

SANTA BARBARA OIL SPILL

1970-3

HEARINGS
BEFORE THE
SUBCOMMITTEE ON
MINERALS, MATERIALS, AND FUELS
OF THE
COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS
UNITED STATES SENATE
NINETY-FIRST CONGRESS

FIRST SESSION

ON

S. 1219

**A BILL TO DIRECT THE SECRETARY OF THE INTERIOR TO
TAKE CERTAIN ACTIONS, AND MAKE AN INVESTIGATION
AND STUDY, WITH RESPECT TO DRILLING AND OIL PRO-
DUCTION UNDER LEASES ISSUED PURSUANT TO THE
OUTER CONTINENTAL SHELF LANDS ACT**

MAY 19 AND 20, 1969



**Printed for the use of the
Committee on Interior and Insular Affairs**

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1969

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

HENRY M. JACKSON, Washington, *Chairman*

CLINTON P. ANDERSON, New Mexico
ALAN BIBLE, Nevada
FRANK CHURCH, Idaho
FRANK E. MOSS, Utah
QUENTIN N. BURDICK, North Dakota
GEORGE McGOVERN, South Dakota
GAYLORD NELSON, Wisconsin
LEE METCALF, Montana
MIKE GRAVEL, Alaska

GORDON ALLOTT, Colorado
LEN B. JORDAN, Idaho
PAUL J. FANNIN, Arizona
CLIFFORD P. HANSEN, Wyoming
MARK O. HATFIELD, Oregon
TED STEVENS, Alaska
HENRY BELLMON, Oklahoma

JERRY T. VERKLER, *Staff Director*
STEWART FRENCH, *Chief Counsel*
WILLIAM J. VAN NESS, *Special Counsel*
DENNY MILLER, *Professional Staff Member*
CHARLES COOK, *Minority Counsel*

SUBCOMMITTEE ON MINERALS, MATERIALS, AND FUELS

FRANK E. MOSS, Utah, *Chairman*

HENRY M. JACKSON, Washington
ALAN BIBLE, Nevada
GEORGE McGOVERN, South Dakota
MIKE GRAVEL, Alaska

LEN B. JORDAN, Idaho
HENRY BELLMON, Oklahoma
GORDON ALLOTT, Colorado
TED STEVENS, Alaska

(II)

CONTENTS

	Page
S. 1219.....	1
Departmental reports:	
Budget.....	6
Interior.....	2
Justice.....	5

STATEMENTS

Allen, Alan A., marine scientist, General Research Corp., Santa Barbara, Calif.....	146
American Association of University Women, Santa Barbara Branch.....	163
Clyde, George, county supervisor, Santa Barbara County, Calif.....	73
Cranston, Hon. Alan, a U.S. Senator from the State of California.....	8
Curry, Robert R., assistant professor of environmental sciences, University of California, Santa Barbara, Calif.....	129
Dole, Hollis, assistant secretary of the Interior for mineral resources, accompanied by Dr. William T. Pecora, Director, U.S. Geological Survey, and Mitchell Melich, Assistant Solicitor, Department of the Interior....	44
Eissler, Fred, Sierra Club, Santa Barbara, Calif.....	153
Foss, R. Edwin, executive vice president, Sun Oil Co., accompanied by Myron Elliot and Clyde Wheeler, Sun Oil Co.....	117
Hearst, Peter J., Oxnard, Calif.....	171
Humble Oil & Refining Co.....	170
Kuchel, Thomas H., former U.S. Senator from the State of California.....	16
League of Women Voters of the United States.....	171
Morrison, Harry, vice president and general manager, Western Oil & Gas Association, accompanied by Harry Pistole, Humble Oil & Refining Co., Frank A. Davis, Phillips Petroleum Co., and J. K. Cassell, Standard Oil Co. of California.....	86
O'Brien, Charles A., Esq., Chief Deputy Attorney General, State of California.....	30
Sidenberg, Lois, president, Carpinteria Valley Association, Carpinteria, Calif.....	124
Teague, Hon. Charles M., a Representative in Congress from the State of California.....	39

