination of James Michener's Chesapeake and William Warner's Beautiful Swimmers resulted in a national awareness of the Bay.

Public awareness of the Bay was obviously a critical component of the effort. However, a public commitment to action could not have been achieved unless there was agreement on the problems and the solutions. Recognizing the need to develop an agreement, the Chesapeake Bay Program established a unique consensus-building process.

There were three parallel components to this process:

1. Key scientific investigators were asked to synthesize the Bay Program's research findings in response to management questions approved by the Management Committee. A series of scientific workshops were held and

Table 1. CHESAPEAKE BAY PROGRAM CHRONOLOGY

1975	Congress authorized 5 year $25 million study
1976	EPA established the Chesapeake Bay Program (CBP).
1977	CBP established a Policy Advisory Committee comprised of policy makers, and a Management Committee comprised of senior state water quality and resource managers, and a Technical Advisory Committee. The Management Committee met bi-monthly and helped to focus the research efforts on management objectives. Research Study areas were selected at a conference of citizens and scientists in Ocean City, Maryland.
1978	The Citizens Program for the Chesapeake Bay was funded by CBP to establish a public education/participation program and a Citizen Steering Committee. The Steering Committee met bimonthly from February 1978 to September 1982 and helped to focus public comments on the Bay. A bimonthly newsletter, mini-projects and other committee activities increased public awareness of the Bay and the EPA research program.
1979	Scientific researchers, state and federal agency representatives and citizen participants met at Hampton Roads, Virginia to review the program's efforts.
1980	Scientific researchers, state and federal agency representatives and citizen participants met at Cross Keys, Maryland to review the program's efforts.
1981	A general public education report Chesapeake Bay: An Introduction To An Ecosystem was published. The report which was widely distributed, increased public awareness of the ecology of the Bay. A Scientific Research Team of Bay scientists was established to synthesize the data from the 40 individual scientific studies. State Water Quality Teams comprised of state agency officials were established to discuss preliminary scientific findings. A Resource Users Management Team was established to review the scientific findings and assist in developing management recommendations.
1982	A summary report of the CBP technical studies was published. This report synthesized the scientific understanding of the Bay and contributed to a growing consensus among the scientific community on Bay problems. Governor Hughes of Maryland and Governor Robb of Virginia met to discuss preliminary CBP findings and, as a result, the media focused its attention on the Bay.
1983	The CBP gave several U.S. and State Congressional Briefings on its findings. Governors Hughes and Robb met with Governor Thornburgh of Pennsylvania in Harrisburg, Pennsylvania to solicit his involvement in the Bay cleanup. This summit meeting resulted in a commitment from Pennsylvania. The Governors and Senators of the key states invited EPA Administrator for a boat trip on the Bay. This major media event resulted in a political commitment to a joint state and federal cleanup effort. The final reports of the program were delivered to the U.S. Congress on September 30, 1983. These final reports described the current State of the Bay, trends in water quality and resources, sources of pollution and strategies for managing the Bay. A concise summary report, Chesapeake Bay Program: Findings and Recommendations described in layman's terms the problems and outlined a framework for action. The states and EPA sponsored a series of workshops and a Chesapeake Bay Conference (December 1983) to discuss the CBP findings and develop a plan of action. A Chesapeake Bay Agreement was signed by the states and the federal government. The agreement created a Chesapeake Bay Executive Council, Implementation Committee and Liaison Office.
1984	The Chesapeake Bay Liaison Office was established in Annapolis to provide technical support to the cleanup effort. The Chesapeake Bay Executive Council comprised of the governor's designees and chaired by EPA Regional Administrator met in January, July and October. The Implementation Committee comprised of state water quality and resource managers and chaired by EPA Region III Water Division Director met bimonthly and established subcommittees. A Citizens Advisory Committee and Scientific and Technical Advisory Committee were established by the Council in October.

a scientific consensus on the State of the Bay evolved.

2. Key state and local agency officials were briefed on the evolving scientific consensus and were asked to provide insight on some of the potential solutions to the perceived problems. A series of small meetings were held and a range of alternative control strategies were developed;

3. Key resource users in the Bay area representing diverse interests were brought together as a team to review the scientific findings and to develop realistic implementable strategies for addressing Bay problems. A series of workshops were held and Baywide goals and objectives were formulated.

The interaction of these three parallel efforts provided a unique synergy. It is unlikely that any one effort would have been truly successful without the input of the other efforts.

By the time these consensus building efforts reached fruition, the public was well aware of the problems. The Resource Users Management Team (RUMT), in particular, generated a ripple effect that spread throughout the Bay Community as participants discussed Bay problems with their own interest groups. The net result was a tremendous public outcry for action at a time when the political leaders were prepared to lead the way for their staff had been involved in the process.

In the months that followed there were a series of meetings between the Governors of the affected states Federal Administration Officials and U.S. Congressional leaders (See Table 1). These meetings resulted in the Chesapeake Bay Agreement of 1983 which committed the states and the federal government to improve and protect the water quality and living resources of the Chesapeake Bay. This commitment received unprecedented public support as evidenced by the state and federal appropriations authorized in 1984 and the election results. To better understand this unusual phenomenon, the remainder of this paper will more closely evaluate the dynamics of one component of this overall process - the public participation effort and, specifically, The Resource Users Management Team.

3. RESOURCE USERS MANAGEMENT TEAM

What was the context in which the Public Participation effort evolved? Why was it necessary? The answers to these questions emerge from understanding the synergy which developed from the growing scientific concern over the Bay and from public concern over the inability of science to drive public policy decisions.

For years the Bay had been a fertile laboratory for scientific inquiry. Notable Bay scientists, such as Eugene Cronin, who served as Director of the Chesapeake Bay Research Consortium, provided valuable insight into possible reasons for decline of the estuarine resource. The Chesapeake Bay Institute at Johns Hopkins and the Virginia Institute of Marine Sciences both become known world wide for their estuarine studies. The historic Academy of Natural Sciences Benedict Estuarine Laboratory engaged in a number of state-of-the-art studies of the Bay and its tributaries. In short, there was an abundance of good science and good scientists seeking to better understand this complex estuary and its diverse 64,000 square mile watershed.

As is typically the case, however, despite a wealth of scientific information, there was a lack of consensus over what needed to be done to restore the Bay. Science helped fuel concern about the Bay, but there was no agreement on a policy agenda to address the issues science had identified. This lack of agreement was exacerbated by the number of sovereign jurisdictions governing some portion of the Bay watershed, the diversity of economic interests involved, and the inherent complexity of the Bay as ecosystem. In the real world of public policy, decision-makers cannot indefinitely postpone decisions until all the evidence is assembled or all the disagreements among parties resolved. But they can postpone action if there is a lack of clear consensus about the causes of pollution or its effects. This was the case in the Chesapeake Bay circa 1980.

The Resource Use Management Team provided a public participation effort which complemented the integrated scientific approach represented by the EPA Bay study. There were those who were critical initially that roughly 8 percent of the original $28 million allotted for the EPA Chesapeake Bay program was allotted for public information and public participation. But as W. Cranston Morgan, a commercial fisherman and President of the Citizens Program for the Chesapeake Bay said of the Resource Users Management Team, "These very able people made the difference. They made decisions as to the direction of research, the goals to shoot for, and the nuts and bolts of ways to obtain management tools. They prodded the Environmental Protection Agency (EPA) each step of the way ...."

While this statement may exaggerate the role of the RUMT group, it does accurately reflect the importance attached to the group not only by the public, but more importantly by the EPA staff. A mutual respect quickly developed between EPA technical experts and members of the RUMT team , allowing for an appropriate balance between science and public opinion. Understandably, as regulatory issues have grown more and more scientific in nature, questions over the appropriate balance between expert scientific fact and value-laden public opinion have grown correspondingly. The debate is highly significant, but always entails judgement as to the appropriate mix between scientific fact and public opinion. The RUMT process allowed for a balancing of that mix.

When the Resource Users Management Team first met in Port Deposit, Maryland in November 1981, an abundance of scientific information suggested the continuing decline of the Bay ecosystem. Submerged aquatic

vegetation which served as an important food source and nursery ground for many aquatic species, had virtually disappeared from some regions of the Bay. Increased loads of toxic pollutants and nutrients were also well documented, though the precise effects attributable to each were subject to continuing scientific debate. Meanwhile, commercial fishermen were reporting steadily declining yields from both finfish and shellfish species from a resource with yields once large enough to feed the entire country of Japan. Certain recreational uses of the Bay, in particular swimming, were impaired. In short, the overall context was one of growing public anxiety in the midst of seemingly contradictory scientific information.

The EPA study was in fact meant to help bring some focus to the science and lay the basis for public policies which would help to arrest the decline of the Bay. The Resource Users Team was the public participation mechanism devised to help better clarify the policy decisions which federal, state and local governments were reluctant to make in the absence of clear choices.

The Resource Users Team was an exercise in consensus building. It was comprised of individuals who had both the time and patience to attempt to understand complex scientific issues and help clarify the choices before the public. This was not a public participation process created to provide a constructive, though meaningless outlet for activist views. Nor was it undertaken to fulfill some statutory mandate for public involvement. Rather, the Resource Users Team was an effort to provide stakeholders in the Bay with meaningful input to the work of scientific experts, without compromising the integrity of the scientific process. While no group can ever be chosen without offending some specific interest, either for lack of representation or the wrong representation, the RUMT group was indeed broadly representative of the diverse interests which had some economic, recreational, residential, industrial, environmental, or other stake in the Bay. The composition of the groups was in fact quite balanced among the predominant user groups. Of the 28 members, 7 represented agricultural interests, 6 industry, 7 commercial fishing, 7 environmental and 1 recreational.

Walter Lippman once cautioned that it would be better not to seek public intervention in all matters, since mass opinion tends often to be misinformed or disinterested. He preferred a democratic theory which "economizes the attention of men as members of the public and asks them to do as little as possible in matters where they can do nothing very well". In contrast, the RUMT team was asked to do a lot. Members developed an almost symbiotic relationship with the EPA staff. They networked in the interim between meetings. The staff was certainly a source of technical expertise and information, however, RUMT members also provided useful insights into sources of additional data and methods of analysis and presentation. At no time, during the course of the process did the staff ever change information or bias the results of its scientific inquiry.

4. THE RUMT PROCESS

Each of the formal RUMT sessions began with a technical presentation of information followed by a discussion of its implications. The RUMT group then (1) suggested ways of organizing the material presented so it would be clearer to the public, (2) assisted the staff in drawing out conclusions, (3) forged agreement on a set of water quality objectives which had important economic as well as environmental consequences, and (4) then proceeded to recommend mechanisms which would help achieve the stated objectives.

In the end, after five lengthy two-day meetings spanning eighteen months, the RUMT team - in spite of the diversity of user groups and conflicts in view among them - arrived at a set of policy recommendations which are extremely tough. It reached this end by first agreeing on the facts then setting an overall water quality goal to:

"Provide for the restoration of finfish and shell fish stocks in the Bay, specifically the abundance and diversity of freshwater and estuarine spawners,"

Once there was agreement on the findings and a goal, the group was able to settle upon a reasonable set of public policy initiatives which would help achieve this goal. It is doubtful, had the group initiated discussion on these options at the outset, without achieving initial agreement on scientific characterization of the Bay and goals for its restoration, that it could have arrived at its conclusion on appropriate public policy mechanisms.

The initiatives proposed to the state are unusually tough for a group as diverse as this one. For example, the group concurred with the EPA characterization of phosphorus limitation for the freshwater portion of the tributaries and the upper portion of the main stem of the Bay. While establishing nitrogen as the limiting nutrient for the down river estuarine portions. This finding was the cause of significant discussion since it necessitated fine tuning control strategies so as not to cause longer-term problems by locking into remedial strategies which exacerbated the nitrogen problem by removing too much phosphorus or vice versa. There were corresponding conflicts between point and nonpoint source control strategies. In short, a balance had to be struck to achieve an appropriate N:P ratio and an economically equitable set of control mechanisms which did not excessively penalize any single user group.

The RUMT group thus sought to emphasize tough point source control in tributaries (actually more stringent than the EPA Bay Program recommended) while emphasizing nonpoint source controls (in particular, adoption of best management practices and restricted development in critical zones) to address nitrogen control

Baywide. In regard to nitrogen, the group recognized the economic tradeoffs and decided that prohibitively costly nitrogen controls at treatment plants could be deferred. Without belaboring the entire set of recommendations made by the RUMT group, clearly it was able to tie land to water. As Frances Flanigan, Executive Director of the Citizens Program for the Chesapeake Bay notes in an article for EPA.

> "The inter-connectedness of the web of users with the land and the water has disarmed those who would blame the Bay's decline on someone else. The growing sense that it is not "them, it's us," has created an atmosphere where creative problem solving can take place".

Indeed it was the problem solving aspect of this group which made it attractive to users with diverse and often conflicting perspectives. As an example, take the perspective of one industry member, FMC Corporation.

5. AN INDUSTRY USER PERSPECTIVE

FMC is a diversified manufacturer of equipment and chemicals for government, agriculture and industry. It has an agricultural chemical plant in Baltimore Harbor and hundreds of employees who live in the Bay watershed, use the Chesapeake Bay for recreation and fishing, and thus directly benefit from it. FMC's interest in Bay management are, in an of themselves varied. In a company this diverse, management often finds it important to convene its own internal "user group" meetings to focus on how it can most responsibly address public policy issues. While it is expected and correct that industry, like any other self-interested party in the RUMT group, would recognize and seek to articulate and defend its own self-interest, FMC, and for that matter the RUMT group in general, acknowledged that to be successful in the public policy area, it is important to recognize how an organizations' self-interest best reconciles with the public interest. In particular, FMC is a manufacturer of phosphorus compounds, used in literally thousands of various applications - as food additives, in fertilizers, in cleaning compounds, in lubricating oils, as metal etchants, and so on. Most of these have the potential to reach surface waters either as effluent to municipal wastewater treatment plants, direct discharge from industry or institutional outfalls, septic systems or as urban and rural runoff. The company's stated environmental policy with respect to phosphorus is as follows:

"FMC recognizes phosphorus to be an essential nutrient to all life forms. We also recognize, however, that excessive phosphorus input to surface waters can promote algae growth and result in accelerated eutrophication of surface waters. In those cases where phosphorus can be shown to be the limiting nutrient, management of phosphorus loading to the extent required to produce measurable environmental benefits can best be achieved by a combination of cost effective point source controls (i.e. advanced secondary treatment at wastewater treatment plants) and comprehensive nonpoint source controls (adoption of best management practices to curtail urban and rural run-off)."

In the context of the RUMT discussions, FMC acknowledged the importance of phosphorus controls for the fresh water portions of the Bay's tributaries but suggested closer scientific scrutiny of the extent to which nitrogen was the controlling factor in the estuarine portions of the Bay. Indeed, significant debate occurred over this important issue and continues at present. Nonetheless, this did not preclude FMC's support of the phosphorus controls as recommended for the fresh water portions of the tributaries. More importantly perhaps, by working with other user group members, often times direct or indirect customers for FMC phosphorus, the RUMT consensus which emerged reflected an effective but equitable approach to phosphorus control with each user group including agriculture sharing the cost for phosphorus reduction. The network of relationships - forged often through contentious first encounters - carried over beyond the final RUMT meeting, and in fact, led to a broadening of the consensus process which occurred through the convening of various workshops on aspects of Bay management during the summer of 1983. This in turn culminated in the successful recommendations made by the RUMT team though in some cases the workshops were either less or more stringent in their control approaches then was the RUMT team.

6. SUMMARY

It would appear that the Bay program successfully provided for citizen involvement and produced a product that had widespread citizen support, as evidenced by the Chesapeake Bay Agreement of 1983 (Table 2) and the passage of legislation at state and local levels in the year that followed the governors conference. The public made it very clear that its primary collective concern about the Bay was management, i.e. how scientific information is applied to the government decison making process and how that process reflects publicly stated goals and legal requirements. In response to this concern, the Bay program shaped its research program to respond to management questions, it then took the results or findings of the research and used them as the basis for development of a series of management alternatives or strategies. Lastly, throughout the process it provided a strong viable mechanism to assure constructive citizen input which led to a broad consensus on a course of action.

Table 2. The Chesapeake Bay Agreement of 1983

We recognize that the findings of the Chesapeake Bay Program have shown an historical decline in the living resources of the Chesapeake Bay and that a cooperative approach is needed among the Environmental Protection Agency (EPA), the State of Maryland, the Commonwealths of Pennsylvania and Virginia, and the District of Columbia (the States) to fully address the extent, complexity, and sources of pollutants entering the Bay. We further recognize that EPA and the States share the responsibility for management decisions and resources regarding the high priority issues of the Chesapeake Bay. Accordingly, the States and EPA agree to the following actions:

1. A Chesapeake Bay Executive Council will be established which will meet at least twice yearly to assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resources of the Chesapeake Bay estuarine system. The Council will consist of the appropriate Cabinet designees of the Governors and the Mayor of the District of Columbia and the Regional Administrator of EPA. The Council will be initially chaired by EPA and will report annually to the signatories of this Agreement.

2. The Chesapeake Executive Council will establish an implementation committee of agency representatives who will meet as needed to coordinate technical matters and to coordinate the development and evaluation of management plans. The Council may appoint such exofficio nonvoting members as deemed appropriate.

3. A liaison office for Chesapeake Bay activities will be established at EPA's Central Regional Laboratory in Annapolis, Maryland to advise and support the Council and committee.

MEDIATION IN A COASTAL ZONE PLANNING CONTEXT

Verne Huser
Western Network

Mediation, the use of an independent intervenor to assist conflicting parties negotiate settlements, has been applied to labor-management disputes for more than fifty years, but it is a relatively new technique for settling natural resource disputes. Mediation was used to help settle a series of site-specific disputes in the estuary of the Columbia River in the early part of the decade. This paper is a description of that mediation effort and a follow-up of its initial results.

FACTUAL BACKGROUND

The Columbia River Estuary Study Taskforce (CREST) planning process, which began in 1974, involved dozens of local, state and federal agencies and hundreds of citizens in two states, three counties, seven incorporated cities and four port districts. It was initiated to develop a coordinated regional management plan for the Columbia River estuary and its shoreline in response to growing conflicts between preservation and development interests. In Washington that plan is being implemented through revised Shoreline Management Master Programs. The comprehensive planning effort evolved against a backdrop of a new stringent and untested statewide land use planning law in Oregon (1), where most of the proposed development in the estuary would occur.

Issues

The issues essentially grew out of conflicting interests: developers wanted to use the estuary for major deep-water port facilities while resource agencies and conservationists wanted to protect the associated wetlands and unique biological resources of the estuary. While each entrepreneur or land-owner sought maximum development potential, resource protection interests were concerned about the cumulative impact of all the potential development: dredging and filling, pollution and spill possibilities, loss of habitat and changes in natural patterns. Mitigation of losses caused by development was a major concern since the estuary consists of unique biomes.

Beyond the physical attributes of the estuary were the administrative or governmental concerns: the concept of federal consistency through which the interests and needs of the various federal agencies are heard; and the coastal goals and guidelines of Oregon's land-use planning law administered by the Department of Land Conservation and Development (staff) and balanced by the Land Conservation and Development Commission. Development plans theoretically can only move forward when local comprehensive plans have been "acknowledged" by the Commission as being consistent with the goals and guidelines.

Economic Aspects

An economic evaluation of the Columbia River estuary was published in February 1981, a 100+-page document written to justify a series of "exceptions" to Oregon's statewide planning goals and guidelines for coastal resources (2). If a proposed development activity is inconsistent with the goals and guidelines, an exception from those goals and guidelines must be justified environmentally, economically, and socially. The local economy at the time of the planning process was largely forest product- or seafood-related, but there was high hope for major port development for coal export (3), grain transshipment and a variety of ocean-related fabrication facilities. The area was economically depressed, and actual port traffic was on a gradual decline.

However, the highways, railroads and related bridges into the area surrounding the Columbia River estuary were in need of upgrading if any major development occurred, and significant improvement of other infrastructural elements would be required should any significant bulk commodity or containerized export facility be developed. A major marketing effort had been under way for some time to link the area with coal sources in the Intermountain area and energy demands in the Far East.

A number of projects had been proposed for the area, but lack of local comprehensive plans and cost of delay had discouraged them. Brown and Root had proposed an oil-platform fabricating facility in the mid-1970's, and Alumax at one time had planned an aluminim smelter in the area.

Uncertainties

Planning efforts are initiated in part to reduce uncertainties. In the CREST comprehensive planning effort there were numerous uncertainties during the mid-1970's. Some of them were economic: Would coal exporting be a viable option for the area? Would the fabrication of off-shore oil rigs be profitable? Feasible? Would the fishery withstand increased harvest pressures in competition with other uses?

Scientific and technical uncertainties posed a planning constraint. Part of the purpose of the planning effort was to collect data in a central location. Proposed projects had generated

considerable information. General data was well known but sketchy; there were substantial voids in information. For example, little was known about certain benthic species and their habits and habitats. Site-specific information for a few areas of special interest was available but other areas were virtually unknown. A dozen different state and federal agencies each had part of the answer to what the estuary was, but like the blind men and the elephant, each saw only part of the total picture. It was to clarify what information was available, to gather what was not and to coordinate the whole that CREST was created.

Political uncertainties existed as well. Jimmy Carter was in the White House during much of the CREST planning process; his policy gave emphasis to the coal export concepts. About the time the CREST Plan was published, Ronald Reagan became President, and policies would change. No one knew which way things might go. Oregon had elected Vic Atiyeh as Governor. He'd appointed a special task force to study -- some said to push -- development on the Lower Columbia. In January 1981 he is quoted in The Daily Astorian: "It is in the State's interest to have a deep water port facility at the mouth of the Columbia River and a coal facility is an essential first step." Local legislators had introduced bills that would result in the formation of a lower Columbia port authority and a state deep-draft port commission. At the same time, certain state and federal agencies concerned about biological resources and water quality were exerting counter pressures through the federal consistency concept. Business interests were jockeying for position, and pressures were exerted to water down the State's land-use planning law. One of the final efforts made by former Governor Tom McCall before his death by cancer was to lobby strongly for retention of that law, passed under his administration.

Legally, the concept of federal consistency was triggered by concern on the part of several agencies about the proposed CREST Plan. It involved Section 404 of the Clean Water Act of 1972, Section 10 of the Rivers & Harbors Act of 1899, the National Environmental Policy Act of 1969, Executive Order 11990 (Protection of Wetlands) and 11988 (Floodplain Management), the Coastal Zone Management Act and the Fish and Wildlife Coordination Act. While the agencies were represented in the planning process, they had no veto power. Since their input to the planning process was merely advisory -- and local jurisdictions were not taking their advice -- they had to speak through institutionalized procedures. State constraints included the Fill and Removal Law (ORS 541) and Oregon's 1973 Land Use Act (Senate Bill 100). State land-use planning goals and guidelines were ignored to the extent that a 137-page document was produced by the Oregon Department of Land Conservation and Development to explain why the CREST Plan was inconsistent with Oregon's coastal goals and guidelines.

There were also jurisdictional considerations: the State of Oregon had purchased one of the potential development sites (Tongue Point). The Oregon Division of State Lands (DSL) administered the site but also had permit authority for the State. The State and the port were competing for potential coal port facility, yet the County had jurisdiction over the area through its comprehensive plan (being developed as part of the CREST Plan). The site was also within the urban growth boundaries of the City of Astoria.

One of the best sites for deep-water port development, Tansy Point, was within the City of Hammond. The site had been deeded to the city under a stipulation that it would be used in a certain manner, but that stipulation was not in keeping with statewide coastal goals and guidelines, and the federal resource agencies (Environmental Protection Agency, National Marine Fisheries Service, Fish and Wildlife Service) and Oregon Department of Fish and Wildlife favored the site for concentrated port development because it would cause the least damage to estuarine resources. City officials were afraid they would lose ownership of the site if it were used for its highest and best use because that use had been opposed by the donor. Legal battles were threatened. The estuary was in turmoil.

NATURE AND COURSE OF NEGOTIATIONS

Exploration

The Office of Environmental Mediation (OEM) at the University of Washington, forerunner of the Institute for Environmental Mediation (now The Mediation Institute) was asked by CREST to conduct a workshop in conflict resolution in January 1978 -- some three years after the CREST planning process was initiated. Three members of the OEM staff, the author included, spent a full day training CREST participants in the nature of conflict and a variety of ways to address conflict, not avoid or ignore it but deal with it. In early 1979 the author, representing OEM, participated in a conflict resolution seminar conducted by the CREST staff in which the CREST Conflict Resolution Process was explained. CREST subsequently developed a conflict resolution process through which the participants settled 23 of 28 site-specific disputes in the estuary before the CREST Plan was published in late 1979. The OEM became a back-up system for dealing with disputes the parties themselves could not settle (4).

During 1979 and 1980 after the CREST Plan had been published and while it was being reviewed by Oregon's Department of Land Conservation and Development, OEM monitored the process. There were no outstanding disputes on the Washington side of the estuary, but five sites on the Oregon side continued to be problem areas. In December 1981 CREST informally asked for the consulting services of the Institute for Environmental Mediation (IEM) (OEM had left its university setting and had become a non-profit corporation offering its services at no charge to the parties). On January 6, 1981 CREST formally asked for the services of IEM's staff "in helping to resolve some of the remaining issues preventing approval of the Columbia River Estuary Regional Management Plan by the Oregon Land Conservation and Development Commission."(5) It is worth noting here that the goal of "acknowledgement" of the CREST Plan by LCDC was only one of two major goals of the mediation effort once all the parties were involved.

Process Design

During the latter days of 1980 and the early days of 1981 an IEM mediator met informally with all the parties including local jurisdictions, state and federal agencies, anyone with an interest. It wasn't until early March, however, that the time seemed right to begin designing the process to bring parties to the table -- though the whole exploratory effort was a step in that direction.

At that time a second mediator (Sam Gusman of The Conservation Foundation) was brought into the process, and the parties, with the help of the mediators, began to structure a framework in which they could bargain with one another, in which they could negotiate a settlement to their decade-old disputes.

It soon became evident to the mediators that given the number of potential parties and the desirability of having all key parties locked into

the process, a more formal process design needed to be initiated. Normally the mediators shuttle between and among the parties, carrying messages and finding areas of agreement, never letting the parties meet jointly until they have reached agreement on a number of ground rules: which parties should be at the table, who should represent the parties, what issues will be addressed, when and where to meet, what the deadlines are. In this complex multi-party dispute it seemed appropriate to hold a joint session to reach that kind of agreement before the real negotiating began, and that is what happened.

CREST staff, working with the mediators, invited potential representatives of various interests to participate and developed a public participation element so as to satisfy the letter of Oregon law that calls for meaningful public participation at every phase of the planning process.(1)

The initial pre-negotiating process-design session (April 9-10) was attended by between 28 and 35 people at various times during the two days: potential negotiators, alternates, technical advisors, property owners, attorneys, consultants and interested parties. There were three areas of discussion: 1) scoping questions, which included what sites would be discussed in the negotiations, how they would be considered (in a planning context or more openly), and through what stage of process. (It was this third area that led to the joint goals: increased predictability at permit time and LCDC acknowledgement). 2) participation questions, which included not only who should be at the table but what roles each should play: that is, should they be technical advisors? negotiators with veto power? process advisors (for those parties with permit authority)? 3) where-do-we-go-from-here questions: can you design a process that will work for you, that will enable you to get where you want to go?

A few answers were put into writing, but it was obvious that most of the participants had to check back with some higher authority. At least they all understood what was being proposed: they were in charge of the process, and they were designing the process to meet their mutual needs, interests and concerns. They scheduled a second session two weeks later.

They also agreed on a caucus of state agencies with CREST staff and the mediators, an informal unstructured discussion of vital issues by a handful of key players. Generally speaking local jurisdictions were pro-development, federal agencies were by necessity pro-resource protection, and state agencies involved a full range of interests. The mediators sensed that the key to compromise lay in the broadest range of interests, which were represented by the State agencies.

One of the problems in the initial session had been that if each of the five sites were dealt with separately and agreement were reached, LCDC might still look at the total picture and say, "Too much development." The mediators took a position: the parties at the table can determine the conditions under which development can be justified or LCDC can do it prior to the beginning of formal negotiations, but negotiations cannot begin until that decision has been made. The parties had to begin the mediation effort, if there were to be one, with all parties fully aware of the ground rules including the extent of justifiable development in the estuary, a determination that had not yet been made. The caucus of April 14 was designed to press that point.

And press it they did. On April 17 DLCD Director Wes Kvarsten issued a memorandum to participants in the CREST mediation effort, the subject being CREST MEDIATION PRINCIPLES as follows:

"The Department agrees with and believe our Commission can support the following principles for mediation of CREST issues:

1. The CREST economic analysis is sufficient to justify some water-dependent development at each of the following ten sites:

   Tansy Point
   West Skipanon #1
   West Skipanon #2
   East Skipanon
   Port of Astoria Piers
   North Tongue Point
   South Tongue Point
   Bradwood
   Westport-Crown Zellerbach
   Westport-Dant and Russel

   SOME AMOUNT OF DEVELOPMENT COULD OCCUR AT EACH SITE, OR THE MEDIATION GROUP COULD DECIDE TO ELIMINATE A SITE AND PROVIDE A CORRESPONDINGLY GREATER AMOUNT OF DEVELOPMENT AT ANOTHER OF THE LISTED SITES.

2. The CREST economic analysis justifies AN APPROXIMATE TOTAL AMOUNT OF water-dependent development for these sites as follows:

Uses	Quantities*
Log export	20 A/site minimum 40 A total
Grain export	30 A/site minimum 180 A total
Bulk minerals - coal	100 A/site minimum 100 A total
Bulk minerals - noncoal	30 A/site minimum 60 A total
Containerized forest products	30 A/site minimum 60 A total
Containerized general cargo	70 A/site minimum 140 A total

   *SITE: MINIMUM ACREAGE NEEDED PER SITE FOR THE USE. TOTAL: APPROXIMATE TOTAL ACREAGE NEEDED FOR THE USE.

   THIS DOES NOT RULE OUT OTHER "LOCATIONAL" REASONS, WHICH GO BEYOND SATISFYING "USE NEED", TO JUSTIFY DEVELOPMENT OF A PARTICULAR SITE (e.g., AVAILABILITY OF SUITABLE SITES: PROJECT CONFIGURATION).

   FURTHER, THE DEVELOPMENT DESIGNATES FOR EACH SITE SHOULD REFLECT THE TOTAL OF THEIR DEVELOPMENT SUITABILITY FOR ALTERNATE USES.

3. Within the context of the above constraints, mediation should be used to determine the development suitabilities (including extent) for each site, subject to the economic and environmental characteristics of each site." (6)

This document became the key element in designing the negotiation process. It was presented at the second pre-negotiating process-design session April 20-21 and became the basis for a matrix that was used in the early stages of the negotiations. It led to a break-through. These April meetings served not only to design the process but to clarify issues and to help the parties achieve similar expectations of the process. The parties focused on the negotiators' issues, which they resolved to all the parties' mutual satisfaction, and on a charge to the mediators:

"STATEMENT TO THE
INSTITUTE FOR ENVIRONMENTAL MEDIATION

The CREST Council invites the Institute for Environmental Mediation to convene a mediation panel to hold talks and help resolve conflicts on the potential water dependent development sites for which exceptions have been taken in the CREST Plan (Tongue Point, Tansy Point, East and West Skipanon, and the site west of Pier 3), and as required in the negotiating process, alternate potential sites and additional issues.

The purposes of mediation are two-fold: (1) to increase predictability in the permit process, and (2) to arrive at a set of decisions that DLCD will recommend to LCDC for acknowledgement. Although predictability can be improved by these agreements on the sites being planned for development, it is understood that permit issuance cannot be guaranteed at this time. The final site specific parameters, i.e. needs, alternatives, water dependency, impacts upon estuarine resources, etc. will be based upon project-specific characteristics at the time of application for a permit.

The CREST economic analysis, entitled "An Economic Evaluation of the Columbia River Estuary", projects a need for an approximate total amount of water dependent uses in the CREST planning area. DLCD has indicated that this analysis is adequate to justify certain acreages for water dependent uses so far as plan acknowledgement is concerned. The CREST Council suggests to the mediation panel that it give initial consideration to the CREST economic analysis and the DLCD memorandum of April 17, 1981.

The issues to be addressed in the mediation process will include: (1) consideration of suitable activities, facilities, and dimensions for the above sites, and (2) conditions under which such development can occur in a manner compatible with living estuarine resources. It is understood that (on the basis of estuarine resource values) some sites may be deemed suitable for large-scale estuarine development while some sites may be suitable for minimal or no alteration of aquatic areas.

The parties involved in the negotiation process will include but not necessarily be limited to the following: Federal - COE, EPA, USFWS, NMFS; State of Oregon - DSL, DLCD, DED, ODFW; Clatsop County, the Cities of Astoria and Warrenton, the Port of Astoria, as well as CTIC and CREST staffs. There should be opportunities for citizen involvement in all phases of the mediation.

Negotiations should be completed by the end of June, 1981."

Four federal agencies -- Environmental Protection Agency, National Marine Fisheries Service, Fish & Wildlife Service and Corps of Engineers -- would participate fully as would four Oregon State agencies -- Division of State Lands, Departments of Land Conservation and Development, Fish and Wildlife, and Economic Development -- and four local jurisdictions: the Port of Astoria, the Cities of Astoria and Hammond and Clatsop County. Another vital aspect of the final day's deliberations: they set a deadline for completing the negotiations, June 30, 1981.

Formal Negotiations

May 4-5. The initial negotiating session opened with a review of the ground rules -- the panel would operate by total consensus, parties could caucus at any time, only official negotiators would be at the table but anyone who needed access to any negotiator would have that access, the public would have an opportunity at the beginning of each negotiating session to comment or question, the mediators would serve as gatekeepers at the pleasure of the parties. There was some positioning to test the rules, then CREST staff provided each participant with a huge blue notebook filled with background information.

Going over that information, site by site, occupied the remainder of the 2-day session; participants absorbed information, questioned facts and details, clarified issues, discussed alternate sites, and even asked for more information or further clarification. They generated a series of questions to ask the Columbia River Bar Pilots concerning navigational needs in the estuary and invited a representative of that group to the next session. Issues were simply laid on the table, opened up for discussion, and a good feeling of working together on a problem began to emerge -- though there were certainly some differences of opinion.

One sense that emerged from the first session was that resource agencies were less concerned, less protective about uplands (lands above the 404 line) than they were about wetlands and intertidal areas; that dredging is not as damaging as filling but that too much dredging and too much filling was not acceptable, that in-kind mitigation was critical.

Development interests, on the other hand -- the local jurisdictions, the Oregon Department of Economic Development (now known as the Economic Development Department), and to some extent the Oregon Division of State Lands -- seemed to feel put upon, a philosophy perhaps best described by an attorney for one of the landowners: "You guys seem to believe that everything I have is mine and everything you have is negotiable." They had an especially difficult time accepting the concept of mitigation (in fact, the development interests lost one of their major "coal port" sites because they had earlier allowed the only logical mitigation site to be filled for a non-water-dependent use).

The Oregon Division of Land Conservation and Development presented the matrix concept that had been essentially developed in the April 14 caucus, and the whole issue of Oregon's land-use planning law as it relates to coastal zone planning got a thorough airing. The mediators let the discussion flow, did very little gate-keeping in this initial negotiating session. The deadline was less than two months away, a constraint in a sense but also a vital spur to force the parties to make decisions, to make commitments. Only toward the end of the second day did the mediators take a firmer hand, directing the flow of energy in an attempt to maintain forward momentum.

CREST staff spent the time between negotiating sessions by refining facts and figures. Mediators caucused with various agencies and individuals, both those at the table and others not as directly involved but nonetheless vitally interested in what was going on at the table. The Corps of Engineers gathered additional information as requested by the mediation panel, and the questions for the bar pilots were refined and presented to their official organizations for response.

May 14-15. The second negotiating session began with public comment by the editor of the local newspaper (The Daily Astorian) who was also a member of the Governor's task force on the Lower Columbia: he stressed the importance of the mediation effort, thereby giving the process the Governor's unofficial sanction. The mediators reviewed the ground rules, stressing the importance of each party's having up-to-speed alternates at the table if the officially-designated negotiator was unable to be there. Then the bar pilots' representatives held court, answering all of the questions the mediation panel had formulated, discussing them in some detail, responding to further

questions from the panel and from the audience. It was a key session in establishing the credibility of the mediation process, totally open and full of vital information, much of which had never apparently been considered before.

After lunch the negotiators returned to the matrix. Resource agency representatives pointed out that the matrix suggests only 600 acres of development on the Oregon side of the estuary, that with more than 900 acres of uplands available in the area, there was really no need to go into the estuary at all. The discussion became heated at times as each negotiator commented on the issues. The concept of "most suitable uses" for each site was raised as an approach to dealing with the issues, but the coal sites dominated the discussion since they are the largest. The first day ended with frustration as the parties, so eager to get at one another during the pre-negotiating sessions, seemed unable to engage one another in a meaningful way.

The second day's session began with a pep talk by the mediators that in essence went like this: "You've done a good job of telling your opponents what you need, but you have not yet shown that you are ready to deal realistically with their needs. We see no movement toward bridging the gap between you. If we don't see substantial movement before the end of the day, we'll go home and forget about mediation in this situation." It was no idle threat: there were less than 45 days remaining before the deadline; if there were no breakthrough today, there was little hope of reaching agreement by June 30.

But that day the ice was broken as DSL representative Stan Hamilton took the lead in addressing the most controversial site in the estuary, Tongue Point, which the State owned and which was managed by DSL. The area adjacent to the Lewis and Clark National Wildlife Area is highly productive to juvenile salmon. It had been disturbed in the past and has great potential for port development. Suddenly the parties were engaged in significant negotiations. As Daily Astorian reporter Chris Genna described it,

> "Pro-development officials would offer a proposal to develop the two sites -- 'North' Tongue Point, the 55 acres of uplands and five finger piers the state bought last year, and 'South' Tongue Point, the 100 upland acres the state is negotiating to buy . . .
>
> "Then pro-conservation officials would offer a counterproposal. On it went, with counterproposals following caucuses, followed by caucuses, followed by counterproposals. Stan Hamilton of the Division of State Lands would see the agencies' 40-foot channel at the north and raise them a 25-foot channel to the south side.
>
> "Or Jim Lauman, representing the Oregon Department of Fish and Wildlife, would see his turning basin at the north but raise him protection of the shallows around Mott Island." (7)

The remainder of the day was spent largely in caucuses with parties returning to the table to exchange proposals. By the end of the day tentative agreement had been reached on Tongue Point in a three-pronged proposal: agreement on facts, development designations and subarea policy (conditions under which development might occur). This proposal established the pattern for agreement on the remaining sites. Agreement did not come easy, and much language refinement had yet to be done, but substantial progress had been made, and there was hope an agreement might yet be developed for the entire estuary.

The next negotiating session was scheduled for June 1 and 2. During the intervening two weeks the mediators met with each of the negotiators and with various coalitions of negotiators, with agency personnel and interested citizens not sitting at the table. There were caucuses for language clarification and to lay groundwork for discussion of other sites. CREST staff worked overtime providing incredible technical support. For every hour at the table, the mediators spent roughly 12 hours behind the scenes preparing for the negotiating sessions, touching base, massaging egoes, carrying messages, listening to concerns, but it was becoming obvious that the process was working, that skeptics in the background were beginning to support the mediation effort.

June 1-2. The third negotiating session began with a mediator suggestion that detailed discussion of the Tongue Point language be postponed until agreement had been reached on other sites. The parties were working together, mutually seeking answers to accommodate each other's needs and interests, still representing their own interests but recognizing that only by considering the concerns of all parties could they get their own needs met. Tentative agreement was reached on another site before dinner that evening.

After a two-hour dinner break, the parties returned to the table for an evening session that promised productive negotiations, but after 10:00 p.m. tempers flared and no agreement was reached. During the evening each side -- development and protective interests -- presented the same proposal, but at that point, neither could accept the other's position. Lines hardened, and the good feeling that had been growing throughout the day disappeared. An impasse was reached, and people began to back away from compromise.

The next morning the discussions of the previous evening proved productive after all as both elements, in their frustration at not having reached agreement the previous evening, began again to work together in a meaningful manner, making appropriate trade-offs to accommodate the needs of the other, to deal with practical problems. During the day tentative agreement was reached on each of the other sites, and language was developed, often jointly rather than in oppositional caucuses, toward an ultimate agreement. As Sam Gusman, one of the mediators, put it: "After the June 1-2 meeting, we very clearly had made substantial progress and were well on the way toward definition of statements that, with modification, were likely to form the basis for a final mediated agreement."

June 22-23. Much of this fourth negotiating session was spent in caucuses, intially interest-related caucuses with development oriented negotiators in one and the resource protectionists in another, but as the day wore on, this pattern changed to cross-interest coalitions dealing with specific sites. The negotiating session became primarily a work session with serious consideration of the details necessary to make each site functional within the LCDC matrix, which had been largely forgotten once the parties really engaged one another.

Draft language for each site was reviewed in detail. The day after the session, Gusman and the CREST staff incorporated the newly-revised draft language with "Explanatory Notes" highlighting problem areas and distributed it to all negotiators. The negotiators were thus able to go into the final session with a document on which there appeared to be substantial agreement, with certain key exceptions which were detailed in the Explanatory Notes. Each negotiator had an opportunity to study the language with colleagues and superiors before the final session and bring to the meeting any concerns, proposed changes or problem areas.

During the week between the last two negotiating sessions, the mediators met with each negotiator,

with various caucuses and constituencies, with agency personnel and technical advisors to be sure that all bases had been covered, that there were no surprises in store for anyone involved in the process and that all needs, concerns and interests had been considered at the table.

For example, the mediators met with seven members of the Corps of Engineers from three different sections to be sure all of their concerns were established in the document, that all their needs were met. It was clearly understood by all parties that the Corps, by participating in the process, was in no way giving up an authority or responsibility at permit time, but it was also made clear that the Corps would consider the document very seriously when a developer applied for a permit.

June 29-30. The fighting was not over yet. The final negotiating session was as tough as any of the earlier ones. The parties knew each other better by then, had been working cooperatively for a total of some 80 hours in the mediation effort, not to mention hundreds of hours away from the table, thousands of hours before the mediation effort began. The June 29th session began with site-specific work groups caucusing. Participants kept coming back to the table for clarification of issues in the joint group, then returning to refine language in additional caucuses. The negotiators worked from 8:00 a.m. through 10:00 p.m. with only a brief break for dinner, and most participants took their work along. Lunch had been brought in as it had been throughout the negotiations. On June 30th the parties worked steadily from 8:00 a.m. through 10:30 p.m. without a break. Both lunch and dinner were brought in. Much of the time was spent in one-on-one negotiations over minute but important details. A final dispute over mitigation threatened to scuttle the whole agreement only hours before midnight, but in an emotion-packed final hour the dispute was settled, and all negotiators signed the agreement by 10:30 p.m. on the day of the deadline.

The Agreement

Totalling 36 pages of double-spaced typewritten copy and maps, the Agreement consisted of a preamble explaining the context, a signature page, a list of findings, development designations and subarea policies for each of the five sites considered by the panel. There were two sections for Tongue Point, a North and a South; two sites on the West Bank of the Skipanon River were delineated.

Ratification

The understanding at the beginning of the negotiations was that each negotiator would sign whatever agreement would be reached, but given the nature of the parties involved, it was further understood that a ratification process would follow a successful conclusion of negotiations whereby each agency or local jurisdication would verify its concurrence. The ratification process required eleven weeks, but by September 16, 1981 each entity -- local jurisdiction, state and federal agency -- had sent a letter of endorsement or ratification to the CREST Council.

Implementation

The mediated agreement was subsequently incorporated into the local comprehensive plans of the three jurisdictions responsible for the implementation of the agreement (Clatsop County, the Cities of Astoria and Warrenton), and those comprehensive plans have been acknowledged as valid by the Oregon Land Conservation and Development Commission. Thus, one major goal had been accomplished.

The second goal, greater predictability in the permit process, has been tested thrice (as indicated in the following section on Evaluation) and is serving its purpose. The Corps of Engineers and the Environmental Protection Agency have indicated to the author in telephone conversations that the document is being used and that development proposals within the guidelines of the mediated agreement are being permitted, often in a matter of no more than six months.

EVALUATION OF SUCCESS

LCDC Goals and Guidelines

Oregon's Land Conservation and Development Commission balances one of the most restrictive land-use planning processes in the nation. Since the Department of Land Conservation and Development was established through Senate Bill 100 in 1973, there have been attempts in each legislative session to pull its teeth. To date every effort in that direction has failed. The process seems to be alive and well, the law stronger as it withstands test after test.

Once the details of the mediated agreement were incorporated into the appropriate local comprehensive plans, those plans were submitted to LCDC for approval or "acknowledgement" as the jargon puts it, and all three of the plans -- Clatsop County's, Astoria's, Warrenton's -- have been acknowledged as in keeping with the Statewide Goals and Guidelines of Oregon's land-use planning law.

The Daily Astorian editorialized "The lengthy discussions established the important fact that developers will not be permitted to run roughshod through the estuary. But it also established that permit granting agencies cannot take hard line, unbending positions."(8) But that was five weeks after agreement was reached. Three years later Mike DeLapa, director of the CREST staff during the mediation effort, had this to say, concerning what might have happened without mediation:

> "The Oregon Land Conservation and Development Commission would have been the final arbiter, but the planning process undoubtedly would have been drawn out much longer . . . . The various interest groups would have argued their cases individually before the Commission, interacting very little. Without a mechanism for communication and negotiation, the differences among the groups would have been exaggerated and points of agreement missed and misunderstood. This would have been more time-consuming, frustrating and expensive than mediation."(9)

Henry Desler, Chairman of the CREST Council and of the Port of Astoria Commission at the time of the mediation effort, felt at the time that "The exchange of information and ideas is far more valuable than the agreement itself."(10) He grew disillusioned with the agreement, however, and frustrated with its implementation. For a variety of reasons, few of them associated with the mediation effort itself remain; there has been a complete turnover of personnel at the Port and new administration for the CREST staff.