COMMUNICATIONS

Chapman, C. Brewster, Jr., acting associate solicitor, territories, wild-life and claims: Letters to Solicitor, dated May 20 and April 14, 1969...	58
Eissler, Fred, director, Sierra Club: Letter to Walter J. Hickel, dated April 30, 1969.....	156
Eliason, Mrs. A. Daniel, chairman, Conservation and Civic Interests: Letter to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated May 5, 1969.....	174
Hickel, Walter J., Secretary of the Interior: Letter to Fred Eissler, director, Sierra Club, dated April 21, 1969.....	155
Kimball, Thomas L., executive director, National Wildlife Federation: Letter to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated May 20, 1969.....	80
Livermore, N. B., Jr., secretary, Resources Agency of California: Letters to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated June 10 and July 14, 1969.....	173, 186
MacKenzie, Charleen, Santa Barbara, Calif.: Telegram to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated May 14, 1969.....	174

IV

Melich, Mitchell, solicitor, Department of the Interior: Letter to Hon. Henry M. Jackson, chairman, Interior and Insular Affairs Committee, dated May 21, 1969.....	Page 58
Morrison, Harry, vice president and general manager, Western Oil & Gas Association: Letter to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated, June 2, 1969.....	115
Muskie, Hon. Edmund S: Letter to Hon. Henry M. Jackson, chairman, Committee on Interior and Insular Affairs, dated May 9, 1969.....	169
Myers, Anna Laura, Santa Barbara, Calif.: Letter to Hon. Henry M. Jackson, chairman, Interior and Insular Affairs Committee, dated May 7, 1969.....	174
Pecora, W. T., director, U.S. Geological Survey: Letter to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated June 25, 1969.....	145
Rowley, George M., Santa Barbara, Calif.: Telegram to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated, May, 15 1969.....	174
Taylor, Lyle A., West Covina, Calif.; Letter to Hon. Henry M. Jackson, chairman, Interior and Insular Affairs Committee, dated May 3, 1969..	173

ADDITIONAL INFORMATION

Cancellation of lease; judicial review, Title 43—Public Lands, United States Code.....	29
Federal OCS leases in Santa Barbara Channel.....	53
"Finding Lemonade in Santa Barbara's Oil," by Garrett Hardin, professor of biology, University of California.....	158
"Oil News: Protest Number Four," from the Santa Barbara News-Press, May 14, 1969.....	160
Order regarding drilling and other operating procedures off California....	49
Recommendations for a permanent cessation of oil drilling in the Santa Barbara Channel, reasons for and against.....	167
Report of study on oil in the Santa Barbara Channel.....	164
Santa Barbara branch of the American Association of University Women, resolutions of.....	166
Santa Barbara organizations, and others, endorsed S.1219.....	16
Santa Barbara supervisors, resolution of.....	79

APPENDIX A

"Withdrawal of Oil from the Repetto reservoirs off Santa Barbara, Calif.," news release by Dr. Lee A. DuBridge, science advisor to the President..	175
"Future of the Union Oil Lease," by John C. Calhoun, Jr., chairman, Special Panel.....	175
Members of Special Panel on the future of the Union Oil Lease.....	176
Memorandum for the President, dated May 27, 1969, by Lee A. DuBridge, science advisor to the President.....	177
Task force studying Santa Barbara Channel oil recommendations, news release by Walter J. Hickel, Secretary of the Interior.....	177
"Outer Continental Shelf—Oil and Gas and Sulfur Operations," from the Federal Register, May 7, 1969.....	178

APPENDIX B

Additional letter from N. B. Livermore, Jr., secretary, Resources Agency of California, to Hon. Frank E. Moss, chairman, Minerals, Materials, and Fuels Subcommittee, dated July 14, 1969.....	186
--	-----

SANTA BARBARA OIL SPILL

MONDAY, MAY 19, 1969

U.S. SENATE,
SUBCOMMITTEE ON MINERALS, MATERIALS, AND FUELS
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS.
Washington, D.C.

The subcommittee met at 2 p.m., pursuant to call, in room 3110, New Senate Office Building, Senator Frank E. Moss (chairman of the subcommittee) presiding.

Present: Senators Frank E. Moss, Utah; Mike Gravel, Alaska; Len B. Jordan, Idaho, and Gordon Allott, Colorado.

Also present: Senators Leo Metcalf, Montana; Paul J. Fannin, Arizona; Clifford P. Hansen, Wyoming, and Alan Cranston, California.

Staff Present: Jerry T. Verkler, staff director; Stewart French, chief counsel, and Charles Cook, minority counsel.

Senator Moss. The subcommittee will come to order.

This is the time set for the hearing on S. 1219 before the Minerals, Materials, and Fuels Subcommittee. This is an open public hearing to hear testimony on S. 1219, a bill to authorize and direct the Secretary of the Interior to terminate certain Federal oil leases and suspend others in areas of the Outer Continental Shelf off the coast of California, with particular reference to the Santa Barbara Channel.