With new personnel in all key port positions, fences mended and better relations between the port and other local entities, the present scene is more placid than at any time during the past decade according to Coastal Planner George Blomberg of the CREST staff, who was an important technical advisor during the mediation effort. He says that the port realizes the significance of an acknowledged plan and appreciates the utility of the document -- even though the

port may have been partially frustrated by the agreement because some of its large-scale plans were thwarted. Blomberg says that some people, especially those who were not part of the negotiations, are impatient with the mediated agreement, but that it is the underpinning for development in the estuary, a mechanism that allows appropriate development to occur. He suggests that while a few faces have changed, the agreement has survived the changes and serves both conservation and development interests.(11) DeLapa echoes that sentiment: "Mediation served well the interests of development and conservation on the Columbia River Estuary."(9)

Predictability in the Permit Process

The other major goal of the CREST mediation effort was "to increase predictability in the permit process." There have been three tests to date concerning this goal, one at each of three sites: Tongue Point, the East Bank of the Skipanon River, and the Port Piers. At Tongue Point the developer backed out of the project during the recession of the early 1980's though it seems clear the necessary permits would have been forthcoming in as little as six months, according to Blomberg, who says that the mediated agreement lets developers know "what's do-able." (11)

Henry Desler predicted in 1981 that the agreement would "increase permit predictability and, above all, allow for regional economic growth while at the same time conserving the vital natural resources of the Estuary."(12) Blomberg suggests that if developers abide by the agreement, they are playing by the rules drawn up to guide development in the estuary; and they will have support from some strange bedfellows- former adversaries that came together to negotiate a settlement that is beginning to produce its own track record. Some development that seemed just beyond the horizon during the mediation effort -- like coal export sites -- are all but lost from view now, but other unforeseen development proposals have entered the picture. Yet the agreement is as valid for them as it was for anticipated projects that have not materialized. The agreement is proving not only useful but adoptable, according to Blomberg.(11)

DeLapa again concurs:

> "The agreement reached was detailed enough to provide both predictable guidelines for developers and assurances to resource agencies that development would be consistent with their legislative mandates. It guided development to areas that were environmentally and economically appropriate. The agreement was also publicly and politically acceptable because it included all affected groups . . . . The agreement has withstood several tests already and appears to have made the development process quicker and more predictable."(9)

National Marine Fisheries Service within the Department of Commerce said in its ratification letter, "We are pleased to have worked with these parties to achieve a consensus which will improve the predictability for water-dependent development as well as resource protection on the lower Columbia River." Both the Corps of Engineers and the Environmental Protection Agency use the mediated agreement when they review permit applications for the areas in question.

Oregon's Division of State Lands, which issues permits at the state level, ratified the mediated agreement with these words: "The Division fully supports the terms and conditions of the agreement." Oregon's Economic Development Department uses a computerized Industrial Property Inventory System for determining appropriate development sites within the State; it has incorporated the sites designated in the CREST mediated agreement into that inventory.

More than three years after consensus was reached, the CREST mediated agreement seems to be working. As Mike DeLapa points out,

> "Mediation enabled CREST to complete a regional land and water use plan for the Columbia River Estuary . . . . When long-standing differences over development plans for the estuary could not be resolved, mediation provided a framework for various public and private groups to bargain. Because mediation occurred at the end of a comprehensive planning process, these groups were able to make tradeoffs between the economic development and conservation needs of the region."

He says further,

> "As I see it, effective land use planning must balance current and future public needs for development, conservation and preservation; develop plans that are internally consistent and consistent with the goals of local, state and federal governments; and provide certainty and predictabiliy in the development process. By all these criteria, the Regional Plan was successful, due in large part to mediation. I believe all the participants would agree that the benefits of mediation clearly exceed its costs and that it was much better than other alternatives, given the political situation at the time."(9)

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Future Coastal Zone Conflicts

INTRODUCTION

Judith T. Kildow

A key to successful problem solving through negotiation is the availability of adequate information. Negotiating parties who have a number of options and adequate detail seem to be more likely to reach equitable trade-offs and to resolve their conflict. However, the generation of information for useful purposes is not a trivial task.

In recent years, engineers have generated some system models for trying out different scenarios which permit interested parties to compare the effect of individual decisions on the final agreement. The success of these models depends on the availability of specific information, and with each party's ability to combine imagination and realism in their approach to the decision making process. A model allows everyone involved to share the same information and "talk the same language."

The two papers to be presented at this session reflect attempts at modeling scenarios which integrate engineering design into the policy process. They provide a framework to understand information which can be used in negotiation.

The oil spill model provides a basis for assessing damages and could be a strong vehicle for providing the information necessary to reach agreement on equitable compensation for those affected by a nearshore accident.

The second paper illustrates how the initial design of a new technology, or the redesign of an old technology, can be a key to its acceptance, and can help avoid costly, large-scale legal battles. If the relevant parties are included in the initial stages of an incinerator ship design, for example, the hope would be that everyone's fears would be allayed before the ship went to sea. Or, if opposition on certain points could not be resolved, then the disposal company could stop the project and cut losses.

These two examples merely suggest the potential usefulness of integrating engineering with planning and policy-making. If these tools are employed at an early enough stage, they could preclude or mitigate major problems and avoid the need for extensive litigation mediation. Even if they are only tools in the process and conflict ensues, they at least provide a common information base for all parties and provide a firmer basis for negotiation.

ASSESSING DAMAGE AND LIABILITY FROM OIL SPILLS

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ABSTRACT

We discuss the role of analytical models in conflict resolution, focusing on the problem of assessing damage and liability from oil spills. We classify analytical models into two main categories, "descriptive" and "prescriptive", and discuss how each category can be used in general conflict resolution problems. We then identify the key players and issues in the problem of assessing damage and liability from oil spills, as well as the main areas of potential disputes within the context of this problem. We discuss how the MIT Oil Spill Model - a model that has been developed to help policy makers evaluate oil spill cleanup alternatives - might be used for conflict resolution purposes. Finally, we conclude by presenting how the ideas behind such a model can be extended toward hazardous substances spills and the resolution of potential disputes in that area.

INTRODUCTION

The purpose of this paper is to discuss the role of analytical models in conflict resolution, focusing on the problem of assessing damage and liability from oil spills and on a model that has been developed to address problems within this general context.

There can be many definitions of the word "model", depending on the context in which this word is used. In a most generic sense, a model is defined as an abstraction of reality, whose purpose is to represent a well-defined real-world process and help obtain insights in the workings of that process. Depending on the context, the word "model" can be used with many designators. For instance, an "analytical" or "quantitative" model is a mathematical abstraction of reality, that is, an attempt to quantify the attributes of a specific real-world process as well as develop quantitative relationships among those attributes. In other contexts, one can similarly speak about "physical" models, "engineering" models, "decision" models,"deterministic" models, "probabilistic" models, "economic" models, "regulatory" models, "management" models, or even "economic conflict resolution" models (we shall be more specific about this later on).

One designator we would like to focus on in this paper is that of a "computer model". This is typically used to describe a model that is closely associated with and implemented by a computer program, which is typically used as a "tool" to obtain insights into a particular process. The association between the model and computer program is sometimes so close, that the phrase "computer model" (or often only "model") ends up being used to describe the computer program itself rather the abstract model implemented by that program. In the same context, the word "submodel" (or simply "model") is often used to describe specific components (or subroutines) of the computer program in question. Such an interchangeable use of the world "model", although probably unacceptable to purists, is broadly practised among scientists, engineers, policy-makers as well as laymen, and therefore will be used too in this paper. However, we should keep the distinction between a model and its associated computer program clear, as developing each of the two entails profoundly distinct intellectual processes and involves issues of different nature.

The process of "modeling" involves a clear definition of the assumptions that are used to "map" a real-world process onto the abstract one represented by the model. Many of these assumptions may be drastic in nature, to make the resulting model simple to work with, and that may harm the model's ability to adequately explain and provide insights into the real-world process. In that sense, it can be seen that the "modeling" step is probably the most important step within the overall goal of developing a computer-based "tool" that can be used in conjunction with a given real-world process. Of course, an efficient computer implementation of a given model is also important, and sometimes crucial. There can be many ways to computer-implement a given (abstract) model, and selecting the best way to go can have a profound bearing on the overall outcome.

Given the above very general (but hopefully relevant) remarks, we now proceed to describe how this paper is organized:

In Section 2 we discuss the role of analytical models in general conflict resolution problems. We classify analytical models into two main categories,

"descriptive" and "prescriptive", and discuss how each category can be used in such a context. In Section 3 we define the problem of assessing damage and liability from oil spills, in terms of key players, issues and areas of potential dispute. In Section 4 we describe the philosophy behind the "MIT Oil Spill Model", a model that has been developed to address problems associated with oil spills. Although this model has not been designed specifically for conflict resolution purposes, we next discuss how it might be used in such a context. We conclude the paper in Section 5 by discussing how such a model can be extended toward hazardous substances spills and the resolution of potential disputes in that area.

This section ends with a word regarding the approach and style of this paper: This paper provides a "quantitative" perspective on a complex subject that does not seem to lend itself easily to analysis by quantitative techniques alone. The paper is addressed mainly to the non-quantitative reader, and, as a result, may seem too elementary to a quantitative audience. In addition, and mainly as a reflection of the author's own background, the paper may also seem simplistic to an experienced "conflict-resolution expert" (if there is such an individual). Nevertheless, it is our hope that the ideas presented in the paper will shed some light on how analytical models can be used to resolve conflicts in oil spill damage and liability situations.

2. ROLE OF ANALYTICAL MODELS IN CONFLICT RESOLUTION

In the previous section we mentioned that there can be many kinds of models, depending on the context in which they are used. For the purposes of this section, we shall focus on analytical models, and we shall classify them into two major categories. Such a classification will be seen to be important in conjunction with conflict resolution problems.

A "descriptive" model attempts to represent the real world and evaluate what would happen under a fairly explicit set of inputs and other assumptions, without offering recommendations as to what actions ought to be taken so that some desirable goals are attained. For instance, a model which evaluates cash flows and returns on investment in a particular project as functions of user-supplied values for revenues, expenditures and interest rates, as well as of other assumptions on the investment scenario, depreciation and tax laws, etc., belongs to this category. The output of a descriptive model is, as its name implies, a description of the values of quantities of interest, and/or an analysis of how these values change as a function of assumed inputs. If the context in which such a model is developed is probabilistic (as opposed to deterministic), the output of a descriptive model will involve information of a probabilistic/statistical nature. For instance, a stochastic oil spill trajectory model might produce estimates of the probabilities that oil spilled according to a prescribed scenario in a given geographical area will hit specific parts of the shoreline.

By contrast, a "prescriptive" model not only describes what would happen under a fairly explicit set of inputs and other assumptions, but also offers recommendations as to what should be done (by somebody who has the power to make decisions) so that certain explicitly defined measures obtain "satisfactory" (that, is "good", "improved", or even "the best possible") values. In terms of the investment evaluation model described earlier, a prescriptive version of such a model would not only evaluate cash flows and returns on investment, but would also select the project(s) which would achieve the best possible return. Such models can be useful to decision-makers or policy-makers whenever (a) there are many alternatives on a particular way of action, (b) enumerating or generating these alternatives is difficult to be done in a systematic way "by hand", and (c) there is a fairly explicit way to assess alternatives against one another (that is, there are established quantitative criteria, or measures, by which the decision-maker can say whether he or she prefers alternative A to alternative B). We should stress that in spite of the fact that the existence of (a) (b) and (c) above may seem obvious at first glance in most decision problems, this is not necessarily the case in practice. This is particularly true in complex problems where it might be difficult just to identify some alternatives that make sense, let alone choose the best of them. And even if the number of alternatives is broad, there might be no universally accepted way of evaluating one alternative against the other. In most real-world decision problems a fair amount of effort has to be spent in order to establish (a) (b) and (c) above ; and this is a task that should be undertaken by both the modeler and the model's ultimate users.

Descriptive and prescriptive models can be useful, each in its own way, in general conflict resolution problems. The role of a descriptive model is simply as a tool that can be used to explore the consequences of alternative scenarios regarding both the inputs and the assumptions of the model. As such, it is imperative that the assumptions of the model be accepted by all parties in the conflict. If this is the case, the model can be used by all parties without prejudice.

An example of such a descriptive model is the "Deep Seabed Mining Model" developed by Nyhart et al (1978) in conjunction with the Law of the Sea negotiations. This model examines the operations of a hypothetical mining consortium operating in the Pacific Ocean and yielding three million tons of manganese nodules annually over a 25-year period. The model is deterministic and is driven by about 150 data values, mainly basic cost values and future mineral prices. For any set of inputs, the model generates cash flows over time. The purpose of the model is to serve as a means for comparing the economic performance of deepsea mining systems under different conditions. Excellent discussions of how this model was used can be found in Sebenius (1980) and in Raiffa (1982).

The role of prescriptive models in conflict resolution problems is different. If a descriptive model can be thought of as describing how the "pie" to be shared by the parties in conflict would be split as a result of various assumptions, a prescriptive model can be considered as first increasing the size of the pie and then describing how it would be split. Increasing the size of the pie can, at least in principle, leave all parties better off than they would be if no model were used. To demonstrate this point, let us examine an oversimplified case of conflict resolution within the context of oil spill cleanup.

Suppose that an oil spill occurs in a given geographical area that is covered by an "oil spill model". Under the Federal Water Pollution Control Act, the Federal Government (i.e. the Coast Guard or EPA as appropriate) is authorized to clean up the spill unless it determines such removal will be done properly by the spiller. The spiller then becomes liable, except when certain defenses apply, for the costs of cleanup borne by the government, up to statutory limits. Costs of cleanup may include costs of replacement and restoration of natural resources lost or damaged. Assume that the exact value of damages to natural resources depends on cleanup actions taken, and, furthermore, that there is an unambiguous way to evaluate the value of the lost natural resources for each response scenario.

In many cases, the spiller may act promptly and clean up the spill before it causes significant damages. In such cases, no conflict between the spiller and the Federal Government will occur. There are however cases in which the spiller may estimate that his ultimate overall out-of-pocket expenses will be lower if he takes less than adequate action to clean up the spill, in the hope that he will successfully avoid liability for subsequent damage claims. In such cases, a conflict situation between the spiller and the government will occur. This is so because the government will be required to make up for cleanup capability required for the spill, and/or pay for replacement and restoration of natural resources. Of course, the spiller may be subsequently found liable and end up having to reimburse the government for all these costs, but such reimbursement may either occur after many years of litigation, or not happen at all.

A prescriptive model might be useful in such conflict situations by identifying response alternatives that entail a lower overall total (that is, response and damage) cost. If such alternatives are clearly identified, there may not be enough of an incentive for the spiller to follow the strategy suggested in the previous paragraph, because that strategy may cost him much more in the long-run. Instead, the spiller may prefer to follow the response alternative suggested by the model, especially if it becomes clear that this alternative is the one that minimizes total costs. In summary, the use of the model here is to alleviate or resolve the conflict by identifying ways to "increase the pie" to be shared by the parties involved (here the pie being the savings in total cost resulting from the use of the model).

This example has been, of course, simplistic and was presented only for illustrative purposes. However, the same concepts can be applied at least in principle to more complex situations, involving more parties and/or more issues.

Such a use of models may also encourage parties which are likely to get engaged in conflict situations to become actively involved in the development of such models before the actual realization of those conflicts. As mentioned in Nyhart (1984), "if the different stakeholders can come together and agree on the basic assumptions, facts and determinations of what is known and unknown, they can begin to narrow their differences and thereby bound the area of negotiation. In the process of examining the inputs and assumptions of the model each may find more common ground than expected, before the negotiation of outstanding points even begins".

3. OIL SPILL DAMAGE AND LIABILITY: INHERENT COMPLEXITIES AND CONFLICT-INDUCING FACTORS

Assessing damage and liability from oil spills is typically a very complex problem. This section attempts to analyze the reasons for such a complexity and shed some light on what are the issues that are likely to generate conflicts within this context.

It is well known that each spill situation is unique. As a result, it is many times futile to attempt to resolve a spill by associating it with another spill in the past and somehow "translate" policies or results connected with that spill to something that can be applied to the one in question. The complexity of the general task of assessing the damage and liability from a spill on an after-the-fact basis (or, a fortiori, "predicting" such quantities before a spill happens), and of the task of resolving resulting conflicts in this area can be understood by the following facts:

(1) There are usually a multitude of parties involved in any spill: In case of a tanker spill, the ship's master and crew, the shipowner, the owner of the cargo (charterer), the owner of another ship (in case of a collision spill), the tugboat company or other salvors, insurance companies, and the ship manufacturer(s). A spill also invariably involves the Coast Guard (in case of a spill in U.S. waters), State and/or Local governments, private cleanup contractors, cleanup equipment manufacturers, and fishermen, local residents and local tourist industries who may suffer damage. Other government agencies as well as international bodies may be also involved in the spill one way or another. A similar list can be considered in case of an offshore drilling spill. Under such circumstances, and given that the objectives and interests of these parties are not necessarily the same (and, in fact, may diverge significantly), it is almost inevitable that some form of conflict will occur. It was in fact a financial conflict between the owners of the AMOCO CADIZ and a salvage company regarding the use of a second tug to tow the vessel after its steering gear was damaged that ultimately led to the largest tanker spill in history (France, 1978). Of course, conflicts and disputes may occur not only in an operational scenario (that is, with respect to what should be done in a specific spill), but, also in a planning and policy situation, where important decisions that will impact future spills have to be made.

(2) The state of the art of evaluating oil spill damages with any acceptable level of confidence is still unsatisfactory, despite growing progress during recent years. There is still uncertainty with respect to several key issues: First, there is uncertainty with respect to how many (and to what extent) environmental resources are impacted by the oil as a function of the spill scenario. Second, there is uncertainty with respect to how one can translate such environmental impact consequences into economic (i.e. dollar) damages. These two issues are profoundly different, yet equally critical. The first issue is mainly biological, the second is economic. There is a vast literature attempting to answer questions in both areas. Perhaps the most comprehensive analysis on the economic impact of a spill is the recent National Oceanic and Atmospheric Administration's (NOAA) report on the AMOCO CADIZ oil spill that occurred in Brittany in 1978 (NOAA, 1983).

(3) The U.S. laws pertaining to liability for damages arising from spills and providing for compensation in such cases is complex and uncertain to produce predictable results from spill to spill. The major federal statute, the Federal Water Pollution Control Act (33 USC 1321) provides that if a spiller of oil fails to clean it up properly, the Coast Guard, (or EPA as appropriate) is authorized to clean it up (or hire someone to do so) and to recover its costs from the spiller, where the source is known, up to statutory limits and subject to certain defenses. The Federal Government or a State may also recover the costs of replacement or restoration of natural resources lost or damaged in the spill, subject to the same qualifications. A fund exists to cover these costs where the spiller is not identified. Other parties who suffer damage may not recover under the act.

However, if the oil spilled was produced on the U.S. continental shelf, traveled to the tanker through the Trans Alaska Pipeline system, or was spilled at the U.S.'s one deep water port, three different laws provide different liability for the spiller toward all those damaged, different limits to those liabilities, and different defenses for the spiller. There is also liability created under traditional maritime tort perhaps under the Refuse Act, as well as under many state laws, each with its own significant characteristics. Uncertainties attach as to which of the state laws may hold up under Federal court scrutiny, and the conditions under which the overriding limitation of the Federal Limitation of Liability Act may be cast aside by the courts.

Under such wide variety of regimes, some of which are ambiguous or conflicting, it comes as no surprise that the overall legal/regulatory system leaves much to be desired as far as providing an efficient mechanism to handle this problem is concerned.

Given the above, it is almost natural for conflicts among parties involved in the oil spill problem to occur. We feel it is particularly important to emphasize that such conflicts would occur even if the deficiencies associated with (2) and (3) above are completely eliminated (which may be never). Imagine for instance an "ideal" world in which there is no ambiguity whatsoever regarding the actual value of damages from a spill, and, in which the legal/regulatory system is perfectly explicit as to what the liability of each party will be. Even under such "utopian" assumptions, the mere fact that different parties in this problem have different objectives will inevitably create conflicts among these parties.

A possible exception to the above argument might be the case where the legal/regulatory system is restructured in such a way that the objectives of the parties in question become more "in line". In terms of the example presented in section 2 suppose there is a law that says that cleanup and damage costs will have to be equally borne between the spiller and the Federal Government. Naturally, such a law might seem unfair to one of the parties in question, or even to both: The government may argue that there is no reason for them to pay anything. The spiller in turn may argue that such a law may cost him more than whatever he might pay otherwise. However, the advantage of such a policy is obvious: It transforms the problem from a conflict situation to a cooperative situation, where the interests of both parties are "forced" to coincide, and, as a result, clean-up the spill as promptly as possible. Of course, this example is oversimplified, but we feel it serves to illustrate our point that conflicts can be greatly reduced (or even eliminated) by appropriate legislation. Naturally, the process of designing such kind of "anti-conflict" legislation is, in itself, a subject for serious study and analysis, for it is not clear that the existing framework would lend itself to such a process. We speculate that untangling the existing legal/regulatory "mess" would be amenable only to "Gordian knot" techniques (design new legislation from scratch rather than modify the existing one).

Coming back from an idealized world (where the deficiencies associated with (2) and (3) above do not exist) to the real world, we note that by far the most important cause of conflict in assessing damages and liability from oil spills is due to reason (2), that is, to the uncertainty associated with putting a value on damages. We note here that such an uncertainty seemingly can be bypassed if damages are computed in an explicit, albeit arbitrary way. For instance, certain states such as California have adopted a system of "pricing" natural resources, according to which the damages from a spill are computed by multiplying the estimated number of organisms belonging to a species which are "killed" by the spill, by appropriate "prices" for that species. This approach suffers from the deficiency that such "prices" rarely reflect the true social cost of the species in question. It would thus seem that the best alternative to making progress on this front is to continue to actively promote research and development in damage assessment.

4. THE MIT OIL SPILL MODEL

As seen in the previous section, the oil spill problem covers a very broad spectrum of issues and is particularly complex from almost whatever viewpoint it is examined. The MIT Oil Spill Model has been designed to look at this problem from a rather focused standpoint. This section presents a summary description of this model and discusses how it might be used in the resolution of related disputes, including but not limited to conflicts on oil spill damage and liability. Readers interested in more details about the MIT Oil Spill Model are referred to a number of related publications, such as Psaraftis et al (1980, 1983), and Nyhart et al (1981, 1983).

The MIT Oil Spill Project began in 1979 with support from the National Oceanic and Atmospheric Administration's (NOAA) Office of Sea Grant and received additional support from a number of government and industry organizations. The goal of the project has been to examine existing and alternative systems for oil spill cleanup in the U.S., and create a computer-based tool which would enable the user to analyze complex decisions regarding oil spill response.

The MIT Oil Spill Model has been the first which attempted to integrate all parts of a spill response system and explicitly incorporate

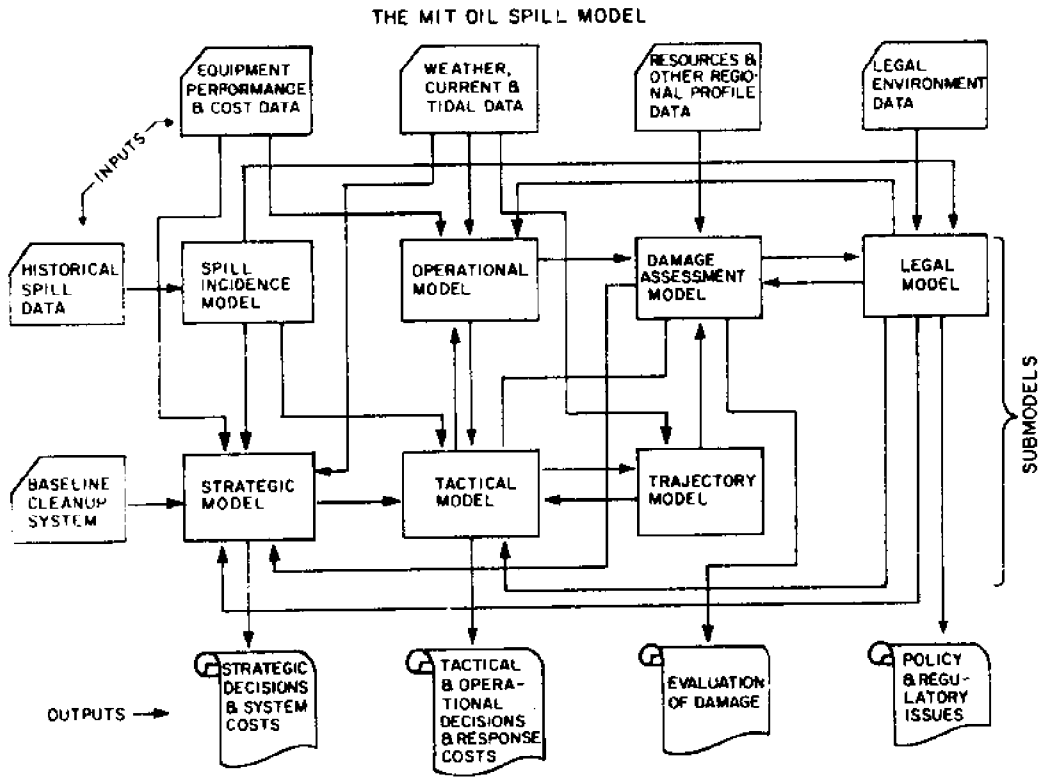

Figure 1.

quantitative descriptors of system performance as well as decision-making techniques. It can be used in a variety of ways, including planning for the long-term response needs of a region, assisting an on-scene coordinator in cleaning up a specific spill, evaluating the environmental and economic damage of a spill, evaluating those damages versus the cost of cleanup, and helping government and industry evaluate their spill response options.

The structure of the model (Figure 1) includes three types of elements: inputs, sub-models, and outputs. Inputs provide the decision-maker with all the information necessary to evaluate the decisions at hand. The sub-models (or simply models) are computer algorithms where all the calculations, assessments, and trade-offs are performed. Finally, outputs are decisions, recommendations, and other issues relevant to the specific problem addressed.

All the components of the model, together with the linkages among them, are described below.

The spill incidence model is the "generator" of oil spills. These spills are simulated according to probability distributions concerning their volume, frequency of occurrence, and geographical location. Such probability distributions can be derived, using several methods, from the historical spill data.

The strategic model evaluates planning decisions for potential oil spills and for a given geographical area. Such strategic decisions, involve issues such as locations, quantities, and types of equipment that should be stockpiled to cope with the full range of potential oil spills during a specified period. The strategic problem is a special case of what is known in the mathematical programming and operations research literature as the "facility location problem", a problem with main applications in urban emergency service systems (such as locating fire stations, hospitals, etc.) The objective is to minimize the expected total costs-fixed investment costs, spill-specific cleanup costs, and damage costs - from oil spills over the period of consideration. Inputs for the strategic model include spill probabilities from the spill incidence model, equipment performance and cost data, the damage assessment model, and the baseline cleanup system, which describes the current system for responding to oil spills and against which any system proposed by the strategic model can be compared.

The tactical model addresses decisions to be made when a spill occurs; for instance, decisions on the aggregate level of oil recovery capability (gallons of oil recovered per hour) necessary to control the spill, and how this level should be dynamically adjusted throughout the duration of the spill in response to changes in outflow rate and weather conditions, as provided by the weather, current and tidal data input. In addition, the tactical model is linked with the operational model to determine what specific sets of cleanup equipment (booms, skimmers, dispersants, etc.) chosen from the stockpile located near the spill, should be dispatched to the spill site. The latter model provides more detail on actions that should be undertaken at the spill site, taking into account

efficiency and geometric characteristics of booms and skimmers, performance of specific equipment in bad weather and efficiency of dispersant application as well as the relevant costs of cleanup.

Tactical and operational decisions critically depend on what happens or may happen to the oil once it enters the marine environment and vice versa. Two components of the overall model are linked with the tactical model for that purpose: the trajectory model and the damage assessment model.

The trajectory model tracks the movement and spreading of the oil on the sea surface. The processes which act on the oil once it is discharged into the water are numerous; evaporation, natural dispersion, drift, emulsification, biodegradation, photo-oxidation, and sedimentation are the most important. Each depends on the type of oil as well as the general environmental conditions (weather, current and tidal data). The MIT team reviewed all existing trajectory/transport models and finally decided to develop its own, so as to better integrate it with the rest of the overall model. The trajectory model is state-of-the-art, including features such as depth effects and breakup of large slicks.

The damage assessment model takes into account oil movement, furnished by the trajectory model, and evaluates damages to resources impacted as the oil moves through offshore and coastal areas. The resources and other regional profile data give a region-specific inventory of environmentally and economically sensitive resources, tabulated in a rectangular grid format. This submodel evaluates potential damages to marine fisheries, organisms, tourism, and other categories. It is linked to both the tactical and strategic models.

Finally, there is a legal model, taking as inputs the legal environment data. The role of the legal model is to address issues such as impact of various state, federal, or international liability and compensation laws on the distribution of the burdens of oil spills, and other policy and regulatory matters.

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Applications of the MIT Oil Spill Model thus far include the New England case, the Petro-Canada case and the Charleston, SC case. With respect to New England, both strategic (planning) and tactical/operational analyses have been made. A comprehensive data collection effort was deemed necessary for such a task, including collecting data on the area's regional profile, cleanup equipment and environmental conditions. The Petro-Canada case addressed the problem of optimal stockpiling of chemical dispersants to respond to offshore drilling blowouts in New Foundland and Nova Scotia. Finally, the Charleston SC case (which is still ongoing) has addressed both tactical and strategic issues with respect to the Naval Facilities Engineering Command's pollution problem in the port of Charleston.

Use of Model in Conflict Resolution

The use of the MIT Oil Spill Model in the context of conflict resolution has not been one of the original main goals of the project. However, we feel that the potential for using the model in such a context clearly exists. Take for instance the case of a conflict between the spiller and exposed local parties with respect to the response to a specific spill. Although such cases are typically much more complex than the oversimplified example presented in section 2, the benefits from using the model can be substantial. In many simulated runs of the model, a major conclusion was that a prompt response can avert a substantial amount of damages. It turns out that one of the most common causes of delays in initiating cleanup is the prolonged negotiation between the spiller, his insurance agents and cleanup contractors as to what actions should be taken in response to the spill. If the model can show that there can be tangible benefits to both the spiller (in terms of lower cleanup costs, and, ultimately, lower liability) and to local residents (in terms of lower damages) due to a prompt response, then both parties can move away from a conflicting situation to an essentially cooperative posture. In such cases, the use of the model can increase the size of the overall pie (in terms of damages averted) and that, in turn, can lead to increased benefits for the parties in conflict.

Of course, the benefits of the model in oil spill conflict resolution are not limited to its use as a prescriptive (or "pie-increasing") instrument. We feel that equally (or perhaps more) important is the ability of this model to answer "what if" questions, so that all parties involved in a conflict can rapidly understand the implications of alternate courses of action or negotiating positions. For instance, in the case of a conflict between the Department of the Interior (who may be pushing for increased offshore oil drilling in an area) and a local community (who may be worrying about the potential impact of such a policy on its environment), the model can be used to assess predictable damages associated with such drilling activities. Granted, the value of those damages will never be known for certain, but often only a "ball-park" estimate is necessary to ascertain whether any proposed development entails major environmental consequences or not.

To take another example, CERCLA (the Comprehensive Environmental Responses, Compensation, and Liability Act of 1980) requires that the Federal government shall promulgate regulations for the assessment of damages resulting from an oil spill. These regulations shall specify

> "(A) standard procedures for simplified assessment requiring minimal field observation, including establishing measures of damages based on units of discharge or release or units of affected area and (B) alternative protocols for conducting assessments in individual

> cases to determine the type and extent of short- and long-term injury, destruction, or loss. Such regulations shall identify the best available procedures to determine such damages including both direct and indirect injury destruction, or loss and shall take into consideration factors including but not limited to, replacement: value, use value, and ability of ecosystem or resource to recover" (CERCLA 1980).

In the first of these cases, the model might be run a great many number of times in advance to simulate a broad variety of spill scenarios in a geographical area. Then, once a spill occurs in that area, a "quick-and-dirty" estimate of its damage can be obtained by relating that spill to its most related simulated scenario. Note that such an approach would make sense for small spills, where the cost of performing detailed on-scene assessments might be prohibitive. Such a use of the model would only necessitate the collection of a few representative data that best describe the spill in question. All model calculations would be performed in advance.

Regarding now case (B), which typically corresponds to large-scale spills, the model can be used on a real-time basis, so as to provide more accurate estimates of damages. Such an increased degree of accuracy would be possible since the magnitude of the spill would justify (in fact, necessitate) a more comprehensive data collection effort.

A third illustrative instance is one which might arise in the case of oil pollution for which an owner and operator of a vessel may be held liable under the Outer Continental Shelf Lands Act Amendments of 1978, (43 USC $$ 1801 et seq.). Here claims for economic loss from oil pollution may be asserted for removal costs and in addition a wide range of damages, including injury, destruction, or loss of use of real or personal property or natural resources as well as loss of profits or impairment of earning capacity due to these things. And the claimants may be others in addition to governments. So a greatly expanded complex of claims and claimants may exist, with the possibility of settlement in or out of court, and as against the owner, operator, guarantor, or the statutorily established fund.

In such a case, the model may shed light on the complexity of the situation by providing estimates of damages and liability of the parties involved.

There are other uses of an oil pollution model which come to mind, springing in part from the subject matter of this conference. A model could be used at pre-lease sale stage to evolve close-in risk just as a model now does for open-water pollution. In the exploration permitting period, it could be used by states in evaluating their federal consistency, criterion, or in mediation of subsequent disputes.

One can thus see that in terms of assessing damage and liability, the model can provide important estimates of such quantities to all interested parties and, in that sense, help bridge differences that may exist in certain areas. As we mentioned before, the calculation of an "exact" dollar value for damages is not, and is not likely to be in the near (or even remote) future within the reach of the state of the art. However, an estimate of such damages that has been obtained through well-understood assumptions and principles is always better than an arbitrary figure, and, as such, can help close the gap that usually exists between extreme viewpoints.

As we mentioned earlier, such a process would be facilitated if the parties that are likely to be engaged in disputes of that nature take an active role during the development of the model. Within the MIT Oil Spill Project, such an interaction of key players was made possible (and in fact was encouraged) through the project's Advisory Committee, a body of experts from various branches of government, private industries and environmental groups who met regularly with the project team for advice and feedback. Differences of opinion among these parties were frequent, and, at times, seemingly irreconcilable. However, this forum gave us a significant opportunity to at least identify the most important issues and develop a model that can be used to address them.

5. CONCLUSIONS

There is no point in hiding that the use of models for conflict resolution in the general area of oil spills is currently in its infancy. But since the same is true regarding the use of any model for any conflict resolution problem, we feel that whatever small progress has been made within the oil spill context can be extended to other problems. For instance, the extension to conflict resolution in hazardous substances spills seems to be a natural direction to go. However, it is clear that the hazardous substances spill problem is much more complex than the equivalent oil spill problem, mainly because so many necessary "building blocks" in this problem remain unknown. These include, but are not limited to the evaluation of damages, where the state of knowledge is almost nonexistent. In addition, liability and compensation mechanisms such as Superfund are, at best, untested.

A different direction is the development of a systematic body of knowledge and methodologies for conflict resolution problems and the design of models for such a purpose. From a quantitative perspective, such tools as decision analysis, multi-attribute utility theory and game theory seem to lend themselves toward such a goal. Whether such an ambitious objective would bring about a new generation of analytical methods in this area remains to be seen.

ACKNOWLEDGEMENTS

I am indebted to Dan Nyhart for "initiating" me in the exciting area of conflict resolution. His numerous suggestions on this paper are also gratefully acknowledged.

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THE CONCEPTUAL DESIGN OF OCEAN INCINERATION SYSTEMS AND THE IMPACT OF REGULATION

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INTRODUCTION

To start any new business in the United States, at the very least, one needs a cursory awareness of the government regulations at all levels affecting company operations. However, in this paper, it is argued that in the case of an incineration system designed to destroy liquid hazardous wastes at sea, governmental regulation may be the chief concern among factors to be considered.

Following a brief history of the use of incinerator ships, this paper describes basic categories of logistical system designs and their interrelationship to business strategies. Subsequently, the effect of government regulation on the system design process is evaluated and scenarios representing likely outcomes are postulated for various possible government actions.

Because ocean incineration has now become a controversial topic, a computer model for use in conflict resolution will also be described.

BACKGROUND ON INCINERATOR SHIPS

Since 1969 incinerator ships have been used in Europe to dispose of liquid toxic waste. Incineration at sea of liquid combustible chemical wastes should not be confused with ocean dumping. It is distinguished by the incineration process which theoretically thoroughly decomposes chemical wastes into harmless substances.

Until recently, incinerator ships were created by conversion of small commercial cargo vessels. Since 1981 three specially-designed incinerator vessels have been constructed or ordered.

European Experience

In 1969 the 984 deadweight ton (dwt) tanker Matthias I was fitted with an incinerator. Two chemical manufacturers, Bayer AG of Germany and Solvay Cie of Belgium, chartered the vessel that burned organic liquid chemical wastes in the North Sea for five years. A 3,445 dwt tanker, Matthias II was similarly converted and succeeded the smaller vessel. The Matthias II incinerates wastes collected from small chemical manufacturers throughout West Germany by the Haniel Group, Duisburg, and the Suedmuell GMBH and Company, Frankenthal.

At the same time the use of the Vesta, a 1,356 dwt incinerator vessel was shared by Bayer, Solvay and Westab GMBH and Company, a chemical waste collector from Duisburg. This ship, converted from a tanker in 1979, picks up toxic wastes from a marine transfer terminal in Antwerp, Belgium for incineration approximately fifty miles off the coast.

The 4,693 dwt Vulcanus, operating as an incinerator ship, has burned wastes off the coasts of Europe, U.S. and Australia since being converted from a tanker in 1970 at the Bremden Shipyard, Emden, West Germany. This same yard has now delivered the first ship designed and built for ocean incineration, the 4,370 dwt Vulcanus II. Launched in November 1982, this vessel loaded 3,029 cubic meters (800,000 gallons) of chlorinated hydrocarbons in Norway one month later and incinerated these wastes in the North Sea. The Vulcanus II is capable of burning wastes at a rate of 19.7 cubic meters (5,200 gallons) per hour. This new vessel has eight cargo tanks ranging from 297 cubic meters (78,455 gallons) to 461 cubic meters (121,776 gallons) in size for a total cargo capacity of 3,161 cubic meters (835,000 gallons). (The older Vulcanus has been fitted with a new cargo section of essentially the same tank sizes and capacity.)

U.S. Experience [2]

The Vulcanus has incinerated wastes in the U.S. on several occasions, starting in 1974 when the ship, operated by Ocean Combustion Service, destroyed wastes for the Shell Company. In 1977 the U.S. Air Force contracted with the Vulcanus to destroy more than 11,357 cubic meters (three million gallons) of herbicide Agent Orange in the Pacific Ocean, eight hundred and fifty miles southwest of Hawaii. Ocean Combustion Service was bought by Chemical Waste Management, Incorporated of Oak Brook, Illinois in 1980. During 1981 and 1982 the Vulcanus spent time sailing out of a

Mobile - Chickasaw, Alabama port facility, where wastes were collected by rail, barge and truck. The Vulcanus incinerated these wastes at a site in the Gulf of Mexico, about three hundred and fifty miles southwest of the port.

In 1982 the only two U.S.-flag incinerator ships were ordered from Tacoma Boatbuilding in Tacoma, Washington. Apollo Company, a subsidiary of Apex Marine Corporation, will own and charter the 7,187 dwt vessels, Apollo I and Apollo II, to At-Sea Incineration (ASI), a subsidiary of Tacoma Boatbuilding. ASI has tentative plans for four more incinerator vessels. Each Apollo vessel has twelve tanks of 416 cubic meters (110,000 gallons) each and can destroy wastes at a rate of 15.9 cubic meters (4,200 gallons) per hour. Although these vessels will be the largest incinerator ships in the world, the size of each tank is far below the maximum size of 3000 cubic meters (792,471 gallons) allowed by the Intergovernmental Maritime Organization (chapter 5 of the Bulk Chemical Code, paragraph 5.1.2 for a type II chemical carrier). When the first of these vessels is delivered in 1984, the operators plan to use the Atlantic Ocean Incineration Site, located about one hundred and forty miles southeast of Cape May, New Jersey, designated by the U.S. Environmental Protection Agency in November 1982.

U.S. Government Efforts

A December 1978 report prepared by Global Marine Development, Inc. for the Maritime Administration, then of the U.S. Department of Commerce, determined that there is a significant demand for the services performed by incinerator ships. It estimates that the domestic market could support 4 large vessels with 12,000 metric tons (11,810 long tons) of waste capacity a piece by 1983 and 5 vessels by 1989[3].

A federal interagency review board exists to coordinate and expedite all Federal Government activities related to developing an incineration at sea capability in the U.S. Formed as an ad hoc work group in February 1980, its official designation has become the Interagency Review Board for the Chemical Waste Incinerator Ship Program." Participating agencies include the Environmental Protection Agency (EPA); the Maritime Administration (MarAd); the United States Coast Guard (USCG); and the National Bureau of Standards (NBS). Through the Title XI loan guarantee program, MarAd has guaranteed mortgages worth seventy five percent of the cost of the two Apollo vessels. SeaBurn, a subsidiary of Stolt-Nielsen, has applied to the Title XI program concerning the construction of an incinerator ship incorporating the conceptual design of a containership.

U.S. Hazardous Waste Problem

The term "hazardous waste", as defined in the Resource Conservation and Recovery Act (RCRA), means a waste, or combination of wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may: (1) cause, or significantly contribute to an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (40 CFR Part 261). The United States has a serious hazardous waste disposal problem. Wastes, inevitable by-products of manufacturing processes and chemical use in our industrial society, are generated in huge volume. Public health and the environment are threatened by a shortfall in disposal capacity and unsafe disposal practices. The Environmental Protection Agency (EPA) has estimated that tens of millions of tons of hazardous waste are generated annually across the nation. Many of these wastes are incinerable.

CONCEPTUAL DESIGNS

In most circumstances, the least costly method of moving a homogenous liquid cargo is in bulk form. Crude oil supertankers are an example of ships taking advantage of this fact. However, depending on the nature of the cargo, for instance if it is not homogenous or the shipment size is relatively small, liquid bulk cargo may be carried in product tankers (with a large number of smaller tanks) or chemical carriers (with a still larger number of still smaller tanks). If liquid hazardous waste is considered as another liquid bulk cargo, then the obvious conceptual designs resulting are crude oil tanker, product tanker or chemical carrier (with the inclusion of incinerators on each ship). Nevertheless, the regulations imposed or the tasks required to incinerate waste offshore, may constrain the disposal system to the extent that carriage of yet smaller parcels of waste is more efficient.

As alluded to above, a departure from the tankship concept may be in order if the parcel size or the tasks involved in transporting the cargo are exceedingly restrictive. To consider a conceptual design of an incinerator ship configured as a containership (incorporating an incinerator), it is helpful to review the origin of the containership. The containership evolved because shipowners perceived the economic advantage of loading break-bulk cargo into containers at the origin of a shipment and handling the container as a uniform package to the destination. Therefore, the containership design streamlines and standardizes the cargo handling system; and vastly improves the overall system economics. Since hazardous waste cannot necessarily be treated as a homogenous bulk liquid cargo, a containership concept may have considerable merit.

LOGISTICAL ALTERNATIVE

To understand which ship design would be most desired in the movement of liquid

hazardous wastes, it is necessary to consider the overall logistical system. Since the destination of all the liquid hazardous waste on the vessel is the EPA-designated ocean disposal site, emphasis can be placed on the movement of the cargo from its origin to its placement aboard the vessel.

A logistical system provides means for transporting wastes from waste generators' facilities to final open ocean incineration sites and for performing any waste preparation and temporary storage functions required enroute. A logistical system performs all functions required to get wastes aboard a vessel in a form which will allow their successful and legal incineration. At a minimum, a logistical system must include: 1) means of transporting waste from waste generators' sites to a port facility, such as truck, barge, or rail; 2) a port facility and 3) a vessel. If waste blending, preparation and temporary storage facilities are required, the logistical system must also incorporate such facilities.

Three categories of logistical systems could be used to support incinerator ship operations. There are no-infrastructure systems, integrated systems, and existing infrastructure systems represented diagrammatically in Figures 1, 2 and 3 respectively. The use of the term "vehicles" in these figures refers to either trucks, railroad cars or barges. However, in the near future the most probable alternative is the truck.

No-Infrastructure System

No-infrastructure systems minimize the investment in fixed facilities. Wastes accumulate at their sources and are stored in tank trucks or portable liquid containers. Full containers are transported to an existing port transfer facility which is not dedicated solely to incinerator ship operations. Wastes are not blended with wastes from other sources prior to incineration and so waste streams remain segregated. However, some volatile liquid such as diesel fuel may be added to containers to increase the energy content or to reduce the viscosity of wastes. Full containers are loaded aboard a vessel, or their contents are pumped into a vessel at the port transfer facility. Different land-based components of the system may be procured from suppliers under contract.

Integrated Systems

The integrated system employs a new "full-service" port facility where wastes are analyzed, stored and blended. One facility is dedicated to incinerator ship operations. Such a terminal facility would be equipped to convert some of the non-pumpable wastes to pumpable wastes through the use of solvents and/or heating.

One company will likely supply and operate (or control) all logistical support services. Wastes are transported to the new port facility where they are blended with compatible wastes to produce large volumes of waste of uniform consistency and composition. The port facility can be designed to handle waste arriving in virtually any shipment quantity and be capable of handling a diversity of waste types. Blended wastes are pumped from fixed storage tanks to a waiting vessel.

Existing Infrastructure Systems

Existing infrastructure systems employ existing port transfer facilities, which may not be dedicated solely to incinerator ship operations. In this way, they are like the no-infrastructure systems and require less new investment in port facilities than an integrated system. Existing infrastructure systems are like the integrated system, however, in that they permit waste blending and preparation to occur prior to loading a vessel, and they centralize storage of accumulating wastes at one (or a few) location(s). Blending, preparation and storage functions are performed at existing facilities separate from the port facility. Because available facilities will not have been specifically designed for incinerator ship operations, one would expect less flexibility than with the integrated system in terms of waste streams and shipment sizes which can be effectively handled.

In existing infrastructure systems, then, wastes are taken to a blending and temporary storage facility where they accumulate, and wastes from different sources are blended. Blended waste streams are later transported to an existing, streamlined port facility and are loaded onto a vessel. Different land-based services and components of the system may be procured from suppliers under contract.

THE BUSINESS STRATEGY

The Role of the Port

The role of the port may vary from a simple transfer point (e.g. a dock over which waste cargo is loaded aboard the vessel by pumps and hoses or a roll-on roll-off ramp), to a transfer point with limited storage capabilities (e.g. a marshalling area for liquid containers or fixed storage tanks) or to an extensive integrated facility with testing, blending and storage facilities. The type of role desired for the port will depend on the business strategy chosen, which will in turn depend on the market segment sought.

The total market for incinerator ships can be broken into a high and low value market (in terms of revenues per unit volume for ocean incineration firms). High value wastes have few disposal alternatives and/or their nature is such that they are highly politically sensitive. The high value market consists of wastes stored or stockpiled in government warehouses, private plants, transformers, or landfills deemed unsafe. The wastes in this market include PCB's, Silvex, DDT, and identified wastes from landfill clean-up.

In the low value market, prices are primarily determined by alternative, land-based methods of disposal. Large volumes of these wastes are routinely produced on a continuous basis by both manufacturing and non-manufacturing sources.

Interdependencies between Logistical Systems and Markets

The integrated system is appropriate for both the high and low value markets. The low value market is characterized by a diversity of waste stream compositions and production rates. The new full-service port facility provided by the integrated system is best equipped to accept this wide range of wastes and shipment sizes. Large capital investments are needed for the port facility and waste delivery network. Large volumes of wastes are required to justify these investments in dedicated fixed facility capacity; these volumes can be generated in the low value market.

The high value market can be served by systems requiring smaller investments, namely existing infrastructure and no-infrastructure systems. These systems are more restricted in the waste types and shipment sizes they can accept because they do not possess waste preparation, blending, and storage capabilities to the extent that the integrated system does. The existing infrastructure system may be attractive in the case of stockpiling of homogenous, politically sensitive, hazardous wastes. It is likely that only a limited number of waste types will compose the high value market during any given period of time and that shipments of each will be sizeable (because inventories exist). Consequently, the handling and processing of numerous wastes simultaneously is not required.

Advantages/Disadvantages of Systems

Table 1 relates the types of wastes to the needs of the logistical system. No one system is optimal for all situations. The choice of the logistical system must take into account the market characteristics, the availability of existing facilities and the impact of regulations at all levels of government.

A no-infrastructure system or an existing infrastructure system can be implemented faster than an integrated system, because they do not entail siting a new hazardous waste port facility. The no-infrastructure system does not permit waste blending or preparation prior to incineration, and thus, operations flexibility is sacrificed. The existing infrastructure system allows waste blending and preparation, but not to the extent offered by an integrated system. An integrated system can be designed to handle virtually any waste type and shipment quantity. However, an integrated system is the most capital-intensive, and consequently entails increased risk for investors.

IMPACT OF GOVERNMENTAL REGULATIONS

Legislation and regulations at all levels of government will affect the design of ocean incineration systems. In many cases these actions will be taken without any thought to ocean incineration but simply as a response to the national hazardous waste problem. Key factors influenced by government activities are: market size and composition, vessel design and operations, and port design and location.

Market

The amount of liquid hazardous waste in existence will depend on activities of the EPA. Any EPA actions to change the categorization of some waste from non-hazardous to hazardous, will increase the overall market for waste disposal. For example, if the EPA determines that certain liquids now in use (e.g. pesticides) can no longer be produced and exisiting inventories must be destroyed, such actions may increase the potential high value market for incineration systems.

On the other hand, government actions could lead to a smaller hazardous waste market. Government bodies could subsidize the use of waste exchanges where wastes are traded between companies that can each utilize the other's waste as a useful product. It is also possible, although unlikely, that wastes that are now legally declared hazardous, could be upgraded to non-hazardous wastes.

Government actions will also affect the market for ocean incineration if new legislation, or regulations, concerning the use of land fills (or other alternatives to ocean incineration) is implemented. In addition, incineration at sea requires processing and approval of permits by governmental bodies.

In the recent past, congress has considered legislation to restrict the current use of land fills for hazardous wastes. Many groups believe that increased funding for enforcement of existing laws is necessary to insure that hazardous waste is disposed of legally. With more funds for inspectors, existing hazardous waste treatment and disposal facilities could be checked for compliance with existing laws and inadequate businesses could be closed. Such actions would aid ocean incineration interests.

Government actions could also work against ocean incineration. Federal funds have been spent on research concerning mobile incineration units (e.g. the "fiery dragon"). This is one example of a competing technology of undetermined viability.

Implementation

Once a market is defined, government actions will also affect implementation of a business plan. Any delays in promulgating ocean incineration regulations or in processing ocean incineration applications could work against such interests.

At the present time there is only one EPA designated ocean disposal site in the Gulf of Mexico. EPA is in the process of designating another ocean incineration site in the Atlantic. Since current regulations dictate that only one incinerator vessel can operate within a designated site at any given time, there are potential logistical problems for competing ocean incineration companies.

Vessel & Port Design

The vessel and port design must be integrated into a chosen overall logistical system, which is, in turn, dependent on the business strategy. A key consideration is whether the desired logistical system requires the construction of a new port facility. On a state level, if a coastal zone management (CZM) plan has already been approved by the federal government, the state will require any new port facility to be consistent with their CZM plan. On the local level, residents near a proposed site (or along the truck route) for a new incinerator ship port facility will be almost certain to oppose it. In most cases state government officials will not fight against such opposition - - and may well join it. If the potential incinerator ship owner decides not to build a new port facility (i.e. an integrated system), he must use existing port facility (i.e. a no-infrastructure or existing infrastructure system). If the planned logistical system requires long term storage of waste at the port facility (e.g. fixed storage tanks), then a TSD (treatment, storage and disposal) facility permit is needed from EPA. Such a permit places certain burdens on the port facility operator in terms of insurance and monitoring (even for years after closure of the facility). Storage tanks used for waste in conjunction with incinerator ships would typically remain dedicated for such service and would not be used for other cargoes.

A TSD facility permit would not be required if the storage of waste at the facility is only temporary. For a carefully planned logistical system, trucks carrying waste could be coordinated to meet the incinerator at a designated port facility. Tank trucks could pump their wastes onto the vessel. Such a system would require repeated making and breaking hose connections and cleaning of the hoses for each trucks load. A quicker way would be to lift standard marine liquid bulk containers onto a vessel at any existing containerport. The choice of systems will determine whether the vessel is designed as a liquid bulk carrier (i.e. a chemical carrier) or a containership.

CONFLICT RESOLUTION

Ocean incineration has now become a controversial topic. Consequently, a company planning an ocean incineration system can expect to encounter some public opposition. MIT is developing a model on a personal computer that will hopefully aid public and private planners and decision makers in the identification and analysis of alternative logistical systems for ocean incineration.

One approach to the resolution of people's differences regarding the implementation of a system to incinerate hazardous waste offshore is to expose these people to the design options and attendant constraints for such a system. When these options and constraints are compared with one another, one or more feasible scenarios for realizing the system could be revealed.

Toward this end the model allows the user to evaluate a large number of alternative means for carrying out each of the steps composing a system designed to incinerate hazardous waste offshore. The set of alternatives presented is not exhaustive but represents most alternatives currently considered as viable plus some others. The basic idea is that, if a concerned citizen wishes to understand such a system and determine what sort of system meets with personal criteria for feasibility, then that person can use the model to help design such a system with "available" components. The model allows the user to specify incompatible components. This concept can be extended to several users with differing reasons for their interest in offshore incineration (public interest groups, investors, government regulators, etc.). Each of these users can design a feasible system, compare their systems and possilby negotiate a configuration which satisfies all concerned.

The data upon which decisions to use a particular alternative are based, include: Regulations, Risks and Background Information. Figure 4 provides a flowchart of the computer model.

The model allows the user to define the alternative components of the various stages of an ocean incineration system as identified in Table 2. Physical parameters of the logistical system will be input by the user or supplied by the model as default values.

In addition the model will provide: a table of regulations which detail the differences between the individual state regulations and the corresponding federal regulations delineating lawful handling of hazardous waste for each stage of the transportation and incineration process; a table of risks which are principally qualitative assessements of the dangers involved in handling hazardous waste and comparisons with familiar processes; and background information which does not fit into any of the above categories. This might include: pending legislation, state strategies for disposal of hazardous waste, state progress with the phasing in of compliance with federal legislation and regulations, political action groups and their recent activities and other relates information.

Functions The Model Can Perform

The model can hopefully serve the following purposes:

Education - anyone wishing to acquaint themselves with the problem of transporting and incinerating hazardous waste offshore can

do so by working with the model to learn about the problem.

Communication - since it is difficult to discuss and conceptualize a system which does not exist, a model of the system and relevant information will help people communicate with one another when discussing the problem/system.

Conflict Resolution - assuming that there is disagreement about the best way to implement the type of system in question, the improvement in communication and understanding afforded by the model will help to identify mutually compatible solutions and/or identify the exact points of disagreement so a solution can be negotiated.

Conflict Avoidance - the planners of systems designed to transport and incinerate hazardous waste offshore can use a model to hold open discussions with the members of the host community to determine their exact concerns and how to acceptably address these concerns before an attempt to locate hazardous waste processing facilitates.

Design Analysis - the model can be used to perform conceptual design of the transportation system to fit the needs of hazardous waste producers and as mentioned, address the concerns of people affected by the implementation of such a system.

Structure The Problem In A Meaningful Way - one difficulty in dealing with a problem of this nature is to conceptualize a system which does not currently exist. By setting forth alternatives which are physically possible the user can concentrate efforts on dealing with systems which can exist rather than spending valuable time on systems which are physically or legally impractical.

Analysis Of Alternatives, Feasibility And Infeasibility - the model is set up to allow the user to choose among several alternative means for accomplishing each of the transportation and processing tasks associated with the incineration of hazardous waste offshore. The model also keeps track of which alternatives are compatible with one another so that once a particular alternative is chosen, the choices available in other stages of the system may be limited.

Wholistic System Design - it is intuitively reasonable to think that a system designed to carry out a particular function will perform better than a series of components which somehow combine to perform the same task. An inherent feature of the model is that it prevents the user from combining incompatible components. Consequently, the user is forced to consider the perspective of the overall system in his design.

CONCLUDING COMMENTS

Three new incinerator vessels have been designed and constructed (or are nearing delivery) for use in U.S. waters. Several more are in the planning stages.

To what extent these vessels will operate profitably is still unknown. However, it is certain that actions at all levels of government will play a key role in the success of these vessels. Government activities will also influence the design of future incinerator ships and their related logistical systems.

Hopefully the computer model described in this paper will aid public and private planners and decision makers in formulating and evaluating alternative logistical systems.

FOOTNOTES

1. The information for this subsection was taken from "A Maritime Antidote for Hazardous Wastes" by Jeffrey E. Stoll, Surveyor, American Bureau of Shipping, February 1983.

2. Ibid.

3. Global Marine Development, Inc., A Study of The Economics and Environmental Viability of A U.S.-Flag Toxic Chemical Incinerator Ship, December 1978.

ACKNOWLEDGEMENTS

Much of the information for this paper is based on the study, Logistical Systems To Support Ocean Incineration of Liquid Hazardous Wastes by Henry S. Marcus and Charles T. Daniel, Massachusetts Institute of Technology, August 1982 under contract number MA-81-SAC-10060 for the Maritime Administration as well as Planning A Port Interface For An Ocean Incineration System by Henry S. Marcus and Maurice A. Glucksman, now in process at MIT under contract number DTMA91-84-C-41022 for the Maritime Administration.

TABLE 1 THE NEED FOR BLENDING AND PREPARATION OF WASTES PRIOR TO INCINERATION

NO BLENDING	MUCH BLENDING
WASTE SPECTRUM	
· UNIFORM COMPOSITIONS	· DIVERSE WASTES
· UNIFORM BTU CONTENTS	· VARYING BTU CONTENTS
· LARGE SHIPMENTS/RAPID	· SMALL SHIPMENTS/SLOW
· GENERATION RATES	· GENERATION RATES
NO ADVANCE PREPARATION	MUCH ADVANCE PREPARATION
WASTE SPECTRUM	
· BULK WASTES	· WASTES IN BARRELS (DECANTING REQUIRED)
· PUMPABLE WASTES	· VISCOUS WASTES (ADD SOLVENTS AND/OR HEAT)
· NO SUSPENDED SOLIDS	· SUSPENDED SOLIDS (REMOVE SOLIDS)
· NON-CORROSIVE WASTES	· HIGHLY CORROSIVE WASTE (REDUCE CORROSIVITY)

Table 2 Alternatives Possible at Each Logistical Stage of the Model

1. Waste Generator
   - A. Industrial plant
   - B. Treatment and storage facility
2. Delivery Mode to Port
   - A. Truck
     - i. Marine liquid bulk container on flatcar
     - ii. Rail truck car
   - C. Barge
     - i. Marine liquid bulk containers on deck barge
     - ii. Liquid bulk barge
3. Port Facility
   - A. Liquid Bulk Terminal
     - i. With fixed storage tanks
     - ii. Without fixed storage tanks
   - B. Container Terminal
   - C. Roll-on Roll-off Facility
4. Type of Vessel
   - A. Tanker Design with Incinerator
   - B. Tanker Design without Incinerator
   - C. Containership Design with Incinerator
   - D. Containership Design without Incinerator
   - E. Roll-on Roll-off Vessel Design with Incinerator
   - F. Roll-on Roll-off Vessel Design without Incinerator
5. Possible Use of Offshore Platform
   - A. Floating
   - B. Fixed
6. Type of Incinerator
   - A. Continuous Injection
   - B. Rotary Kiln

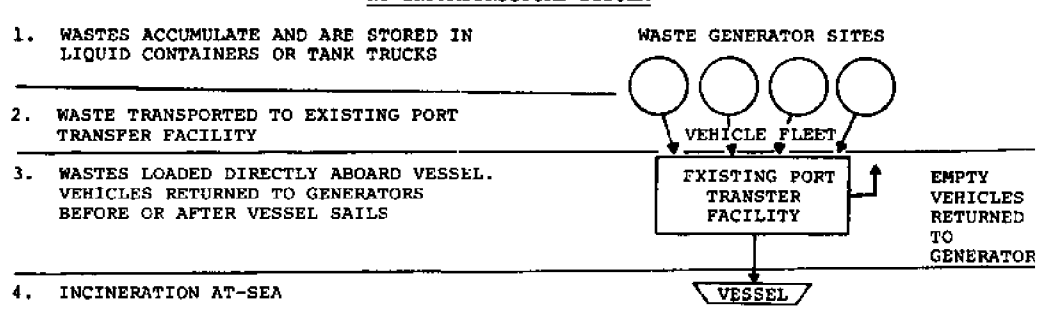

FIGURE 1

INTEGRATED SYSTEM

1. WASTES PICKED UP AND TRANSPORTED DIRECTLY TO NEW, FULL-SERVICE PORT FACILITY
2. WASTES ARE BLENDED AND STORED WHILE AWAITING LOADING
3. WASTES LOADED ADOARD VESSEL
4. INCINERATION AT-SEA

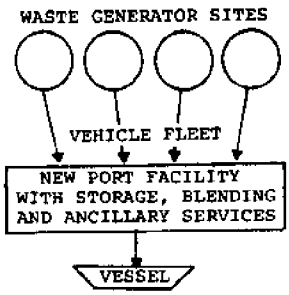

FIGURE 2

EXISTING INFRASTRUCTURE SYSTEM

1. WASTES PICKED UP AND TRANSPORTED TO EXISTING BLENDING AND STORAGE FACILITY
2. INTERMEDIATE BLENDING AND STORAGE OF WASTES PROVIDED
3. WASTES TRANSPORTED TO EXISTING PORT TRANSFER FACILITY
4. WASTES LOADED DIRECTLY ABOARD VESSEL
5. INCINERATION AT-SEA

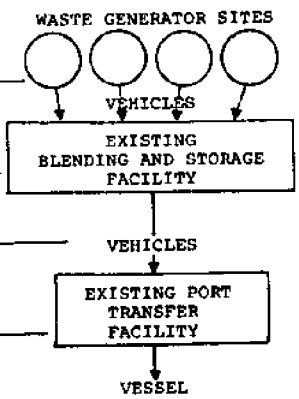

FIGURE 3

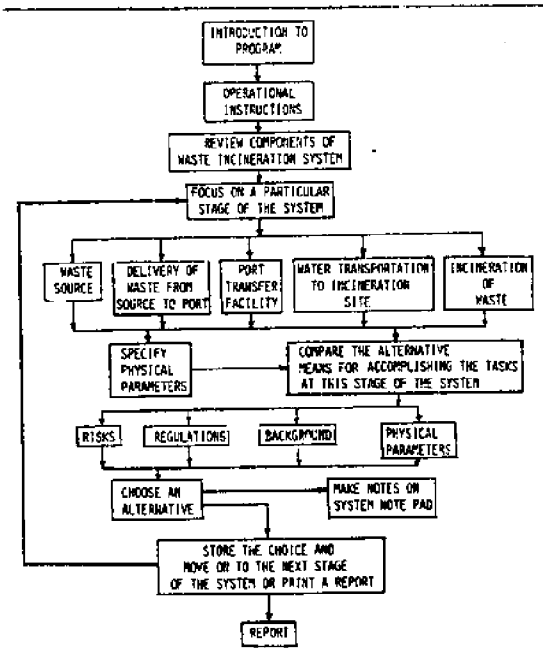

Figure 4

MODEL OPERATION

Outer Continental Shelf Conflicts

OUTER CONTINENTAL SHELF CONFLICTS

by

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Controversies over oil and gas development on the Outer Continental Shelf ("OCS") have tended to be highly charged, emotional, and difficult to compromise. I would like to suggest several reasons why this has been the case and why existing statutory mechanisms, designed to ensure coordination and conflict resolution, have not worked as effectively as they might. Finally, I would offer one or two alternatives which might succeed in fostering consensus where none has previously existed.

I.

The Nature of the Problem

Conflicts over OCS oil and gas development have often pitted various coastal constituencies against the oil companies and, in a number of cases, pitted the state against the federal government. Conflicts have been protracted and intractable. Some of the reasons for this situation are:

a) OCS development upsets traditional notions of state sovereignty and state and local prerogatives, i.e., that when there will be major development along the coast, the state and/or local communities will be able to control that development through coastal planning, zoning and other governmental mechanisms.

b) OCS development conflicts tend to be largely symbolic in nature, with visions of industrialized, developed coastline contrasted, in many cases, to existing rural, scenic and/or recreational areas. Controversies over leasing in Central and Northern California typify this clash of contrasting visions.

c) OCS oil and gas development carries with it the risk of catastrophic accident. However small this risk may be, it may be unacceptable to coastal communities and coastal constituencies.

d) Dramatic oil spills of the past, i.e., Santa Barbara, the Amoco Cadiz, Ixtoc I, reinforce public concern about the risk of catastrophic incident. Dead seabirds and tar-coated beaches following the 1969 Santa Barbara spill remain a vivid image in the public mind.

e) There are public doubts, which are difficult to dispel, about the effectiveness of OCS technology in reducing risks. Uncertainty associated with the biological hazards of the disposal of drill muds and cuttings is a case in point. At the same time, there are often real issues of environmental concern, i.e., protection of lobster habitat in Georges Bank or sea otter habitat in California.

f) Opponents of offshore drilling, i.e., fishermen's groups, recreational and tourist industries, agriculture, perceive themselves as having little to gain from OCS development. At the same time, these opponents fear that OCS development will squeeze out the uses in which they have an interest, thus directly threatening their livelihood. Finally, coastal communities may see development only as creating a "boom or bust" economy.

II.

Adequacy of Existing Coordination Mechanisms

Existing mechanisms of coordination are of questionable effectiveness. Indeed, they may tend to encourage, rather than deter, litigation.

a) A complex legal framework governs OCS oil and gas development. Relevant statutes include the Outer Continental Shelf Lands Act (especially Section 19), the Coastal Zone Management Act (especially Section 307), the National Environmental Policy Act, the Endangered Species Act, the Clean Air Act, the Clean Water Act, etc.

b) This complex statutory structure necessarily creates opportunities for litigation and legal gamesmanship. Various statutory requirements often are viewed simply as hurdles to be overcome by the federal government and as an arsenal of weapons to stop development by constituencies in coastal states. Because of the complexity of the scheme, moreover, there is almost always a colorable claim which can be made to challenge developmental decisions.

c) Policies of the last several years have raised questions about the good faith of those within the government responsible for the OCS leasing program, leaving coordination mechanisms such as Section 19 in disrepute. Former Secretary Watt's 1981 decision to "reconsider" leasing rejected by the Carter Administration, after extensive discussions with the state, in four basins off the coast of Northern California, particularly aggravated state mistrust of the Interior Department.

d) The success of opponents of development in obtaining Congressional moratoria, such as that embodied in the FY 1984 Department of the Interior Appropriations Act, has reduced the incentives to negotiate within the established legal framework.

III.

Alternatives For The Future

It is problematic whether conflicts over OCS oil and gas development can be significantly dampened and a real dialogue created. Several initiatives, however, might serve to reduce the level of controversy:

a) Creation of an OCS revenue sharing system, such as that embodied in S.2463, the Ocean and Coastal Resources Management and Development Block Grant Act (approved by House-Senate Conferees in September, 1984), so that the states and constituency groups would have an economic stake in OCS development;

b) Creation of a regional planning process, similar to that used for coal development, which would ensure that state and regional concerns have a major impact on setting leasing goals and determining which areas should be leased and developed; or, alternatively, creation of a joint state-federal decision - making body, including all states affected by development in a particular region, similar to the Regional Fishery Management Councils which implement the Magnuson Fishery Conservation and Management Act;

c) Commitment of greater resources to a strengthened environmental assessment program in order to help allay public fears and provide a sound underpinning for leasing decisions; and

d) A hands-off policy in Congress, reflecting a legislative commitment to let things work out within the existing legal structure.

OCS Lease Sale Litigation: Can It Be Avoided?

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The efforts of the United States government, carried out by the Department of the Interior (DOI), to make available for exploitation federally-owned Outer Continental Shelf (OCS) lands has led to the filing of nearly 30 federal lawsuits within the last 10 years. Recognizing its potential to disrupt the OCS program, Congress in 1976 and 1978 adopted comprehensive legislative amendments designed in significant part to avoid OCS litigation. However, such litigation has intensified.

This paper will discuss this OCS litigation experience, detail the measures which Congress adopted in an attempt to avoid it, report their limited success and more frequent failure, and consider alternative means of avoiding litigation.

1. THE HISTORY OF OCS LEASING LITIGATION

The Pre-1974 Experience

Prior to 1969, there was little public awareness of the federal OCS leasing program. Between the passage of the 1953 OCS Lands Act (OCSLA) and January 1, 1969, 23 OCS lease sales were conducted, about 6,000,000 acres were leased, and over $3,000,000,000 was collected by the United States in bonus bids.1/ Although the bulk of the leased lands were off Louisiana (and to a lesser extent Texas), DOI conducted lease sales off Florida, California (including the basins north of San Francisco), and Oregon/Washington. Notwithstanding the magnitude of the program during this era, there was not a single lawsuit challenging OCS leasing.

However, in January of 1969, a well being drilled in the Santa Barbara Channel off California blew out causing a large (approximately 100,000-barrel) oil spill. The Santa Barbara oil spill made the general public aware of offshore oil and gas leasing and its potential for disruption of the environment. Moreover, this incident led to a heightening of public concern with protection of the environment and helped precipitate the passage of the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321, as well as other environmental laws.

It was not long before a "public interest" plaintiff invoked NEPA to challenge an OCS lease sale. In NRDC v. Morton, 458 F.2d. 827 (D.C. Cir. 1972), the court ruled that the 67-page environmental impact statement (EIS) prepared for a Louisiana OCS lease sale was inadequate under NEPA because it ignored several alternatives to the project. Accordingly, the court enjoined the sale, and it was not conducted until about nine months later after the EIS was supplemented in this and other respects. Until this and a few similar rulings in non-OCS cases in 1971-1972, it was not clear whether the courts would interpret NEPA in a fashion which constrained federal agencies.

The 1974 "Acceleration" of OCS Leasing

The Santa Barbara Oil Spill, the passage of NEPA, and the courts' clarification of the Act's requirements came on the eve of a massive change in the federal OCS program. During its first 20 years, the United States had been essentially self-sufficient in energy and concentrated OCS leasing largely in the Gulf of Mexico, where the activity was well understood and enjoyed significant public support, and the Santa Barbara Channel. (The early Florida and Northern California/Oregon/Washington sales did not result in successful exploration.)

However, after the nation experienced the disruptive effects of the first "Arab oil boycott," the OCS program was "accelerated" to offer far more acreage and thereby make a greater contribution to national energy independence. The goals of the accelerated leasing program could be achieved only by opening up "frontier" OCS areas off the Atlantic Coast, Alaska, and California.

The first "frontier" lease sale on the new accelerated program involved tracts off the coast of Southern California, and both the program and that sale were challenged by California. California ex. rel. Younger v. Morton, 404 Fed. Supp. 26 (C.D. Cal. 1975), appeal dismissed, 608 F.2d 1247 (9th Cir. 1979). California's challenge was rejected by the court under a rationale which suggested plaintiffs would have a difficult time in securing judicial relief against OCS sales in an era of acute energy shortages:

"Plaintiffs do not attempt to argue that the United States does not face an energy crisis. Rather, theirs is an urging to use some other frontier for undersea experimentation and to come to California's shores only when a fail-safe process has emerged. This short-sightedness fails to take into account the great developmental strides that have brought to the oil industry practiced techniques in platform drilling and improved methods of oil capture." 404 F. Supp. at 30.

Despite this rebuff, virtually every effort to implement the accelerated program by leasing in frontier areas has resulted in litigation:

Frontier Planning Area	Lease Sales Scheduled	Lease Sales Litigated
North Atlantic	4*/	4*/
Mid-Atlantic	5	3
South-Atlantic	3	1
California (Southern, Central, not including Santa Barbara Channel)	4	4
Alaska (Gulf of Alaska, Cook Inlet, St. George Basin, Navarin, Norton, Diapir/Beaufort)	12	6
Total	28	18 [2]

*/ Sale No. 42, which was first scheduled for January 1978 and then rescheduled for November 1979, was challenged on both occasions and is counted twice. This figure also includes Sale No. 82, which is scheduled to take place on September 26, 1984. On September 6, Massachusetts sued to enjoin that sale.

Lawsuits were instituted for the first lease sale in all but two (South Atlantic and Navarin) of the 11 frontier regions outside the Gulf of Mexico and Santa Barbara Channel.

Moreover, leasing in the Gulf of Mexico has not proceeded wholly without litigation challenge. Of the 27 sales conducted there since 1972, five were attacked in litigation. Two suits raised NEPA issues (one of which involved frontier leasing in the Eastern Gulf of Mexico), while the other three sales were challenged by Texas and Louisiana in connection with their continuing dispute with DOI over the division of revenues on federal lands leased immediately offshore State submerged lands.

Finally, there have been five separate challenges to the leasing program as a whole. In addition to the 1974 California case already described, two separate proceedings were instituted in the D.C. Circuit, complaining first of Secretary Andrus' 1980 five-year leasing schedule and then Secretary Watt's 1982 schedule. Also, two separate injunctions were sought in 1979 and 1980 against all subsequent OCS lease sales based upon a challenge to the royalty provisions contained in OCS leases.

Thus, since accelerated leasing was approved in 1974, there have been nearly 30 lawsuits challenging either individual lease sales or various aspects of the leasing program. However, during this era only one sale, No. 52 (North Atlantic, 1983) has been canceled as a result of an injunction. In another, No. 68 (Southern California 1982), about 25 tracts out of more than 100 were never leased. One sale (No. 42, North Atlantic 1979) was postponed 22 months. All others were held on or within a month of their scheduled dates, although in six instances there were delays, ranging from a few weeks to more than two years, in the actual award of leases as a result of litigation obstacles. In two of these cases (No. 53, Central California 1981; No. 76, mid-Atlantic 1983) the delay in final execution of the leases pertained to only a few of the tracts included within the sale.

2. CONGRESS' EFFORTS TO STRUCTURE THE OCS PROCESS TO AVOID LITIGATION

The accelerated leasing program, coupled with heightened national concern with environmental issues, resulted in a reassessment by Congress of the adequacy of the OCSLA as a legislative framework for the OCS program. Moreover, in 1972 Congress had passed the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451, to encourage States to commence comprehensive planning with respect to activities in or affecting their coastal zones. By the mid-1970s, the States were on the verge of adopting CZMA programs implicating OCS projects. Accordingly, Congress undertook a comprehensive review of the OCS program and of the CZMA insofar as it might affect that program.

By this time, there had already been a number of litigation challenges to OCS leasing: The first Atlantic sale had been challenged in lawsuits which led to three opinions of a U.S. Court of Appeals and two efforts to invoke Supreme Court review;3/ the first Alaska OCS sale had been challenged;4/ the first sale in the Eastern Gulf of Mexico had been sued upon;5/ and California had initiated the challenge to the accelerated program and to leasing off its southern shore.6/

Congress was thus aware of and deeply concerned with the potential of litigation to disrupt OCS leasing. As one court recently described Congress' intention in this regard:

"Litigation and, especially, delay from litigation were to be discouraged -- particularly at the pre-development, pre-exploration leasing stage, where the chances of harm to the environment are slim."7/

Under the 1953 OCSLA, there had been no assured means for DOI to regulate OCS activities, once leases were issued. In the aftermath of the Santa Barbara spill, DOI had attempted to suspend indefinitely operations in the area, giving rise to a challenge by lessees who successfully contended that they had a "vested right"

to proceed with exploration, development and production which could be taken only pursuant to condemnation proceedings. Union Oil Co. v. Morton, 512 F.2d 743 (9th Cir. 1975).

Congress realized that if OCS lessees could proceed with development, even in the face of significant environmental risks, it would be necessary, at the leasing stage, to explore thoroughly all of the issues which might later arise during the 20- or more year life of an OCS project. It would also be necessary to impose stipulations in the leases to allow regulation of post-leasing activities -- i.e., exploration and development/production -- and invite litigation, at the leasing stage, over the adequacy of the environmental analysis undertaken and safeguards adopted. To avoid such leasing disputes, Congress divided OCS projects into a number of stages and assured DOI comprehensive control of all aspects of OCS projects.

This, it was expected, would lead State governments and others to take a less rigorous view as to the environmental constraints applicable to the leasing stage itself and thus would diminish lawsuits aimed at OCS leasing. As the Supreme Court recently held:

> "Congress has thus taken pains to separate the various federal decisions involved in formulating a leasing program, conducting lease sales, authorizing exploration, and allowing development and production. Since 1978, the purchase of an OCS lease, standing alone, entails no right to explore, develop, or produce oil and gas resources on the OCS. . . . The stated reason for this four part division was to forestall premature litigation regarding adverse environmental effects that all agree will flow, if at all, only from the later stages of OCS exploration and production."8/

In large measure, the 1976 and 1978 amendments litigation-avoidance mechanisms rested on this division or staging of OCS projects.

1976 CZMA Amendments

The 1972 CZMA had not "provide[d] for the problems that States began to anticipate in connection with increased energy-related activities in the coastal zone" and gave the States "no part in any decision concerning development on the [OCS]. . . ."9/ In 1976, Congress addressed that deficiency by amending the CZMA to require that the programs developed under that statute recognize the national interest in OCS and other coastal-dependent energy projects.

At the same time, Congress clarified the powers granted to States under the CZMA by providing that they could insist that the exploration or development/production activities of OCS lessees were conducted in a manner "consistent" with their CZMA programs: Subject to a limited review authority by the Secretary of Commerce, under the CZMA, States can veto any activities "affecting any land use or water uses" in their coastal zones to the extent that they do not comply with the provisions of their federally-approved CZMA programs. Section 307(c)(3)(B), 16 U.S.C. § 1456(c)(3)(B). In making this adjustment to the statute, Congress specifically rejected an amendment which would have extended State CZMA authority to the leasing stage of the OCS process.10/

The 1978 OCSLA Amendments

The 1976 amendments to the CZMA anticipated the restructuring of the OCS process which resulted from the 1978 amendments to the OCSLA. In Sections 11 and 25 of those amendments, 43 U.S.C. §§ 1340, 1351, Congress gave DOI explicit authority to disapprove the exploration and development/production stages, notwithstanding the prior issuance of an OCS lease. Moreover, recognizing that it is the final development/production stage which presents the first realistic threat of harm to the environment, Congress required DOI to publish a development-stage EIS at least once for every frontier region before approving development/production, Section 25(e), and specifically empowered the Secretary to disapprove this stage if it presented an unreasonable threat of harm or damage to the environment, Section 25(h)(1)(D).

The framers of Section 25 of the OCSLA regarded it as "one of the most important provisions of the . . . amendments."11/ The importance that Congress attached to Section 25 was directly related to the desire to avoid litigation at the leasing stage of an OCS project:

> "The failure to have such a mechanism in the past has led to extensive litigation prior to lease sales, when onshore and environmental impacts of production activity are not yet known."12/

The 1978 OCSLA amendments also sought to discourage litigation by creating consultation opportunities for affected State governments and others at early stages of the OCS process. Congress added Section 18 to the OCSLA, 43 U.S.C. § 1344, which requires DOI to publish a five-year schedule indicating its general plans for OCS leasing. In addition to considering a variety of environmental, geologic, economic, and other factors, DOI is required to receive "comments" from the States, as well as other interested parties, and give Congress an opportunity to exercise oversight prior to DOI's final approval of the program.

Section 19 was also added to the Act, 43 U.S.C. § 1345, requiring DOI to abide by "recommendations" from governors of States affected by OCS leasing as to the "size, timing, or location" of a lease sale, unless the Secretary determines that those recommendations do not provide for an adequate balance between State and national interests. Section 19 makes the Secretary's determination in this regard "final," subject only to an arbitrary or capricious standard of review.

Finally, Section 8(g) was added to the Act, 43 U.S.C. § 1337(g), to deal with the special problem of leasing federal OCS

lands immediately adjacent to States' submerged lands, where there are common "pools" or "fields" in which both the State and federal government have a proprietary interest. That this section was designed to avoid litigation at the leasing stages is clear from its terms: The Secretary is authorized to proceed with leasing of an area pending consultation with the State as to a "fair and equitable" disposition of revenues from federal leases involving such common pools or fields. Section 8(g)(3). Should such consultation fail, a federal court is empowered to resolve this issue. Section 8(g)(4).

Thus, in a variety of ways, Congress in 1976 and 1978 sought to anticipate and avoid disputes between the States, as well as other parties, and the federal government over OCS leasing. As it turned out, the mechanisms adopted by Congress in this respect have not reduced litigation.

3. POST-1978 LITIGATION EXPERIENCE

Although, as mentioned, a number of the OCS lawsuits preceded Congress' amendments of the OCSLA, the majority of the 30 or so cases that have been filed in the past 10 years have come in the aftermath of those amendments. The litigation posture adopted by Massachusetts and an allied environmental group in connection with Sale No. 42, the first offering of tracts in the North Atlantic, first revealed that the 1978 amendments might not reduce litigation in the manner anticipated by Congress.

The Massachusetts suit was filed in January 1978 just prior to the adoption of the OCSLA amendments. The principal claim made, at that time, was that DOI had erred by authorizing the sale during the pendency of those amendments: Plaintiffs argued that the Secretary should have awaited passage of the amendments, whose essential nature was then known since comparable bills had passed both the House and Senate, in order to acquire new regulatory authority to protect the Georges Bank fishery. The district court accepted this argument, finding "a violation of this duty in the Secretary's permitting of sales to take place before enactment of the legislation that would authorize several important safeguards designed to protect fishing."13/

The injunction entered by the court on this theory was ultimately vacated as moot, after the passage of the legislation.14/ However, plaintiffs did not thereafter abandon their attack upon Sale No. 42, but instead broadened it to allege new violations of NEPA, the Endangered Species Act (ESA), 16 U.S.C. § 1531, and to introduce issues under other federal statutes.15/

The post-1978 litigation surge of which the Sale No. 42 case was merely a prelude did not result from any newly discovered evidence as to the risks of OCS leasing. Even those plaintiffs who have traditionally opposed OCS leasing do not claim that the increased data accumulated with additional OCS leasing experience demonstrates that it poses greater risks than were previously suspected; the argument which they have advanced in many cases is that, notwithstanding the accumulation of more knowledge about the process, we still do not know enough to be assured that OCS activities are as risk-free as they believe appropriate.

Similarly, technology does not explain the litigation. There has been continued improvement in this regard and continued toughening of regulatory standards to ensure that OCS operations are conducted in an environmentally sound manner. Although Secretary Watt received criticism from many quarters with respect to his handling of the OCS program, little, if any, of that criticism suggested a loosening of government regulation in this respect.

Also, accumulating U.S. experience with the OCS program cannot explain an increase in litigation. The Santa Barbara spill occurred in 1969, and another major spill occurred well offshore in 1970 as a result of a pipeline rupture. From that date to the present there have been no major oil spills on the U.S. OCS. (Such spills have occurred in foreign waters, most notably the so-called Ixtoc or Campeche spill off Mexico.)

Explanation for the litigation explosion seems to lie elsewhere. Although Secretary Andrus continued to be pursued by those opposing North Atlantic leasing and, indeed, suffered his entire leasing program to be declared at least partially unlawful in proceedings instituted by California, Alaska, and others, it was not until Secretary Watt assumed office that OCS litigation mushroomed to its present proportions. This was not due entirely to the more aggressive leasing policies adopted by Secretary Watt, although some of the cases flowed from those policies -- e.g., the attack on Sale No. 76, the first area-wide lease sale in the Atlantic.16/

Many of the decisions which he made that were later attacked in litigation were merely ratifications of earlier planning decisions made during the Andrus years. For example, prior to leaving office, Secretary Andrus had tentatively decided to include within a Central California leasing proposal sea-otter habitat tracts which California argued were inconsistent with its CZMA program when Secretary Watt decided to lease them. Similarly, Secretary Watt proceeded with leasing in the Norton and St. George Basins of the Bering Sea, at the same scale that Secretary Andrus had previously proposed. Moreover, the dispute under Section 8(g) that has led to three separate lawsuits involving Louisiana and Texas first arose in the Andrus years immediately following the passage of the 1978 amendments.

At least part of the explanation for the post-1978 litigation explosion is the amendments themselves in the sense that they articulated new legal requirements against which DOI's conduct could be challenged. For example, two attempts were made to enjoin all OCS leasing based upon new provisions added to Section 8(a), 43 U.S.C. § 1337(a), which directed the Secretary to experiment with new bidding systems to achieve the "fair market value" goals of the statute. Twice it was

alleged, ultimately without success, that Secretary Andrus was not making sufficient progress with such experimentation to achieve the goals of the Act.17/

On two other occasions, States and others invoked newly enacted Section 18 of the OCSLA, which was designed to assure States' early involvement in the five-year planning process for OCS leasing, contending that the factors which it required the Secretary to consider had not been adequately evaluated.18/ Thus, far from avoiding litigation by giving the States an early opportunity for input, adoption of Section 18 merely gave them an earlier litigation opportunity prior to the leasing stage of an OCS project.

The Section 8(g) suits filed by Texas and Louisiana have already been mentioned. Unable to come to an agreement with the federal government on a "fair and equitable" division of revenues for the leasing of tracts contiguous to those owned by the States, Louisiana and Texas predictably turned to the courts for injunctive relief against lease sales.19/

The Section 19 consultative process ensuring that great weight be given to gubernatorial recommendations with respect to the "size, timing and location" of leasing has on at least four occasions prompted strongly-pressed claims for injunctive relief. California and Massachusetts have both claimed twice that the Secretary's failure to accept their recommendations, in toto, constituted a violation of the statute justifying injunctive relief against all or part of a lease sale.20/

Thus, the very provisions of the OCSLA which Congress hoped would avoid litigation have often provided the necessary legal foundation for challenging OCS lease sales. However, the most vivid illustration of the failure of the OCSLA amendments to achieve their goal of reducing litigation are the seven lease sales which were challenged under the CZMA.

Several of those cases presented pure issues of law which challenged, ultimately without success, Interior's interpretation of that statute as not applying to the OCS leasing stage.21/ Others challenged the adequacy of the CZMA "consistency" determinations made for OCS sales by Interior, prior to the Supreme Court's decision that the CZMA does not apply to OCS leasing.22/ All of these suits were based upon the premise that the leasing stage itself is so significant in defining the risks posed by an OCS project to the coastal zone that CZMA review of the leasing stage is required. In all these cases, States rejected the view that the stage-by-stage division of an OCS project accomplished in the 1976 CZMA and 1978 OCSLA amendments made it unnecessary to have strict scrutiny of the environmental or coastal zone impacts at the leasing stage.

Thus, despite all of its efforts to reduce litigation at the leasing stage of an OCS project, Congress did not succeed in achieving this goal. The rest of this paper will focus on one aspect of the 1978 amendments, Section 19 of the OCSLA, to illustrate the success and failures of the consultative process which it established, as well as possible alternative processes.

4. ALASKA -- THE CONSULTATIVE SCHEME AS ENVISIONED

Because of its shape and size, the State of Alaska is surrounded by abundant OCS acreage. DOI speculates that Alaska's OCS contains 55% of all "promising" OCS oil and gas acreage.23/ Happily, the Section 19 consultative scheme has operated in Alaska as Congress envisioned.

Sale No. 87 (Diapir Field/Beaufort Sea)

The most recent example of the operation of the consultative scheme is Sale No. 87, which was conducted on August 22, 1984, without litigation challenge. The absence of legal controversy over the sale by no means implies a lack of serious environmental issues. To the contrary, the Beaufort Sea is the avenue through which an entire population of endangered bowhead whales passes in both spring and fall. Moreover, Sale No. 87, the first area-wide offering in the Beaufort Sea, for the first time involved the leasing of tracts in the Eastern Beaufort, which may be a bowhead whale feeding area. The normal sensitivity of conducting OCS operations which have the potential to affect an endangered species is heightened in the Beaufort Sea, given the cultural and subsistence dependence of the Inupiat Eskimo upon the bowhead.

Had Sale No. 87 been the first offering in the area, litigation would have been far more likely. However, the lawsuits brought against the first two Beaufort Sea offerings, both of which focused upon bowhead whale-related issues, did not succeed. In North Slope Borough v. Andrus, 642 F.2d 589 (D.C. Cir. 1980), the court upheld the initial offering of tracts in the Beaufort Sea, notwithstanding Endangered Species Act and other claims, by stressing Interior's continuing regulatory authority over OCS projects at the subsequent exploration and development/production stages.

In North Slope Borough v. Watt, 20 ERC 1457 (D. Alaska 1984), litigation against the second Beaufort Sea lease sale failed where the issue was the sufficiency of exploration-stage measures to protect the bowhead from the risks of an oil spill. The court held that those risks were so small that Secretary Watt did not abuse his discretion in allowing exploration in all but the two months of the year when the bowhead whale is in the immediate vicinity of drilling rigs. Thus, while the environmental issues presented by the sale were significant, the applicable law was not favorable to potential plaintiffs.

Beyond that, Secretary Clark, newly installed in office as the Sale No. 87 leasing proposal was being refined, showed great flexibility in his dealing with both State and local officials. Even before given an official opportunity to submit comments under Section 19 of the OCSLA, Alaska's Governor Sheffield advised the Secretary that a significant portion of the leasing area north and west of Barrow, which was thought to have relatively low oil or gas potential, should be deleted from the sale in the light of special environmental risks. Secretary Clark

announced before the Section 19 process even began that the sale would be so restructured.

Other factors played an important part in avoiding litigation. Both the State and local governments had a significant stake in the project. Leasing in the Beaufort Sea has, in effect, been an extension of on-shore leasing in Alaska and off-shore leasing in Alaskan waters. The State has received immense revenues from these lands; all Alaskans are aware of the direct benefits that they receive from oil and gas activities. Moreover, some of the lands which have been involved in all three Beaufort Sea lease sales are subject to a suit pending in the United States Supreme Court which will adjudicate whether they are owned by the federal or state government. While every coastal State has a Section 8(g) interest in the leasing of lands contiguous to those which it owns, Alaska has a special interest in Beaufort Sea lands in the light of its title claim.

The North Slope Borough, the governmental entity that spans North Alaska, also will share in the economic success of offshore leasing there. Unlike Massachusetts, which has seen the infrastructure for North Atlantic leasing placed in neighboring Rhode Island (a State which vigorously wooed the offshore industry), the Borough has tax and economic benefits associated with commercial development in the Beaufort Sea. While the Inupiat Eskimo, who constitutes the vast majority of the Borough's population, has a strong interest in preserving the bowhead whale, he also has an interest in the enhanced governmental services and economic activity that flow directly from offshore leasing in the Beaufort Sea.

With the issues in this posture, it is not surprising that the Section 19 process, in which not only the Governor but also the North Slope Borough's representatives were involved, avoided litigation. The issues between the two sides, following Secretary Clark's early deletion of areas identified by the Governor, focused upon the conditions to be imposed on exploration in the Eastern portion of the leasing area. The State and the Borough desired to have a moratorium on exploration there, pending the completion of studies concerning the area's importance as a feeding ground for bowhead whales.

Ultimately, that issue was resolved by the adoption of language in the final sale notice which advised potential lessees first that Alaska would consider information obtained from the pending studies when evaluating whether subsequent exploration and development plans are consistent with Alaska's CZMA program; and second that DOI itself would consider the results of these studies in determining whether to approve exploration plans under Section 11 of the OCSLA. Apparently, the State and local governments were ultimately willing to accept this outcome because of their perception that DOI was acting in good faith when it stated that it would pay serious attention to these studies.

Other Alaska Sales

The concord between Alaska and DOI with respect to Sale No. 87 is merely the most recent of the accommodations made between the two in connection with OCS leasing. In Sale Nos. 71 (the second Diapir Field/Beaufort sale 1982), 57 (Norton Basin 1983), 70 (St. George Basin 1983) and 83 (Navarin 1984), Secretaries Watt or Clark engaged in Section 19 consultation with the State, thereby allaying its concerns to a sufficient extent to avoid State-initiated litigation. In Sale No. 71, this came about as a result of Interior's recognition of at least some elements of Alaska's concern with respect to a seasonal drilling limitation in the Beaufort Sea to protect bowhead whales. In Sale Nos. 57, 70 & 83, the State's principal concern of applying its CZMA program at the development/production stage of the project in connection with pipelining of oil to shore was recognized by DOI in the final sale notice.

These agreements between the State and federal governments did not, however, wholly avoid litigation. Sale Nos. 71, 57, & 70 were all the subject of lawsuits filed by local governments and environmental groups.24/ However, the absence of the State on the plaintiffs' side of the case made it impossible for them to mount a full-scale attack upon the lease sale (for example, by depriving plaintiffs of a credible CZMA argument.) Moreover, although difficult to assess, local governments and environmental groups who are required to attack an OCS lease sale, to which the State's Governor has tacitly agreed, may have their credibility diminished in the eyes of the court.

For whatever reasons, none of these lawsuits succeeded: The claims of the plaintiffs were entirely rejected in Sale No. 71. In Sale No. 57, the district court ruled for the defendants on the merits; in Sale No. 70 the district court granted plaintiffs an injunction against the execution of leases (not the opening of bids) which was ultimately vacated when relatively minor NEPA and ESA errors were repaired by DOI. Perhaps shaped by the lack of success of plaintiffs in these cases, as well as the agreement by the State as to its terms and conditions, no plaintiffs filed an action to challenge Sale No. 83.