This measure is sponsored by the able junior Senator from California, Senator Cranston, and he is joined as cosponsors by Senators Goodell, Mansfield, Mondale, Nelson, Schweiker, Tydings, Williams of New Jersey, and Young of Ohio.

Without objection, I will direct that the text of S. 1219 be printed at this point in this hearing record.

(The bill referred to follows:)

[S. 1219, 91st CONG., FIRST SESS.]

A BILL To direct the Secretary of the Interior to take certain actions, and make an investigation and study, with respect to drilling and oil production under leases issued pursuant to the Outer Continental Shelf Lands Act

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior shall immediately—

(1) order the termination of all drilling for oil, gas, or other minerals in the Santa Barbara Channel off the coast of the State of California under leases issued pursuant to the Outer Continental Shelf Lands Act;

(2) order the suspension of all such drilling under all other leases issued pursuant to such Act for areas off the coast of the State of California until the completion of the investigation and study pursuant to section 2 of this Act.

SEC. 2. The Secretary of the Interior shall as soon as practicable (1) make an investigation and study to determine methods of drilling for, producing, and transporting oil under leases issued pursuant to the Outer Continental Shelf Lands Act, which will remove the threat of pollution and other damage to the environment and ecological community, (2) make an investigation and study of methods of

phasing out oil production under said Federal leases in the Santa Barbara Channel, and (3) report the results of such investigations and studies to the President and the Congress.

Senator Moss. This measure was referred, for report and comment to the Interior Department, the Department of Justice and the Budget Bureau on March 4, and I will direct that these reports be printed at this point in the record.

(The reports referred to follow:)

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., May 16, 1969.

HON. HENRY M. JACKSON,
*Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: Your Committee has requested this Department's views on S. 1219, a bill "To direct the Secretary of the Interior to take certain actions, and make an investigation and study, with respect to drilling and oil production under leases issued pursuant to the Outer Continental Shelf Lands Act."

The bill would direct the Secretary to order termination of drilling under Federal leases in the Santa Barbara Channel off California. It would also order the Secretary to order suspension of all such drilling under other Federal leases in other Outer Continental Shelf areas off California until a study is completed. The bill would also direct the Secretary to undertake an investigation and study of drilling, producing, and transporting oil under the Outer Continental Shelf Act and to report his findings to the President and Congress.

Following the "blowout" of January 28 at the Union Oil platform off Santa Barbara, California, the Department initiated a broad review of all Outer Continental Shelf regulations and orders. Our engineers began revising the regulations which were in effect in the Santa Barbara Channel at the time of the blowout. Oil companies were invited to look at our proposals to see if the industry itself could suggest ways of tightening the regulations--and they did propose some tougher rules.

Governor Reagan agreed to have his oil and gas officials provide an additional review of our new regulations. This review by California has been helpful. It also served as a first step toward closer voluntary coordination between State and Federal agencies concerned with the common objective of preventing pollution. This type of official cooperation has not existed, but it now will become a normal activity in future years at the Department of the Interior.

A panel of distinguished scientists and engineers was named by the President to make recommendations on cleaning up the pollution in Santa Barbara and on fighting possible future pollution. Many of their ideas already have been followed and proved helpful in keeping the damage at Santa Barbara to a minimum.

We are pushing for new legislation to strengthen the Federal Government's role with regard to oil pollution and spills. This legislation has already passed the House of Representatives and is being actively considered in the Senate.

With our modern technology, we can get at the source of the problem. First, we must discipline our procedures. We have put into effect the most stringent possible regulations we can devise to safeguard our environment in the form of OCS Order No. 10. These new regulations will control oil drilling and production not only off Santa Barbara, but in all Federal waters off the entire State of California. They are a new high standard which we hope all our coastal States will follow.

In addition, we have proposed amendments to the Outer Continental Shelf operating regulations applicable to all Outer Continental Shelf areas. These are now subject to public comment. We are also carefully reviewing existing leasing regulations with a view to improving them and to providing a greater emphasis on environmental controls.

Another major action we have taken is the signing of an order which turned the existing 2-mile buffer opposite the Santa Barbara State Oil Sanctuary into a permanent ecological preserve (order and illustrations attached.) Previously, this area has had no legal status. The now Santa Barbara Ecological Preserve is 21,000 acres. It is inhabited by numerous species of fish and shellfish. This area, as indicated in the attached order, is extremely valuable for fishing and other recreational uses.