5. MASSACHUSETTS AND CALIFORNIA; FAILURE OF THE CONSULTATIVE PROCESS

Massachusetts

In contrast to the operation of the consultative process with Alaska, DOI has to date been unsuccessful in consulting to avoid litigation with Massachusetts. Even before the OCSLA amendments of 1978 were adopted, Secretary Andrus in late 1977 engaged in a Section 19-type process with Massachusetts, prior to Sale No. 42, the first North Atlantic leasing proposal. At the time, DOI acquiesced in virtually all of the State's recommendations: 23 of the 24 near-shore and fishery tracts recommend-

ed by Massachusetts for removal from the sale were deleted; the Secretary stated that, although the OCSLA did not then require it, he would require a development phase impact statement prior to authorizing that stage of the Sale No. 42 project; and the Secretary recognized the biological significance of Georges Bank, as requested by Massachusetts, by adopting a fisheries training program, by requiring that all equipment be indelibly marked to help fishermen identify OCS operators whose equipment fouled their fishing gear, and by agreeing to limit the number of platforms to minimize interference with commercial fishing. The judge who ultimately adjudicated the Sale No. 42 case conceded that "the Commonwealth made requests of the Secretary, who to the limit of his ability under the law, accommodated them."25/

Notwithstanding these concessions, Massachusetts, joined by an environmental organization, filed suit to enjoin Sale 42 in its entirety. Ultimately, this litigation led to a 22-month postponement of the sale.26/

Secretary Watt's experience with Massachusetts was not significantly different. In preparing for the second North Atlantic lease sale (No. 52), he received Section 19 recommendations from the State, which urged the deletion of 7 tracts in shallow waters said to be of high fishery value, 41 tracts at the heads of submarine canyons which the State identified as important lobster habitat, and 50 deep-water tracts far offshore to which the State objected because of its concern as to the adequacy of OCS technology. In response, Secretary Watt deleted all seven of the shallow-water fishery tracts and 34 of the 41 lobster-habitat tracts. He refused to comply with the recommendation concerning the 50 deep-water tracts, since he found that OCS operations were already being conducted in such waters elsewhere and could safely be conducted off Massachusetts.

Again, dissatisfied with Interior's position, Massachusetts filed suit to enjoin Sale No. 52 in its entirety and was joined in doing so by essentially the same environmental groups that joined it in the Sale No. 42 litigation. That suit ultimately led to the cancellation of Sale No. 52, after both the district and court of appeals had declared a NEPA violation in connection with the sale.27/

Sale No. 82 seems to be a replay of the failure of Massachusetts-DOI consultation under Section 19. For this sale, Governor Dukakis recommended the deletion of all tracts lying in waters of 400 meters or less, on the ground that these are fished more intensively than the tracts in deeper waters, as well as scallop tracts in the "Northeast Peak." (Massachusetts did not reiterate the opposition which it expressed in Sale No. 52 to deep-water tracts.) Secretary Clark agreed to delete 12 Northeast Peak tracts and 293 tracts within the 400 meter isobath. However, he decided to include 149 tracts in depths of 400 meters or less to which industry had assigned a "high priority" for exploration. Dissatisfied with this degree of compliance with the State's recommendations, the Governor announced on September 5, 1984, that litigation would be instituted to enjoin Sale No. 82.28/

Obviously, neither the Section 19 consultative process nor other aspects of the OCSLA have avoided litigation in connection with North Atlantic leasing. The contrast with the Alaskan experience seems explicable on several grounds:

First, all of the lands having even a remote prospect for oil and gas development in the North Atlantic lie far offshore; Massachusetts has no direct financial stake in the revenues derived from OCS leasing either by virtue of the ownership of its own submerged lands or a Section 8(g) interest in lands within the three-mile contiguous zone.

Second, the Attorney General in Massachusetts has independent authority to sue irrespective of the wishes of the Governor, and there is a strong tradition of his invocation of that authority. Highlighting this aspect of litigation with Massachusetts, in the second stage of Sale No. 42, after Governor King took office and adopted a pro-development policy, the Attorney General continued vigorously to prosecute litigation against the sale. This prompted the Governor to take the extraordinary step of filing a brief amicus curiae on behalf of the United States against his own Attorney General.

Third, there is an extraordinarily active environmental/fishing community in Massachusetts, who strongly opposes OCS leasing. These groups act through a highly professional and apparently well-financed environmental law firm. Their readiness to file suits to enjoin OCS sales may be a spur to the State to be equally vigilant in protecting Massachusetts' environmental interests.

California

Consultation between DOI and California pursuant to the 1978 OCSLA got off to a reasonably good start. The first post-amendment sale, No. 48 (Santa Barbara Channel), was revised in significant measure in response to California's environmental concerns. This did not, however, prevent the State's Land Commission from joining in litigation to enjoin the sale on the grounds that the royalty provisions contained within the leases would not generate fair market value for the United States.29/

The next episode of DOI-California consultation ran aground as a result of a change of administrations. In the early stages of Sale No. 53 (the first offering in the area North of Santa Barbara since the 1960s), Secretary Andrus, in response to Governor Brown's Section 19 recommendations, had agreed to delete the four basins off Northern California, thus restricting the sale to the Santa Maria Basin off Central California. He had not, however, agreed to the Governor's recommendations to delete approximately 20 tracts in the Santa Maria Basin located adjacent to the habitat of the "threatened" southern sea otter.

When Secretary Watt took office, he announced that he was reconsidering

Secretary Andrus' deletion of the four northern basins, thus giving rise to great opposition to the sale in Northern California. Although Secretary Watt ultimately "deferred" offering the four northern basins, the State, provoked by his reconsideration of their leasing, sued to enjoin the offering of those Santa Maria Basin sea otter tracts of which Governor Brown had initially complained.30/ The injunction entered by the district court in mid-1981, on the ground that their leasing did not comply with the CZMA, was ultimately vacated in January 1984, when the Supreme Court held that the Act does not apply to OCS lease sales.

Sale No. 68, involving tracts in the Santa Barbara Channel and southward to the Los Angeles basin, held a year later occurred against a background of mistrust between both the State and federal governments. California recommended the deletion of a number of tracts in Santa Monica Bay, as well as some off Orange County, and DOI determined to proceed with the sale without deleting these tracts. California sued to enjoin the leasing of those 20-30 tracts to which it objected. An injunction was granted on the same CZMA theory as the one entered against the disputed tracts in Sale No. 53.31/ Although the court's injunction was ultimately set aside in the aftermath of the Supreme Court's decision that the CZMA was not applicable to the leasing stage of an OCS project, those tracts have not yet been separately reoffered, although they may be included in future OCS sales.

These three California cases were instituted during the administration of Governor Brown. When Governor Deukmejian, a Republican with a more pro-development outlook, came to office there was reason to hope for an avoidance of litigation between the State and federal governments. Moreover, by the time of the next California sale, No. 73 (Central California), Secretary Clark had replaced Secretary Watt. The Governor and the Secretary reached an accommodation as to Sale No. 73: a number of near-shore tracts adjacent to the habitat of the sea otter were removed from the sale, pursuant to the Governor's Section 19 recommendations. Moreover, the lease stipulations recommended by the Governor dealing with problems of air quality, pipelining of oil to shore and the like were imposed on the remaining leases. Accordingly, the Governor's representative and the Secretary signed a memorandum of understanding that Sale No. 73 was proceeding in a fashion that served the best interests of the people of the United States and the citizens of California.

Nonetheless, the California Coastal Commission (CCC), an independent agency responsible for applying California's CZMA program, sued to enjoin the entire lease sale on the ground that it was not being conducted in a manner consistent with that program. The lower courts granted preliminary injunctive relief in this regard, but Justice Rehnquist set it aside on an emergency basis32/ in an order that foreshadowed the Supreme Court's then-imminent decision in the Sale No. 53 case that CZMA programs do not apply to the leasing stage of an OCS project.33/

Thus, just as with Massachusetts, the Section 19 process has not avoided litigation with California. Many of the factors that explain this failure in Massachusetts are also present in California.

Although there is a strong oil industry presence in California (e.g., corporate headquarters for Standard Oil of California, ARCO, and Union), there is an environmental community in the State that is even more active than that in New England. Additionally, the Santa Barbara spill experience has left a particularly indelible mark in the State concerning the risk of OCS operations there. Finally, the CCC, at least while armed with CZMA powers over the leasing stage of an OCS project, also operates without direction by the Governor.

6. ASSESSMENT OF MECHANISMS FOR AVOIDING LITIGATION

The Section 19 process for receiving and giving weight to gubernatorial recommendations has succeeded only in places like Alaska, where State and local governments have a direct stake in OCS leasing. It has failed where there is an active environmental community and less direct interest by the States in the viability of OCS projects.

However, before condemning this and the other litigation-avoidance measures adopted by Congress, it must be noted that the six years of litigation experience since the 1978 OCSLA amendments have in large measure represented a period of judicial refinement of the operation of the 1978 OCSLA amendments. The holdings of several appellate courts34/ stressing the stage-by-stage division of an OCS project and the desire by Congress to postpone resolution of environmental issues to the post-leasing stages may account for at least some recent diminution of litigation -- e.g., the failure to attack Sale No. 83 (Navarin) or Sale No. 87 (Diapir Field/Beaufort Sea).

The same observation is true of the CZMA: Many of the lawsuits filed between 1981 and 1983 against OCS lease sales were based wholly or at least in principal part upon the claim that they had to be conducted in a manner consistent with CZMA programs. Unless the CZMA is amended to reverse the Supreme Court's construction of the Act as not applying to lease sales,35/ there will be no such OCS leasing stage cases in the future.

Finally, the most recent decision of the D.C. Circuit under Section 18, affirming, in full, Secretary Watt's ambitious 1982 leasing program by stressing the discretion given to the Secretary at that point in the process, may have a chilling effect on later Section 18 cases.36/

There is another factor which may be even more significant in pointing the way toward an OCS leasing future which is less litigious than the ten years past. Aside from two or three areas off Alaska, DOI has now conducted lease sales in every "frontier" region. Although some areas have spawned litigation opposition to so-called "re-entry" sales -- e.g., the second, third, etc., offering -- the

general history of OCS leasing litigation has been that the greatest controversy is stirred by the first offering in a region. Oftentimes, exploration following that offering is unpromising -- e.g., North Atlantic, mid-Atlantic, South Atlantic, Gulf of Alaska -- and this experience may cause affected States and local communities to view the reoffering of acreage with less alarm.37/

Even though as one surveys the future it appears likely that OCS leasing litigation may abate, it remains worthwhile to survey decisional mechanisms from the perspective of litigation avoidance.

The Section 19 Balancing Process

The scheme articulated in Section 19 of the OCSLA, where balancing authority is ultimately vested in the Secretary of the Interior to determine whether to proceed with OCS leasing, represents a codification and refined articulation of the earlier balancing responsibility assigned to the Secretary by the 1953 OCSLA. Moreover, it is the same type of authority generally exercised by executive and administrative officials charged with implementing a federal program: The decision-maker is required to consider all relevant factors, both affirmative and negative, bearing upon the activity for which he or she has responsibility.

In many instances, of which OCS leasing is clearly one, most of the factors that the decision-maker is required to balance are non-quantifiable, while a few can be reduced to dollar and cent values. The courts have clearly recognized with respect to OCS leasing that, in these circumstances, the Secretary has significant discretion in deciding whether to proceed with a particular leasing program38/ or a particular lease sale.39/ This discretion is emphasized in Section 19 by the recognition that the Secretary's decision with respect to an OCS lease sale is "final" subject to judicial reversal only if "arbitrary or capricious." 43 U.S.C. § 1345(d).

This is not to say, however, that the decision is wholly discretionary. There are significant constraints imposed by a variety of legal requirements on the exercise of that discretion.

NEPA requires an analysis of the impacts of an OCS project at its inception and the alternatives to it. This constraint insures that the Secretary makes a well-informed decision.

Section 19 addresses the substance of the balancing process. In directing the Secretary to accept the recommendations of a Governor concerning the "size, timing or location" of leasing, unless the Secretary determines that those recommendations do not provide for a proper balance between State and federal interests, the section creates a rebuttable presumption that Governors' recommendations comport with the public interest.

A substantive limitation is imposed by the ESA. This statute is applicable in many OCS leasing cases: endangered whales in the North Atlantic; threatened sea otters off California; endangered whales and other species off Alaska. It provides that no federal activity shall jeopardize the continued existence of any endangered or threatened species. Once it is determined that an activity will create such jeopardy, it may not proceed, absent extraordinary action by a cabinet-level committee to exempt the activity from the ESA.

A final constraint which the lower courts had applied to OCS leasing but the Supreme Court has removed, was the requirement to conduct lease sales in a manner "consistent" with State CZMA programs. There are now pending in Congress several bills which would overturn the Supreme Court's decision and subject lease sales to the CZMA. Prior to the Supreme Court's decision, the lower courts had not yet refined the nature of the CZMA constraint on leasing. The Ninth Circuit had indicated that the Secretary had a good deal of flexibility in complying with CZMA programs,40/ while a district court in Massachusetts had read the Act as imposing far stricter limitations upon the Secretary.41/

Given the many constraints on leasing decisions, a State or other party dissatisfied with a particular OCS leasing proposal has recourse to a variety of litigation claims. These claims typically present conventional issues for the court, since they are concerned largely with the procedural requirements of law -- e.g., was the EIS properly prepared; did the Secretary correctly weigh the Governor's recommendations. The arbitrary and capricious standard of review means that all but a few of the more activists judges will avoid investigation of the substance of the policy decision underlying the leasing proposal.

Moreover, the issues which have been presented in past OCS leasing cases allow completion of the judicial review process with relative speed and inexpense. Most cases are resolved in a matter of weeks in the district court and get expedited treatment in the appellate courts; often the litigation process from start to end is completed in a year's time.42/ Because these cases are tried on the record compiled before DOI, rather than on new evidence submitted in court, there is rarely any discovery, and the issues can therefore be framed for a court simply on the basis of legal memoranda and oral argument.

In sum, the balancing process as embodied in Section 19 has not avoided litigation, but the judicial process that has been required is relatively efficient. It is also important to note that each of the judicial resolutions of these disputes does more than settle the issue at hand. Collectively, the OCS leasing decisions constitute a coherent body of law, which adds gloss to the statutes and serves as guidance to potential disputants in the future concerning the scope of the issues which might be presented by future leasing proposals. Other, less formal dispute-resolution processes tend to be ad hoc and would not generate principles with the same authority as the judicial decisions that emerge from OCS leasing litigation.

Bargaining

As an alternative to the decisional technique contained in Section 19, consideration could be given to creating a bargaining process.

One possibility would be to restructure Section 19 as an explicit bargaining, rather than a consultative, process. As the experience with Massachusetts and California shows, presently States often have their Section 19 recommendations granted in substantial part, but nonetheless sue DOI if they are not adopted in toto. DOI frequently finds itself in the position of having acceded, in substantial part, to State demands without avoiding litigation.

If, however, DOI were authorized by Section 19 to grant a State's recommendation with respect to lease-sale design from a bargaining posture -- i.e., grant State recommendations only on the condition that the State not sue -- States like Massachusetts and California would be confronted with the choice of accepting substantial, albeit not complete, concessions from DOI without suing to challenge a lease sale, or, alternatively, instituting litigation and putting at risk those concessions.

Another possibility would be to require State consent to OCS leasing and federal consent to important State activities to be used as the quid pro quo for the voice given the States in the OCS process. If, for example, DOI consent were required for implementation of certain (or perhaps all) aspects of a State CZMA program, it might be possible to set up a bargaining arrangement between the State and federal governments where CZMA and OCS leasing considerations were settled in a comprehensive negotiation to the satisfaction of both the State and federal governments.

However, even if conditions could be created for a viable bargaining process involving the States (as well as their local governments), there would remain the very live potential of dissatisfied elements of the public, who could seize upon NEPA, the ESA, or other statutes to attack an OCS leasing proposal. While their suits might be less credible if not joined by the State, the existence of this litigation potential means that even a perfect bargaining arrangement between State and federal governments would not keep all OCS leasing proposals out of the courts.

Assign States the "Leading" Role in Sale Design

Until the Supreme Court exempted OCS leasing from CZMA program compliance, California and other States took the view that that statute permitted them to play a "leading" role in the determination of OCS leasing based upon their construction of the terms of their CZMA programs. At least as a theoretical matter, the Congress could decide to invest the States with such authority. If it did so, it would, of course, negate the possibility of State lawsuits against OCS lease sales, although there would still remain the possibility of environmental group suits attacking the pro-development decisions of some coastal States.

However, the benefits of OCS leasing are national in scope: OCS oil and gas is distributed throughout the United States to inland, as well as coastal consumers; the benefit of developing additional domestic oil and gas resources to prevent dependence upon foreign exporters of hydrocarbons is a national security goal; the fiscal/monetary benefits of reducing the outflow of dollars for foreign oil imports are also matters of national concern. States playing a "leading" role in OCS sale design might ignore or depreciate these interests and instead give predominant weight to local concerns.

Shared Decision-Making

The coal leasing program offers another model for resolving conflicts between State and federal governments over energy development. There, Regional Coal Teams (RCTs), comprised of federal and State officials, evolve coal leasing proposals. Essentially, DOI specifies the amount of coal which it desires to lease at a particular time within a large region. Since there is an abundance of readily assessable western coal, the RCTs then review potential mining sites and, on the basis of environmental and other concerns, determine which sites should be included in a lease sale to meet DOI's goal. Although there has not been a wealth of coal leasing experience to draw upon for conclusions as to the success of this leasing technique, it is notable that the controversial Wyoming-Montana Power River coal lease sale, which took place in April 1982, proceeded without judicial challenge by either state. (An Indian tribe and environmental groups did, however, sue to invalidate that sale on a variety of grounds.)

The suitability of the RCT approach for OCS leasing is problematic. Unlike coal, where there is an abundance of the resource and, prior to a lease sale, substantial knowledge as to the amount of reserves located on a given tract, pre-leasing decisions as to OCS development are based on assumptions of scarcity and ignorance as to the location or amount of reserves. Even in the Gulf of Mexico, let alone the frontier areas, there is no assurance that the exploration of a particular area will locate any oil or gas. Therefore, the approach of having DOI designate a desired level of new reserves and using State-federal teams to pick the tracts necessary to make up those reserves is unrealistic.

It is also noteworthy that the avoidance of State suits as to coal leasing may well be explained by the 50% share which States receive of bonus bids on coal leasing projects. Thus, were an RCT-approach used on the OCS, under the present revenue arrangement whereby the federal government keeps 100% of the proceeds, there is no assurance that coastal States would not litigate to prevent lease sales off their shores.

Arbitration

Another approach would be not to

assign decisional responsibility to either DOI or the State, but instead to locate it in an arbitration tribunal, which would receive input from DOI and the States, and then decide how the balance of energy development versus environmental costs should be struck.

The greatest difficulty with this approach is deciding whom should be invested with such decisional responsibility. If it is still to be left in the Executive Branch of the federal government, presumably the office of the President or OMB could be designated. However, assuming the Secretary of the Interior has the confidence of the President, it would seem that in most cases placing a Presidential seal on the final decision would be a change more of form than substance from present decisional arrangements.

Theoretically, other branches of the government might be consulted. Constitutional considerations might, however, rule out vesting arbitration authority in the Congress; rather clearly, they would prevent vesting such authority in the courts. This suggests as the only other alternative to Executive Branch authority the creation of a "independent" administrative agency, whose members (possibly drawn from State governments, as well as federal agencies) would be nominated by the Executive Branch, but would be subject to congressional confirmation and ultimate judicial review.

While such an agency might from time to time make decisions that are more agreeable to the States than those made by DOI, where it did authorize leasing in a controversial area, it would seem to be as likely to precipitate a judicial challenge by the States as current decisional arrangements. Moreover, vesting such final decisional authority in an independent agency would remove from presidential control a significant element of national energy policy -- the pace and timing of developing the nation's OCS resources.

7. CONCLUSION

The present arrangements designed by Congress in 1976 and 1978 to avoid OCS leasing litigation have largely failed. However, the OCS program itself has not been a failure. By and large, a good start has been made on what the Supreme Court described as the "basic" purpose of the OCSLA -- the expedited exploration and development/production of the OCS.43/

While a very substantial volume of litigation has ensued, it has been through a process which is relatively inexpensive and efficient. Alternative schemes for avoiding litigation and resolving disputes will appeal to various observers in differing ways, depending upon their emphasis of expedited development of the nation's OCS resources, on the one hand, as against more rigorous environmental protection, on the other hand. Until Congress makes a different choice than the one embodied in the OCSLA, the current arrangements, litigious as they are, may well be the most desirable.

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*/ The author has been an attorney for various energy companies and their trade associations who have intervened as defendants or appeared as amici curiae to assist the Department of the Interior in defending most of the lawsuits that have challenged OCS leasing. The views expressed herein are the author's and not those of his clients.

1/ OCS lands are leased for a "primary" term (usually five years) and "so long thereafter" as oil and gas are produced in payable quantities. Lessees must pay a royalty specified in their leases of no less than 12.5% of the oil and gas produced. Leases are sold at sealed bid auctions for "bonuses," which have ranged as high as $300,000,000 for a single 5,760-acre tract.

2/ The 18 lease-sale litigations referred to above understate the number of separate complaints that have been filed to challenge these frontier area lease sales. For example, the North Atlantic lease sales have drawn two separate complaints, one by Massachusetts and the other by a "public interest" environmental law firm; Sale No. 76 (mid-Atlantic 1983) precipitated three different lawsuits filed by three States in three separate federal courts; the California sales have usually been challenged by the State, local governments, and environmental groups filing separate complaints.

3/ See County of Suffolk v. Secretary of the Interior, 562 F.2d 1368 (2d Cir. 1977), cert. denied, 434 U.S. 1064 (1978).

4/ Alaska v. Andrus 580 F.2d 465 (D.C. Cir.), vacated in part as moot, 439 U.S. 922 (1978).

5/ Sierra Club v. Morton, 510 F.2d 813 (5th Cir. 1975).

6/ California v. Morton, 404 F. Supp. 26.

7/ Village of Kaktovik v. Watt, 689 F.2d 222, 225-26 (D.C. Cir. 1982).

8/ Secretary of the Interior v. California, 104 S. Ct. 656, 671 (1984).

9/ H.R. Rep. No. 1012, 96th Cong., 2d Sess., 26-27 (1980).

10/ S. Conf. Rep. No. 987, 94th Cong., 2d Sess. 30 (1976).

11/ H. Rep. No. 950, 95th Cong., 1st Sess. 164 (1977).

12/ Id.

13/ Massachusetts v. Andrus, 594 F.2d 872, 880 (1st Cir. 1979).

14/ Id. at 882-83.

15/ See Conservation Law Foundation v. Andrus, 623 F.2d 712 (1st Cir. 1979).

16/ Area-wide leasing involves the offering of all acreage within a planning area (subject to environmental constraints), as opposed to the relatively few tracts within the area previously selected by DOI.

17/ Energy Action Educational Foundation v. Watt, 631 F.2d 751 (D.C. Cir. 1979); 654 F.2d 735 (D.C. Cir. 1980), rev'd, 454 U.S. 151 (1981).

18/ California v. Watt, 668 F.2d 1290 (D.C. Cir. 1981); 712 F.2d 584 (D.C. Cir. 1983).

19/ Texas v. Andrus, Civ. No. B-79-476 (E.D. Tex.); Texas v. Secretary of the Interior, Civ. No. B-83-743 (E.D. Tex.);

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20/ California v. Watt, 683 F.2d 1253, 1268 (9th Cir. 1982), rev'd on other grounds, 104 S. Ct. 656 (1984); California v. Watt, No. 82-2284 (C.D. Cal.); Conservation Law Foundation v. Watt, 560 F. Supp. 561, 578 (D. Mass.), aff'd on other grounds, 716 F.2d 1946 (1st Cir. 1983); Massachusetts v. Clark, No. 84-2757 (D. Mass).
21/ California v. Watt, 683 F.2d 1253; California v. Watt, No. 82-2284; Kean v. Watt, No. 82-2420 (D.N.J.), rev'd, No. 82-5679 (3d Cir. 1984); North Carolina v. Watt, No. 82-___ (E.D.N.C.).
22/ Clark v. California, 104 S. Ct. 540 (1983); Conservation Law Foundation v. Watt, 560 F. Supp. at 574; New York v. Watt, No. 83-1523 (E.D.N.Y.).
23/ Enc. 6 to Letter dated March 21, 1982, from Secretary Watt to U.S. Senate forwarding 1982 leasing program.
24/ North Slope Borough v. Watt, 20 E.R.C. 1457 (D. Alaska 1984); Village of Gambell v. Watt, No. 83-3 (D. Alaska 1983), appeal pending, No. 83-3735 (9th Cir.); Village of False Pass v. Watt, 733 F.2d 605 (9th Cir. 1984).
25/ Tr. of January 28, 1978, pp. 3-74/3-75, Massachusetts v. Andrus, No. 78-184 (D. Mass.)
26/ Massachusetts v. Andrus, 594 F.2d 872 (1st Cir. 1979); Conservation Law Foundation v. Andrus, 623 F.2d 712 (1st Cir. 1979).
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28/ This paper was submitted on September 10, prior to any resolution of the issues raised by Massachusetts' complaint against Sale No. 82.
29/ Energy Action Ed. Foundation v. Andrus, 631 F.2d 751, 654 F.2d 735.
30/ California v. Watt, 653 F.2d 1253.
31/ California v. Watt, No. 82-2284.
32/ Clark v. California, 104 S. Ct. 540.
33/ Secretary of the Interior v. California, 104 S. Ct. 656.
34/ See, e.g., North Slope Borough v. Andrus, 642 F.2d 589; Village of False Pass v. Watt, 733 F.2d 605.
35/ Secretary of the Interior v. California, 104 S. Ct. 656.
36/ California v. Watt, 712 F.2d 584.
37/ Of course, I am referring only to public perception, not the realities of geological exploration; in many areas of the world, industry has drilled scores of "dry holes" before later locating abundant reserves of oil or gas.
38/ California v. Watt, 668 F.2d 1290, 1317.
39/ Massachusetts v. Andrus, 594 F.2d 872, 892.
40/ California v. Watt, 683 F.2d at 1263-66.
41/ Conservation Law Foundation v. Watt, 560 F. Supp. at 574-78.
42/ See, e.g., North Slope Borough v. Andrus, 642 F.2d 589 (complaint filed November 1979; final appellate decision October 1980); Village of False Pass v. Clark, 733 F.2d 605 (first St. George Basin Sale, complaint filed in March 1983, final appellate decision March 1984).
43/ Watt v. Energy Action Education Foundation, 454 U.S. at 154 n.2.

ARE THERE WAYS TO IMPROVE CONFLICT RESOLUTION ON THE OUTER CONTINENTAL SHELF?

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There have been unprecedented conflicts in recent years over the oil and gas leasing program. While the existence of potentially competing interests is, I believe, always going to insure that there will be conflicts, I believe that there are ways that the intensity of these conflicts, which has reached a fever pitch recently, can be diminished. To improve conflict resolution on the OCS, there needs to be a sense that the people affected by the program have a real say in the leasing decisions that are going to affect them, and that the federal government is operating fairly in the way it is balancing environmental and coastal state interests with development interests.

The current leasing program, as adopted originally by Secretary Watt and as it continues to be implemented by Secretary Clark, is perceived to consistently elevate industry interests over environmental and coastal state concerns. I believe government must act to restore greater balance to the leasing program and give those with significant interests at stake a more meaningful role in the process. Unless this is done, it will be hard to improve conflict resolution on the OCS. I do not believe any amount of mediation, negotiation, or other conflict resolution technique can overcome some of these underlying problems.

I do not think the existence of conflicts in and of themselves indicates a need for change or improvement. There are legitimate interests that will always be in conflict over the leasing program. These interests include: the national need for more rapid exploration of domestic oil and gas reserves and for generating maximum federal revenues to help balance the federal budget; other economic uses of the sea, such as commercial fishing which may be adversely affected by drilling; protection of endangered species; and the protection of coastal areas which can be affected by the offshore development and the related onshore consequences. Conflict between these interests often indicates a healthy and necessary working out of different viewpoints.

In the OCS area, however, recent controversy has been unprecedented. This controversy has resulted in an enormous amount of expensive and time-consuming litigation, leasing delays, and lease sale cancellations. (I disagree with the position taken by Mr. Bruce in the previous paper on the question of the expenses of litigation. He has minimized those expenses significantly for some of the stakeholders. For Exxon and API and some of the oil companies, the costs may be small, but I don't believe they are insignificant for the government and certainly not for the environmental community.) Indeed, the intensity of OCS controversy has led Congress to intervene in a rather extraordinary fashion. In an unusual step, they have restricted leasing for the last several years. Consequently, it would appear that the leasing program is ripe for an examination of whether conflicts can be reduced without sacrificing the legitimate interests of those involved.

To understand whether and how conflicts can be resolved or reduced, it is useful to examine the nature of the conflicts, the reasons underlying them and then to address the means for reducing them. Since 1982, there has been a tremendous increase in the level of conflict over the OCS program. This is evidenced by the increase in the number of lawsuits that have challenged both the overall five-year leasing program and the individual lease sales. In the short time since the current leasing program was adopted in July, 1982, 8 of the 18 scheduled lease sales have been challenged on environmental grounds. This compares with 5 challenges on environmental grounds to the 20 sales scheduled in the 4 years prior to the adoption of the Watt program and following passage of the 1978 OCS Lands Act Amendments.

Overall, 12 coastal states have been involved in challenges to the current leasing program: Alaska, Washington, Oregon, California, Texas, Louisiana, Florida, Virginia, Maryland, New Jersey, New York and Massachusetts. Some states have challenged the entire leasing program, some individual lease sales. Some states have challenged both. This litigation has led to some leasing delays, cancellation of two lease sales, and a cloud over the status of certain leases issued. In fact, there was a recent decision in the 9th Circuit Court of Appeals, handed down almost two years after the lease sale had been held, holding that an important section of the Alaska National Interest Lands Conservation Act (ANILCA) had been violated. This throws a cloud over the legitimacy of those leases that were issued almost two years ago, as well as leases issued for other Alaskan OCS areas.

In addition to the unprecedented amount of litigation in recent years, Congress has intervened in a highly extraordinary manner to restrict leasing activities. For this fiscal year, 46 million acres of the OCS off New England and California have been put off limits to leasing through September 30th, 1985. At that time the ban may again be extended. Up until a few years ago, Congress had never taken such an action with respect to OCS leasing.

I believe that the unprecedented conflicts are due principally to the extreme leasing program which was adopted by Secretary Watt and continues to be implemented in some modified form by Secretary Clark. In July 1982, then Secretary Watt adopted a program to offer virtually the entire OCS, almost one billion acres, to the oil industry for lease over a five-year period. One billion acres is an area equivalent to roughly half the size of the continental United States. It represents 25 times the acreage made available for lease in the entire history of the program, from 1954 to 1980. Areas on the schedule include some of the world's most productive fisheries, such as Georges Bank off New England and Bristol Bay in Alaska, as well as some of the nation's most scenic and recreationally important coastlines, such as the Big Sur Coast off California and Florida's Gulf Coast.

A key part of the five-year program was the revamping of lease sale procedures. Prior to Mr. Watt's tenure, lease sales were held under a tract nomination process whereby the department and industry experts nominated promising offshore tracts which were then offered to industry in competitive bidding. These sales typically involved one-to-two million acres. When former Secretary Watt came to the Interior Department, he converted the system to an area-wide process under which the department began placing huge areas -- tens of millions of acres -- on the auction block at one time. I believe that it has been this process of area-wide leasing and the department's refusal to significantly modify it that is at the root of the controversy surrounding the current program

There are a number of serious problems in the area-wide leasing approach. From an environmental standpoint, first is the fact that, with so much acreage being offered so fast, a meaningful assessment of environmental impacts is impossible. For example, one sale scheduled for November of 1985, off Florida's coast, covers an area greater than the combined size of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, and New Jersey. The environmental impact statements prepared on such huge areas are extremely general, to the point of being meaningless. Indeed, the Federal Court in recently enjoining Sale 82 off New England found that the EIS that had been prepared on 25 million acres failed to meet the requirements of the National Environmental Policy Act.

Second, the enormous size and accelerated pace of the lease offerings also make state and local planning extremely difficult. State and local governments feel unable to cope with the massive and frequent leasing proposals off their shores which seriously dilute their ability to comment on and participate in the lease sale preparation process. In addition to environmental concerns, there are very serious economic issues that have been raised about area-wide leasing. According to the Interior Department's own figures, the average bonus bid paid by an oil company to the federal government for the right to drill has dropped by approximately 75 percent since the advent of area-wide leasing. In the 4 years prior to the introduction of area-wide leasing, bonus bids averaged $2164. In the first 10 area-wide sales, bonus bids averaged a meagre $552 per acre. The oil industry and the administration argue that area-wide leasing is not responsible; they point to the drop in oil prices in recent years; they argue that the tracts being offered are in deeper water and contain poorer prospects. But in a very sophisticated and detailed economic analysis that was done for the state of Texas, it was shown that bonus bids declined independently of the drop in oil prices or other factors such as leasing in deeper water. Indeed, the experience of area-wide leasing has led the Governor of the state of Texas, a state traditionally known for its pro-leasing stance, to say "I am persuaded that area-wide leasing has already cost America billions of dollars. I am persuaded that represents an unconscionable windfall for the oil and gas industries at the expense of the average taxpayer".

In addition to concerns about the substance of the program itself, conflicts have been generated about the department's implementation of the program. The government has acted to exclude coastal states from a significant role. In addition it has continually elevated industry interests over environmental concerns. With respect to coastal states, the Interior Department refused to apply the requirements of section 307(c)(1) of the Coastal Zone Management Act to the lease sale stage; the department's position unfortunately was upheld by the United States Supreme Court earlier this year. I might add that that decision raises concerns not only about offshore oil leasing but the applicability of section 307(c)(1) of the Coastal Zone Management Act to other types of federal activities that are carried out beyond the state's three mile limit.

Second, the other principal mechanism for state input into the lease sale process, which is Section 19 of the OCS Lands Act, has proved relatively ineffective. Interior has repeatedly rejected state recommendations for tract deletions and lease stipulations. Since the standard for judicial review is whether the Secretary's rejection of a state's recommendation was arbitrary and capricious, it is extremely difficult for a state to overturn the Secretary's decision.

As a result of its actions, therefore, the Interior Department has effectively closed the states out of the process. I think this has, in fact, helped to generate tremendous coastal state resistance to the current leasing program. When Secretary Clark replaced Mr. Watt last year, he pledged to work with the states to address some of their worries, by dropping areas where environmental concerns outweigh energy potential. While it is true that Secretary Clark has made a concerted effort to quiet the waters, whether that effort will continue post-election remains a question. In addition, to date, compromises have generally been made only where there is thought to be little or no oil. However, when oil interests conflict with

fishing, tourism, or other renewable resource interests, the department has consistently refused to compromise. For example, in the recent Sale 82, the department refused to remove 840,000 out of over 6 million acres on Georges Bank which were of concern to the state of Massachusetts because of important fishing resources in the area.

There is still an overwhelming perception that the leasing program is designed to provide oil companies with the greatest flexibility and convenience, while giving insufficient attention to the interest of coastal states, fishermen and environmentalists. The federal government requires a minimal showing of industry interest before rejecting state recommendations for deleting a tract. For example, in the recent Georges Bank sale, the Secretary of Interior insisted on keeping the 840,000 acres in the sale because of alleged high industry interest. It then turned out that not a single oil company submitted a bid on these tracts, nor on any of the other six million acres offered. I think that really draws into serious question the adequacy of the Interior Department's procedures for effectively evaluating industry interest and balancing those interests against environmental concerns.

I've discussed the intensity of the conflicts and some of the reasons driving these conflicts over the leasing program. I'd like now to give my views on ways to reduce conflicts without sacrificing legitimate concerns of the various interests affected.

I believe there needs to be a greater sense that the government is operating the program fairly and in a fashion that is responsive to the legitimate interests of affected parties. To this end, a more balanced program needs to be adopted which better reflects environmental concerns; and those coastal states which are significantly affected should be given a more meaningful role and the funds to plan for and mitigate the effects of OCS development. These changes are needed to provide a climate more amenable to conflict resolution. I do not think conflict resolution techniques such as mediation and negotiation can make much of a difference unless these, more basic, changes occur. Many of these steps could be taken by a willing Secretary of the Interior. The secretary could, under existing law, abandon area-wide leasing and return to the former tract nomination process, or a modification of that process, thus alleviating much of the environmental and economic concern about the current program. Again, under existing law, the secretary could give greater weight to state recommendations both in the development of the five-year program under Section 18, and in the pre-lease sale process preceding individual lease sales. Alternatively, the framework of existing law could be modified to force more of a balance on the secretary, and limit his ability to ignore environment and state concerns. This could be done through modifications of Sections 18 and 19 of the OCS Lands Act and by amending the Coastal Zone Management Act to restore consistency at the lease sale stage. I do not think you need a major overhaul of the Sections 18 or 19, but I think that the requirements for the secretary's acceptance of state recommendations could be tightened up so that it would not be as easy for him to simply reject them, and for that rejection to be essentially immune from judicial review.

In light of Secretary Watt's tenure and his demonstration of what an insensitive and extreme secretary can do under existing law, it is certainly our preference to see these modifications imposed by Congress rather than leaving the process to the good will of the current secretary whoever that may be.

Finally, much of the conflict over OCS leasing could be reduced if the administration actively supported federal funding of state coastal zone management programs, and OCS revenue sharing, instead of opposing both, as has been the case to date. The OCS revenue sharing legislation that was seriously considered by the last Congress would have given a percentage of the federal revenues from leasing to coastal states. Passage of such legislation would increase trust and support for the government's leasing program immeasurably, by increasing the ability of coastal states to plan for and mitigate the impacts of offshore activities.

From the environmental point of view, of course, we feel it is very important that OCS revenue sharing be linked to state coastal zone management and not just be a giveaway and a buyoff to the states.

Mr. Bruce's paper projects a rosy future ahead in terms of reduced litigation. I think that is overly optimistic. There will be continuing litigation at the lease sale stage, especially those involving huge areas. I also think there is going to be litigation over, for example, the state refusals to certify consistency under Section 307(c)(3) of the Coastal Zone Management Act or the secretary's override of a state refusal to certify consistency under that same section. There will also be challenges to actions taken by the Secretary of the Interior under the OCS Lands Act in approving exploration and particularly development and production plans.

In conclusion, substantial changes are needed in the 5-year leasing program and in the process for providing coastal states and environmental input into that program if we are to see a reduction in the present high level of conflict over OCS leasing.

NEGOTIATION OF OCS CONFLICTS: THE MEDIATOR'S PERSPECTIVE

Alana S. Knaster

Mediation Institute

The negotiations between the commercial fishing industry and the offshore oil industry in Central California pose a complicated set of technical and political questions that are not easily answered. Although there has been remarkable progress at the negotiations table in resolving pieces of the conflict puzzle, one cannot advocate replication of this process until the final agreement is signed, ratified and implemented. Nevertheless, it is worthwhile to identify how the issues have been categorized; to describe, within the bounds of confidentiality, the solutions negotiated; and to analyze some of the mediation approaches applied to resolving each demand category.

At their first caucus, the fishing industry generated a list of four problem categories that had to be addressed if they were to engage in a negotiations process:

-- communications
-- traffic and maneuverability
-- loss of fishing opportunity
-- perceived damage to the resource

The oil industry proposed to establish a Liaison Office to facilitate improved communications on potential at-sea conflicts and on proposed expanded oil operations. The Liaison Office could serve as a place to do business with individual fishermen. The concept appealed to the fishing industry; they were frustrated with the oil industry bureaucracy to resolve problems and believed the communication or Liaison Office could help prevent conflicts. The design of this liaison office: staffing, scope of work, governance and funding became the first topic of negotiations.

Traffic conflicts and maneuverability problems resulted from both geophysical exploration activity and the more routine supply vessel service to platforms and construction sites.

Fishermen complained that they often had to move traps and nets or outmaneuver the various oil vessels to continue fishing productively or avoid damage to gear. The oil vessel operators complained of the cost of changing course or work stoppage to accommodate fishermen. The geophysical at-sea conflicts were assigned to the Liaison Office to handle. Daily, routine traffic required establishment of vessel traffic lanes. Since both industries agreed to the concept, they assigned preparation of the map to the Liaison Officer (who had been hired in October, 1983) and to a knowledgeable fisherman. The negotiations team focused on amending drafts of the map as proposed changes filtered in from fishing organizations, individual oil companies and supply boat companies.

Loss of fishing opportunity had been the key issue raised by the fishing industry in the State of California's administration of the Coastal Act. Vocal fishermen argued that the placement of drill rigs and permanent structures on prime fishing grounds displaced fishermen and caused severe economic hardships as they sought new, equally productive fishing areas. In addition, fishermen from the diverse ports testified that seismic blasts during geophysical research activity caused fish to disperse. Not only did they go off bite for the immediate time period, but often fishing was interrupted for several consecutive days. Loss of fishing opportunity was often equated with increased costs per unit effort. This issue was bifurcated during the negotiations. Fish dispersal was assigned to a sub-committee with seismic expertise and loss of opportunity from oil production became the last issue addressed at the negotiations table.

In their list of concerns, fishermen focused on the potential harm they believed was occurring to the resource both by drilling muds and repeated seismic blasts. Because resolution of these controversies involved both state and federal agencies, it was not considered by the main neg-

otiations team, but referred to a special committee and assigned representation from each industry.

THE LIAISON OFFICE

The Liaison Office was the first accomplishment of the inter-industry negotiations in Santa Barbara. It serves as the point of contact for both industries for information on ongoing activities. The Liaison Officer keeps confidential records of where fishermen fish and when notified of contemplated oil activity, immediately contacts both sides to prevent damage to gear, arrange alternate plans to prevent at-sea conflict or facilitate direct communication on proposed POE's prior to public hearings. The Liaison Officer also assists fishermen in filing claims should damage occur.

The Liaison Office is unique not only in promoting inter-industry communication and accommodation on controversial issues, but as an example of innovative financing and governance of a conflict resolution mechanism. The Office is governed by an eight member committee, four oil and four fishing representatives. Financial support is given by an oil consortium to this Joint Committee which in turn administers the funds. All decisions are made by unanimous vote. One party has a greater ability to pay; the second had developed trust and respect through good faith bargaining with its opponent. This complicated funding and decision-making mechanism was deemed so successful by each industry that they utilized it again later on in the negotiations for a jointly sponsored economic research project.

VESSEL TRAFFIC MAP

The vessel traffic map consists of carefully delineated corridors between key points on the California coast and permanent oil structures. The oil industry has agreed to ensure cooperation from its members and contractors. The map configuration required considerable compromise on both sides, since more circuitous routes cost additional sums for fuel, etc., to the oil industry and because the fishing industry hesitated to give up any more territory to oil activity. But compliance with the map and self-policing was seen as a solution to both gear damage and maneuverability problems. Changes to the map are to be considered every six months and re-negotiated. To date, special emergency requests have been received and handled by the negotiations committee.

FISH DISPERSAL STUDY (LOSS OF OPPORTUNITY)

The fish dispersal issue is a scientific issue with economic ramifications and required special handling in the negotiations. First, the negotiations were expanded to include two state agencies and two federal agencies, each with either permitting authority for geophysical survey activity or resource protection mandates. While the dispute over impact remained a two-industry problem, the industry acknowledged that resolution of their dispute would require extensive, costly scientific research and if there was any actual behavioral effects on fish by seismic blasts, the agencies would be required to alter their regulations in some manner. The four agencies, because they recognized the need for their involvement on this issue, and because their leadership saw the advantages of intergovernmental cooperation to avoid duplication and future inter-agency conflicts, agreed to participate as equal voting members. This Fish Dispersal Steering Committee decided to convene a panel of mutually acceptable scientists to answer two key questions:

Was there sufficient evidence to warrantstudying the possible effects of seismic blasts on fish dispersal?

If so, how would one do a practical study to measure the possible effects?

The Steering Committee has been meeting for eleven months and has negotiated the following:

-- parameters of the issue to be addressed
-- membership of a scientific panel to review the problem posed (balanced by discipline and by expertise on a given fish species)
-- duties of the panel and design of a three day workshop
-- design of an RFP incorporating panel recommendations on how to conduct a study
-- selection of a contractor to do the study

The contractor expects to begin his research in September, 1984, and will present his final report by December, 1984, to all the members of the Steering Committee.

EGGS AND LARVAE (DAMAGE TO THE RESOURCE)

Similarly, there is considerable controversy over whether there is any impact by seismic blasts on undeveloped fish eggs and larvae and therefore on the future of the resource. Because this issue again went beyond the purview of the two industries and because two agencies in particular had regulatory responsibility to protect the resource, this issue was referred to a multi-agency and industry committee. The process utilized for examining the fish dispersal problem was deemed so successful from both a scientific and political perspective, that the parties decided to form a separate committee to address this issue, but replicate the process. They once again insisted that consensus decision-making, although tedious and time-consuming, was the most effective approach in attempting to resolve these controversies.

MITIGATION STUDY (LOSS OF FISHING OPPORTUNITY)

My discussion of this last issue shall be brief. First, the negotiations on this subject are at a very sensitive point and second, the approach agreed to for resolution of this question is still confidential. It is significant to mention that the industries have agreed on a methodology for defining the parameters of this perceived problem and for designing economic predictor models. Whether a solution exists that is practical and mutually acceptable is unclear. Futhermore, it is uncertain whether at this time a solution can be generated without participation of government in some capacity.

POSSIBILITIES FOR FUTURE CONFLICT RESOLUTION EFFORTS

Despite the uncertainties of the ultimate success of this total negotiations effort, there are some conclusions that can be drawn from this experience and recommendations on their future application that are valuable.

1. The negotiations process has the effect of opening channels of communication between disputants that were not formerly available and which have the tendency to reduce overall tensions and prevent new problems from arising. This may occur because the parties become personally familiar with one another or because they wish to keep the bargaining environment conducive to settlement.

Often interim issues emerge that are not on the table at the onset and these can be handled through negotiations because the process is in place and the parties feel comfortable using it. This happened repeatedly in Santa Barbara.

2. The process established for addressing resource questions (fish dispersal) already has served as a model for conflict resolution of an additional resource issue (eggs and larvae). The credibility of a research study has been a critical issue in numerous other ocean conflicts - marine mammal controversies over sea otters, whales, and tuna, at-sea incineration of hazardous waste and wetlands development/protection. The use of a neutral mediator is essential in this model, since not only must one obtain agreement among the decision-makers and advocacy groups, but one must also facilitate consensus - reaching among the scientific community members that may be asked to participate.

By far the most difficult step in this approach has been gaining agency cooperation, especially when there are overlapping jurisdictions and a history of turf battles on the disputed issue. Hopefully, examples of successful joint decision-making and negotiations will reduce this resistance to participate.

3. To date, in the fishing/oil controversy, it has been easier to reach agreement on solutions to vessel interaction problems than even to address long term relational issues such as loss of opportunity or resource damage. However, the learning that has occurred as a result of each industry attempting to solve the interactional problems has enabled the negotiators to be more creative in trying to resolve the more difficult issues. The history of successfully bargaining also contributes to solving the seemingly impossible dilemmas faced by the parties.

4. Conflict resolution of OCS disputes is possible when the respective actors - industry, advocacy groups, government agencies are trying to coexist and accommodate differences. If the desire or need to coexist is absent, then there is no possibility of success at the negotiations table.