In addition, all unleased areas south of the Santa Barbara Ecological Preserve will be held as an additional buffer zone. No drilling or production will be permitted in this 34,000 acres. The buffer will help protect the Preserve and maintain the scenic view from Santa Barbara.

The Ecological Preserve and its buffer thus will total 55,000 acres.

About half of the remaining Federal lands in the channel are not leased. Before any consideration is given to leasing these areas, the public will be consulted and its recommendations carefully considered and all environmental factors, including resource values and ecological relationships, will be carefully considered.

The programs we are developing in response to the Santa Barbara tragedy are serving as a model for our future actions along the nation's entire coastline. We will continue to look ahead to tomorrow's environment as much as we look at today's development of our resources.

In addition to the above efforts, we will also continue to look into new and improved methods of insuring that the drilling and production of oil will not adversely affect other resource values. In the area of transportation of oil, the Department is supporting legislation (H.R. 4148) which passed the House of Representatives. That bill provides authority for the issuance of regulations in the area of transportation of oil by vessels.

For these reasons, we believe that S. 1219 is not necessary and should not be enacted.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

RUSSELL E. TRAIN,
Under Secretary of the Interior.

[Enclosures]

UNITED STATES DEPARTMENT OF THE INTERIOR

CODE OF FEDERAL REGULATIONS—TITLE 43—PUBLIC LANDS: INTERIOR

Chapter II—Bureau of Land Management

Appendix—Public Land Orders

Public Land Order

OUTER CONTINENTAL SHELF OFF CALIFORNIA—ESTABLISHMENT OF SANTA BARBARA CHANNEL ECOLOGICAL PRESERVE

By virtue of the authority vested in the President by the Outer Continental Shelf Lands Act (67 Stat. 462, 469; 43 U.S.C. 1341), and pursuant to Executive Order No. 10355 of May 26, 1952 (17 F.R. 4831), it is ordered as follows:

Subject to valid existing rights, the following described lands of the Outer Continental Shelf are hereby withdrawn from all forms of disposition, including mineral leasing, and reserved for use for scientific, recreational, and other similar uses as an ecological preserve:

The area is shown on official Outer Continental Shelf Leasing Map, Channel Islands Area Map No. 6B, approved August 8, 1966, and revised July 24, 1967, as:

CALIFORNIA—OFFICIAL LEASING MAP, CHANNEL ISLANDS AREA MAP NO. 6B

<i>Block</i>	<i>Description</i>
51N 65W	NW $\frac{1}{4}$ NW $\frac{1}{4}$
51N 66W	N $\frac{1}{2}$
51N 67W	do
51N 68W	N $\frac{1}{2}$ N $\frac{1}{2}$
52N 64W	All Federal portion thereof
52N 65W	do
52N 66W	do
52N 67W	do
52N 68W	do
52N 69W	do

The following described lands of the Outer Continental Shelf will be withheld from leasing as an adjunct to the Ecological Preserve.

The area is shown on official Outer Continental Shelf leasing Map, Channel Islands Area Map No. 6B, referred to above, as:

CALIFORNIA—OFFICIAL LEASING MAP, CHANNEL ISLANDS AREA MAP NO. 6B

Block

50N 66W
 50N 67W
 51N 66W
 51N 67W
 51N 68W
 51N 69W
 51N 70W
 52N 70W

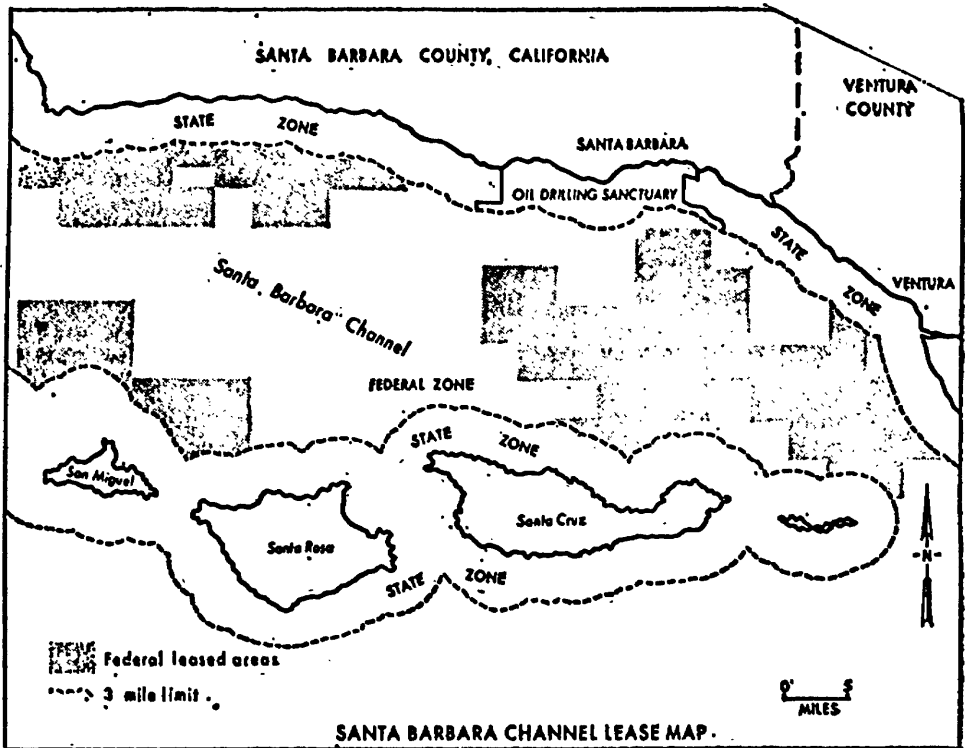
Description

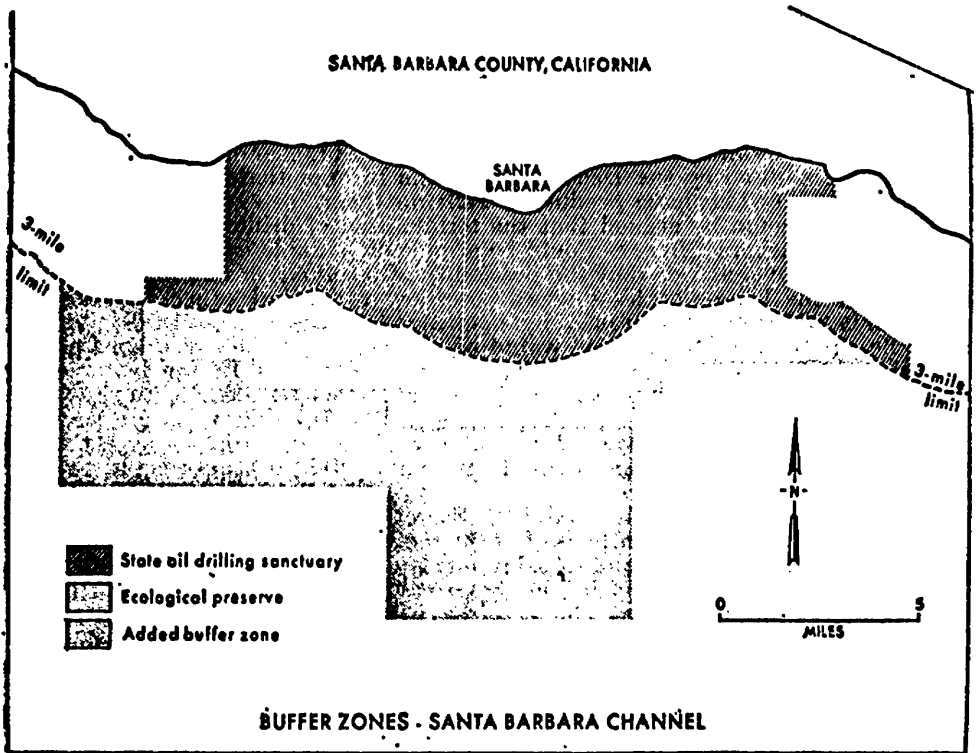
All
 do
 S $\frac{1}{2}$
 do
 S $\frac{1}{2}$ and S $\frac{1}{2}$ N $\frac{1}{2}$
 All
 E $\frac{1}{2}$ and E $\frac{1}{2}$ W $\frac{1}{2}$
 All Federal portions of
 E $\frac{1}{2}$ and E $\frac{1}{2}$ W $\frac{1}{2}$

All persons, and particularly those engaged in commercial and sports fishing and other similar or related activities, are called upon to conduct their activities in the areas described above in a manner which will help to protect and preserve the values of this area for scientific study, recreation, and other similar uses for the benefit and enjoyment of this and future generations.

March 3, 1969

WALTER J. HICKEL,
 Secretary of the Interior.