5. This last condition - desire to co-exist - raises important ethical questions for the mediator or neutral intervenor. It was mandatory at the onset of this dispute for the mediation team to evaluate the sincerity of each industry, fishing and oil, in wishing to compromise on the issues under consideration. If either side's real intention had been to defeat or discredit its opponent, the mediators would not have participated further.

ROLE OF THE SEA GRANT MARINE ADVISORY PROGRAM

The Sea Grant Marine Advisor in Santa Barbara has continued to play a crucial role in the dispute and its resolution. First, he invited the mediators to explore the possibility of joint talks to avoid what he believed would have been a frustrating and evermore devisive alternative approach. Second, he served as technical advisor to the mediators until they had a better understanding of all the complex operations of both industries. Third, he is respected by both industries and helped transfer their allegiance and trust for him to the mediation process and thus helped avoid unnecessary delays. Last, he continues to serve as technical advisor on all aspects of the negotiations and serves as on the spot problem solver and peace-maker between formal negotiations sessions. His role is certainly worth exploring by Marine Advisory Programs in other locales.

NEGOTIATION OF OCS CONFLICTS: THE COMMERCIAL FISHERMEN'S PERSPECTIVE

Joseph Giannini

Morro Bay Commercial Fishermen's Association

In April, 1983, the first formal negotiation session between the offshore oil industry and commercial fishing industry was convened in Santa Barbara. The old-timers in the harbor recalled similar discussions thirty years past and shook their heads discouragingly at the young turks who thought they would have success. The veteran oil executives present reminisced about previous meetings which devolved into shouting matches. But although there was plenty of fist shaking and finger pointing that day, the negotiations have continued for almost a year and a half as the two industries have tackled each problem one by one.

By no means does this imply that the fishing community is 100% behind the negotiations nor that the bargaining table is the salvation for oil/fishermen conflicts. We have, however, made great progress over the pre-negotiation days, but with reservations. First, I shall describe the progress.

Lease Sale 73 (OCS Central California) had major effects on commercial fishing. Suddenly, there were geophysical boats daily and everywhere. Companies were presenting dozens of Plans of Exploration (POE's) a month. We were overwhelmed, disorganized internally and just did not know where to turn for information and help. The Coastal Commission was our main avenue of assistance, but they were and are terribly understaffed. At one meeting, there were fifty-seven POE's up for approval by the Commission. Fishermen didn't know where to begin giving their input on the known potential impacts to fishing. Where there were potential conflicts with seismic boats, there was no single place to call. If fishing gear was damaged, each company either passed the buck to another company or kept referring calls to a different office, usually in Texas, for filing complaints. Many fishermen were wiped out and lost their boats and homes. Numerous others were impacted severely both by damage to gear and loss of fishing opportunity. The agencies tried to bring some order out of chaos through new permitting procedures, but this did not establish the clear lines of communication and accountability that were necessary.

Compounding the problem was disorganization within our ranks. Fishermen are terribly independent, and conservative businessmen. While cohesive within our harbor organizations, our communication and cooperation links up and down the coast were weak.

The political situation became equally unsettling. The new governor pledged to destroy the Coastal Commission and promote off-shore oil exploration. Washington was equally receptive to oil lobbyists and their demands. But, Santa Barbara had just elected two anti-oil state legislators and the focus of fishermen turned to these two elected officials.

The historic meeting in April, 1983, was supposed to have been a public forum with speeches on the fishing industry's problems for all the local politicians and press. It was hoped that we could get everyone's attention and get some changes. But through the help of the Marine Advisor and a team of mediators whom he contacted, we established the willingness of the oil industry to negotiate right away. In other words, they wanted to avoid adverse publicity; we wanted their attention. Instead of devoting all our energies to speechmaking, we focused instead on preparing our demands, counter proposals and negotiations strategy.

At the April meeting, we selected three representatives for each industry to tackle the issues that had been raised in the fishermen's demand package. And we began meeting monthly to hammer out agreements.

I mentioned progress earlier in my discussion. We purposely chose the issue that we were most likely to reach a compromise on as our first topic at the table: the establishment of a Liaison Office. This office, the product of our first signed agreement, provides notification to fishermen

about potential conflicts at sea above and beyond permit requirements, quickly gets any communication between the industries started to prevent conflicts and assists fishermen in filing claims if conflicts and damage do occur. The Liaison Office is used extensively by both industries for information on seismic activity and on future POE's. Fishermen now have one number to call for oil/fishing problems. Also, the existence of the Liaison Office is an inducement for oil and seismic companies to cooperate and avoid conflict. The Liaison Office keeps a record of incidents at sea and claims filed.

Our second agreement was a set of mutually acceptable changes in the seismic permitting process. Both sides gave up a little of what they wanted to satisfy the needs of the other industry. We jointly submitted this statement to the State Lands Commission and the jointly proposed changes were adopted in February, 1984.

Our most recent agreement provided established vessel traffic lanes in Central California for all service vessels operating on the coast. The lanes again are an attempt to minimize direct at-sea conflict and damage to gear and to give the fishermen some predictability on where it is safe to fish and where they won't have to maneuver and lose fishing time. The oil industry agreed to self-police its members and strictly abide by the agreement. The Liaison Office again is the communication locus for implementation and documentation.

I have described the specific tangible accomplishments of the negotiations to date. There are several changes that are critical to continued talks and that are a measure of progress that I shall also discuss. First, the fishing community has become quite organized internally in confronting the oil industry and we are treated accordingly by both the industry and federal and state agencies. Second, when there have been problems, the oil negotiation team members have responded as a group to assist and provide a remedy to the situation as expeditiously as possible. Third, there is a concerted early and honest effort to reach an accommodation on POE's prior to Coastal Commission hearings by most of the companies. Both the Liaison Officer and fishing industry negotiators are also able to notify possibly affected fishermen to get them to the table to try to work things out. Fourth, we have gained recognition for our problems as legitimate issues that must be addressed.

Now that I have painted a rosy picture, it is appropriate to discuss the reservations of the fishing industry about the success of negotiations on oil/fishing issues. We presented a total package of demands in April, 1983, and began by agreeing on the easiest issue, not our top priority issues. We see the negotiations as a package deal just as one views a set of demands by a union or a country at the negotiations table. We are constantly aware that our progress to date may be touted by the oil industry or others as miraculous proof of their good faith and that when we get to our number one priority, we might be deemed unreasonable and the negotiations terminated. Until we reach agreement on our top priority, we hesitate to give out praise and our oil colleagues continue to feel slighted when some fishermen still complain or testify against projects or even lambast the negotiations.

We believe we shall successfully conclude our negotiations. There still may be disagreements on how to solve problems, but being at the table and staying at the table continues to be a major gain for both industries: the fishing industry has recognition of the existence and legitimacy of its problems with oil activity and the oil industry has a track record for resolving problems without new adverse government regulations. One of the negotiation team members calls this the "good neighbor policy".

We have made significant progress both as an industry and between industries as a result of negotiations. We continue to rely on our mediation team to keep communication flowing, to negotiate out our differences and to propose compromises just as we are at the point of breakdown. We don't know if we have discovered the grand solution for all OCS fishing/oil conflicts. We do know that this mediated negotiations approach has been useful in Central California. Whether we will continue to have negotiations or whether our fears will prove unjustified, we cannot predict.

Even if we successfully conclude our negotiations, there will be no victory. There have been severe impacts on fishermen that cannot be reversed; there will continue to be impacts by new activity, however well mitigated through negotiations. Our goals, because we have acknowledged the continued existence of oil activity in Central California, is to coexist by avoiding future unnecessary conflicts, to continue to perpetuate fishing as a viable industry in our region and to protect and enhance the resource that all citizens of California share.

OIL INDUSTRY/COMMERCIAL FISHING INDUSTRY JOINT COMMITTEE NEGOTIATIONS FROM OIL INDUSTRY REPRESENTATIVE'S PERSPECTIVE

Douglas E. Uchikura

Chevron U.S.A., Inc.

The following is an oil industry representative's perspective on the efforts of the Central Coast (California) commercial fishing industry and the offshore oil and gas industry to address the inherent conflicts resulting from co-use of the marine environment. The Santa Barbara Channel/Santa Maria Basin, offshore California is well known for its substantial oil and gas resources. Major discoveries in the federal Outer Continental Shelf (OCS) have been announced within the last three years. Knowing this, the local commercial fishing industry envisioned an intensification of previous conflicts. They also feared being excluded from fishing grounds due to the presence of offshore oil and gas facilities.

In a nutshell, the basic sources of conflict are:

1. Pre- and Post-Leasing Geophysical Surveys -

   These surveys are conducted to give a preliminary assessment of an area's oil and gas potential, as well as to detect geological hazards (e.g. shallow gas zones), substrate type, and archeological/cultural resource potential. The conflict arises with set gear fishermen (e.g. set gill nets, crab/lobster traps). The geophysical survey vessels tow lengthy cables to receive pressure signals deflecting off the ocean floor. The cables have encountered set gear resulting in gear loss to fishermen. One adverse corollary effect of the gear loss is that crab/lobster traps continue to catch until the clips self-destruct, which results in a loss of the commercial resource.

2. Exploratory Drilling -

   Exploratory drilling vessels are of three basic types: drillships, semi-submersibles and jack-ups. The drillships and semi-submersibles have anchor patterns which can occupy an area two miles in diameter. This precludes trawl fishing within the anchor pattern. Jack-ups are secured to the bottom by legs and do not occupy as much space as drillships and semi-submersibles. In any case, exploratory drilling operations are temporary, lasting from 90-120 days.

3. Production Platforms -

   Production platforms are permanent facilities (30 years plus). They occupy a relatively small area. However, if they are set within an historic trawl line, they can cause loss of fishing area as well as costs arising out of changes in trawl strategies.

4. Offshore Pipelines -

   Offshore pipelines structurally are insignificant obstructions to trawl fishing. However, anchor scars created by pipeline installations have created obstructions.

In addition to the offshore conflicts described above, the shoreside problems need mentioning. Onshore, commercial fishermen experienced difficulty receiving notice of pending offshore oil and gas operations, particularly the ever-present geophysical surveys. Also, after damaging their gear they encountered significant losses of time trying to talk to the "right" person in an oil company so as to get action on a gear loss claim. Absent knowing which oil company may be responsible for a specific gear loss, they tried to use the Fishermen's Contingency Fund established by the OCS Land Act Amendments of 1978 (OCSLA). Once again they encountered red tape, loss of time and regarded approaching the Fund as a fruitless endeavor. Having experienced the offshore and onshore conflicts and visualizing only an increase, the commercial fishermen began to organize and present their problems to State and Federal agencies managing offshore oil and gas projects.

Initially, the principal agency involvement came from the California Coastal Commission and California State Lands Commission. The Coastal Commission, as the State's coastal zone management agency under the federal Coastal Zone Management Act (CZMA), reviews OCS oil and gas projects for consistency with the California Coastal Management Plan (CCMP). The underlying purpose of this review pursuant to OCSLA and the CZMA is to determine whether an OCS oil and gas project causes adverse impacts on land and water uses within the State's coastal zone. If so, the Commission can object to a project proponent's

certification that the project is consistent with the COMP. This objection can be appealed to the Secretary of Commerce. However, the preferred course is to negotiate impact mitigation measures which allow the Commission to concur in a company's consistency certification even if the project is inconsistent with a specific policy. For example, a COMP policy relevant to commercial fishing states:

> "Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes." (California Public Resources Code, Section 30230, emphasis added.)

If the Commission finds an OCS oil and gas project inconsistent with the above policy it can still concur with a consistency certification if it finds "(1) alternative locations are infeasible or more environmentally damaging; (2) to do otherwise (i.e. to object) would adversely affect the public welfare; and (3) adverse environmental effects are mitigated to the maximum extent feasible." (California Public Resources Code, Section 30260.)

Therefore, in order to proceed with an exploration or development/production plan, oil companies have agreed on a case-by-case basis to mitigation measures, such as adjusting an anchor pattern to avoid a trawl line or to use a jack-up vessel, if available, rather than a drillship or semi-submersible.

The State Lands Commission, as manager of California tide and submerged lands and lessor for oil and gas leases involving such lands, reacted to the outcries of commercial fishermen by developing a permit for geophysical surveys which previously could be conducted without permits (provided explosives were not used as the survey energy source). The Federal Minerals Management Service, which manages OCS oil and gas resources, generated a similar permit.

The preceding discussion summarizes commercial fishing/oil industry conflicts and how some agencies intervene to resolve those conflicts.

However, the agency efforts were regarded by the commercial fishing community as only a beginning to conflict resolution. As for the oil industry, it felt many of the mitigation measures negotiated, particularly through the Coastal Commission consistency review process, were agency "blackmail". The latter term being descriptive of a situation where an agency's legal foundation is questionable, but practicalities (e.g. having a drilling vessel on standby at $50,000/day) require accommodations, rather than commencement of lengthy administrative or judicial proceedings.

Fortunately, the commercial fishermen, unlike many special interest groups, having themselves experienced regulatory overburden, prefer to minimize government's role in their business and were willing to discuss oil and gas conflicts industry-to-industry. This led the two industries to convene a joint industry workshop, with the assistance of professional mediators. The purpose of the workshop was to provide each industry with an opportunity to air problem areas and then determine how to proceed toward comprehensive inter-industry conflict resolution, to the extent such is appropriate. Significantly, several agencies were invited to witness (not directly participate in) the workshop proceedings and hopefully endorse, at least informally, the conflict resolution strategies which developed.

After a lengthy discussion, the workshop participants developed a list of items requiring inter-industry action. The principal issue areas established were:

1. Improve inter-industry liaison/communication (i.e. who's where/when).
2. Reduce space/use conflicts by establishing oil industry support vessel corridors.
3. Determine whether a compensation/mitigation program can be developed.

Once the above list was developed, the question became who would negotiate the solutions. The sheer number of workshop participants excluded a workshop from being the appropriate forum. The answer was to form an inter-industry Joint Committee comprised of representatives from each industry but in manageable numbers. Each industry caucused and appointed three representatives to serve. The fishermen chose representatives from the trawl fishery, the set gear fisheries, and a person representing fishermen in the Morro Bay area.

The Committee agenda was the list established by the workshop participants.

A critical and valued component of the Joint Committee's negotiations is the assistance of professional mediators. They definitely have helped the two industries develop a course and stay on track. This has resulted in a negotiating atmosphere conducive to frank and open discussion, rather than posturing. A bonus to the Joint Committee, which no one could have predicted or planned, is the Committee's chemistry. Anyone who has experienced committee work, even with people on the same side of an issue, can appreciate the importance of having personalities which work together without stumbling over each other's egos.

As for the role of government in the Joint Committee process, the agencies would monitor the Committee's progress. This serves as some degree of incentive to have the negotiations proceed. The key agencies watching the Committee are the (1) State Lands Commission (manages California tide and submerged lands); (2) Coastal Commission (California coastal management agency under CZMA and permitting agency for oil and gas activities in State waters); (3) California Department of Fish and Game (manages fisheries); and (4) Minerals Management Service (branch of federal Department of Interior which manages offshore oil and gas leasing and projects).

The stage having been set, the Joint Committee met. The basic goal of the Committee is to address its agenda and thereby encourage

coexistence of co-users of the marine environment -- the oil industry being able to proceed in a timely way with offshore oil and gas development, while the viability of the commercial fishing industry is maintained.

The Committee's initial task was to establish negotiation guidelines. With the assistance of the mediators, the following guidelines were developed:

1. The substance of Joint Committee discussions is to be confidential, even from each industry's constituents. Any public statements must be negotiated.
2. Joint Committee decisions must be unanimous. Any member can keep an item from being approved by the Committee.
3. The Committee would attempt to meet monthly.
4. Naturally, either industry could abandon the negotiations at any time.

Administrative matters aside, the Committee prioritized the agenda developed by the inter-industry workshop. Taking least complex to most complex, the agenda order became:

1. Form an inter-industry Liaison Office.
2. Establish oil industry support vessel corridors.
3. Determine compensation/mitigation for long-term or persistent adverse impacts to local commercial fishing industry, if possible.

The Joint Committee took several months to negotiate the precise structure and functions of the Liaison Office. Essentially, the office is to facilitate inter-industry communications so as to minimize conflicts. For example, the Liaison Officer will assist in putting a geophysical contractor in contact with fishermen potentially impacted so an appropriate agreement can be reached to avoid conflicts. Simultaneously with determining the Liaison Office structure and functions, the matter of funding had to be addressed. The fishermen were not going to fund it at all. Their position was that the oil industry's presence was what was causing the conflicts and necessitating the negotiations in the first place. Also, they did not have sufficient financial resources to share in funding the office.

Foundations, as a neutral funding source, were looked into by the mediators. However, it became apparent that obtaining funds from such sources would take too long.

An alternate source was a local oil industry consortium, called the California Coastal Operators Group (CCOG). This funding source concerned the fishermen on the Joint Committee because they feared strings would be attached and the Liaison Office would be too closely linked to the oil industry, thereby reducing, if not eliminating, its neutrality.

The Joint Committee decided the above problem could be avoided if the Liaison Office was managed by the Committee, but funded by CCOG. After some discussion between the oil industry representatives on the Committee and the CCOG Board of Directors, CCOG agreed to serve as the Joint Committee's fiscal agent with regard to the Liaison Office. This would preserve the necessary separation between the office and the oil industry, as well as assure the office's objectivity. Proof of the separation is that the Joint Committee selected the Liaison Officer, who answers directly to the Joint Committee, not CCOG.

As an equitable tradeoff for CCOG's funding, the Joint Committee agreed the CCOG Executive Director would become a voting member of the Committee. In order to keep the membership equal, the commercial fishing industry could add a voting member. This was done and the Joint Committee then had four members from each industry.

The Liaison Office in place, the Joint Committee was ready for its next agenda item. However, before it could get to the vessel corridor issue, the State Lands Commission's permit for geophysical surveys came up for renewal. Although this was not on the Committee's original agenda, the credibility which the Committee had developed over the preceding months made it a natural forum to negotiate mutually acceptable measures which could become permit conditions if accepted by the State Lands Commission.

To legitimize this subject as one which the Joint Committee could address, two individuals were added to the Committee on the issue of geophysical permits and surveys. These individuals (one commercial crab/lobster fisherman and one representative for geophysical contractors) were members of a geophysical survey/commercial fishing subcommittee formed during the original inter-industry workshop. Part of their agenda was assumed by the Joint Committee. After several meetings, the Committee negotiated acceptable permit conditions which were forwarded to the State Lands Commission in the form of a negotiated communique. The conditions were ultimately accepted by the Commission as geophysical survey permit conditions.

As for vessel traffic corridors, the Committee negotiated these with substantial input from non-member set gear fishermen as well as oil companies and support vessel operators. The objective was to return grounds to set gear fishermen which were previously lost due to increased vessel traffic from oil support piers. Since vessel safety could not be jeopardized by the corridors, wide circulation of the draft corridor maps was necessary.

At this time the final vessel corridors have been established and are being implemented on a voluntary basis. Also, the Committee negotiated notice procedures in the event of observing non-compliance by boat operators or set fishing gear within the corridors. Inter-industry cooperation is anticipated as a further indication the two industries can work out differences without government intervention.

The last, and most difficult Joint Committee agenda item is the issue of compensation/mitigation for long-term adverse effects to the local commercial fishing fleet. The Committee decided to address this issue in a sequential manner.

First, a fisheries evaluation study was commissioned so as to assess the local commercial fishing resource. This would help put the significance of the fisheries in perspective. Again, the Committee went to CCOG for funding the study; CCOG agreed.

The next phase is to develop an assessment of how specific oil and gas operations might impact the economic performance of specific commercial fisheries. The Joint Committee is again asking COOG to fund this phase of the analysis. COOG's decision is pending at this writing.

As one can see, the Joint Committee negotiations have produced tangible conflict reducing measures. However, factors which are peripheral to the Committee negotiations substantially affect the Committee's future. The most significant problem is to maintain industry-wide support of the Joint Committee process.

From the oil industry side, this has been difficult in part due to the confidential nature of Joint Committee deliberations. This results in several companies feeling unsure of the direction and value of the Committee. The problem is exacerbated when commercial fishermen continue to pursue legislative and administrative relief from perceived oil and gas impacts. The fishermen see their efforts as keeping pressure on the oil industry and enhancing that industry's incentive to cooperate. However, the oil industry views these actions as diversions requiring the use of resources to address (e.g. testimony at legislative commitee hearings) and as evidence of a split in the fishing industry as to whether the Joint Committee is worthwhile. In addition, several companies feel that Central California commercial fishermen have already successfully negotiated substantial, and often expensive, mitigation measures and yet they continue to complain as if no progress has been made toward reducing conflicts. These factors lead the oil industry to question the viability and effectiveness of the Committee. Many companies begin to wonder whether it would be preferable to pursue administrative and judicial remedies. These are processes which are more familiar and comfortable to them. In order for the Committee to work, it is essential that the oil industry members have a broad-based support from the oil companies operating in the area. Without this cohesiveness, future progress is jeopardized, as is future funding of Committee endeavors.

A major concern the oil industry has about Joint Committee negotiations is the precedential nature of certain agenda items, particularly long-term compensation/mitigation. The industry conducts substantial offshore operations in the Gulf of Mexico. These have occurred for many years and on a much larger scale than offshore California. The companies maintain that, in general, the Gulf Coast commercial fishing and oil industries have coexisted in relative harmony without having to go through extraordinary procedures like the Joint Committee.

Despite the queries as to the need for the Joint Committee, the oil industry has generally remained supportive. The key is for the oil industry members of the Committee to stay in regular communication with their constituency through such organizations as COOG and the Western Oil and Gas Association. To assist in these communications, it would be helpful for the Committee to regularly negotiate releasable progress reports. The Committee could stand to be more diligent in this.

The following conclusions can be made about the Joint Committee process:

1. The Committee was never intended to be, nor could it be, a substitute for one-on-one negotiations between an oil company project proponent and potentially impacted fishermen. The Committee can only supplement such one-on-one negotiations by pursuing industry-wide solutions to issues which lend themselves to such, like improving inter-industry communications through the Liaison Office.
2. It is essential to have the assistance of professional mediators. They perform such important functions as following-up on Committee actions, preparing meeting agendas and minutes, and keeping the negotiations on track. Their sense as to when the industries should break from the negotiations and separately caucus has been very helpful.
3. The Joint Committee process is valuable because any impact mitigation measures agreed upon are likely to be approved by applicable government agencies. The agencies are generally supportive of mutual resolution of disputes. Also, negotiated solutions can comfortably be incorporated into permits, where appropriate.
4. As previously mentioned, an area of improvement would be to diligently negotiate progress reports so as to enhance communications with and help maintain the support of the members' respective constituencies.

In general, the Joint Committee has been a very worthwhile and exemplary effort.

OCS Conflicts: Georges Bank and Gulf of Maine

OUTER CONTINENTAL SHELF CONFLICTS: GEORGES BANK AND GULF OF MAINE

INTRODUCTION

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The next two papers discuss problems and opportunities in two specific marine areas: Georges Bank and the Gulf of Maine/Bay of Fundy region.

My remarks are brief because I feel they are certainly more important than my introduction. In addition, it is difficult to develop a set of unique remarks which will not steal the spotlight from the two presentations. I could focus on the speakers themselves but I suspect you know some of them better than I. I could discuss the subject area of the papers but here again you may be more knowledgeable about their content and the research protocols used than I. This leaves just one thing - the geographical regions themselves: Georges Bank and the Bay of Fundy.

It would be difficult for me as a marine scientist to propose two more interesting and better known pieces of real estate in the ocean. Georges Bank is certainly one of the more interesting parts of the ocean, and the recent World Court decision will ensure further debate and notoriety. The presence of Georges Bank has influenced many things including the current coastline of much of New England. Georges Bank protected much of this region from erosion, especially during the recent 130 m rise of sea level. The area protected includes what is now the lot that my waterfront house is on. I, of course, am pleased for this good fortune and hope that I can be as fortunate with the potential Bay of Fundy project, which may only involve a 10 cm change.

As a marine geologist I have endured, and sometimes even enjoyed, the many recent controversies concerning exploration for oil and gas on Georges Bank. I have heard people refer to Georges Bank as one of the world's largest fishing areas, which it certainly is not. I have heard it referred to as one of the most important fishing areas, which it also is not. But rarely have we heard it referred to as what it is -- one of the most intense, highly productive fishing areas. Productivity on Georges Bank is extremely high and, as such, makes it a very vital area for learning more about such marine processes.

One argument about Georges Bank will always stay with me - it goes something like this. "Why drill on Georges Bank and ruin the fisheries there for only 10-15 days of U.S. oil and gas supply?" Could drilling, even in its worse case scenario, destroy the fish population? Interestingly, 15 days of U.S. oil and gas supply is equal to a little over 200 million barrels which, using a conventional price per barrel, is equal to perhaps about 30 or 40 years of fish catch for the area. Is this an argument for drilling or not? Well, so much for numbers.

Marine scientists, as I suspect many of you know, can be just as naive as anybody else. We often feel that the science should dominate the decision-making process and are just starting to learn that other things like economics, politics, or social consequences may be important or even more important. This, of course, biased many early thoughts regarding drilling on Georges Bank.

The Bay of Fundy/Gulf of Maine region appears to be much simpler. It has a unique shape and orientation that lead to very high and low tides. These tides, as you will hear, can have considerable energy potential. But again, there is no free lunch. There will be a cost to pay. Suddenly, the Bay of Fundy/Gulf of Maine is not very simple at all. Decision-makers are going to have to consider things like the M_2 tide.

The two papers which follow will provide greater detail and insight into how to major ocean-related conflicts can be resolved.

THE ROLE OF FACILITATION, MEDIATION AND NEGOTIATION IN INITIATING PETROLEUM EXPLORATION ON GEORGES BANK DURING LEASE SALE #42 (APRIL, 1979 - JUNE, 1980)

THOMAS J. SCOTT, PRESIDENT

CENTER FOR NEGOTIATION AND PUBLIC POLICY, INC.

1. BACKGROUND TO THE DISPUTE

The Arab embargo in 1973 focused the nation's attention both on its increasing dependence on foreign petroleum and its growing vulnerability to disruption of crude oil supply in the event of further outbreaks of hostility in the Mideast.

While pressure for energy development increased, there was equally strong pressure from environmental groups to provide safeguards. Although in 1978 the Outer Continental Shelf Lands Act Amendments had passed, in 1979 many questions still remained about managing the multiple uses of the Georges Bank. Perhaps the most basic of these was--could the fish and environment be protected adequately while oil and gas development took place?

During the 70's three successive administrations attempted to increase exploration of the Outer Continental Shelf (OCS) and to begin drilling on Georges Bank and the California coast. In the case of Georges Bank, lobbying, litigation and political maneuvering blocked action until the closing hours of the decade when, on December 19, 1979, Lease Sale #42 was finally held. $887 million were bid for 73 tracts.

Since 1974, the Center for Negotiation and Public Policy has been experimenting with public policy negotiation particularly involving environmental and energy problems. It is important to note that while this paper focuses on policy negotiation, and the often "behind the scenes" work of facilitation and mediation, the author is well aware of the other means that were used to resolve the conflict on Georges Bank, which included judicial decisions, legislation and regulation, and that this mediation effort represents only a part of the story.

This paper addresses the period from April, 1979 until December, 1979 when development activities were halted through litigation and while the effective implementation of recently passed legislation (OCSLA Amendments of 1978) was yet to be realized. It summarizes the factual background of the dispute including the major issues, the economic concerns, and the scientific, political and legal uncertainties. Then it addresses the period from December, 1979 to June 1981 during which time a monitoring program was designed, permits were issued, and drilling begun. Finally, it addresses the period from 1982 to the present.

Against this background, the nature and course of the mediation process is described along with the role of facilitation, negotiation and networking in the period before the lease sale where a foundation of trust was established among the parties which, some believe, considerably shortened the permitting process after the lease sale. Then former antagonists were helped to collaborate to design and implement a monitoring program.

The paper concludes with an evaluation of what appeared to work well about the process and what didn't.

2. THE NATURE OF THE NEGOTIATION

In the Center's role of helping people deal with the conflict over Georges Bank there were a number of separate skills applied: intervention, mediation, facilitation, networking, meeting management, policy analysis, and "brokering" between scientists and policymakers. Let me begin by sharing our definitions of these different skills, then I will describe to you how they were applied in differing degrees and at different times during the three separate time periods: a) before the lease sale, b) after the lease sale, and c) after the drilling began.

Intervention

We use the word "intervention" here in the narrowest sense to describe the role the Center takes in choosing issues. To effectively apply the third party process we believe the professional must be highly selective about what issues he addresses and when he addresses them and thus be in a position to assure that the necessary ingredients for a successful negotiation are in place. The Center assumes the initiative in identifying issues, identifying and involving the concerned parties and locating neutral funding. Invariably an issue will only be selected if there is a clear and identifiable decision point on the horizon, if neutral funding can be found to support the "third party process" and if initial assessment indicates that some

solution is possible.

Mediation

We define "mediation" as a process in which a third party helps interests resolve differences. This involves sequential discussions, often with more than two parties, and includes follow-up to complete communication by confirming to all parties a consensus viewpoint.

Facilitation

Mediation, applied early in the process, usually leads to the development of a common agenda of perceived needs by the parties that often justifies convening a meeting of three or more individuals. We think of facilitation as describing the skills required to design, convene and conduct a successful meeting and the synthesis process that follows the meeting which leads to ongoing interaction by the group to help it achieve its goals. We call the facilitator a "moderator" when referring to him or her in public. This appears to avoid a connotation of "manipulation" which has sometimes been associated with the word facilitator.

Networking

We consider networking an essential and ongoing part of the process of helping individual interests to communicate with each other and to provide for them an ongoing, flexible synthesis mechanism to address complex issues and to keep the process sensitive to emerging policy developments.

Networking is also helpful in expediting the implementation of a plan and in building an ever expanding circle of acquaintances who are the actors concerned with an issue. Initial introductions take place on the telephone where the third party learns for the first time the special field of interest of the individual, his or her goals, objectives and concerns, and learns the names of other people who share the same view as well as the names of adversaries. Additional associations with these people take place over time and an increasing feeling of confidence in the integrity of the third party enhances the breadth of confidential information which may be shared.

Meeting Management

A part of the Center's process involves groups and, therefore, meeting management skills are important. These include: designing an agenda, assisting a group refine and confirm it, and acting as a "traffic cop" to help a group achieve its desired outcomes. Group graphics, a visual recording of a group's deliberations on large newsprint, is another meeting management skill which provides a useful means to focus a group and enhance the sense of participation.

Policy Analysis

In dealing with complex issues of public policy the mediator needs to have an in-depth knowledge of the issue under discussion, or a technical resource person is required to help provide a means to synthesize available information for the participants. With Georges Bank, Virginia Tippie provided this policy and technical support on fisheries issues and on the marine sciences.

"Brokering" Between Scientists and Policy-Makers

One of the most perplexing problems in the realm of public decisionmaking today is how to provide policymakers with sufficient scientific information to make decisions where there is a high degree of scientific and technical uncertainty. A range of mechanisms are employed by the Center to accomplish this exchange of information. With Georges Bank, the careful selection of a cross-section of scientific viewpoints in the preparation and presentation of background papers for a September, 1979 meeting at the University of Rhode Island (URI) stimulated and focused discussion among scientists in the presence of policymakers. This experience was described as useful and informative by the policymakers present.

Policy Negotiation

Together these skills are applied by our Center in a process which we call "policy negotiation," but some people feel that this title may not be descriptive because policy negotiation is not really policy development and it is not really negotiation. We use the phrase to describe a process designed to help people broadly participate in developing better legislation, more effective regulations or a more expeditious and acceptable permitting process where a large degree of scientific, technical and economic uncertainty is present. We help the public and private sector interests to more effectively interact around environmental, economic and energy issues at the national, regional, state and community levels.

3. POLICY NEGOTIATION AS APPLIED TO GEORGES BANK

Before the Lease Sale

In 1979 the Center decided to convene the various interests concerned with Georges Bank at the University of Rhode Island. This decision was a classic intervention. Center staff had decided in April that a decision point on the lease sale might be near because of a number of factors: 1) A new Administration had taken office in Massachusetts that was viewed as more favorable to offshore development; 2) The Court of Appeals had vacated an injunction halting exploration and, in its opinion, had described the nature of the Secretary of Interior's duties in protecting the fisheries, and 3) The Outer Continental Shelf Lands Act Amendments of 1978 had been passed and the stipulations and regulations required by the Act which were sought by environmentalists and fishermen were under development by the appropriate agencies.

The Center approached URI to provide

a neutral ground for a meeting because among academic institutions in the region, the University had an academic faculty with scientists respected by the scientific community at large, and economists respected by not only the oil and fishing industry but also by government. To further enhance URI's credibility, John Knaus, Dean of Oceanography and Provost of the University, had been appointed Chairman of the prestigious National Advisory Committee on Oceans by President Carter. And finally, Rhode Island was a good location to convene the disparate parties because, unlike Massachusetts, it had not been a party to the litigation to stop the lease sale.

It was a fortunate coincidence that Virginia Tippie, URI's Chairman of the Center for Ocean Management Studies (COMS), was interested in convening a meaningful meeting on Georges Bank and had recently become interested in facilitation. She provided a high degree of scientific and technical competence which is an essential component of a successful policy negotiation, and turned out to be a successful facilitator as well.

The details of the URI meeting of all the diverse interests which was convened at the W.Alton Jones campus at URI on September 5-7, 1979 are the subject of another paper. Suffice it is to say here that more than forty people from the various interest groups in the private sector and the concerned agencies of federal and state governments were all present, along with the principal scientists. In many instances, it was not possible to bring the agency or corporate decisionmakers themselves to the table because at that time many were parties to the lawsuit. But each interest was represented, at least, by a deputy of sufficient stature to be respected by the rest of the group. We had fishermen and oil company people, two of whom had actually been "roustabouts" in the oil fields. Most people present had never met someone who had actually drilled for oil or went more than 100 miles to sea each week to make a living as a commercial fisherman.

These three groups, a cross-section of the most competent scientists, "real world" fishermen and oilmen, and agency decisionmakers, were brought together and helped to communicate with each other for more than thirty-six hours. This meeting provided the foundation of understanding and the beginnings of a mutual respect for each other that ultimately established a sufficient level of trust upon which lasting agreement could be forged.

In general this first session served to define and rank the key issues--fishermen's gear damage and sharing space, coastal impacts on beaches and tourism, and environmental damage to fish stocks. The last of these was of greatest concern to the most people. When the meeting came to a close, there was public expression of approval for the "third party" process and a request for future opportunities to meet again.

After the Lease Sale

The road to the lease sale was not a smooth one despite the initial feelings of trust engendered at the Rhode Island meeting and although the meeting had been well positioned in relation to key decision points. The National Oceanographic and Atmospheric Administration had set October 10, 1979 as the date to decide on a request by environmentalists to make Georges Bank a Marine Sanctuary under the Fishermen's Management Act of 1976. Secretary of Interior Cecil Andrus had set October 30, 1979 as the date for Lease Sale #42.

It is worth noting that the Marine Sanctuary request was withdrawn a few weeks after the URI meeting, some believe as an indirect result of action by the participants. This decision smoothed the way to the lease sale but in mid-October negotiations between the Plaintiff and the Department of Interior about the make-up of a Biological Task Force to advise the Secretary of Interior about managing the leases broke down. A last minute appeal to the Supreme Court delayed the sale once again. It was finally held on December 13, 1979.

Between December, 1979 and February, 1980, it became clear that a vacuum continued to exist as evidenced by the fact that environmentalists, fishermen and oil companies could not see a way to communicate with each other. There was great uncertainty about how the Bureau of Land Management (BLM) and the U.S. Geological Survey (USGS) would fulfill their obligations in developing final regulations and lease stipulations to manage the lease tracts under the OCSLA Amendments.

In February, 1980, as a result of the judicial decision which finally settled the litigation, a memorandum of understanding was negotiated by the Environmental Protection Agency (EPA), the National Oceanographic and Atmospheric Administration (NOAA), and the Department of Interior (DOI) creating a Biological Task Force to be made up of scientists from each of the three agencies to advise the Secretary of the Interior about managing the exploration for oil. While meetings were to be open to the public, there was no formal provision for public participation. Private sector fears persisted about the competence of the government to manage the oil leases so as to protect the fisheries.

It was in this context that the first meeting of what came to be known as the Ad Hoc Committee was convened by the Center at the Center for Ocean Management Studies at the University of Rhode Island on March 3, 1980. In response to expressed concerns by environmentalists and oil companies, the Center invited the principal interests to meet. This time Doug Foy, one of the former plaintiffs, as well as Hal Bybee, the Chairman of the American Petroleum Institute's Offshore Committe and the elected representative of some of the private sector defendants, were invited to be among the participants. In total, two environmentalists, two fishermen, and two oil company representatives participated along with a scientist designated by each of the three interests.

Though a favorable climate was established, and an agenda prepared by the mediators, it required very little active facilitation to help the group select an issue. They decided immediately on the need for a monitoring plan to protect the fisheries, and they agreed that they did not trust the

government to design an adequate one.

The elements of a plan were agreed to before the meeting was over, and one of the scientists volunteered to draft the plan for comment by the group. It was approved verbatim by the group a week later.

The Biological Task Force was convened for the first time in February, just before the Ad Hoc group first met. This Task Force had the formal responsibility for developing a means to monitor the drilling on Georges Bank so as to identify any changes in the ecosystem which might be caused by the exploratory activity. At its first meeting it appointed a subcommittee charged with developing a monitoring plan.

Although this Task Force was hardly viewed as representative by the states since its voting members were entirely from the federal government, it did provide a useful framework and continuity through a series of scheduled, open meetings which lent themselves to an informal third party facilitation process. This informal interaction was important because there was no formal means for oil companies, fishermen and environmentalists to participate in the design of a monitoring plan.

As soon as the existence of a monitoring subcommittee became known, the facilitator from the Ad Hoc group introduced himself to the subcommittee chairperson and offered help from the group in designing the scientific monitoring experiment. Informal interactions culminated in a joint meeting of the monitoring subcommittee, other interested parties, and the Ad Hoc group hosted at the University of Rhode Island on June 9, 1980. Out of this meeting, a consensus was reached on the design of a monitoring plan which was presented to the Biological Task Force on July 14th and approved.

The 40 page monitoring plan was submitted for formal review by the various agencies, by the Outer Continental Shelf Advisory Committee and its subcommittees, and by the five affected states. While it contained the essential elements of the original ad hoc recommendations, it had grown substantially to accomodate a number of different interests. The review process elicited various criticisms from all sides which became incorporated into a comprehensive decision document prepared by headquarters staff of the Bureau of Land Management and the U.S. Geological Survey for the Undersecretary of the Interior. It finally became apparent that it might be years before it could be implemented if the agency recommendations were adopted by the Undersecretary because, among other things, they required the complete redesign of a more "cost-effective management-oriented monitoring program--in coordination with the North American Regional Technical Working Group and the Outer Continental Shelf Advisory Board's Scientific Committee."

October 30th was set as the final date for the Undersecretary's decision. Early in the month when the Ad Hoc group obtained a copy of the Undersecretary's decision document it became apparent that some means must be found to inform the Undersecretary of the potential for delay. It was here that the credibility of the third party process withstood its most difficult test to date because it decided to intervene in the Undersecretary's decision. The facilitator was successful in persuading the Undersecretary to convene a meeting in his conference room consisting of key agency department heads and members of the Ad Hoc group prior to making his final decision. This success was short-lived because after a few pleasantries and introductions around the table, the Undersecretary adopted verbatim the six key decision points recommended by his department heads.

Before leaving the room he said he realized that his decision would not make it easy to expedite a monitoring plan, but that he felt obligated to stand by the recommendations of his department heads. "However there may be," he said, "some way to 'fine tune' these recommendations so as to speed things up--you are all welcome to try."

The meeting among the Ad Hoc Committee and the department heads continued for over an hour as the parties tried to find ways to resolve the problem.

It is interesting to note that third party help made it possible to "fine tune" the Undersecretary's decision between November 15th and December 10th and help key department heads agree on a greatly simplified design for a scientific experiment to monitor exploration and to initiate its presentation to the Biological Task Force by December 15, 1980. This was accomplished largely by "one on one" mediation which succeeded in bringing the right people from the agency and the Ad Hoc group together. It was the credibility and competence of the scientists present from both the private sector and the government, and their ability to express themselves simply and clearly which helped to make the document understandable and acceptable to a broad spectrum of interests. The final document bore a strong resemblance to the monitoring program designed by the Ad Hoc group on March 3, 1980.

As a result of the decision document review process and the interaction with the Ad Hoc Committee, the agency representation on the Biological Task Force was restructured by assigning a competent marine biologist from the U.S. Geological Survey's regional office and a qualified research director from the Washington, D.C. office of the Bureau of Land Management. Thus a step was taken toward implementing an effective resource management structure. In March, 1981, the restructured Biological Task Force approved the simplified plan. On May 9th, the final permit was issued and in early July the first oil rig was in place and turning.

Exploring Georges Bank - Lease Sale #42

Exploratory drilling which began on Georges Bank in July, 1981 continued through most of 1982 and resulted in the drilling of eight wells--all of them essentially dry holes. Careful supervision of this activity by Interior staff from U.S. Geological Survey concluded that there were eight cases of spilled oil from the rigs in two years, seven of which were 60 gallons or less in size and one of which amounted to 240 gallons.

Initial evaluation of seasonal samples taken four times a year as part of the monitoring experiment revealed no measurable accumulation of mud or cuttings at any

sampling point.

After Lease Sale #42

An important footnote to this period was that during the fall of 1981, a major structural change in the federal resource management process was announced by DOI. As was mentioned earlier, one of the key problems in managing Georges Bank was that so many different agencies were involved. With the formation of the Minerals Management Service, combining BLM with the USGS Conservation Division, this critical problem was resolved. Instead of a hydra-headed management structure, the responsibility for both the sale of leases and the subsequent management of tracts was consolidated. What this meant for Georges Bank was that the scientific information that was collected would have a built-in mechanism, within its own department, that could use the data in making decisions.

With Lease Sale #42 complete, the monitoring program in place, with eight wells drilled, the Minerals Management Service (MMS) of the Department of Interior scheduled Lease Sale #52 for August, 1982. In December, 1981, with the help of Woods Hole Oceanographic Institute, the MMS Off-Shore Program, and the National Academy of Sciences, the Center convened a meeting of 50 key individuals from government, industry and interest groups concerned with Georges Bank, including principal scientists from government and academia, in order to exchange information on the status of energy exploration on the Bank and the adequacy of the monitoring activity.

The purpose of the meeting was to permit top scientists and policymakers to examine the design of the management structure and the peer review process for the monitoring program established by the MMS and the ways in which information from the monitoring could be factored into decisions related to the drilling. The meeting was convened in April, 1982, at the W. Alton Jones Campus at the University of Rhode Island in conjunction with the Center for Ocean Management Studies. The planning committee selected the top scientists in each of six disciplines and designated them as a peer review committee. A neutral chairman was appointed for the meeting. This Ad Hoc Peer Review Committee was present and in place in the event that the meeting participants concluded that the peer review mechanism for the monitoring plan established by the MMS was inadequate. Should this eventuality occur, members of the committee had agreed to provide further service, and the MMS had agreed to utilize the ad hoc peer review mechanism.

The group confirmed the design of the scientific experiment, and endorsed the adequacy of the science and the MMS management structure which supervised the work. Finally, they concluded that an outside scientific peer review process was unnecessary.

The group that met in April, 1982 decided that it would like to meet annually and to establish a Georges Bank Forum to provide an update on the data being generated, to assess the validity of the data and the possible need for new studies. In addition, it would develop mechanisms that would permit policymakers to use the research generated.

During the meeting, several people noted that many of the management and scientific components of the Georges Bank monitoring program could serve as useful models for other Outer Continental Shelf areas under consideration for leasing. The group asked the Center for Ocean Management Studies to act as convener of the new Forum and asked the Center for Negotiation and Public Policy to continue its role in the facilitation process.

Because funding for the facilitation process was depleted in June, 1982, the Center was unable to continue in its third party role. In August, 1982, Massachusetts brought suit to block Lease Sale #52. The courts upheld the plaintiff and Lease Sale #52 has been cancelled. No scheduled date has been announced for Lease Sale #82.

4. SUMMARY

What Worked and Didn't Work and Why

In considering what worked and didn't work let us look at each of the five components of the policy negotiation process: intervention, mediation, facilitation, networking, meeting management--and see where they were employed in the process.

You will remember that the Center intervened in several specific instances: In identifying and bringing all the parties together in September, 1979; in selecting the Ad Hoc group and convening it in March, 1980; in assisting the monitoring subcommittee and hosting a joint meeting in June, 1980; in involving itself directly in the Undersecretary's decision in November, 1980; in convening key department heads and private sector scientists in December, 1980, and in identifying and convening the principal parties-at-interest and an Ad Hoc Peer Review Committee in April,1982.

Clearly the September, 1979 meeting got people to start talking together, to reach agreement on the facts, and it illustrated the benefits of third party help. It may have facilitated withdrawal of the Marine Sanctuary proposal. It was not successful in mediating between the plaintiff and the defendant in negotiating the design of the Biological Task Force. Here the mediator was used to try to help the parties explore ways to resolve differences about the number of agency representatives on the Biological Task Force, but agreement was unable to be reached. This failure sent the parties back to court.

The March, 1980 Ad Hoc group meeting was successful in bringing together and stimulating collaboration among key actors who had been adversaries until that time and demonstrated to them the process of collaboration in negotiating and implementing discrete agreements. It laid the foundation for understanding of the benefits of the process to federal agency decisionmakers. It surprised members of Congress and Congressional staffers to hear consensus recommendations from such traditional adversaries as oil and environmental interests and it successfully enlisted their aid in moving the agencies toward action.

In June, 1980 a joint meeting brought the two groups together but it did not succeed the first time in achieving a consensus on the design of a monitoring plan that was accept-

able to all the outside parties who must approve it.

Intervention in the Undersecretary's decision in October, 1980, however, appeared to have paid off. It revealed starkly to agency personnel the need for change in the representation on the Biological Task Force. It enabled an acceptable consensus document to be drafted under the guise of "fine tuning" the "Under's decision." These two factors together permitted the drafting and distribution of RFPs and contracts to begin the sampling process by June--near record time in the federal bureaucracy.

The Center's process did not have anything to do with the reorganization of the Minerals Management Service--that was a completely fortuitous outgrowth of a mid-continent conflict over mineral and oil leases in the Rocky Mountains which resulted in the reorganization of the department to deal with all federal leaseholder supervision, both on-shore and off-shore, by combining the Conservation Division of the U.S. Geological Survey with the Bureau of Land Management.

Third party intervention was successful in convening the parties after the monitoring program had been implemented and to have them agree that it was effective and was a high quality scientific experiment, properly managed and with adequate peer review.

It was not sustainable long enough to permit mediation among the parties to deal with conficts leading to court action and cancellation of Lease Sale #52.

Informality, Perceptions, Ideologies, and Motivations

Certainly the informality and flexibility of the process was essential to its success, particularly in encouraging regulators and regulatees to collaborate with each other. This informality arises out of and is sustained by effective one-on-one communication which is an essential component of effective networking. There exists today a network in place which could be re-energized in short order to deal with emerging issues in the Outer Continental Shelf.

The fact-finding activities early in the process tended to narrow the differences between the perceptions of the key parties and the current scientific wisdom.

Finally, ideologies played an important role in motivating the different interest groups. Environmentalists prefer to avoid changes which would tend to disturb natural ecosystems. Nonetheless, as the parties learned to know each other better they began to respect the fact that all parties were working towards a consensus solution which would accommodate their different interests.

Sustaining the Consensus

In any issue as broad as the Georges Bank one there will always be a multitude of competing interests to be reconciled on an ongoing basis. It is our feeling, though obviously from a less than completely objective position, that ongoing third party help could successfully sustain a consensus in managing the development of multiple resources in this area.

FUNDY TIDAL POWER

G. C. Baker and Robert W. Knecht

Abstract

The paper is in two parts: the first part describes present designs for extracting energy from Fundy's large tides and outlines the technical and economic constraints which exist. Operating methods are discussed and a qualitative account is given of environmental effects due to construction and operation. Measurable effects are predicted to exist throughout the Bay of Fundy-Gulf of Maine system. The first portion of the paper also describes, from the owner's point of view, necessary conditions for development, and ways in which they might be achieved. Imperatives are said to include good quantitative estimates of economic and environmental benefits and costs, value judgments, and assuming such estimates are favourable, a unified framework for environmental regulation and control of the project(s).

The second part of the paper focuses on the issues being raised by various interests and on their perceptions of the potential impacts of a tidal power project, the methods employed so far in attempting to better define potential problem areas, and the role that science has played in the debate. The complications introduced by the transnational aspect of the problem and the dispute resolution devices available for handling such conflicts will be described. The advantages of using the International Joint Commission in the resolution of the Fundy tidal power issue will be presented and contrasted with the other options.

PART 1 - THE PROJECT AS VIEWED BY A PROPONENT

Introduction

The Bay of Fundy tides are now considered to be a feasible, economically attractive and in some ways environmentally advantageous source of electric energy. However, there are indications that large-scale development of the resource would cause adverse impacts on Gulf of Maine coasts, and potentially also on commercial fisheries. Tidal power therefore clearly contains the potential for conflicts involving coastal and offshore areas.

It is important to recognize that such conflicts are at present merely potential; that no large-scale development has as yet been committed and that considerable flexibility exists. There is therefore an opportunity to design and apply effective measures for the mitigation and resolution of potential conflicts unhampered either by past commitments or rigidities of opinion.

Nevertheless, there are certain constraints which arise from both technical and economic considerations, as well as uncertainties which can only be resolved or minimized through further scientific investigation. Both the constraints and the uncertainties have a bearing on questions of conflict resolution. In this section of the paper, these constraints and uncertainties are presented in the context of project design, operating methods and the environmental effects expected as a consequence thereof.

An Economic Perspective

Use of tidal energy by mankind dates back to at least the early Middle Ages. Cheaper fuels and more efficient engines brought forth by the Industrial Revolution rendered tidal power uncompetitive and it gradually fell into disuse. This situation lasted until the early 1970's, when the trend of gradually falling real costs of energy was sharply reversed.

Although sporadic attempts had been made to develop energy from the Fundy tides dating from the early years of the present century, comprehensive studies of the resource potential were not undertaken until 1966. In 1969, the best sites for development were identified. By 1977, construction techniques had been improved and tidal power from leading sites was judged to be marginally economic. By 1982, improvements in design and construction techniques, together with the continued rise in the real cost of energy, had increased the estimated life cycle benefit-to-cost ratio of tidal plants to about 3 to 1.

It is clear that economic viability is a prerequisite in any tidal development. The studies under reference have shown that economic viability requires full utilization of the advantages of scale and of the

greatest tidal ranges available. These limit the development possibilities to site B9 in Minas Basin, site A8 in Cumberland Basin, with site A6 in Shepody Bay as an outside possibility. (See Figure 1.)

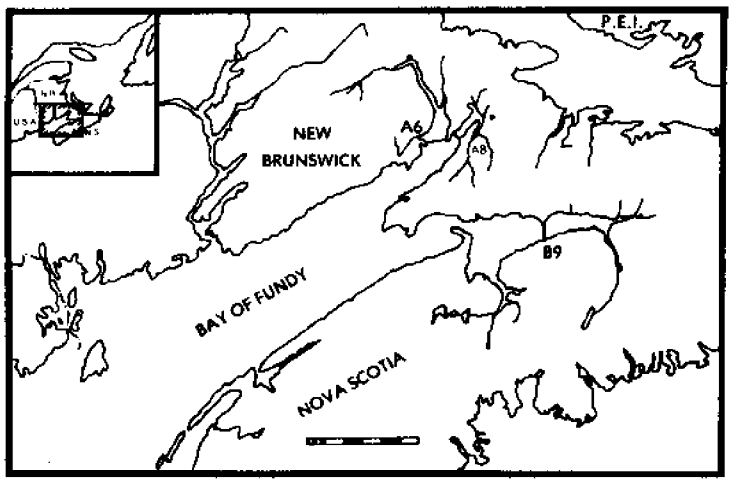


FIGURE 1: Location of tidal power sites.

Tidal power has always intrigued the inventor and many methods and machines for the extraction of tidal energy have been proposed and patented. Despite such well-meaning creativity, the only cost-effective approach entails the construction of dams and the use of hydraulic turbines operating on tidal heads in single or double effect, single basin tidal plants. Linked basin schemes have not been found economical, in part due to the present and prospective surplus of electrical capacity and in part due to lower effective heads. The operating methods referred to are illustrated in Figure 2.

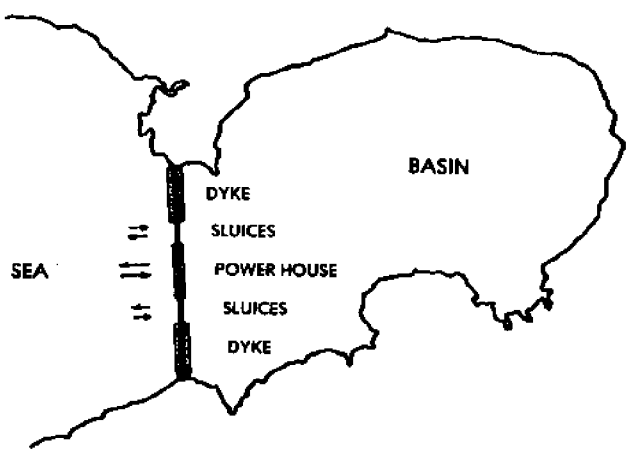
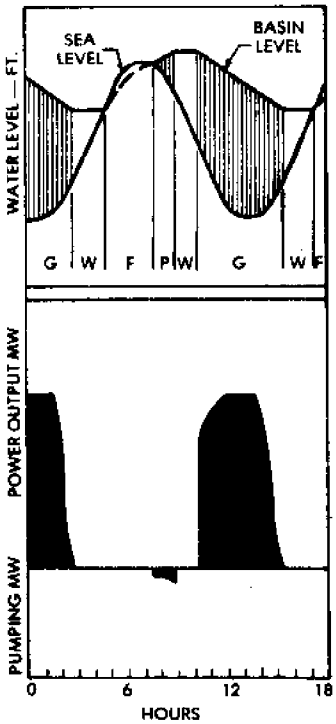


FIGURE 2(a): Single basin tidal power layout.



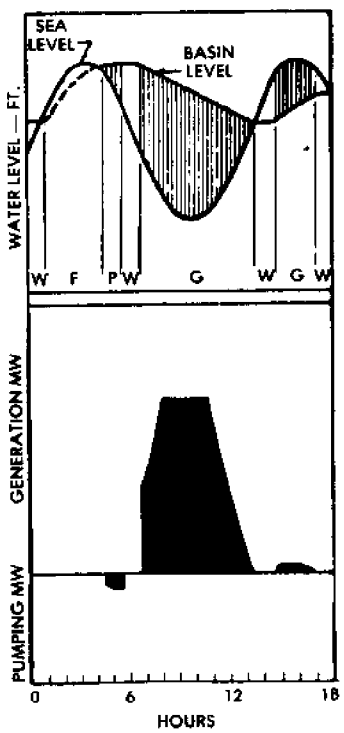


Figure 2(b): Water levels and output for single (top) and double effect generation.

Design and Operation

Present plant designs for the leading sites are generally similar except as to size and for the present purposes it will suffice to describe B9. The barrage would extend about 5 miles from Economy Point to Cape Tenny. The deep water section would

consist wholly of caissons, with earth dykes covering the intertidal zone at each end. Caissons would be of various designs, containing turbines, sluice gates, cribs providing temporary sluicing capacity prior to closure, and blind cribs.

The number of turbines is variable over a broad range with little effect on the at-site unit cost of output. Least unit cost at present prices of machinery and construction would be achieved with 128 turbines and 70 sluices. Unit costs would increase less than 5% if the number of turbines were increased to 140 or decreased to 106. Changes of this sort in the installed capacity have some bearing on both the permeability of the barrage and the energy extracted from the resonant tidal system.

Construction would require 10.5 years for 106 turbines or just over 12 years for 140 turbines. Closure and first energy production would occur in any case at the end of the eighth year with 56 turbines in operation. Changes in magnitude and phase of flows through the barrage would commence with the placement of the first caissons and increase more or less gradually through the construction period as indicated in Figure 3.

As a single effect plant, B9 would operate on a 4-phase program through each tidal cycle as follows:

1. Holding (sluices and turbines closed).
2. Generation (sluices closed, turbines open).
3. Holding (sluices and turbines closed).
4. Refilling (sluices and turbines open, turbines not generating).

Single effect represents the economically optimum design from the standpoint of at-site energy cost. Nevertheless, utility system absorption and stability considerations might result in a decision to adopt the double effect mode. The increase in the at-site cost of energy would be approximately 5%. This penalty might well be outweighed in the overall project economic picture by the other conditions cited. If the plant operated in double effect, sluicing from basin to sea would take place during the latter part of the generating phase and the refilling would be accomplished initially by inward generating and later by inward sluicing. Apart from those changes, the operating schedule would be the same as for single effect.

The head available at the start of generation, and therefore the time of starting, regulation of the turbine from time to time during generation, and the timing of the end of the generation period are all variables entering into the problem of output optimization. The plant would normally run on an optimized program either for maximum output or maximum output value. However, departures from the optimized schedule are possible. Some, like the release of water from sluices for fish attraction, involve little economic penalty, whereas large distortions of the optimum generating cycle involve significant loss of output. Alterations of those types are available for the mitigation of environmental effects if necessary.

Regardless of the operating mode finally selected, the turbines would be horizontal axis propeller machines, either bulb or straight-flow type, of diameter approximately 7.5 m, and with generator limiting capacity of about 38 MW, equivalent to a rated head of 9.35 m. The machines could be designed for synchronous operation, in which case regulation would be by wicket gates for single effect operation and wicket gates plus variable pitch blading for double effect. It is more likely, however, that the machinery would be designed for asynchronous operation and regulated simply by the applied load. In that case, output would be transformed to transmission voltage and rectified for DC transmission. Fish mortality would probably be lowered if wicket gates were omitted.

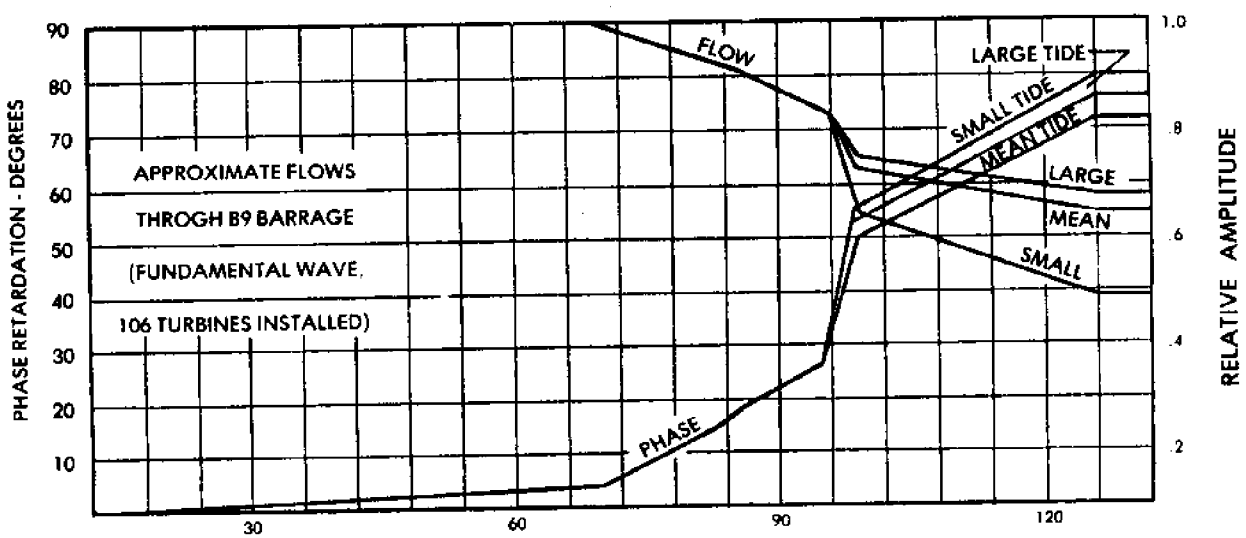


FIGURE 3

Where design options are indicated, final choice would be made during the definitive design of the project and the options are open for mitigation of environmental impacts.

Certain features of the present (feasibility study) designs are summarized in Table 1. The B9 barrage is illustrated in Figure 4 and water elevations for a typical generating cycle in Figure 5.

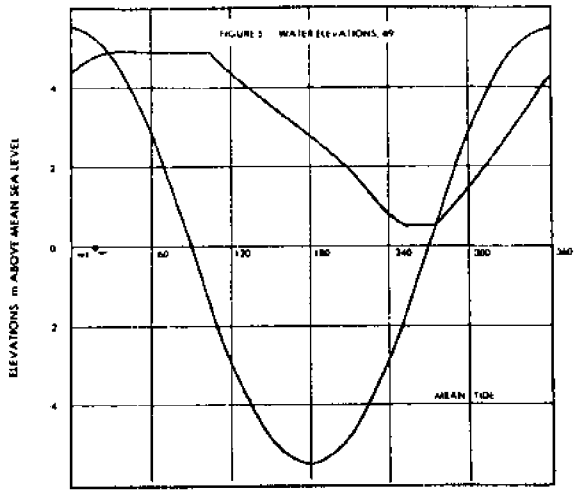


Figure 5

Table 1: Characteristics and Costs of Tidal Power

		Site B9		
		Small	Optimum	Site A8
1.	Total no. of powerhouse units	106	128	37
2a.	No. of sluices (shallow)	6	70	--
2b.	No. of deep sluices	44	22	--
3.	No. of spare units	6	8	2
4.	Rated unit output (MW)	38	38	31
5.	Installed capacity (MW)	4028	4864	1147
6.	Net plant capacity (MW)	3800	4560	1085
7.	Net annual energy (GHh)	11766	14004	3183
8.	Capacity factor (%)	35.4	35.1	33.5
9.	Cost estimate ($ x 10^6)			
	(a) Total direct cost	3524	4011	1153.2
	(b) Indirect & interest plus contingency	2493	3019	726.1
	(c) Total capital cost	6017	7030	1879.3
10.	Annual charge (9c) x .05531	332.8	388.8	103.9
11.	Cost of energy (mills/KWh)	28.3	27.8	32.6

Note: The unit costs for the schemes are not adjusted for the benefits due to energy and revenues during construction. Costs are in 1981 constant dollars.

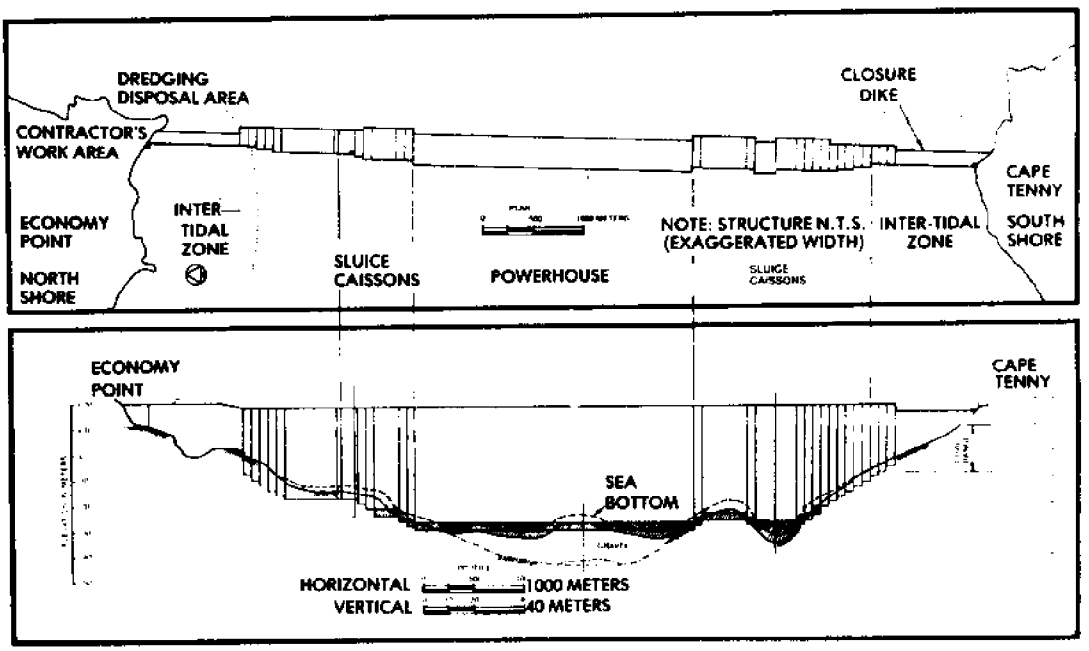


Figure 4: B9 barrage plan and elevation

Absorption of Output

The output of a single basin tidal plant consists of regular, discrete pulses of energy, one per tide for single effect and two for double effect. While various means of energy storage are available for retiming this energy, such adjuncts are more appropriately designed, constructed and operated as part of a utility system, where they can fill a multi-purpose role. From the viewpoint of tidal design, the product is thus simply energy without significant firm capacity. Studies have indicated that such energy can be used by utility systems to displace existing high cost thermal generation. The displacement targets are primarily oil and secondly coal. Displacement is technically feasible as long as the amount of tidal energy is small in proportion to total utility load.

For Maritime Province utilities, this restriction sets a relatively low upper limit on absorption capacity. But an even lower limit is presented by the relatively small amounts of oil projected to be used in the 1990's and beyond. New England and New York power pools are by contrast projected to depend heavily on hydrocarbon fuels out to the limit of present forecasts. They are thus the best markets for tidal energy from the standpoints of both project profit and benefit to society. Any large-scale tidal project would therefore inevitably depend on markets in the northeastern United States.

Present Status

At present, no project exists and much work remains to be done to reach the point of a commitment decision. This work includes, among other things, site selection and the interactive conduct of environmental assessment and definitive design. Site selection presents relatively few options, but necessarily involves decisions bearing on the ultimate development of the Upper Fundy tidal resource. For economic reasons, it would be necessary in any event to "high-grade" the resource. The Fundy-Gulf system in its natural state annually dissipates some 230,000 GWh, of which recent estimates indicate about 20,000 GWh per year to be economically recoverable at projected real costs of energy. However, a single-site development which precluded any future additions would still further (and perhaps unjustifiably) limit the resource potential.

The work leading up to a commitment decision is labelled for convenience the precommitment program; it would cost $50 to $100 million, depending on site and other factors. Before starting to spend this amount of money, an effort is being made to ensure that development is viable from the financial and marketing standpoints. Results of this current work should be available early in 1985.

Environmental Aspects

While no environmental assessment has yet been undertaken, a considerable amount of work has been done in recent years, mainly aimed at an improved understanding of the marine physical and ecological systems likely to be affected. The views expressed in this section are intended to summarize the results of such work, from the standpoint of a potential owner.

From what has already been stated, it is clear that a tidal plant will necessarily alter the magnitude and phase of tidal flows across the line of the barrage, affecting the tides themselves. Two efforts to quantify such effects have been made, both using two-dimensional finite time difference HDN models. The first, by the Atlantic Tidal Power Programming Board, suffered from lack of tidal data outside the Bay of Fundy and was constrained to use an insufficiently remote seaward boundary. The second, by the Tidal Power Review Board in 1976-77, utilized the Greenberg model with seaward boundary at the edge of the continental shelf. That model gave good results in verification tests and potential participants in a tidal project tend to consider it reliable.

Results obtained from the model in predictive mode have been published, and are illustrated in Figure 6. Recent discussions have tended to omit any reference to the precise conditions modelled and to view the predictions in a context which could well be erroneous. The main omission is the fact that the predictions were made with the M2 tide as the sole input. The predictions would be correct for actual tides if the S2 and other significant constituents were unaffected, but would otherwise over- or understate the extent of amplitude changes in the actual tide. Model runs do indicate, however, that the average perturbation of the tides will be very close to the M2 results.

Secondly, the predictions were made for specific timing and magnitude of flows through the tidal barrage. Significant changes in such flows, caused by changes in operating methods or installed sluice or turbine capacity, would have a minor but perhaps not negligible effect on predictions.

Before changes in the tidal regime and the scope for mitigative measures can be fully understood, predictions will have to be obtained with a drive containing all the significant tidal constituents, sensitivity of results to changes in barrage permeability will be needed and the possibility (probably faint) that drastic changes in operating schedules can be used to modify the tides at times of storm surges will have to be explored.

Most of the direct long-term environmental consequences envisaged stem from alteration of the tides, either in the headpond area or at more distant points in the lower Bay and Gulf. Many local effects have been identified and at least roughly quantified. There would, for instance, be loss of intertidal areas in the headpond, less nutrient production by zooplankton and benthic organisms, balanced by less turbid water and greater phytoplankton production. While some negative impacts would occur, nothing prohibitive is envisaged.

The impacts on Maine coasts have been well identified, but quantification will have to be based on a more precise definition of tidal plant design and the resulting tidal regimen. It will require a thorough assessment by environmental scientists. From the viewpoint of a potential owner, coastal

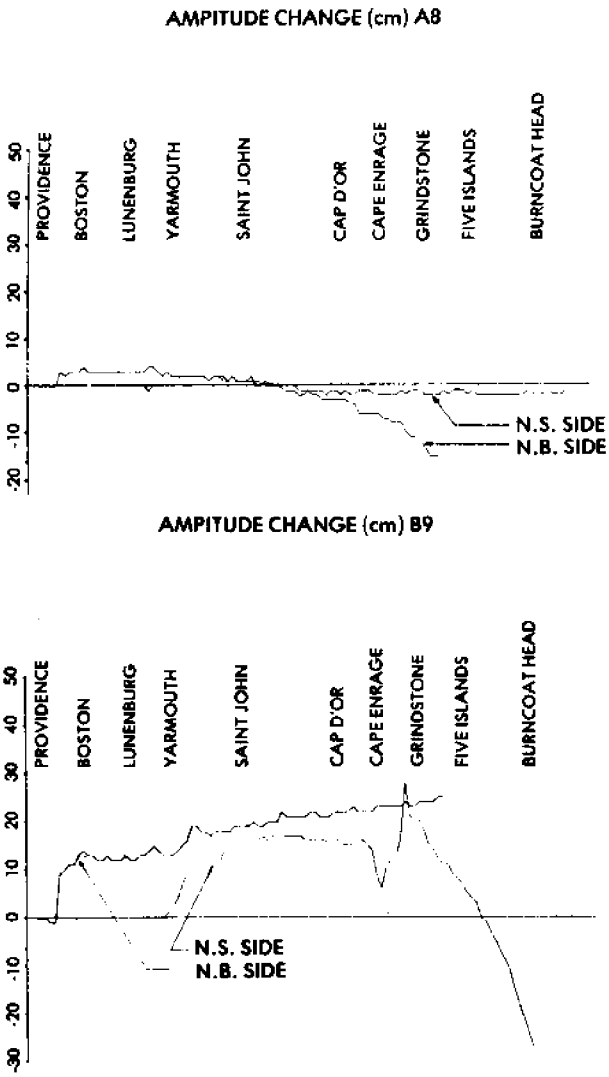


Figure 6: Tidal amplitude change with operation of plants at indicated sites (TPRB, 1977)

impacts would require compensation of individuals for damage or remedial works and the costs would become part of project capital cost. These impacts are potentially serious and are perceived as important factors both in site selection and in estimating the ultimately developable resource potential.

Alteration of the tides would affect currents, temperatures, nutrient and larval distribution in the lower Fundy and Gulf of Maine and therefore has the potential for benefit or harm to the important commercial fishery of that region. It may be possible to obtain some indication of the results using a relatively simple approach, and this work is now in progress. Preliminary results suggest a beneficial effect for some important commercial species.

One potentially major impact does not stem from alteration of the tides, but rather from the existence of a barrage and operation of the turbines. This involves the shad (alosa sapidissima). Work by Dadswell indicates that the potentially viable tidal sites are all used by this species as summer feeding grounds, and it is estimated that a single fish would, in the course of its summer sojourn, make an average of 15 passages through the turbines at site B9. Under these circumstances even a relatively low rate of mortality per passage would impose an insupportable rate of attrition on shad stocks. This worst-case scenario implicitly assumes that behaviour of the species is not altered by construction of a barrage and reduced sediment concentrations.

From the viewpoint of a potential owner, it would be impossible to proceed with any development which would result in the decimation or destruction of a fish species of importance both to sportsmen and commercial fishermen. Methods of mitigating this potential impact may be available. Mortality tests necessary to define the extent of the impact have been scheduled by Tidal Power Corporation for the spring of 1985, using the 7.6 m Straflo turbine at Annapolis Royal.

Turbines of the size and speed suitable for large scale tidal developments and operated on the modest heads available are expected to have low mortality rates for fish up to about 1 m in length. Thus a tidal plant is not expected to impact heavily on anadromous fish passing the barrage on an annual spawning run.

In summary, the significant direct impacts appear to comprise the effects of higher tidal ranges on the New England coast, undefined effects on the Bay-Gulf commercial fishery, and shad mortality. Of these, only the last is thought to be mitigable by choice of suitable plant design.

Indirect impacts, all beneficial, would arise because the tidal energy would displace hydrocarbon fuels with consequent reduction of air pollution, including acid-forming emissions, radionuclides and particulate matter.

Preparing to Deal With Potential Conflict

Unless benefits substantially exceeded disbenefits, no tidal plant could be built. There is reason to believe this condition can be attained and for purposes of this paper the assumption is made that it will be attained. However, even with the greatest possible mitigation of impacts through appropriate design, some negative impacts would occur. For example, negative impacts would be felt by clam diggers in the headpond area, owners of shoreline property and structures in the lower Bay and Gulf. The economic benefits would necessarily be split in some fair fashion between project owners and the customers of utilities purchasing the tidal energy. The environmental benefits, with a few exceptions, would inure to the public at large. With an uneven distribution of impacts in prospect, the seeds of conflict are sown.

Feasible conditions for any tidal project would include, among other things, the availability of export permits, adequate financing and transmission facilities. None of these could be obtained unless the project were beneficial, and so perceived, in all the jurisdictions affected.

From the owner's point of view, these requirements translate into a need to (a) establish the facts regarding project benefits and disbenefits, and (b) obtain if possible a consensus of opinion, based on the facts, in all the jurisdictions affected.

Neither of these tasks can be performed by a proponent in isolation. As in so many other facets of human affairs, the words of the British jurist are relevant: "It is not enough that justice be done; it must also be seen to be done." The fact-finding must be preceded by a judgment as to what facts are relevant and this judgment must be made by a disinterested and impartial agency. The scientific work necessary to assess environmental effects must be well performed and the stature of those engaged in its execution and supervision must be such as to command public acceptance of the results.

In a perfect world, a consensus of public opinion would develop automatically from consideration of the relevant facts, but in real life at least two difficulties arise. One is presented by the apples-and-oranges nature of economic and environmental considerations; the lack of an accepted common unit of value. Thus two people can look at a given set of facts and reach widely different value judgments.

The other difficulty in the present case is created by the delay necessarily involved in obtaining reliable data. Media tend to be addicted to sensationalism, and in recent months have been publicizing the more sensational aspects of legitimate environmental concerns. In some cases the publicity has portrayed today's scientific conjecture as ultimate truth. There is some danger that by the time the facts are known, they will be irrelevant; that opinions formed on the basis of media coverage will have been cast in concrete.

It therefore appears that a constructive step both in the minimization of conflict and in its resolution would be to delay the hardening of opinion until the facts become available. Complete achievement of such an objective would no doubt be impossible, but efforts to that end might nevertheless be worthwhile.

In a situation where both Canadian and U. S. interests are involved, it is desirable that parochialism and even the suspicion thereof be avoided. This militates against separate national approaches to environmental questions. Furthermore, any proponent would find it difficult, if not impossible, to deal with a situation in which it was answerable to a number of environmental agencies likely to impose conflicting requirements on the project. In view of these considerations, environmental supervision through a single agency may well be a necessary condition of project feasibility.

Because of the foregoing considerations, it appears highly desirable from the proponent's point of view that the means for environmental regulation and control be decided on a binational basis, and put in place with the least possible delay.

PART 2 - TIDAL POWER AS AN "ISSUE"

Introduction

The use of tides to generate electricity has been long discussed but, as far as North America is concerned, has only come under serious economic consideration within the last 8 to 10 years. The rapid escalation in the price of imported oil during the mid- to late '70's coupled with the continuing dependence of the northeastern United States on such oil has greatly improved the outlook for tidal power.

In the abstract, tidal power appears to be an environmentally desirable way of producing energy. It involves a renewable resource, it does not generate waste heat or noxious byproducts, and it does not add carbon dioxide to the atmosphere. Unfortunately, like so many other things in life, it appears that here too there is to be "no free lunch". Predictions based on mathematical models suggest that worrisome increases in tidal ranges and currents could accompany tidal power generation. Debate over these possibilities has now added tidal power to the growing list of "energy vs. the environment" issues on the public agenda.

The purpose of this part of the paper is threefold:

1. To review briefly the recent history of the tidal power issue and to outline the nature of the issue;
2. To describe what appears to be needed to resolve the emerging conflict;
3. To discuss the options that would seem to be available, with special emphasis on possible use of the International Joint Commission.

The Recent History of the Issue

Before attempting to describe how Fundy tidal power evolved into an issue, perhaps it would be well to define what is meant here by the term "issue". In our judgment, a proposed action or project becomes identified as an issue when evidence enters the public domain that suggests that the costs of the project, intended or unintended, may actually be greater than the projected benefits or that new and unintended side effects are likely to arise from the proposed project. Often it is groups that are traditionally opposed to certain classes of projects that, on their own initiative, conduct studies that produce results questioning the benefit-cost ratios of controversial proposals. In the present case, however, it was the developer itself, Tidal Power Corporation, that contracted for some of the early studies that suggested adverse impacts from the proposed facility.

Indeed, one of the differences between this issue and other environmental conflicts has to do with both the source and the quality of early information on possible impacts. To a large extent, although not exclusively, information entering the public domain has come either directly from reputable research scientists or indirectly from them via reasonably accurate media accounts. That these studies have involved both Canadian and U. S. researchers representing a number of different disciplines and institutions has reinforced the perceived objectivity of the information being received on the issue.

The following chronology, though not comprehensive, gives some of the high points in the development of the issue. A series of Canadian government-sponsored reports have served to frame the issue. The first, issued in 1969, concluded that tidal power was not economically feasible under the then existing conditions; a second, released in 1977, showed that the altered world energy situation had made Fundy tidal power economically feasible; and the third, issued in 1982, gave an even more optimistic assessment of the potential of Fundy tidal power.

Between 1969 and 1979, as discussion of tidal power increased, scientists began to look more carefully into the possible environmental consequences of the requisite power generating structures. When ground was broken on the construction of a $50 million one-turbine prototype at Annapolis Royal in Nova Scotia in 1980, Fundy tidal power attained a new level of reality.

Beginning in about 1981, articles began to appear in both the Canadian and U. S. regional newspapers concerning the possibility of adverse effects from a Fundy tidal power project. Most of these were based on interviews with one or more of the growing number of researchers that were beginning to focus more specifically on the issue. In Canada, a Fundy Environmental Studies Committee made up of scientists working in the Bay of Fundy was organized and efforts were begun to form a U. S. counterpart.

Four meetings in the United States in the last 18 months have heightened public interest in the topic. In July of 1983, U. S. Senator George J. Mitchell (D-Maine) convened a public hearing of the Senate Committee on Environment and Public Works in Augusta, Maine, to take testimony on the matter. A workshop was held at the University of New Hampshire in November of 1983 to discuss scientific needs in connection with the issue. In December, 1983, the New England Governors' Conference and the National Oceanic and Atmospheric Administration held a public forum in Boston on the topic and in May of 1984, the Fundy tidal power issue was one of three topics studied at the First Annual Bilateral Symposium on New England/Eastern Canadian Affairs held in Providence, Rhode Island.

Several events drew public attention to the issue during August of 1984. On August 6, a major article appeared in the New York Times on the Fundy tidal power matter; on August 25, the Annapolis Royal prototype plant was opened and officially became the first operating tidal power plant in North America; and on the same day, the New York Times ran a letter to the editor sharply criticizing the economics of tidal power.

In effect, then, up until the last year or so, the issue had been largely defined by Canadian government reports prepared by professionals primarily concerned up to this stage with the economic and engineering feasibility of the project and by a small number of Canadian and U. S. scientists. As an increasing number of the U. S. public became aware of the proposal and its possible impacts, however, elements of the state and federal governments in the U. S. began to be drawn to the issue. As of this writing, the Governor's offices of the New England states and state coastal management, state fisheries, and state energy offices are all involved in the matter. At the federal level, NOAA, the U. S. Army Corps of Engineers, the Fish and Wildlife Service, the Department of Energy, EPA, and the Federal Emergency Management Agency have all become interested in one aspect or another of the topic.

Nature of the Issue

What fears are drawing public attention and creating an issue of Fundy tidal power? What have the public or its representatives learned about the tidal power project that causes them most concern? Are these concerns likely to be "real"? How and when will they know? Are the developer and those likely to be impacted working with different sets of numbers? Are "value" differences involved? Are the major impacts likely to be subject to mitigation? Are the projected impacts likely to be found to be an inherent part of a viable project? Is compensation likely to be a reasonable mitigating measure? Formulating responses to these kinds of questions is a necessary step on the way toward shaping an approach to conflict resolution.

In the judgment of the author, Fundy tidal power has become an issue because of a growing fear that significant adverse impacts may be felt by a population that perceives itself to have little or no legal (or political) leverage over decisions regarding the project. Two aspects seem to be involved--concern that adverse consequences will be suffered without offsetting benefits and concern that decisions will be made without regard to the views of those likely to be affected.

The estimation of the magnitude of the various types of impacts of a Fundy tidal project is, of course, a difficult process involving considerable uncertainty. Some of it relates to the limitations of the mathematical models used to predict changes in tidal range and tidal currents due to the construction of a tidal barrier. Other uncertainty is introduced when attempting to judge the effects of these physical changes on such phenomena as coastal inundation, erosion, tidal mixing, primary productivity, water temperature, and the weather. Indirect effects such as those that might affect fish populations are even harder to estimate at the present time. Principal focus so far has been on the increase in tidal range that predictions say would be associated with the project.

In addition to effects produced by increases in tidal range and current predicted to be felt along the New England shoreline as far away as Cape Cod, another important class of impact that occurs immediately at the tidal facility itself will almost certainly affect U. S. interests as far away as the mid-Atlantic states. Tagging studies suggest that very large numbers of anadromous fish spawned in U. S. rivers from the mid-Atlantic states northward, spend a portion of each summer in the very bays in the Fundy region proposed for tidal power development. Dire predictions have been made as to the impact of the project on the American shad stock.

As more research is completed and the physical oceanography and biology of the Fundy-Gulf of Maine system are better understood, more accurate prediction of impacts can be expected. But a good bit of this knowledge will not come quickly or easily. In many cases, additional data over several annual cycles will be needed. Effects on fish stocks due to the operation of the Annapolis Royal plant, for example, will be of great interest but the collection of these data will take several years. Probably most importantly, development of the mathematical models required to provide data for environmental purposes will take considerable time, effort and expense.

The second aspect of concern, we believe, involves a fear on the part of some members of the potentially impacted U. S. public of being virtually powerless to affect a Canadian tidal power decision. So far, except for some broad statements of reassurance by Tidal Power Corporation executives, concerned members of the U. S. public have not been shown any avenue for formal expressions of concern, nor have they been informed of the decision-making processes to be followed by the two governments. U. S. citizens who have become accustomed, over the last decade and one-half, to a full range of legal tools (environmental impact statements, restraining orders, other forms of litigation) are understandably apprehensive with the uncertainties introduced by the trans-national aspects of the tidal power proposal. Many environmentalists probably believe that simply having access to prescribed legal tools provides useful incentives to all concerned for meaningful discussion and accommodation.

What is Needed in a Conflict Resolution Mechanism?

Approaching the problem from the perspective of the concerned U. S. public, it would appear that a workable mechanism for conflict resolution should contain at least the following three elements:

1. An agreed process to produce and disseminate authoritative answers regarding the physical effects and likely consequences of the construction and operation of a tidal power facility in three areas of principal concern: effects of increases in tidal range, effects of increases in tidal currents, and effects of turbine mortality on fisheries.
2. An agreed process that ensures that information on the full costs as well as the full benefits of the proposed project becomes a formal part of a decision-making process that involves both governments.
3. An agreed long-term monitoring program that would measure observed effects and their consequences, if a decision is made to construct the project. Associated with this element would be an agreed mechanism to link the outcome of such a monitoring program back to the bilateral government decision-making scheme.

The developer, on the other hand, has a somewhat different set of needs, some of which will have to be met by such a process. Fundamentally, as Mr. Baker outlined above, the proponent needs a firm basis upon which to make his next business decision. Like the concerned public, he needs to know the magnitude of the impacts to be expected as quickly as they can be reliably estimated. He also needs to know if they are likely to exceed some threshold of acceptability in certain locations and what those thresholds might be. He needs to know if impacts can be reduced in magnitude by mitigation measures or made acceptable through the payment of compensation and if compensation is to be involved, what that will do to the economics of the project. Equally importantly, he needs to know with certainty that a bilateral governmental decision-making process can be found which will produce the authoritative answers that both his company and the public need and which will produce a go or no-go decision in a predictable timeframe.

The Available Options

An analysis of the possibilities, such as that undertaken by Dr. Allison Rieser in 1983, reveals relatively few good options. While international law places a generalized obligation on nations to refrain from activities which degrade the environment of their neighbours, it does not provide the kind of predictable legal framework required here. Domestic law in Canada and the U. S. also appears to fall short. The environmental impact assessment requirements of neither country, in this specific instance, necessarily extend to the transboundary impacts. And the federal government reviews associated with action to approve either an export license (in Canada's case) or an import license (in the U. S. case) for the electrical energy involved, also appear limited in their scope. State and provincial laws do not, by themselves, seem to provide an adequate legal basis for dealing with the issues raised in the Fundy tidal power case.

We turn then to bilateral arrangements as a possibility. A new treaty could be negotiated between Canada and the United States to deal expressly with the Fundy tidal power situation and as a part of the agreement, a new mechanism could be created to meet the special needs of the Fundy case.

In fact, attention has recently been focused not on a new agreement but on the use of an existing bilateral arrangement--the International Joint Commission (IJC). Created by the Boundary Waters Treaty of 1909, the IJC has a history of dealing with thorny transboundary environmental and water resource issues with considerable success. It has also demonstrated that it can handle issues as complex as the present case and has developed a reputation for authoritative technical work.

In its early period, the IJC was principally occupied with its judicial mandate--approving or rejecting applications for projects (hydroelectric, flood control, reclamation) affecting boundary waters. Since about 1960, however, it has become increasingly involved in issues related to water quality and the environment, generally under the investigative authority given it in Title IX of the treaty.

The IJC seems a promising candidate for the dispute resolution role in the Fundy tidal power case for at least four reasons:

1. Transboundary environmental problems are its main focus and the tidal power project impacts are clearly of that type.
2. Given its balanced U.S.-Canadian membership (three commissioners from each country) and its joint U.S.-Canadian boards, its recommendations will be credible in both countries.
3. The solid technical reputation of the IJC should ensure that its fact-finding is accepted as authoritative.
4. Given the continuing nature of the organization and its flexibility, the IJC could play different roles at various stages in the resolution of the Fundy case. For example, it could act as a fact-finding body initially, make recommendations concerning decision-making in the case to the two governments, and play a long-term monitoring role if the project is built.

Outlook

It would appear that the Fundy tidal power issue is at the point where action by the two federal governments is required. The magnitude of the project, its transnational aspects, and the nature and extensiveness of the possible impacts all argue for the initiation of government-to-government involvement. Early reassurance to potentially impacted interests in the U. S. that their concerns will, in fact, be factored into the formal decision-making process seems important. Equally important appears to be the need for authoritative information on likely impacts and the probable consequences of such impacts.

The Tidal Power Corporation (TPC) would appear to need to know what kind of information the two governments are likely to require on the project and what procedures and timetable will be followed in arriving at a decision with regard to the project. TPC is approaching the time when another large investment must be made. That investment, while still not the major financial commitment, requires knowledge of the government decision process to be used and the timetable associated with it. The corporation must be certain that at the end of its next increment of studies--the precommitment phase--all of the information necessary to make the commitment decision is at hand. Hence, both the TPC and the potentially impacted publics need early information on the fact-finding/conflict resolution/decision-making processes that will be used in this situation.

As indicated above, momentum appears to be building behind the idea that the IJC could play a useful role in the Fundy tidal power case. Recently, the New England Governors and the Eastern Canadian Premiers have taken the matter under study. It appears possible that the Premiers and Governors will formally request that the President and the Prime Minister initiate a reference to the IJC with respect to the feasibility and desirability of the Fundy tidal power project at their next meeting.

A recommendation coming out of the First Annual Bilateral Symposium on New England/Eastern Canadian Affairs (May 1984) also called upon the governors and premiers to take the lead in the collection and dissemination of scientific and environmental information on the Bay of Fundy, Gulf of Maine, and Georges Bank. Recognizing that the processes to be followed in bringing the IJC into the situation are likely to be time-consuming, the governors and premiers could play a very useful role in the interim by creating an office that serves as a clearing-house for information on the topic.

The prospects of generating pollution-free energy from the large tides in the Bay of Fundy remains an exciting one indeed. The positive aspects of this proposal are so attractive that the overall feasibility and desirability should be evaluated promptly and authoritatively. The possibility of potentially serious side effects must be carefully examined by a respected bilateral agency of the two governments and a definitive statement on the full spectrum of benefits and costs prepared as soon as possible. Necessary additional research studies should be commenced at the earliest opportunity. The bilateral agency should also prepare recommendations to the two governments regarding the decision-making process to be used, including the criteria to be used in arriving at a decision.

Up to this point, the debate over Fundy tidal power has been a relatively rational one. Action on the part of the two federal governments is now needed to continue that tradition.

MEETING THE CHALLENGE: USE AND PROTECTION OF OUR OCEANS AND COASTAL WATERS

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The oceans and coastal waters are of great importance to all of us because they support a rich and diverse variety of plant and animal life, provide food and recreation for populations around the world, and are used for transporting ourselves, our goods, and materials between nations. The oceans are also a great potential resource for minerals and energy and have the capacity for assimilating a certain amount of waste materials. And, therein lies our challenge: How do we capitalize on the availability of the ocean's mineral and energy resources, also, the oceans' waste assimilative capacity without damaging their value as a natural and environmental resource?

During this presentation, I plan to share with you what EPA, in cooperation with other federal and state agencies, is doing and plans to do under our several statutory authorities to meet this challenge. Included is a brief discussion of EPA's ocean disposal research program.

First, however, it is important to understand two things about EPA in order to understand how we do business. First, EPA is a regulatory agency: our primary job is to enforce environmental and public health protection laws. Major program offices in headquarters include air and radiation, water, and solid waste and emergency response. EPA's new OMEP will be located in the Office of Water. There is also an Office of Enforcement and Compliance Monitoring to ensure that EPA enforces the several laws consistently. And, there is an Office of Research and Development to ensure that our program offices use the latest information on environmental and public health risks and the latest technologies for controlling and minimizing those risks.

Second, EPA is highly decentralized. Headquarters provides program direction, support, and overview and our ten regional offices implement the programs, many of which -- such as construction grants and permitting in the water pollution control program -- are further delegated to the States.

EPA's marine and estuarine environmental protection efforts are authorized by, or related to, requirements of the Clean Water Act (CWA), Marine Protection, Research, and Sanctuaries Act (MPRSA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and Resource Conservation and Recovery Act (RCRA).

Under the CWA, for example, all discharges to waters of the US, including estuaries and the territorial seas, must be permitted in accordance with NPDES requirements under §301 and 402 of the Act. Depending on the location of the discharge, effluent (discharge) limits in a NPDES permit will be dictated by technology based requirements, which are standardized nationally by EPA regulations, or by water quality standards that are specific to individual receiving water bodies. In addition, all discharges to the territorial seas, contiguous zone, or open oceans, must meet the criteria and EPA guidelines under §403(c) of the Act.

Variances from NPDES technology based requirements for certain industrial and municipal discharges are potentially available under §301(g) and §301(h), respectively. For example, EPA's recently published National Municipal Policy* set forth the agency's approach for ensuring that all municipal treatment plants comply with secondary treatment requirements of the CWA. To obtain a §301(h) variance from the secondary treatment requirement, municipal dischargers to marine waters must demonstrate compliance with specified environmental protection criteria. These criteria and EPA's decision-making process emphasize source control of toxic substances, enforcement of pretreatment program requirements, and locating and designing treatment plant discharges to minimize toxic effects on receiving water biota.

As shown on the chart, a total of 208 municipalities have applied for §301(h) variances; 84 are major applicants, i.e., at least 5.0 MGD and 124 are minor applicants. To date, 29 applicants have received tentative variance approvals and 74 have received tentative denials. All tentative decisions and draft, modified permits are subject to public review and comment before being finalized. There have been six final §301(h) variance approvals and 24 final denials to date. EPA plans to complete the §301(h) decision-making process over the next two to three years.

(Note: *The NMP establishes July 1988 as the target date for final compliance by all municipal treatment plants regardless of the availability of federal funding assistance. Exceptions to the July 1988 compliance date will be only for extraordinary circumstances and established by consent degree.)

§301(h) modified permits will be for five year terms, during which time the permittees will be required to monitor both compliance with effluent limits and impact on receiving water quality. Indeed, EPA, in cooperation with the States, will be evaluating monitoring feedback on §301(h) discharges and conducting our own monitoring programs to ensure continued achievement of CWA objectives by §301(h) permittees, individually and nationally. EPA's §301(h) monitoring program will be developed and implemented cooperatively with NOAA as an integral element of a comprehensive ocean monitoring strategy.

There are about 250 municipal and industrial ocean discharges subject to §403(c) requirements in addition to all other applicable provisions of the CWA. The §403(c) requirements also apply to offshore oil and gas drilling operations that discharge to the ocean or coastal waters. Under a recently signed agreement with DOI, EPA and the minerals management service of DOI are committed to close coordination of environmental studies, regulatory activities, and NEPA-related actions so that EPA's final NPDES general permits for oil and gas drilling operations in DOI lease sale areas can be issued by EPA at the time DOI publishes their final notice of (leasesale) offerings.

EPA is not planning to issue individual permits for oil and gas drilling operations in lease-sale areas for two reasons. First, it is expected that circumstances surrounding most or all drilling operations within a lease-sale area will be comparable so that individual permits would be redundant. Second, requirements for general permits are expected to generate sufficient information to determine permit conditions without application information. Thus, general permits can be issued without a named applicant or applicants. The effect is that EPA can propose general permits for lease-sale areas early in the leasing process, thereby minimizing delays. EPA, therefore, is issuing NPDES general permits covering part or all of the lease-sale areas. EPA has already issued general permits covering existing lease-sale areas in the Gulf of Mexico and off the southern California coast.

Also, under §404(b) of the CWA, EPA has published guidelines defining the criteria and testing procedures for evaluating permit applications to the Corps of Engineers (COE) for dredge and fill activities in estuaries and for placement of fill in the territorial seas.

In addition, §404(c) of the CWA authorizes EPA to veto specification of sites for dredge and fill activities whenever EPA finds that such activities will have unacceptable adverse effects on water supplies, shellfish beds, or fisheries.

Finally, EPA's responsibilities for prevention and control of oil and hazardous material (O&HM) spills to the contiguous zone or territorial seas are described under §331 of the CWA. Under the National Contingency Plan, established as required by §311(c)(2) of the CWA, the U.S. Coast Guard is the federal action agency for spills of O&HM to these coastal waters.

Dumping of any materials (including dredged materials) to the oceans, contiguous zone, or territorial seas is strictly regulated under the MPRSA, the Ocean Dumping Act, as well as U.S. commitments to the convention on the prevention of marine pollution by dumping of wastes and other matter, more commonly known as the London Dumping Convention (LDC). Incineration of liquid hazardous wastes is also regulated under MPRSA.

Although EPA is responsible overall for leading and coordinating implementation of the MPRSA as shown on the chart, administration of MPRSA programs is a shared responsibility among several federal agencies, including EPA, NOAA, COE, and the Coast Guard. In addition, the DOI must do environmental assessments and prepare EISs during the development of lease-sale offerings for offshore mineral and energy development. So, clearly, close coordination and collaboration is needed among the several agencies if we, collectively, are to meet the challenge I described at the beginning of my presentation.

MPRSA
MAJOR RESPONSIBILITIES

EPA
- o Site designations and management (all sites)
- o Permit issuance for nondredged materials
- o Research on environmental and public health risks and control technologies

COE
- o Ocean dumping of dredged materials and issue permits for dredged material dumping

NOAA
- o Environmental monitoring and research on long term effects

Coast Guard
- o Compliance monitoring and surveillance

EPA's regulations for implementing the MPRSA address ocean dumping for final disposal of wastes and incineration-at-sea for destructive disposal of liquid hazardous wastes. In addition, there are two distinct phases or elements of the ocean disposal program: Sites for ocean disposal must be formally designated by EPA (i.e., by promulgation in the Federal Register) as environmentally acceptable locations for specified type(s) of waste and disposal method(s); and permits must be issued for actual waste disposal, whether by dumping or by incineration.

As part of the MPRSA "ocean dumping" regulations promulgated in 1977, EPA designated 141 dump sites on an interim basis, including 127 dredged material sites, 13 nondredged material sites and 1 incineration-at-sea site. EPA was sued by the National Wildlife Federation (NWF) in 1980 for moving too slowly on final site designations. A "consent decree" was filed in court in which EPA agreed to a schedule for preparing 22 EISs and designating 46 affected dumpsites. As shown on the chart, EPA has (as of August 27, 1984) completed 15 EISs and promulgated 16 final site designations. EPA is also proceeding, in cooperation with the COE, on a schedule for designating sites not covered by the NWF consent decree. Because most dumpsites are for dredged materials, the COE shares in the cost of site designation field studies.

MPRSA DISPOSAL
SITE DESIGNATIONS

Total Interim Site Designations = 141

-127 Dredged material sites
- 13 Nondredged material sites
- 1 Incineration-at-Sea-Site

Site Designation Status as of August 27, 1984:

-16 Final Designations (15 EISs)
- 6 Proposed Designations
-10 Sites Dedesignated
-56 Sites under Evaluation
-53 Sites Scheduled for Evaluation

Of special interest here are EPA's recent actions on dumpsite designations for the New York City (NYC) metropolitan area. On May 4, 1984, EPA published its tentative decision in the Federal Register to deny petitions for redesignation of the NYC 12-mile site for sewage sludge disposal because continued sludge disposal at the 12-mile site is inconsistent with the MPRSA criteria and EPA regulations. There is unreasonable degradation of the marine environment and a suitable, alternative disposal site exists. In that same Federal Register notice, EPA promulgated final designation of sewage sludge and industrial waste dump sites within the boundary of the previously approved (interim) NYC 106-mile dump site.

Applicants for ocean disposal permits, either ocean dumping permits or incineration-at-sea permits, are required by MPRSA to demonstrate the need for such activities and that there will be no adverse effects on human health and welfare; biological communities, shorelines, and beaches; marine ecosystems; or alternative uses of the oceans;and also, that ocean disposal impacts are less adverse to the public interest than are other disposal alternatives, including land disposal. EPA's ocean dumping regulations must be consistent with requirements of the LDC; and the LDC has strictly prohibited several kinds of materials from ocean dumping. Prohibiting materials include radiological, chemical, and biological warfare agents and high-level radioactive wastes.

This chart shows that there were seven EPA-issued, special (i.e., three year) ocean dumping permits in effect in 1983, along with nine interim permits and one research permit. Most of the dumping is along the east coast and most of it, in terms of tonnage is sewage sludge. The chart also shows that about nine million tons of sewage sludge and industrial wastes were dumped (under EPA permit) during each of the last several years. These numbers are very small by comparison with ocean disposal of dredged materials. The COE annually dumps (or issues permits for dumping) about 75 million tons of dredged materials in the ocean.

It was EPA's intent back in 1977, consistent with our regulatory provisions, to phase out all ocean dumping of materials which failed to meet EPA's detailed environmental impact criteria by December 31, 1981. New York City sued EPA on this issue and, in 1981, Judge Sofaer told us that we must consider all relevant statutory factors in MPRSA (not just our environmental impact criteria) when determining whether ocean dumping of sewage sludge, or any other wastes, unreasonably degrades the environment. EPA is currently revising our regulations to be consistent with the Sofaer decision.

EPA has also taken a hard look at our ocean dumping decision-making process in response to the Sofaer decision. EPA published its current approach to ocean dumping in the May 4, 1984 Federal Register, as summarized on the chart:

OCEAN DUMPING OF
NONDREDGED WASTE MATERIALS

Permits in Effect

Permit Type	1981	1982	1983
Special (3 yr.)	13	12	7
Interim	15	12*	9*
Emergency	0	1	1
Research	1	0	1

*continued in effect under court or administrative orders

1000 Wet Tons of
Waste Materials Dumped

	1981	1982	1983
Sewage Sludge	6682	7632	8312
Industrial Waste**	2287	1096	336
TOTAL	8969	8728	8648

**includes acid wastes, cellar dirt (construction), wood incineration, and chemical wastes

EPA'S APPROACH TO OCEAN DUMPING

The Agency will --

"(1) The agency will, as an overall principle, protect the oceans from significant adverse effects of waste disposal;

(2) In any specific case, the agency will allow ocean disposal of a waste only if the applicant can show that no practicable alternatives are available that have less impact on the total environment; and

(3) For the long run, the agency will actively encourage environmentally beneficial approaches such as waste minimization, recycling, or reuse."

EPA has established a task force to develop municipal sludge management guidelines under § 405 of the CWA. With regard to ocean disposal, the agency is attempting to characterize different municipal sludges in order to determine components of the sludges and their potential effects on different marine settings.

As I mentioned earlier, EPA has one site designated for incineration-at-sea, located in the Gulf of Mexico. Another site is proposed off the NE Atlantic Coast. EPA authorized, by issuing a research permit, a "test burn" of 3.5. MG (four ship loads) of liquid hazardous wastes in 1981 at the Gulf of Mexico designated site. Although the test burn complied with the LDC technology-based requirements, there is considerable public concern over whether such

incineration of hazardous wastes adequately protects the public health and environment. In fact, at the request of Congress, EPA is preparing special regulations for incineration-at-sea. We expect to "propose" these regulations in the Federal Register early in 1985, and promulgate them about a year later.

EPA's ocean disposal research program provides necessary information and scientific tools for evaluating wastes to be ocean dumped or disposed of through ocean outfalls. A major aspect of the research program is the hazard assessment concept. This concept is based on information required by the ocean disposal permit program, for site characterization; waste characterization and quantification; pre-disposal assessment; and monitoring. The concept is generic in nature and can be applied to any type of waste and any particular disposal site.

The initial step in an ocean disposal decision is characterization and designation of a disposal site. The objective of site characterization is to ensure an acceptable match between the characteristics of a given site, and the characteristics of waste types being considered for disposal at the site. Since site characterization is a pre-permit activity, it only involves differentiation of waste types on the basis of their source (e.g., dredged materials, sewage sludge, and industrial wastes). A series of workshops was held in February 1983 for the development of a scientific protocol for ocean dumpsite designation. This protocol is now under consideration by EPA and the Corps of Engineers for use in their permitting programs.

After a site has been designated for disposal, a waste characterization process is conducted for the specific wastes in each permit application. Waste materials are characterized by those physical properties which determine its fate and transport in the environment, and by those chemical properties related to toxicity, residue formation, and biostimulation. Research is currently underway to develop or revise procedures to better enable wastes to be evaluated. This effort will result in a user manual for evaluating wastes proposed for ocean disposal.

Hazard assessment is a process which provides the necessary data and interpretive framework for estimating the probability of harm to the aquatic environment. The principal components in this process are exposure assessment and effects assessment. Exposure assessment consists of estimating the duration and intensity of contaminant exposure for potentially impacted biological communities. Examples of exposure assessment research include studies on the effect of current directions on ocean outfall mixing rates and the development of a three-dimensional analytical model for predicting transport and fate of ocean dumped contaminants at the NYC 106-mile dump site.

Effects assessment consists of estimating the responses of impacted biological communities in terms of toxicity, residues, or biostimulation. Research is being conducted on the effects of pollutant interactions on sediment toxicity and on a multi-species flow-through approach to predict ecological impacts of dredged material disposal. Research on the use of a thermodynamic model for predicting the maximum contaminant bioaccumulation from sediments and sewage sludge is very promising. Hazard assessments are intended to be sequentially tiered; that is, information from each level of testing is evaluated to determine if additional information is necessary to arrive at a disposal decision with a prescribed level of confidence. Tiered hazard assessment procedures are currently under development.

If a positive disposal decision is made, or a § 301(h) variance is granted, pre- and post-disposal monitoring activities are initiated for the purpose of verifying the hazard assessment predictions. The scope of these activities is defined by conditions of the § 301(h) modified permits.

EPA ocean disposal research is closely coordinated with other agencies to eliminate duplication of effort and assure the best use of available resources. For example, EPA is participating in the aquatic portion of the U.S. Army Corps of Engineers Field Verification Program (FVP). The dredge site for the FVP is Black Rock Harbor in Bridgeport, Connecticut. The overall objective of the aquatic portion of the FVP is to use dredged material disposal as a case study for implementing the hazard assessment strategy. The disposal of dredged-material in Black Rock Harbor started in the spring of 1983. The study will continue for a period of three years.

EPA has also worked closely with NOAA in the preparation of site characterization reports related to designation of the New York City 106-mile ocean dumping sites. EPA and the National Marine Fisheries Service collaborated on the update of the 106-mile site characterization report and EPA contributed to the NOAA/NMFS physical oceanography report on the area.

Just as EPA, the COE, and NOAA are actively implementing our responsibilities under the MPRSA, the Coast Guard is actively monitoring and ensuring compliance with ocean dumping permits. In 1983, for example, the Coast Guard received over 4100 notices of scheduled dumping operation and conducted 189 surveillance missions. EPA, in 1983, took civil enforcement action against two noncompliers that were referred to us by the Coast Guard.

In addition to EPA's "action" responsibilities under the CWA and MPRSA for regulating ocean discharges, ocean dumping, and incineration-at-sea, our related responsibilities under CERCLA and RCRA are of interest here. These two statutes are fairly similar in purpose and objectives; the primary distinction being that RCRA regulates the manufacture, transportation, and disposal of hazardous materials, in the present tense. What to do about the environmental and public health problems associated with abandoned hazardous waste sites is the regulatory jurisdiction of CERCLA. A direct link between these two statutes is that offsite disposal of materials from abandoned hazardous waste sites must be at a RCRA approved facility.

Of particular importance with respect to CERCLA, EPA is responsible for managing several superfund sites in coastal waters that are on EPA's National Priority List for containment and/or cleanup. Included are Commencement Bay at Tacoma, Washington; The Hudson River Estuary site (PCBs); and the New Bedford Bay site at New Bedford, Mass. Implementation decisions on these and other abandoned hazardous waste sites in US coastal waters will have a profound

influence on the uses and usefulness of the affected waters.

At this point, I need to observe that EPA has made a substantial commitment toward improving, maintaining, or enhancing the quality of the nation's estuaries. This commitment is our initial response to growing evidence that chronic abuse of our nation's estuaries is finally taking its toll on this tremendous national resource. An important consideration behind this commitment is our recognition that we are in a position to transfer the experiences, knowledge, and procedures from the ongoing Great Lakes Program and Chesapeake Bay Program to other major estuaries. Initially, we plan to focus on Puget Sound, Long Island Sound, Buzzards Bay, and Narragansett Bay. In cooperation with state and local authorities, we will quantify the pollutant loads for these water bodies, assess their effects on the overall ecosystem, and recommend priority pollution control trade-offs among both point sources and nonpoint sources.

A master environmental plan will be prepared for each estuary which will provide the strategic framework for improving, maintaining, or enhancing environmental resources by targeting available technical and funding assistance to state and local governments for controlling the most critical pollution sources affecting water quality and natural resources.

I need to emphasize here that we are committed to strategizing and controlling pollution sources to achieve environmental results rather than to further study relationships between estuarine water quality and beneficial uses of the estuaries. Also, EPA will cooperate very closely with other involved federal agencies on this effort; in particular, we will cooperate with NOAA to understand the status and trends of estuarine fisheries and the cause-effect relationships between pollution control and expected improvements in the fishery resources.

In closing, I want to reemphasize the importance of the challenge facing all of us regarding the use and protection of our oceans and coastal waters; also, the importance of close coordination and cooperation not just among the federal agencies but among all major elements of the public and private sectors to meet this challenge.

Future Considerations

Future Considerations

Francis McGovern

In this last section which will discuss the application of modeling to the negotiaton process, there are three questions which are of some interest to me.
1) What is the optimal mix of parties, issues, and information necessary to achieve a good outcome. What kind of parties do we want to have? What kind of issues do we want to discuss? And what level of information do we need to have? 2) How does one get the attention of the decision maker in achieving this appropriate mix? 3) How do you effectively transfer information to decision makers in order to get a resolution?

The appropriate mix of parties, of issues and of information

Parties. Today, it seems everyone wants "to negotiate," to find a way for all parties in a conflict to "win" something. There has been some skepticism about the role of the judiciary in the process but I suggest that they, in fact, seek exactly the same thing as the other major governmental players -- the legislative and the regulating agency. The judiciary too seeks the appropriate mix of parties, issues and information, although their approach is necessarily taken in legalistic terms. For instance, to decide who's in the case, who's on the bus, and who's not on the bus they use joinder, intervention, and class actions.

Let me use a case I know involving the judiciary. Currently, I'm a special master in a federal court case for the western district of Michigan involving Indian treaty fishing rights in the Great Lakes. The competing interests included various members of tribes recognized by the federal government, non-treaty commercial fishermen and sports fishermen, the state of Michigan, and various agencies of the United States government. The U.S. Department of Justice filed suit on behalf of the Indians against the state of Michigan because Michigan was allegedly regulating the resource, the Great Lakes, in a way that was inconsistent with the rights of the tribe. It is up to the court to decide who has a legitimate claim. What do you do about the tribe? Are they legitimate parties to the case? What do you do about the non-treaty commercial fishermen? Are they legitimate parties to the case? What do you do about the various sports fishing groups? Are they legitimate parties to the case? Courts regularly rule as to whether these kinds of parties can, in fact, intervene and come within the bosom of the court for some type of adjudication.

Issues. A court constantly tries to seek out the appropriate issues that should be decided. Should it decide the leasing issues first? The devices it uses are items like bifurcation: should it decide one thing first, and then go ahead and decide something else, or should it look at everything at the same time? In the Indian treaty rights case, the original federal judge decided to sever the single issue of whether the tribes have a right to fish in the Great Lakes. If they did not have a right that is different from the right of the citizens of Michigan, there would be no case. The judge decided the tribes had a right to fish in the Great Lakes. The case has now reached a second stage, where the tribes have moved for allocation of the resource. They have asked the court to tell them where and how they can fish. The courts, then are actively engaged in selecting which issue is appropriate, at what time, in what combination.

Information. Judges have changed their role models considerably over the last 15 years because of a marked change in the type of public litigation. Judges used to be viewed as umpires, calling balls and strikes. The judge's role was not to do much of anything until the parties brought an issue to the court to be resolved. Now they are active case managers. They actively try to assist the parties to reach an optimal level of information gathering. Litigators tend to believe that the marginal value of information is infinite, that each new piece of information in litigation carries the same value as what has come before. Judges are now curbing that flow of information somewhat, by restricting numbers of interrogatories, by limiting numbers of depositions, by ordering discovery to take care of this information first and other information later on. They are appointing experts where it seems that the parties could benefit from having access to neutral information.

Judges now are being instructed in the variety of supplemental dispute resolution techniques discussed here. In the new Manual for Complex Litigation, they will be instructed to use a whole menu of techniques that can complement the litigation process in assisting parties to reach a negotiated result. Ninety-two percent of all cases filed are settled; eight percent are tried. A

major proportion of those which are tried tend to be highly politicized issues. Judges are focusing on these in an attempt to devise mechanisms to have the parties work these issues out which are best solved by compromise. Increasingly, many are willing to experiment. So it may very well be, then, that one can argue fairly persuasively that all of the players are interested in the possibility of joint gains, of working together to get that "good outcome." The judge should be viewed as a potential resource in finding and utilizing dispute resolution mechanisms.

Gaining attention of the decision makers

The second kind of problem is getting the attention of the decision makers. It is easier for a judge or court-appointed special master, who has some power. But sometimes even then, it is very difficult to get an individual to focus on negotiation rather than on litigation, because that is where people have the most experience.

Communication

The third concern is: how can we communicate? How can we put together a level of communication, in terms of form and substance that will be helpful to decision makers, once their attention has been gained? There are some real differences in cognitive styles of the various players. By pitching information at one level of abstraction, it may completely go by the intended target. Technical or scientific experts who testify during trials feel a sense of frustration when trying to explain something to a judge or a jury, and all they see are glazed eyes. Using psychological testing approaches (most notably the Meyers Briggs test), recent research suggests there are some identifiable differences in cognitive styles. Take for example, middle management people as opposed to top management people. Research suggests in part that middle management people tend to make problems more complex. A middle management person asked to select a site for a new plant finds out about the water and the land and the taxes and the education and on and on and on. The top level, the decision makers, often times tend to think in more reductionist fashion. Their job and habit is to narrow that complexity down to a very small number of factors with which they can deal. Judges tend to be the same way. Somehow or another, they have to reduce it into a form that they can use to make a decision.

Given these three problems, given the suggestions that have been made to you about some understanding of conflict resolution, it seems to me that modeling may have potential application towards solving some of these problems. It may very well be that instead of the add-on strategy suggested by Susskind, that you might have an add-into strategy by adding a modeling type of process that would assist the parties in determining what the appropriate mix of parties, issues and information might be, assist in getting the attention of those

COMPUTER MODELS AS AN AID TO NEGOTIATION: THE EXPERIENCE IN THE LAW OF THE SEA CONFERENCE

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INTRODUCTION

Advances in the technology for the exploitation of the resources of the ocean made during the 1960's made the exploitation of resources on the ocean floor beyond the jurisdiction of any nation a very real possibility. Thus, almost a century after their discovery, polymetallic nodules (accumulations of manganese and other metals that cover parts of the deep ocean floor) became more than scientific curiosities -- they became potentially valuable commodities. This potential, and the rising interest of developing countries in improving their own economic condition, led the United Nations to deem these resources to be the "common heritage of mankind."[1]

It wasn't until the Third United Nations Conference on the Law of the Sea was convened that it became necessary to define what was meant by "common heritage." Would seabed resources be developed by private firms or by a single supranational organization? How would revenues be collected and distributed? These and other questions took on increasing importance as ocean mining became the keystone for developing state approval of the rest of the Convention, a convention for which the United States sought near universal acceptance to ensure that its other provisions would become customary international law regulating the behavior of all nations.

Within the arena of the negotiations on seabed resources there were a number of separate issues to be resolved. Some were approached through the normal give and take of conventional negotiation, but one issue proved to be too stubborn for conventional means. On the financial aspects of deep ocean mining, not only did industrialized and developing countries differ in their interests, they differed in their basic assumptions as to the profitability of seabed mining. These differences were too wide to be bridged by simple trading of concessions. Instead, technical and economic analyses were used, first to develop a common set of assumptions; second, to identify possible areas of compromise; and second, to express the costs and benefits of possible compromises in terms of the interests of the participants. In the end, the financial provisions proved to be one of the most successful of the many components of the seabed negotiations, and, in the view of key participants in the process, the computer model that produced the technical and economic analyses was crucial to that success.

BACKGROUND: THE NEGOTIATIONS

A confluence of interests of the superpowers (interested in restricting the trend toward extension of national jurisdiction seaward), developing coastal states (interested in maximizing the contribution of ocean resources toward their national development), small industrialized nations (who wanted to establish fishing, pollution, and other regulations that would be recognized and respected by all other nations) and a variety of other nations with varied interests led to the third attempt to establish a universally recognised law of the sea. The Third United Nations Conference on the Law of the Sea was arguably the most complicated negotiation ever undertaken, comprising over 150 nations, over 1000 degegates, spanning eight years of formal negotiation and several more years of preparation.

The Conference began its substantive work in 1974, and by 1977 many of the critical issues were resolved, in principle if not in detail. However, commitment by developing countries on these issues rested on the negotiation of an agreement on the exploitation of the resources of the deep ocean floor.

Polymetallic nodules, which at the time of the Conference were the only seabed resources that had shown potential for economic development, are small, lumpy accumulations of manganese and iron oxides. Such deposits are found in many parts of the ocean, but in one region of the Pacific (Figure 1) the accumulations are enriched in nickel, copper, and cobalt. Spurred by thoughts of the potential value of the metals contained in nodules, the developing

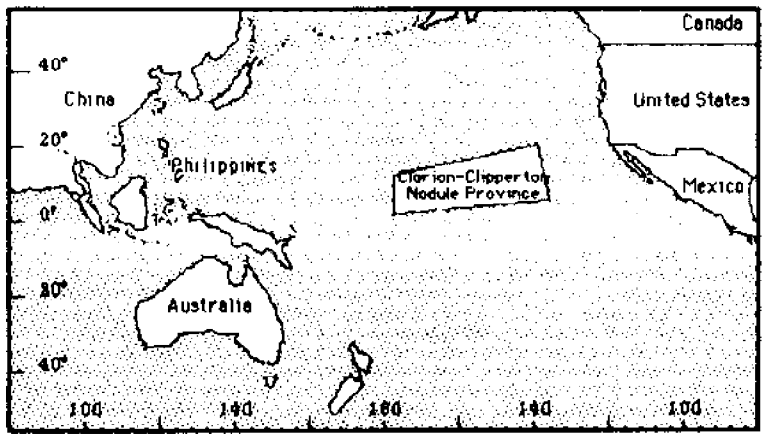

Figure 1.-- Location of Principal Nodule Resources

nations, acting through the Group of 77 (a negotiating group established in the U.N. Conference on Trade and Development which had grown to over 100 members by the time of the LOS Conference), made the resolution of the deep seabed resource issue their quid pro quo for agreement to the rest of the Convention.

On the domestic front, as the navigation, fishing, and continental shelf issues were resolved, American mining companies became more vocal in defense of commercial ocean mining interests and in opposition to the Group of 77. In 1977, the U.S. and other industrialized countries found themselves in a near impossible position of attempting to reconcile industrialized and developing nations objectives regarding seabed mining that seemed to conflict at every turn. In order to focus on the most important and difficult issues, the Conference established three special negotiating groups on seabed matters: one on the system of exploration and exploitation, another on the financial arrangements for exploitation, and a third on the structure of the Assembly and Council that would govern the application of the Convention to seabed resources.

Ambassador T.T.B. Koh of Singapore was selected as chairman of NG-2 (the negotiating group on financial arrangements). The work for this negotiating group appeared to be particularly difficult for two reasons: first, the results would be explicit -- no amount of diplomatic language could hide the cost that nations and companies would have to pay in an agreement, and second, to many observers it appeared to be a zero sum game, where the gains of one side would be at the expense of the other.

Work in the first year of the group was spent in laying the groundwork for the negotiation. The United States, India and other nations presented opening positions that seemed to be based on differing assumptions about the economics of deep ocean mining, so Ambassador Koh began a process of education for himself and the rest of the members of the negotiating group into the details of ocean mining, with the hope of narrowing the range of disagreement about the potential profitability of mining and of identifying areas that could lead to compromise.

By early 1978, the negotiating group had become extremely knowledgeable about the economics of ocean mining. In addition, the group had identified a number of components of the financial terms that could be considered in the negotiations. Still, there were disagreements about the likely profit of ocean mining, resulting in continued support of proposals at the extremes of high and low levels of taxation. The negotiations were difficult because there was no means to analyze and compare alternative proposals. Further, by identifying the many components that could be negotiated, the negotiating group appeared to have made the effort even more formidable.

Without a means to reduce the gulf between the assumptions of the members of the negotiating group, the financial negotiations were in danger of becoming a rigid and unproductive contest between developing and industrialized countries. It was in this setting of apparent stalemate that a new source of information on deep ocean mining was introduced. A report of a research project conducted at the Massachusetts Institute of Technology was released and distributed to Conference participants. The report, A Cost Model of Deep Ocean Mining and Associated Regulatory Issues, provided a means to move away from the adversarial situation that had been developing toward a more cooperative effort to seek agreement.

THE MIT MODEL

The model of deep ocean mining developed in the MIT report is simple in concept. It consists of a technical description of the elements of a

representative deep ocean mining system, an analysis of the costs of building and operating the technical system, and an analysis of costs and revenues over time to produce a measure of profitability.[2]

The complexity of the model lies in its technical detail and adaptable structure. Modeling an operation that has never been built is a challenging task, and the ocean mining system well represented this challenge. However, by drawing from the general descriptions provided by the ocean mining companies, from patent descriptions, and from academic analyses of nodule composition, distribution, and other features, it was possible to break much of the system into components which were comparable to technology in use in offshore oil production, marine transportation, mineral processing and other disciplines. Through the use of established cost engineering techniques, costs of existing processes and equipment were scaled and modified to represent the components of the ocean mining system. The financial analysis was a conventional discounted cash flow calculation, but it allowed for changes of the scheduling of operations, of the national and international systems of taxation, and of the assumptions about the behavior of metal prices. (See Box below for a description of the model in greater depth.)

The final result of these complexities was a "black box." In one end, assumptions as to technical design, mineral resource distribution, metal prices, taxation, scheduling and other factors were entered. Out the other end came a measure of profitability, the internal rate of return (IROR).

The MIT Model began with rather modest expectations. Growing out of an experimental course in law and engineering sponsored by MIT and Harvard Law School, it was developed as part of a graduate thesis examining the effects of regulatory constraints on the investment decisions of companies regarding deep ocean mining.[3] In the early stages of planning it was found that the generalized cost estimates prepared by industry and by the US government were of little use in evaluating corporate investment decisions and of even less use in evaluating the effects of regulatory actions on those decisions.[4] As a result, a significant amount of work was devoted to a detailed description of the technology of a deep ocean mining operation, evaluation of the costs resulting from the particular technologies chosen for development, and a financial analysis of the costs and potential revenues over time in order to produce a measure of profitability.

Without a research budget, the calculations were made without the use of a computer and took over a day to complete. This proved to be a serious limitation on the model's usefulness, but as the research was in progress, the National Oceanic and

A Description of the MIT Model

The MIT Model is a computer simulation of the economics of a hypothetical deep ocean mining system designed to collect polymetallic nodules from the deep ocean floor and process them to produce nickel, copper and cobalt. The basic design of the system is based on company proposals, patent descriptions, analogies to similar systems and equipment, and engineering analysis conducted by the MIT investigators. Conventional procedures for updating equipment prices, adapting estimates to different scales of operation, estimation of engineering fees and contingencies, and other costs are incorporated into the model. Four major technical sectors are described: pre-production activities of research, development, prospecting and exploration; mining; sea transportation; and metal processing. In turn, each sector was divided further into major systems or items of equipment. The estimates of pre-production, capital and operating costs are aggregated for use in the financial analysis section of the model.

The financial analysis section allocates the costs and expenses over the pre-development, development and operation phases of the project. It also calculates the annual revenues based on assumptions of metal content of the nodules, metal recovery efficiency of the processing plant, and market prices for the recovered metals. Based on the annual expenses and revenues, the model calculates payments to the international seabed authority and federal income tax payments. The net cash flow for each year is calculated from revenues, capital investment, operating expenses, payments to the authority, and federal taxes.

The final step, and one of the most important from the user's viewpoint, is the calculation of the simulated project's overall profitability. Many financial measues are used by business analysts to measure the performance of firms, each with certain advantages. Two measures are calculated by the MIT Model: net present value (NPV) and internal rate of return (IROR). These measures are similar in that they both recognize the "time value of money." That is, the idea that a dollar of benefits received some time in the future is of less value than a dollar received now. In calculating either measure of profitability, future benefits are reduced by a factor known as the "discount rate", which is similar to an interest rate. For example, for a discount rate of 10 percent, the value of a dollar received a year from now would be equal to $1/(1+.1) or 91 cents. In calculating the NPV, a discount rate is specified and the sum of the discounted benefits is calculated. The IROR Calculation is somewhat similar, except that the computer makes repeated calculations to determine the discount rate at which the sum of the discounted costs and revenues are equal to zero. Although both measures are calculated by the model, the IROR is generally preferred because it does not require the somewhat arbitrary specification of a particular discount rate (which some observers fear could be taken to represent a fair, allowable or sufficient profit).

Atmospheric Administration (NOAA) took notice of the model. Through the Sea Grant program, NOAA contracted MIT to expand the model and convert it to run on on the MIT computer facility so that the effects of changes in the model's assumptions, both technical and policy-related, could be tested quickly.

A draft report on the MIT model, with a detailed description of the model (including its structure and all of its variables), was delivered to NOAA in February of 1977. The model was circulated to government agencies and outside experts for comment. Encouraged by the initial round of comments, NOAA asked MIT to participate in a workshop in which industry experts were asked to critique in depth the technical and financial aspects of the model. In addition, the draft report was circulated to a growing circle of reviewers. With the results of the workshop and the outside review in hand, MIT modified the model to take the comments into account. In addition, the results of other NOAA contracts that evaluated the land-based processing plant and the nodule transportation system were made available to MIT. The new information was carefully evaluated by MIT and, when it offered improvements over the earlier assumptions, the model was modified.

In addition to the critiques of the model's assumptions and structure, NOAA sponsored several presentations of the MIT Model to representatives of the Departments of State, Commerce, Interior, Defense, and the Treasury and of several Congressional committees to identify areas that could serve as topics for timely application of the model to public policy issues. The model was evaluated for its sensitivity to changes in technical and political assumptions and, in March, 1978, the revised model, with detailed explanations and sensitivity analyses, was published and released to the public.

USE OF THE MIT MODEL IN THE FINANCIAL NEGOTIATIONS

As it was originally formulated, the MIT Model was to be a planning aid to the US Government in the development of regulations for the management of American ocean mining companies. Its principal purpose was to identify the regulatory actions that might significantly reduce the attractiveness of the investment from the corporate standpoint and to compare those effects with those resulting from alternative types of regulation. However, a copy of the first review draft of the model was sent to James K. Sebenius in the Office of Policy in the Commerce Department. As an economist involved in the financial negotiations at the Law of the Sea Conference, he recognized the value of the model as a tool for illustrating the details of complicated systems of taxation and comparing the effects of alternative proposals. After the potential value of the model was brought to the attention of Ambassador Elliot L. Richardson, then Head of the US delegation, the model was used to analyze the effect of variations of royalty rates on project profitability. The ties between MIT and the LOS delegation became closer when Mr. Sebenius left the Commerce Department to attend Harvard Graduate School where he became a consultant to the MIT group. Soon after, one of the MIT staff left to join the Office of Policy in Department of Commerce. This intermingling of staff ensured that the MIT model was kept in tune with the needs of the government, particularly those of the LOS delegation.

Improving the Understanding of Ocean Mining

In late 1978, the role of the MIT model began to change from a tool of the U.S. government to a servant of the Conference as a whole. As developed and developing countries made seemingly incompatible proposals for the financial terms for exploitation, Ambassador Koh sought for a means to move the negotiations forward. The MIT model appeared to offer the opportunity to give the push he needed. Although still receiving financial support from the Office of Sea Grant, MIT and NOAA, at Ambassador Richardson's recommendation, made the model available for use by the LOS Conference. Before it could be put to use, however, it had to be accepted by the Conference participants. For this purpose, a workshop was held at which the MIT team described the model in detail, illustrated its use, and opened the floor for questions and comments. To avoid the appearance of premature acceptance, the Saturday workshop was held off of U.N. grounds under the auspices of the Neptune Group (a group of Church organizations that facilitated the negotiations). Key representatives of developed and developing countries and of the ocean mining industry were invited. After a full day of detailed presentations by the MIT staff, including a long question and answer period, most participants were favorably impressed by the MIT Model and its developers. There was some criticism was voiced by representatives of the European ocean mining industry, in part reflecting concern over an independent source of information about their operations. However, the effect of the industry comments and the responses by the MIT team was to help convince the developing country leaders that, in spite of its U.S. origins, the MIT Model would not be biased against their interests.[5]

The workshop also provided the first opportunity for application of the model when Ambassador Evensen of Norway asked MIT to evaluate his proposed financial provisions. Although not planned as part of the workshop, MIT had tested the Evensen proposal. Upon hearing the results of the analysis, Ambassador Evensen thanked MIT for the work and indicated he would use the results in reformulating his proposal. Acceptance by Ambassador Evensen, who was highly respected by developing country representatives for his serious efforts to reach a compromise, sealed the approval of the MIT Model for use as a tool in the negotiations.[6]

The Model as an Analytic Tool in the Negotiations

The participants in the negotiations had different expectations about the profitability of deep ocean mining and different objectives for the financial provisions. Developing states had confidence in the high profitability scenarios while the ocean mining countries put emphasis on the cases of marginal profitability. The interests of the developing countries lay in ensuring a high cumulative payment by an ocean mining project (without regard to the timing of the payments) and the industrialized nations worried more about the profitability of the operation (which put emphasis on maintaining high income during the early years of the project).

The MIT Model was adapted to capitalize on the differences in expectations and objectives. First, a variety of scenarios were developed to cover the range of projections of future profitability. Second, a subroutine was incorporated that modelled a general system of taxation that included the components identified earlier in the discussions in NG-2, including profit sharing and royalties, application fees and minimum payments, depreciation allowance for capital goods, and other factors. This subroutine allowed the model to analyze complicated systems that included progressive taxation based on annual return on investment, variations of the fraction of proceeds attributable to the mining operation alone, and taxation rates that would change due either to a time or profitability. A compact version of the model incorporating these features was developed for use on an Apple II computer that was maintained by the members of the MIT team who had joined the U.S. delegation. The results of analyses conducted on the compact version of the Model were made available to the sponsors of proposals submitted to NG-2.

Over the 1977-79 period there were over a dozen significant proposals on the financial payments for seabed mining. The progress of these proposals toward the final compromise is illustrated in Figure 2. As illustrated, the initial positions were very far apart in 1977. In early 1978, in part due to the growing understanding of the economics of ocean mining, that resulted from the cooperative work between the MIT team and the U.S. law of the sea delegation, the industrialized countries began to move away from their extreme position. By late 1978, through use of the model, Ambassadors Evensen and Koh were able to develop innovative proposals whose effect on profitability was much lower than the earlier Indian proposals, and whose total contributions to the Seabed Authority were greater than the proposals by the industrialized countries. Developing country resistance to these proposals began to diminish as the model was introduced to the Conference participants and the delegates had the opportunity to study the MIT report and talk with the authors.

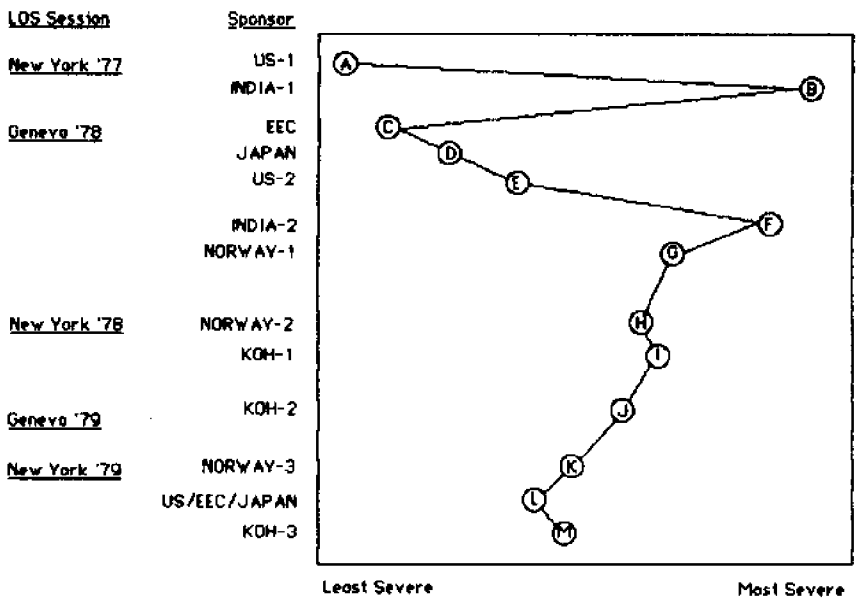

Figure 2.-- Bargaining Dynamics: Financial Terms of Contracts

It was during the resumed session of the Conference in New York in 1979 that the model was put to use as an analytic tool. First, the United States presented a detailed critique of the financial provisions developed at the preceding session of the Conference.[7] Using the MIT Model to examine 14 scenarios based on a variety of assumptions of costs, revenues and other factors, the analysis illustrated that the provisions put a relatively higher financial burden on marginally profitable mining projects than on highly profitable cases. As a result, the U.S. suggested that the system be modified to be more progressive by reducing the burden on low profit operations while increasing the payments required in high profit cases.

The compact model was also used to conduct an analysis of the Norwegian proposal made during the New York session. This analysis was distributed by the former members of the MIT Team in their own capacity rather than as members of the U.S. delegation and it refrained from interpretation of the results.[8] However, the analysis clearly showed the proposal to be more progressive than the earlier Geneva proposal, thereby meeting, in part, the U.S. recommendations.

Discussions in NG-2 then turned to the specifics of what would become the final compromise. At the request of the expert staff working under Koh's direction, scores of possible compromise formulations were evaluated on the compact model (by prior agreement with the U.S. delegation, the results of these analyses were submitted only to the Koh group). When the analyses on the compact model narrowed down to several possible formulations, MIT was asked to conduct the final tests on a group of six scenarios selected to illustrate the effects of the proposals on cases of interest to both industrialized and developing countries. The results of these analyses were used by Ambassador Koh and his group of experts to select their recommended compromise. The MIT results were also included in the report to the Chairman of Committee I to explain the effects of the proposal to the Conference participants.

Koh's compromise was the culmination of a process that resulted in increasingly complicated proposals designed to resolve specific problems identified by various countries. The proposal included an initial application fee, a royalty on gross sales of metals from nodules, a progressive profit sharing system whose marginal payment increased for higher profit levels on the mining (but not processing or transportation activities), a two stage schedule of rates for both royalties and profit sharing which was triggered by the recovery of investment with interest, and minimum rates for annual payments and for the attribution of profit to the mining activities.[9] The details of these provisions are summarized in Table 1. The assumptions used in the scenarios and the effects of the compromise proposal on return on investment and payments to the Authority are shown in Table 2.

Although the negotiations on the Law of the Sea Convention continued for three more years, the system of taxation negotiated in NG-2 remained unchanged after the close of the 1979 session. Perhaps the greatest tribute to the success of the negotiations in this area is that when the United States conducted its year-long review of the Convention, which resulted in a laundry list of desired changes, the financial provisions were not brought up as a subject for change, nor, in the contentious atmosphere that

Table 1. -- Structure of the Mixed System of Financial Arrangements

Application Fee.....500,000
Minimum Annual Payment.....1,000,000

Royalties and Revenue Sharing Based on Two Period Structure

	Royalty Rates (Total Net Revenues)	Revenue Sharing Rates (Mining Income Only)		
		Step 1	Step 2	Step 3
First Period	2%	35%	42.5%	50%
Second Period	4%	40%	50%	70%

Switchover to Second Period: Recovery of 110% of Investment (constant dollars)

Return on Investment (ROI): Annual net revenues divided by development costs
Income Subject to Sharing: Gross revenues less operating costs, depreciation, royalties and fees to the Authority
Depreciation: 10 year period, straight line method
Income Attributable to Mining: Ratio of mining Costs to Total Costs, with minimum ratio limited to 25%.

Source: United Nations -- Third Conference on the Law of the Sea, Report of Negotiations Held by the Chairman and the Coordinators of the Working Group of 21 (A/CONF.62/C.1/L/26, 21 August, 1979)

Table 2.--Economic Scenarios for Analyses of Deep Ocean Mining*
(millions of dollars)

Variables Used in Test Scenarios

Scenario	Research & Development	Capital Cost	Operating Cost	Initial Revenues	Annual Price Inflation
A	150	604.9	123.00	226.5	0.0%
B	150	604.9	123.00	226.5	1.0%
C	50	493.1	100.55	258.2	0.0%
D	50	616.3	138.75	348.5	0.0%
E	50	616.3	138.75	348.5	2.5%
F	50	493.1	100.55	348.5	2.5%

Results of Analyses of the Final Compromise Proposal

Scenario	Internal Rate of Return		Cumulative Payments to the Seabed Authority (millions of dollars)
	Without Payments	With Payments	
A	7.0%	6.1%	$258
B	9.8%	8.6%	$429
C	15.4%	13.8%	$574
D	21.7%	19.5%	$1015
E	22.3%	20.2%	$1792
F	26.6%	23.9%	$1964

* All scenarios are based on the baseline case of the 1978 MIT Model with two modifications: equity investment is raised from 50 percent to 100 percent and the production lifetime is extended from 20 years to 25 years. All costs are expressed in 1976 dollars. Initial revenues are based on metal prices during first year of the project: revenues in later years will be higher if metal prices rise at a rate higher than capital and operating costs.

Source: United Nations -- Third Conference on the Law of the Sea, Report of Negotiations Held by the Chairman and the Coordinators of the Working Group of 21 (A/CONF.62/C.1/L/26, 21 August, 1979).

resulted from the change in the U.S. position, did the developing countries seek to reopen the financial provisions.

SUMMARY

The MIT Model played and important role as a facilitator of the negotiations on the financial arrangements for deep ocean mining. First through education and later as a tool for evaluating and refining proposals, the model helped to avoid confrontation and stalemate. In fact, through its use the negotiators were able to modify proposals in ways that benefitted all parties.

What factors put the MIT Model in such an influential position? Several other economic models and analyses were available to the LOS Conference[10] -- what factors led to the reliance on the MIT model. In part, the selection was due to chance - - the growth of interest by the MIT faculty and students in deep ocean mining, NOAA's decision to finance the MIT research, and the recognition of the potential value of the model by members of the LOS delegation were unplanned occurances that opened the way for the models' introduction. Once discovered, however, five factors contributed to the success of the model:

Applicability the model addressed a topic -- the economics of ocean mining -- that was crucial to the negotiations. The model was detailed, installed on a computer (which facilitated its use), and did not specialize in any particular proposal under discussion by the Conference. The model was accompanied by a detailed report that explained the assumptions, structure and results in great detail. Most important, before the introduction of the MIT Model the Conference participants had no detailed source of economic information on which to base their discussions.

Veracity The structure of the model was based on techniques accepted by cost engineers and financial analysts for other major engineering projects, and the data for most of the estimates were drawn from the known costs of existing equipment and systems. Both the structure of the model and the data were subjected to extensive technical review before the report was released to the public. This review process, the reputation of its sponsor, the Massachusetts Institute of Technology, and the detailed presentation and defense of the model given by the MIT team at the seminar sponsored by the Neptune group, combined to provide the conference participants the assurance the the model was technically correct and without ideological biases that might work against their interests. The trust in the model was maintained throughout the negotiations by the willingness and ability of the MIT team to answer the many questions raised by all parties in the negotiation.

Adaptability The technical and economic assumptions of the model were clearly specified and could be modified to reflect different expectations about costs, efficiencies, resource endowment, and metal markets. Thus, the model could be adapted to test a variety of scenarios of interest to the Conference. Likewise, the structure of the model could be adapted to include new features such as the calculation of payments to the International Seabed Authority, the effect of the payments on the profitability of the mining operation, and the cumulative payments to the Authority over the life of the project. Direct access to the model operators at the Conference helped to ensure that the modifications to the model reflected the intent of the negotiators.

Accessibility Use of the Model was not restricted to any party or group of parties. The report describing the structure and assumptions of the model was distributed throughout the Conference. The MIT team members on the U.S. delegation were available to all participants to answer questions about the model. The model itself was available to all parties in the negotiations to test potential proposals. The MIT team, both in Cambridge and at the Conference, acted as assistants to the negotiators and were available to all parties as consultants to modify the programming of the model to incorporate the legal and economic intent of the sponsors of proposals. The availability of the compact model in New York provided speedy response to requests for evaluation of proposals involving multiple variables. The compact model also made it possible to conduct analyses in direct consultation with the negotiators, unhindered by the lack of face-to-face contact involved in using the main computer model at MIT in Cambridge.

Integrity The MIT team was trusted by all parties in the negotiations to maintain the quality of the model and to protect it from misuse. This was particularly important in view of the "black box" nature of the model and the lack of time available to provide public review of each modification to the model as the negotiations proceeded.

CONCLUSIONS

The substantial contribution of the MIT Model to the negotiations at the Law of the Sea Conference suggests that there may be roles for analytic models in other negotiations and disputes. But, the experience also indicates that such models will not find easy acceptance.

Two points should be considered in evaluating the potential for computer models to assist in the conduct of complex negotiations. On the positive side, a model may reduce technical and economic uncertainties that would otherwise lead negotiators to make extreme demands in order to protect their nation's interests. The importance of the MIT Model in this role was noted by a former U.S. negotiator in saying:

> What broke the log jam in this particular case was a mutual reeducation program which provided a neutral basis for negotiations. The MIT study clearly showed that some of the economic fears of the developed countries were overblown and that some of the political theories of the developing countries would not lead to economic vitality.[11]

However, there is concern that a model might go beyond simple evaluation of an issue to the selection of an optimum solution, based on criteria known only to the model builders. Reflecting the concern that models and model builders were increasing in importance at the expense of the negotiators, Ambassador Paul Engo of Cameroon, Chairman of Committee I on Seabed Matters, commented during the Seventh Session of the LOS Conference in 1978 that:

> [We] have ourselves been dragged into adopting models and systems of calculations on fictitious data that no one, expert or magician, can make the basis of any rational determination... We get more and more engrossed with each session and have been reduced to mere spectators in the inconclusive tournament among experts.[12]

If a model is to be useful in the resolution of conflict, it will be necessary to keep in mind that decisions to compromise or to trade between interests are the responsibility of the elected or appointed representatives of the parties to a dispute. Establishment of a procedure for technical verification and political review similar to that followed by the MIT team may help models gain acceptance by these representatives. Just as important, however, is the reputation of the builders and operators of the model to protect their creation from misuse. Ultimately, it is the confidence of the negotiators in the integrity of the model builders and operators that will determine the degree to which the model is relied upon in the resolution of disputes.

NOTES

1. United Nations, Declaration of Principles (General Assembly resolution 2749 (XXV), 1970).

2. J.D. Nyhart, L. Antrim, A. Capstaff, A. Kohler and D. Leshaw, A Cost Model of Deep Ocean Mining and Associated Regulatory Issues (Cambridge, MA: MIT Sea Grant Report MITSG 78-4, 1978).

3. Antrim, Lance, The Effects of Regulatory Constraints on the Deep Ocean Mining Industry. Thesis for degree of Environmental Engineer, School of Engineering, Massachusetts Institute of Technology, 1977.

4. Early economic analyses were based on aggregated corporate estimates that did not allow for independent outside review. For example, see U.S. Department of the Interior, Ocean Mining Administration, Ocean Mining: An Economic Evaluation, by Rebecca L. Wright. Washington, D.C.: May, 1976. See also Anonymous, Comparison Between Proposals on Financial Arrangements with I.S.B.A. Authority: European Base Case, June, 1978.

5. Ronald Katz, "Financial Arrangements for Seabed Mining Companies," Journal of World Trade Law," 13 (May/June 1979): 209-222.

6. Ibid.

7. United States Delegation to the Third United Nations Conference on the Law of the Sea, Expanded Analysis of the "Mixed System" of Financial Arrangements, August 2, 1979.

8. Sebenius, J.K. and L. Antrim, Analysis of Norwegian Proposal on Financial Arrangements. Unpublished paper presented to the U.N. Conference on the Law of the Sea, July, 1979.

9. United Nations: Third Conference on the Law of the Sea, Report of Negotiations Held by the Chairman and the Coordinators of the Working Group of 21 (A/CONF.62/C.1/L/26, 21 August, 1979)

10. See note 4, above.

11. Sebenius, James K. "The Computer as Mediator: Law of the Sea and Beyond." Journal of Policy Analysis and Management Vol. 1, No. 1 77-95 (1981).

12. Katz.

The author is a Project Director at the Congressional Office of Technology Assessment. The views and opinions expressed herein are his own and do not necessarily represent those of the OTA.

A PRELIMINARY ANALYSIS OF THE USES OF SCIENTIFIC MODELS IN DISPUTE PREVENTION, MANAGEMENT AND RESOLUTION

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I. INTRODUCTION

Conflicts about the use of ocean and coastal resources typify an increasingly important class of social disputes: They involve multiple interests and parties, both private and governmental, often with widely distributed constituencies. The stakes frequently include, in addition to significant economic dimensions, values not always amenable to financial quantification. The underlying scientific information is at once central and uncertain. And the shared uses of the resource, both present and proposed, have lifetimes far longer than those of ordinary commercial arrangements -- implicating, therefore, repeated interactions among and evolution of the affected interests.

A typical example is the prospective use of the Bay of Fundy's tidal forces for the creation of electrical power, a project which will create economic value for some persons and interests, but which risks perturbing the economic and social expectations of a wide variety of others. The technology and its impacts are uncertain. Environmental and biological effects may not be fully known until years after the project has been committed.

Law provides an important (albeit often insufficient) backdrop for the resolution of such complex and polycentric conflicts. Litigation has therefore become a common strategy, and the courts a site for the framing of the questions that underlie the parties' several needs. Litigation has, however, a number of serious limitations which may lead the parties to prefer some form of private alternative dispute resolution process (an "ADR").

The adoption of an ADR technique may alter the role of science within the conflict management process, but it will seldom diminish its importance. Indeed, one significant advantage of most forms of ADR is the removal of the necessary scientific analysis from the distortions inherent in the adversarial legal process. Scientific models and model-building are consequently tools of significant value to complex-case ADR.

By the term "model" we mean to adopt, at least initially, Psaraftis's definition: an abstraction of reality whose purpose is to represent a well-defined real world process (Psaraftis, 1984). An effective model is capable of providing insight into the workings of the processes it represents, and of organizing highly complex realities into workable scales. It thereby aids the parties employing it in the essaying and testing of various alternative solutions to the problems confronting them.

In the present paper we divide the uses of models within ADRs into three basic types -- Ordained Models, Model Building, and Non-Model ADR. Our goal is to describe the separate utilities of the three, and to suggest that choosing among them can in a given context lead in better or worse ways to the achievement of an optimal resolution of the underlying conflicts. We begin the discussion with a set of standard criteria for assessing the quality of an outcome or resolution, and identify the ways in which traditional litigation falls short. We next describe the two principal domains of conflict management -- Alternative Dispute Resolution (ADR) and Preventive Law (PL) -- and derive from them a set of characteristics which should exist in any preferred outcome. Simultaneously, we propose a new set of "process goals," criteria drawn from the theories of ADR and PL and from the Law-Science domain, by which the conflict management process itself may be evaluated. The question in any case will then be how well the selection of one model-use variant over the others achieves the desiderata and satisfies the process criteria.

Our ambition in the present paper is modest: We mean to suggest linkages at a theoretical level, rather than to "prove" them empirically. A fully rigorous analysis, employing the three model-use variants strictly as independent variables, would require the articulation of a comprehensive theory of dispute resolution. To our knowledge the state of the literature does not yet allow such a construction. To the extent that our observations do lead to at least some preliminary hypotheses about the linkage between process tools and conflict outcomes, they may be useful to the eventual elaboration of such a theory.

II. DISADVANTAGES OF LITIGATION

Any theory of conflict resolution which aspires to evaluate alternative strategies must employ, tacitly or otherwise, specific criteria by which the quality of the outcomes or products may be assessed. For the purposes of the present discussion, we adopt those suggested by Susskind & McCreary (1984):

1. The resolution should satisfy by its distribution of gains and losses all of the affected interests sufficiently to avoid the dispute's reoccurence in another form.
2. The solution should capture all of the joint gains available.
3. It should produce definite results and commitments which can be implemented.
4. The process must provide legitimacy to the product.
5. Uncertainty, particularly in the under-lying science, should be dealt with "wisely."
6. Outcomes should be reached efficiently in terms of time and expense.
7. Relationships among the participants should be enhanced for the benefit of future interactions.

Litigation as measured by these desiderata has a mixed but generally poor ranking. It does achieve definite results, and if not commitments then at least mandates of unquestioned enforceability. In addition, as Bruce observes, "Collectively [judicial] decisions constitute a coherent body of law, which . . . serves as guidance to potential disputants in the future. . . . Other, less formal dispute resolution processes tend to be ad hoc and [do] not generate principles with the same authority . . ." (Bruce, 1984).

Bruce's observation in fact makes two points. The first -- his word "authority" -- concerns the legitimacy criterion of Susskind and McCreary. Legitimacy in its practical sense means the ability of a resolution to provide those who fashioned it with a reason why their several constituents should embrace it. (Dauer, 1983). A judicial decree is authoritative; it can be despised but not rejected. It is in any case involuntary and not the product of the negotiator's own agreement. Negotiated agreements do not have legitimacy, in this sense, ex proprio vigore. But that is not to say that it must be absent from well designed ADRs. It comes, in nonjudicial procedures, from perceptions about the adequacy of the procedures themselves, as well as from the evident good sense of the resolution.

The second point in Bruce's observation is of less immediate concern in any given dispute, except as one of the parties may desire an outcome with binding precedential value for like conflicts with other parties in the future. It does seem correct that future litigation can be minimized if the applicable law is well developed and clear. But for that feature of litigation to be valuable, the conflicts must be recurrent in nearly identical forms and not involve large areas of factual uncertainty. The pattern of outcomes in the future, moreover, will be optimal in a litigation regime only if the precedential decisions were optimal as measured by the remaining criteria on the Susskind and McCreary list. That is not likely always to be the case.

As against those virtues, litigation as a conflict resolution process has a number of disabilities, particularly so for the types of matters presently in question. Some are attributable to its procedures; others, to the way in which questions must be framed and criteria imposed. Rules of standing and the cognizability of legal interests limit the flexibility of interests joining in the resolution process, both as to the exclusion of some and the mandatory access allowed to others. Practical and political considerations in the selection of representatives yield to formal legal definitions. Similarly, litigation normally requires that a problem be fully "presentiated" (McNeil, 1974) -- i.e. that there be a bounded answer provided in the present for a set of problems that may have both an extended lifetime and an evolution of interests, facts and parties affected. A lawsuit taken to its conclusion cannot create an institution capable of adaptation to future developments.

A lawsuit must be decided in accordance with the law. Law of necessity addresses only those portions of a comprehensive problem which can be stated as legal issues. Two untoward consequences follow: First, the questions immanent in the problem are altered into forms which the legal system can address. Second, the outcome must be phrased in terms of the questions put. Thus both the underlying complexity of the practical conflict is unfaithfully posed, and the range of solutions available is severely narrowed.

This essential narrowing is the principal reason why litigative solutions to problems tend to be zero-sum. Positive-sum solutions normally come not from the choice of directly competing claims, but from the exchange of values which makes up what other commentators have termed "integrative" solutions. Negotiation rather than adjudication, and the expansion of the range of available solutions are critical to the maximization of joint gains. Litigation has neither.

Finally, litigation does not always employ science "wisely." If a rule of law is phrased in terms of scientific fact, and if that fact is uncertain, then a legal outcome selects the most probable factual alternative and predicates its results on that. There is little room for the wiser use of scientific uncertainty, as for example through the creation of ongoing science institutions built into the overall resolution. (Or, as another example, for the movement away from science as the ultimate determinant and toward other more tractable and satisfactory criteria.) Law and science have separate integrities. "Good" science observes its own; in litigation the internal integrity of science is regularly trumped by that of law. (Nynart and Carrow, 1981).

III. ALTERNATE DISPUTE RESOLUTION AND PREVENTIVE LAW

Alternate Dispute Resolution (ADR) responds to precisely those inadequacies of litigation just noted. Its principal aspirations include the achievement of maximizing solutions through voluntary bargaining, with the questions posed and alternatives framed not in terms of some extrinsic analytical scheme, but from the parties' collective perceptions of the nature of their interests. The "solution space" is

correspondingly enhanced, and the rules of participation are established by the parties themselves.

ADR techniques are virtually limitless in number. Most common are various forms of mediation and structured negotiation, of which one recently developed variant is the mini-trial. Private adjudication, including arbitration, is also within the concept, as are conflict anticipation, dialoguing, joint problem solving, and joint fact-finding. Flexibility is the chief common denominator among them. A number of excellent typologies have been published. (Green, 1982; Center for Public Resources, 1983). In this paper we shall focus on that subset of techniques which share the characteristics of employing third-party neutrals in a facilitative (i.e. nonadjudicatory) role. (Dauer and Nyhart, 1984).

The techniques of negotiation, mediation, arbitration and the mini-trial are applicable to those circumstances in which a problem has ripened into a conflict or dispute. (Hence the phrase alternate dispute resolution.) There is however a second mode of conflict management, which addresses rather than the resolution of existing disputes, the avoidance or anticipation of disputes in the future, and the architecture of solutions to shared opportunities. This second mode may be referred to as "Preventive Law." (Brown and Dauer, 1978).

Preventive Law -- more accurately, preventive Lawyering -- seeks to anticipate and account for conflicts that may arise in the future. It does so by arranging transactions and relationships in such a way as to minimize the probability of conflict, to avoid its disruptive potential, and to secure the maximum degree of transactional success -- each achieved through steps taken in the present.

At its most fundamental level, the mode of problem analysis in preventive law is the reverse of what is employed in adjudicative legal reasoning. That difference can be illustrated by focussing on four concepts: Facts, Rules (of law), Results, and Purposes. In adjudication, the facts are searched for and when "found" are taken as givens. To the Facts are applied the relevant Rules in the form of conditional syllogisms, the conclusion of which is a Result: "If A took and carried away the property of another [a fact] with intent to steal [another fact], then A has committed larceny. [The result.]" In preventive reasoning, by contrast, the first step is not the articulation of Facts, but of the party's Purpose.

From an elaboration of the several Purposes, the Results necessary to achieve them can be derived. Then, working "in reverse" with a knowledge of the available Rules, the Facts which must exist -- in order for the Results and hence the Purposes to exist -- can be determined. The balance of the operation is to cause those Facts to come into being, typically through the design of present agreements.

In that process of designing workable forward-looking agreements, three features should be wrought in, in addition to the substantive terms of the agreement itself. (They will also inform, as described in Section IV.C., supra, the set of criteria by which a given conflict management strategy may be assessed.)

"Prediction" is one of them. It is necessary, for example, to be able to predict perceptions of injury as they may arise in the future. Who, it is asked, and on what occasions, is likely to experience a sense of having been injured as the arrangement unfolds in planned or unplanned ways? How is that perception likely to be acted upon? How, then, can the risk of its occurrence or its disruptive potential be minimized?

The second feature is the creation, at the outset, of a method of monitoring performances throughout the life of the arrangement. Doing so both establishes criteria for analyzing future claims of right, and helps to minimize the consequences of untoward acts by, for example, providing early warning of their existence.

The third is the preservation of bargaining positions into the future. Any complex exchange which exists through time will have in it opportunities for adjustment, modification to accommodate new facts, and changes in implicit expectations. The workability of the design both in the present and throughout its life may depend upon the relative bargaining positions which the original agreement creates (and the parties' satisfaction with them as the arrangement unfolds.) The design must therefore be dynamic, and responsive to the several participants' needs and aspirations. (Brown and Dauer, 1978, 1981, 1982).

Preventive Law deals with potential conflicts. ADR deals with manifest conflicts. Complex multi-party problems, such as those typified by coastal zone and continental shelf resource use, call upon the techniques of both domains. As we will suggest in a later section of this paper, there is a method for integrating them into a single continuum of conflict management. From that integration we will be able to derive an additional set of considerations of use to the optimal selection of process tools.

IV. A CONCEPTUAL FRAMEWORK

A. Introduction to the Variables

The basic framework of the following analysis is that of seeking relationships among three distinct sets of variables:

Process Tools, which may be thought of as the independent variable, are the first of these sets. There are three process tools, each being a variation on the uses of models within a conflict management process -- Ordained Models, Model-Building, and Non-Model ADR.

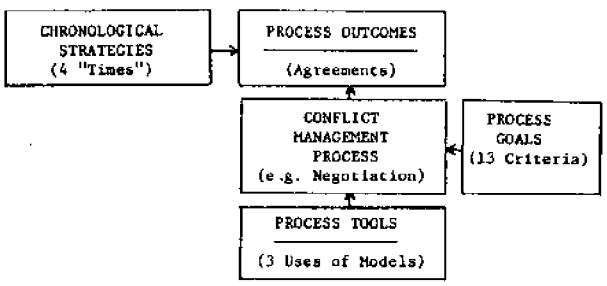
The second is a set of thirteen Process Goals -- criteria for assessing qualitatively how well designed a given dispute resolution (or avoidance) procedure may be. Together they describe, in effect, an ideal conflict management strategy.

The third is a set of "Chronological Strategies." These, four in number, are derived from the integration of ADR and Preventive Law. They are not so much desiderata as they are descriptions of the resolution options available to the parties in the design of any substantial agreement. Ideal agreements uniquely optimize the relative proportions of the four.

Our analysis deals with the causal relationships that may be found among these three sets of variables. In particular, we are concerned with: (1) whether in any given type of

conflict satisfaction of the thirteen process goals can be enhanced by the "correct" choice of a particular process tool; and (2) how well or poorly that same choice may lead to the best combination, in the outcome, of the four chronological strategies.

Before beginning the analysis it is necessary to describe in some detail each of the three sets of variables, and that will be done in the following sections. Their overall relationship may be summarized in advance with the following figure:



B. Process Tools: Variations in the Use of Models

The three process tools which make up the independent variable represent a basic division among the ways in which "models," particularly scientific models, can be employed within ADR procedures.

The first is the "Ordained Model" -- a set of statements about causal relationships, or standards for measuring and determining recognizable injury, accepted by the parties and so capable of providing criteria by which future disputes may be defined and resolved. The model's authorship will often be extrinsic to the parties themselves but will be accepted by them at the outset and thus deserving of being characterized as neutral.

Ordained models have the advantage of offering finality and efficiency in resolving future disputes. Concomitantly, however, they have the disadvantage of fixing at a moment in time interests and facts which may not in reality be fixed. That does not reduce their usefulness in proper cases; it does suggest that in some circumstances it may be useful to incorporate into the existing agreement procedures by which the future may be accomodated without disrupting the ongoing resolution process.

The second process tool is "model-building," by which we mean the bringing together of the parties or representatives of groups of parties in the process of constructing a model. The construction process itself is the focus of the conflict management strategy. It may be short or ongoing, but in every case strives for a consensus about the model to be employed and thus about the basic facts, assumptions, uncertainties and values at stake in the underlying problem. The process may eventuate in an accepted model to handle future disputes, but differs from those ADRs employing an ordained model by not beginning with the assumption that there is any factually "correct" set of inputs or relationships. It thus replaces descriptive analysis with prescriptive argument.

It may be in any given case that this argument -- about the data, the assumptions, the uncertainties -- has already taken place, resulting in substantial consensus about the model's inputs. In the main, however, this second process tool is used for producing that consensus. The direct involvement of the parties highlights some of the advantages provided by its use.

The third process tool may be termed "Non-model ADR." By this is meant a form of conflict management which incorporates a subsidiary procedure (usually facilitated by a neutral third party) that provides the parties or decision-makers with one or more sets of allocative criteria, for use as they see fit. The process begins by intentionally not determining the nature of the values to be exchanged, hence it eschews the too-early use of a model representing any one aspect of the underlying reality.

An example of a non-model ADR is a recently developed multi-defendant loss allocation procedure. (Dauer and Nynart, 1984). In it we adapted the mini-trial form of facilitated negotiation to multi-party toxic substance cases in which the attendant science is disputed or uncertain (or both). The process, which includes the use of an expert science advisor adjunctive to the neutral facilitator, has been applied in the construction of liability sharing agreements among jointly liable (or internally cross-liable) defendant corporations.

In brief, at selected stages in the process a neutral (and independently expert) science advisor consults in confidence with the participants' science staffs, in an effort to reach the widest possible consensus about what is known, what is unknown, what is disputed and what can or cannot be further determined within practical boundaries of time and cost. The result is the advisor's report, which is made available to the principals as their structured negotiations begin.

In litigation, the relevance of scientific facts is rigidly determined by the applicable law, even when the uncertainty of those facts is substantial. In this "non-model" process, relevance can be made a function of uncertainty, to allow for workable rather than merely probabilistic solutions. As their needs require, the parties may use, ignore, or override the outputs of otherwise available scientific models, in favor of criteria such as business economics, industrial relationships, internal and external political considerations, and others.

In sum, the non-model process has these essential features:

1. It removes scientific fact-finding from the distortions of the adversary process, respecting science's own paradigms and procedures.
2. It does not presume that the answers to questions of scientific causation will be determinative. As such, it provides science to the decision-makers as only one of several sets of allocative criteria.
3. It employs, in addition to neutral expertise, the participants' own scientific staffs -- not as witnesses, but as scientists.

Because every negotiated arrangement must address at least some aspects of both the present and the future, each outcome can display components of each of the four categories, or "chronological strategies." Given the state of the theoretical literature, it is not yet possible to establish, a priori, how for any given conflict type the relative contributions of the four should be adjusted for an optimal mix. All that can be said at this point is that the process which leads to the agreement should be capable of allowing whatever combination does seem optimal at the time to obtain, without an artifactual skewing as a result of the process tools employed. Flexibility and openness in the resolution procedures may thus be significant factors.

Briefly, then, the four chronological strategies displayed on the combined ADR/PL continuum -- avoid, resolve, defer and exit -- comprise one of the two independent dimensions against which the suitability of process tool selections may be assessed.

D. Process Goals

Process goals represent criteria for measuring qualitatively the structure of a given conflict management procedure -- more particularly for our purposes, the usefulness in selected contexts of the three process tools (or model-use variants) just described. (The criteria for evaluating the outcomes of a negotiation have already been identified, infra Sec. II. The goals suggested here are derived from the related theories of ADR and Preventive Law, and from replicable principles of the Law-Science domain. The latter is particularly noteworthy in the types of conflicts we are addressing, due to the importance of affording to the process the best possible scientific and technical input.

The thirteen criteria we identify may for convenience be grouped into three main areas, representing in order: ADR/Preventive Law; issues in "constituency management;" and the experience of science-in-law.

Alternative Dispute Resolution and Preventive Law

1. Value Identification. At the outset of traditional negotiations the parties occasionally fix prematurely on goals or positions thought to be important, whereas in many cases the clarification of more fundamental underlying values or interests may move the parties away from positional bargaining and into interest bargaining. (Fisher and Ury, 1983). The use of a process tool should help in thus defining the scope of the dispute in terms of underlying values and real interests.
2. Solution Space. The conflict management process should help the parties to broaden the solution space, by enlarging the total benefits to be distributed (for example, either by helping to identify new Pareto- optimal frontiers or by illuminating additional interests to trade); or by increasing the perceived fairness of their distribution. Creative solutions to conflicts are arrived at by the avoidance of rigid or preconceived remedies and by the parties' recognizing that they have varied interests which can be traded and therefore more effectively negotiated or compromised.
3. Adaptability to new information. Complex conflicts tend to be dynamic over time. There is a need to facilitate the introduction, validation, and acceptance of new data into the conflict management effort as they become available.
4. Maintenance of Bargaining Positions. The model or other process tool should create opportunities for adjustment, further dispute resolution, modifications and the like throughout the life of the agreed-to arrangement. It should help maintain into the future the relative bargaining positions created by the original agreement, and be dynamically responsive to the aspirations and perceptions of the several parties, to preserve their reentry into the adjustment process. (The point is twofold: First, to avoid collateral attacks on the arrangement in the future; and second, to make the agreement more attractive and therefore more likely to achieve consensus in the present.)
5. Predicting Injury. An important element of preventive law is the prediction of future perceptions of injury. The present parties should be enabled to discern who is likely to feel a sense of injury -- and of entitlement -- as the dynamics of the arrangement unfold, so that the solution outlined can be either as impervious or as responsive as the circumstances may allow.
6. Bindingness. The use of a model should help in creating conditions, formal and authoritative or otherwise, through which the parties will consider themselves bound to the commitments they have undertaken (or that have been undertaken in their names.) The ability of voluntarily arrived at agreements (as contrasted with the power of the courts in adjudication) to bind the parties is a crucial aspect of alternate dispute resolution. Frequently, personal participation binds the parties psychologically; in other instances, the good sense of the agreement provides the only glue capable of assuring that the agreement will stick. However, there are other measures -- legal and quasi-legal -- that can be employed in private arrangements to augment the sense of "bindingness."
7. Monitoring Performances. A process tool's use should aid the parties' (and any third-party facilitator's) monitoring of the respective performances and commitments throughout the life of the arrangement; and help in creating criteria for analyzing future claims of right and for minimizing the consequences of untoward acts by providing early warning of their existence.

Constituency Management

Most complex conflicts involve multiple parties. It is therefore characteristic that conflict management agreements are negotiated by representatives. Experience demonstrates that each interest must consider the constituency management problems both of itself and of the others. How, therefore, can the representatives of the different constituencies fully and effectively conduct the negotiations, settlements, and creative arrangements in such a way that their constituents will be most likely to accept and adhere to the undertakings to which they would be committed? The next two evaluative criteria deal with these aspects, among the most difficult in multi-party complex negotiations.

To date the discipline of conflict management has developed comparatively little experience with these three process tools. An ordained model was used in the United Nations' Law of the Sea context. (Antrim, 1984). The non-model procedure (Dauer and Nyhart, 1984) has been employed on several occasions in joint defense agreements for toxic-tort lawsuits. The intended use of model-building as an explicit piece of conflict management's technical armory has also been used, albeit on a limited scale. (Sebenius, 1981). Nevertheless, these ideas, and the very concept of process tools being useful as auxilliaries in a wide spectrum of primary conflict management applications, seems a worthy subject for fuller examination. Problems arising in the continental shelf and coastal zones, again, typify the multi-party and multi-issue contexts in which their use may be most illuminating as well as most useful.

C. Chronological Strategies

From the principles of Alternative Dispute Resolution and Preventive Law we derive a framework which we believe summarizes the choices available to those charged with the management of conflicts and disputes. It should be clear by this point that what we mean by conflict management spans the full spectrum of both time and process choices. By time we mean the possibility of preventing, ameliorating, shaping the handling of, and resolving disputes. By a full range of processes, we mean not only the many mechanisms described in the various typological studies of ADR (supra, p. 6) but more particularly those three process tools essayed in the preceding sections of this paper.

The "Chronology" of Conflict Management

As we have already suggested, it is useful to observe that most of the complex conflict situations typified by ocean uses span considerable time during which the parties, their interests, and the technical and scientific uncertainties are likely to change. The choice of responses to the dynamics of a dispute can therefore be a critical component of its management.

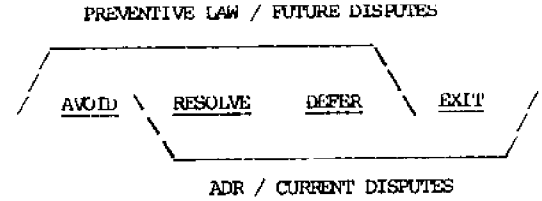
Conflict resolution strategies may be employed either in cases of present dispute, or for the purpose of preventing disputes from arising as one or more of the parties engage in planned activities in the future. ADR and Preventive Law may therefore be thought of distinctly. There is, however, a set of connections between them which is useful to the present analysis. First, most voluntary agreements providing for exchanges of economic values employ both present conflict and future conflict management techniques. Most contracts, for example, both define the measures of present exchange and provide the standards by which executory performances will later be judged (and, often, resolved).

Because many such situations involve both presently competing claims of legal right and potentially competing claims on future resources, there is on the analytic plane a possibility of representing the parties' most basic conflict management choices on a single continuum. Thus the inner logic of Preventive Law and that of ADR may be combined to provide a single framework for a theory of dispute management.

The parties to a present dispute have three basic choices: They may choose to resolve it. They may choose to establish a procedure by which it may be resolved in the near term. (We shall refer to this as defer.) Or they -- or one of them -- may choose to exit, i.e. to accept the consequences of the problem's persistence. Many ADR techniques conclude with a blend of the three, using the choices to modulate the negotiations so as to achieve the maximum consensus without breakdown over those parts of the problem that defy substantive resolution by the procedures then in effect.

Related choices are available with respect to potential or future disputes (or conflicting interests in an exchange). First, future disagreements may be fully "presentiated" and resolved by a contemporary agreement. (Hence the importance of prediction.) Second, they may by agreement be deferred to a process or institution created by the present agreement. (Thus, monitoring performances and preserving future bargaining positions). Third, they may be avoided, in the sense that the structure of the initial agreement leaves minimal possibility of their arising later. (The Purpose-Result-Rule-Fact mode of analysis.)

Ocean conflicts exemplified by those in the preceding papers call both sets of choices into play. There are presently conflicting claims of right as well as potential future claims and the need for integrative long-term exchanges. Conflict resolution strategies sufficient to the task will therefore employ both the ADR and the Preventive Law continua. Our point is that the six choices are actually four:



A comprehensive strategy for the effective management of long-term problems (or opportunities) will thus attend to the four elements of the combined present and future domains.

A simplified example can be constructed from the California coastal conflicts discussed by Knaster, Gianninni and Uchikura (1984). Oil industry seismic testing was thought by fishing interests to be in conflict with fish husbandry; fishing trawl lanes were in conflict with seismic platforms; and, as to the future, deep water oil exploration and extraction was suspected of creating risks to the marine ecology. The problem thus contained numerous present and future opportunities for both profit and conflict.

Certain of the ongoing physical conflicts were avoided by agreement on changed facts (altered sea lanes). Others were resolved by the establishment of compensation offices and of ongoing liasons. Some were deferred by the creation of a testing program (viz. building a model) for seismic effects on fish biology. And although not detailed in the report, it is reasonable to expect that some residual aspects of the problem are unresolved — i.e. one or more parties may have exited with respect to them.

8. Party Flexibility. The process tool selected must enhance the flexibility necessary for the optimal (pragmatic and occasionally political) inclusion of parties, apart from the technical rules of interest or "standing." In particular, it should allow interests identified after the process has begun to be accomodated. The movement of parties among groups and alignments should be facilitated as the negotiations proceed.

9. Legitimacy. Those who fashioned the process require a rationale as to why their several constituencies should embrace it and its outcomes. As in the case of bindingness, legitimacy may come from the process' own internal rigor. Or it may derive from its prior use or the aegis under which it is conceived and implemented.

The Science-and-Law Domain

Large and complex conflictual situations such as those arising in the commercial exploitation of the coastal zone and continental shelf are likely to be surrounded by uncertainties, many of them economic and political but many of them of a scientific or technical nature. Their management or resolution may take on added difficulty due to the need for gaining understanding and agreement on facts, on implications of outcomes, and on the assumptions underlying the technical input. The most informed persons as to the scientific or technical issues are frequently not the principals -- those empowered to resolve the dispute -- but rather their technical and scientific staffs. Even among the most informed, what is unknown may be so great as to create substantial uncertainty.

As part of the task of shaping alternative means of resolving scientifically-laden issues, it makes considerable sense therefore to attempt to improve the quality of the technical input. Doing so gives a more rational basis for arriving at a settlement, providing, among other benefits, a sound basis on which the negotiators may take their agreement forward to their respective constituencies.

One strategy is to create neutral sources of credible scientific input. Another is to make specific efforts to gain consensus among the parties as to the technical facts and assumptions in advance of the negotiation or other resolution process. Still another is to structure the technical aspects of the process in ways designed to enhance the quality of the science.

There are sound principles to be drawn from experience in the regulatory sector, which suggest that it is possible by careful crafting of the process to improve the quality of its scientific dimensions. The following criteria are concerned with these aspects.

10. Distinction and Allocation of Functions. The uncertainties and dynamics of complex problems tend to transform scientists into policy makers or facilitators, and sometimes vice versa. Crisp identification of the respective functions of the scientists, negotiators and decision-makers tends to correlate those functions with their respective capabilities and authority. Process tools should help in making those allocations in a collaborative rather than a competitive manner.

11. Framing the Question. Here the aim is to ask scientific rather than policy questions of scientists -- "is" rather than "ought" questions -- and to minimize (though one cannot completely remove) the distraction and potential disruptiveness of the value-laden aspects of technical and scientific work. The use of a process tool should help frame questions for the scientists and technical persons so that they can respond in a way consistent with their expertise and function, and help minimze the value-laden quality of those questions.

12. Room to Breathe for Scientists. The formal judicial process frequently restricts the ability of scientists and technical experts to provide evidence or apply their expertise in the manner in which they believe proper and find familiar. Rather than allowing the law to determine the relevance of disputed scientific facts, as it does in litigation, the goal should be to allow the pertinent scientific disciplines to establish their own regime of what is germane. The process tool should therefore help to insure that the scientific and technical persons have ample room within the negotiating structure and its subsequent implementation to deal with the data in a manner that satisfies their sense of the internal integrity of their disciplines. If so, "better" science is the result.

13. Accessibility. The scientific and technical considerations of the underlying issues become a part both of the negotiation process and of the eventual resolution, whether that outcome is binding or non-binding. They therefore must be folded into the formal embodiments of the outcome. The scientific input must be satisfactorily accessible (and readily understandable) to the negotiators, and the science must be "user-friendly." As part of the same goal, the process tool selected should help achieve effective communication (and, thereby, understanding and trust) among the several technical disciplines and among the parties and their facilitators.

V. Preliminary Evaluation

With the three process tools, thirteen process goals and four chronological strategies thus elaborated, it is now possible to offer some theoretical, albeit preliminary, thoughts about the relationships among them. This inquiry proceeds by considering each of the three process tools in turn and assessing how well or poorly each serves: (1) to enhance the satisfaction of the process goals; and (2) as to the four chronological strategies, to allow the parties to reach an optimal combination of avoidance, deferral, resolution and exit. The non-model ADR, the least structured of the three, is examined first.

1. Non-Model ADR

It will be recalled that a non-model ADR is a form of conflict management incorporating a means of marshalling acceptable data for use by the parties and the third-party negotiator as they see fit. The process, at least initially, is not directive as to the allocative criteria to be employed. Assuming that the problems at issue are complex technically, laden with scientific uncertainty and contention, one candidate for providing primary allocative criteria is the domain of science. Yet other

domains -- custom, economics, politics, law -- may offer more commanding (or easier) decision-making criteria. Translated into the terminology of ADR, the emphasis is on the importance of identifying the broadest range of interests of the parties, in order to facilitate the largest solution space.

Thus a non-model ADR process tool eschews *a priori* selection of any preferred set of criteria, holding open that choice until well into the bargaining process. It provides virtually unlimited solution space. It also encourages the tailoring of the process to the specific needs of the situation and parties, therefore potentially avoiding costs of superfluous structure. There is, for example, no commitment to building a model unless and until its usefulness may be demonstrated. Because of the flexibility of this process tool, the role of the facilitator is very significant.

Another advantage of the non-model approach is the high degree of bindingness that may be expected to arise from the fact that the parties are a part of the process. Having created the contours of the dialogue themselves, they can reasonably be expected to adhere to the agreed inputs -- and outputs. At the same time, it anticipates the prospective usefulness of scientific and technical considerations by providing for a neutral science advisor to the facilitator, for the latter to use as circumstances suggest. In this manner the non-model ADR could, if called upon to do so, help significantly in achieving process goals from the science-law domain.

Concerning the "four chronologies" in particular, non-model ADRs have, because of their flexibility, some significant limitations and advantages.

Exit (except from the ADR itself) may be made somewhat more difficult by the very capaciousness of the resolution potential. By the same reasoning the ease of resolution is enhanced, because of the increased solution space. The avoidance of future disputes requires some space for integrative architecture, of an agreement by which future events may be dealt with, without creating any perceptions of injury. Such an agreement is more likely to be achieved if there are no pre-negotiation assumptions which narrow the practical domains which may be drawn upon. Thus non-model ADR techniques would allow for (though not necessarily compel) substantial components of dispute avoidance.

Against these virtues must be balanced a limitation on the ability of a non-model ADR to defer elements of the conflict. Deferral means an agreement to resolve either present or likely prospective issues in the future, and differs from exit in that some process for that later resolution is agreed to in the present. That process must be more than a mere agreement to defer. It must be a procedure which appears at least hopeful as a means of resolving future questions. It is of course possible for the deferral mechanism to be all "process" and no "substance," but in a complex case such a procedure would be unlikely to achieve wide consensus among the parties. Criteria for the resolution of future conflicts may therefore be necessary. A non-model ADR eschews the articulation of criteria in advance.

In brief, a non-model ADR seems to be a method of choice in circumstances where there is factual contentiousness rather than only uncertainty. Yet it may be contraindicated in cases with long lifetimes -- i.e., for problems and exchanges with protracted futures and occasions for repeated or evolving interaction among the parties.

2. An Ordained Model

The use of an ordained model is in many respects the opposite of non-model ADR. An ordained model reduces solution space but does serve legitimacy and several others of the thirteen process goals.

A model, to iterate a point made earlier, is an abstraction of reality. But it is of necessity a representation of a selection of the total reality of the parties and issues. In a toxic waste liability allocation system, for example, there could be a model of the relevant toxicological or geological science; or an economic model of the corrective options available; or a political model of the consequences of strategies for future joint action.

The point is that no model can represent all of the potentially relevant dimensions of reality. Selecting a model, regardless of the scope and multidisciplinary ambition it may contain, therefore represents a choice that some aspects of reality are highly relevant to the discussions, while others are much less so. A model generates criteria; choosing what to model is necessarily a choice of the pertinence of the domain from which the model arises. Thus an ordained model should not be expected to widen the solution space or to identify values in the critical, initial sense. An ordained model does not of itself catalyze the parties to express their own views of reality and of what really matters among the whole range of possible realities.

However, to the extent the allocative criteria -- what counts in the end -- are appropriately identified, and are reflected in the model, then it can be very useful in assisting the parties to calibrate their negotiations within those selected parameters. Then the necessity of quantification can force useful value evaluation. The nearly infinite capability of a well constructed model to play "what if" serves as a way to broaden the potential solution space within the selected sets of criteria. Parties can try a wide range of solutions in the limited variable areas to see what the effects are. Finally, it should be noted again that the inherent constraints of an ordained model will serve a situation with party complexity too vast to allow of extended soultion space.

The value of a model to bind the parties may be low if they have not participated in its development or otherwise do not understand its strengths and limitations, even though they have by definition "accepted" it for purposes of the resolution process. On the other hand, to the extent that its representation of reality accords with that of the parties and is responsive to their issues, the carefully constructed model can provide an analytic rationale of considerable strength, which may lead the parties to adhere to the commitments undertaken during the process. The quantitative clarity made possible by such a model can aid in binding when clarity increases the likelihood of meeting commitments.

In a similar vein, the appeal of the rationality of the analysis made possible by an accepted model may legitimate the commitments' claims on the constituencies represented by the negotiating parties.

An ordained model can be useful in predicting injury, if the injury can be expressed in the quantifiable terms for which the model can generate outputs. Similarly, a model can be used for monitoring performance, in a way that helps to maintain bargaining positions, because it sets at the time of the agreement the criteria and operating parameters, and thus the outputs providing baseline expectations against which to observe performances. Its utility in aiding all of these goals of course depends upon its own adequacy and quality.

The ordained model can be very useful in helping achieve the goal of party flexibility, since any interest can make use of it (and, in the Law of the Sea experience, many did).

The success or failure of an ordained model in achieving the law-science process goals -- allocation of function, responsible framing of the technical questions, the degree to which the scientific resources are free to operate within their own milieu, and the accessibility of the science to the decision-makers -- is even more critically determined by the quality of the model and by factors exogenous to it. It is a vessel, providing the opportunity for achievment of goals. To the extent the assumptions underlying its algorithms remain free of hidden values, the algorithms address technical rather than policy questions, and technical input into the model is the product of "good science," it will forward those goals. But a model carries the danger of obfuscating underlying assumptions, and of overweighing the scientific input if it is given undeserved and uncritical value.

Ordained models may therefore be indicated in circumstances where bindingness is for other reasons high; where there are extended opportunities for interaction; and where solution space restrictions may be less important due to a consensus about the relevance of the portion of reality the model represents.

As to the optimal combination of the chronological strategies, selective exit from an ADR employing an ordained model is made more difficult by the fact that issues to which the model does provide answers are presumed fairly to be concluded by it. (This effect may be marginal in magnitude.) An ordained model was particularly well adapted to the Law of the Sea mining context, for example, where exit was not a desireable option, and where the resolution of complex questions in the present was necessary to serve the related issues in which the mining problem was embedded.

Avoidance of future disputes is a complex assessment. On the one hand, the narrowness caused by adopting an ordained model may reduce somewhat the range available to the parties for the fashioning of agreements concerning the future. On the other hand, however, to the extent that disputes are generated by perceptions of unredressed injury, and assuming that such perceptions can be dissuaded by reference to a previously agreed-to ("ordained") set of evaluative criteria, the likelihood that a dispute sufficiently unresolved to be disrupting will arise, in fact may be much reduced. It is therefore difficult to assess a model's impact on the avoidance strategy. One could conjecture, however, that the certainty it provides in terms of regulatory "what ifs" is both necessary to and facilitative of such decisions as the capital investment problems of deep-sea mining.

Resolution and deferral should be much advanced by the use of an ordained model. Deferral, because the present acceptability of a future process is improved when the uncertainties of its later application are reduced. An ordained model reduces those uncertainties by assuring the parties that criteria agreed-to and legitimated in the present will be those obtaining as questions arise in the future. Resolution may be enhanced, perhaps too much so in some few cases, in that an ordained model may be too crisply applicable. The "intelligence" of the model itself may be important in this regard.

3. Model Building

Involving the parties in the task of building a model provides the opportunity for focus on consensus-building as contrasted with immediate dispute resolving. It holds promise for achieving those process goals which turn most directly upon the parties themselves. There is the need in building the model to be specific, most often in a quantifiable way, about the factual premises and assumptions that collectively comprise the representation of the reality at hand. Thus model building offers the prospect of helping to identify the parties' underlying -- and possibly otherwise unarticulated -- values. Because it brings the parties together on a creative task other than, and rationally antecedent to, the resolving of the specific disputes at hand, it aslo offers an opportunity to identify widened solution space. Of course, the opportunity may be missed: The parties may be so tied to prior positions that they see the modelling process as a vehicle for casting not only their preferred solutions, but also their positional values in concrete. There is nothing intrinsic to the process that will guarantee against this happening. Open exchanges of views and a consistent focus on the requisites of agreement are likely to surface real values and, it may be hoped, eventually widen the solution space within which they are operating. A skilled third-party neutral can, in such instances, be helpful in enforcing that focus.

It should also be noted that to the extent that the development of consensus about facts, premises and underlying assumptions has been accomplished before model building commences, its value in achieving these process goals will be less significant.

A further advantage of model building as a resolution tool is, that by participating in the construction of the model, the parties may be expected to develop a commitment to it, and through it to the entire conflict management process to which it is auxilliary. To the extent such a commitment takes place and is transposed, there occurs a binding of the parties to the commitments made during the negotiations. The negative side, however, is that the parties' various constituencies may feel particularly left out and alienated by not being a part of the model building and therefore less likely to accord legitimacy to the outcome. A countervailing consideration is

that model building does not predetermine the selection of parties who participate. Party flexibility is therefore well served. But there is nothing, again, intrinsic to the process which brings that about. One may in fact speculate that the opposite can also happen: Those who began building the model might claim it as their own, shutting others out from ownership.

Three additional process goals -- adaptability to new information, the clear framing of scientific questions to elicit scientific replies, and the development of scientific input accessible to the non-technical users -- all seem to be made more easily achievable by making the parties part of the model building, provided the scientific/technical persons were in fact part of the process and -- again -- provided there was skilled third party facilitation.

As to the need for flexibility in arranging the optimal combination of "chronological strategies," model building is an intermediate option. The process eventuates in but does not begin with an ascertainable set of criteria for the enhancement of the deferral option. Likewise, the resolution function is neither over determined nor deterred by a too-early (or too confining) statement of what is and what is not substantively relevant.

Similarly, where building the model proceeds apace with the construction of a future-looking arrangement, each aware of the other, it should be possible to avoid the "architectural" constraints which the use of an ordained model risks. Hence the avoidance option is affected neutrally by this selection -- neither interfered with nor, so far as we can conjure, promoted.

Finally, as to exit: The flexibility to include or exclude from the model any aspect of the total reality thought crucial by some party to a part of its interests, is in fact the flexibility to exit with respect to that interest. (But not, because the process will result in some certain model, to have that interest served at a later time.)

Model building takes time. It also requires a sufficient probability of eventual success to justify the attempt. Constituency problems abound. Despite its positive utility with respect to the "four chronologies," this process tool may not be best in every case.

VI. SUMMARY

This brief and preliminary analysis suggests that there are numerous factors to be considered in the selection of a process tool for a given dispute. While scientific models may in general be useful in the treatment of such complex and large scale problems as those typified by the coastal zone and continental shelf, there is in their judicious use the possibility of maximizing the various goals which define good process management.

No one of the three process tools, or model-use variants, described in this paper is capable of simultaneously achieving each of the thirteen process goals we delineate, or the four chronolgical strategies derived from the fusion of ADR and Preventive Law. It is therefore necessary for process managers to inquire into a wide range of conflict process dimensions: Is it time, for example, for broadening solution space (non-model), or for finding good solutions within already agreed-to sets of decisional or allocative criteria (ordained model)? Is there a need to break out of sets which have become non-productively rigid (using a non-model ADR in the midst of a bogged down lawsuit)? Is there an important need to bring parties or a limited number of their representatives together, and to stimulate their identification with the negotiation process so as ultimately to bind them to it (model building), or is it more important to provide rigorous support for an outcome so that it commands the allegience of diverse sets of the negotiating parties' constituents (ordained model)? Are the ongoing dynamics of the problem such that settled reference points will be needed both in monitoring the outcome and in maintaining a relative standing among the parties in the future (ordained model), or will it be useful in the future not to be so bound but to be able to reconvene, or to seek new allocative criteria (continued model building, non-model)?

Such considerations illustrate but do not exhaust the need to examine carefully the context of each problem in choosing the preferred process tool. And, of course, these (and other tools) are not mutually exclusive: Development of a model and its implementation may, for example, grow out of an earlier use of a non-model ADR.

This paper has offered a taxonomy of process tools and of criteria for their use, and suggests that there are correlations among them useful to parties engaged in conflict prevention or resolution. The correlations we have suggested are, at this stage, almost entirely theoretical, though they have been drawn both from our own experiences and from those reported in the other papers in these Proceedings. Empirical validation is clearly necessary. As scientific models become more widely employed in conflict management strategies, such verification may become possible in the near future. That is, at least, our hope.

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