U.S. Department of the Interior/Geological Survey

OFFICE OF THE DEPUTY ATTORNEY GENERAL,
Washington, D.C., May 20, 1969.

HON. HENRY M. JACKSON,
*Chairman, Committee on Interior and Insular Affairs,
U.S. Senate,
Washington, D.C.*

DEAR SENATOR: This is in response to your request for the views of the Department of Justice concerning S. 1219, a bill "To direct the Secretary of the Interior to take certain actions, and make an investigation and study, with respect to drilling and oil production under leases pursuant to the Outer Continental Shelf Lands Act."

Section 5 of the Outer Continental Shelf Lands Act, 67 Stat. 462, 43 U.S.C. 1331-1343, authorizes the Secretary of the Interior to prescribe leasing and conservation regulations; section 8 authorizes him to issue leases; and section 12 authorizes withdrawal of unleased land and, subject to corresponding extension of lease terms, suspension of payments, and payment of just compensation, it authorizes suspension of operations in defense areas or during war or national emergencies. 43 U.S.C. 1334, 1337, 1341. Regulations authorize the Secretary to regulate or suspend hazardous operations, 30 C.F.R. 250.12, suspend operations in the interests of conservation, 43 C.F.R. 3383.5, or suspend operations during war or national emergency, 43 C.F.R. 3387.4-2. The Secretary has recently proposed various amendments to Part 250 of Title 30 of the Code of Federal Regulations, to clarify and prescribe specific standards of compliance with the general operating regulations applicable to oil and gas and sulphur operations on all outer continental shelf areas. 34 Fed. Reg. 7381-7385 (May 7, 1969).

By order of February 7, 1969, the Secretary suspended all drilling and production on certain leases in the vicinity of the January 28 well blowout in the Santa Barbara Channel; he has subsequently permitted partial resumption of activity, on a selective basis.

S. 1219 would direct the Secretary immediately to terminate all drilling in the Santa Barbara Channel under existing federal leases and to suspend all drilling off the coast of California under other federal leases until the completion of a study directed by section 2 of the proposed bill.

There is no doubt as to the power of Congress to suspend or terminate drilling in these or any other areas of the outer continental shelf, but as to existing leases, any permanent suspension may subject the United States to monetary liability. We have been advised by the Department of the Interior that the only existing federal leases off the coast of California are in the Santa Barbara Channel. Therefore, the question of liability posed by this bill would concern only the provision for permanent termination of drilling on the present channel leases. We have been further advised by the Department of the Interior that, of the 72 leases in the channel, only two have producing wells on them.

Although it could be argued that the termination of drilling on federal leases in the Santa Barbara Channel would be a noncompensable exercise of the police powers of the sovereign or that the possibility of termination was inherent in the issuance of the leases, at least when necessary to protect other resource and environmental values threatened by operations of the federal lessees, it also could be argued that termination would be an exercise of the sovereign's powers of eminent domain or a compensable breach of contract. In the latter cases, inasmuch as the lessees' bonus payments exceeded \$600,000,000.00, any resulting liability of the United States might be substantial. In addition, the lessees undoubtedly would claim damages for a variety of consequential losses, and long and difficult litigation to identify and fix compensable damages could thus be anticipated.

Section 2 of this bill would require the Secretary of the Interior to investigate and report to Congress on methods of offshore oil production that would eliminate pollution hazards, and ways of phasing out production on federal leases in the Santa Barbara Channel. Nothing in that section would affect the work of this Department.

The desirability of this legislation involves considerations of engineering, conservation, resources and area development, economics, and budgeting, as to which the Department of Justice makes no recommendations.

The Bureau of the Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

RICHARD G. KLEINDIENST,
Deputy Attorney General.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., June 3, 1969.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request of March 4, 1969, for views of the Bureau of the Budget on S. 1219, a bill "To direct the Secretary of the Interior to take certain actions, and make an investigation and study, with respect to drilling and oil production under leases issued pursuant to the Outer Continental Shelf Lands Act."

The Department of the Interior, in its report on this bill, discussed its provisions and recommended that the bill not be enacted. The Bureau of the Budget also recommends that S. 1219 not be enacted for reasons as cited in the Interior Department's report.

Sincerely yours,

WILFRED H. ROMMEL,
Assistant Director for Legislative Reference.

Senator Moss. All of us in this room, and, indeed, almost all Americans everywhere, are only too painfully aware of the tragic events leading up to the introduction of this bill. Early in February of this year, the Nation was dismayed to learn that a major leak had occurred on a Federal oil lease operated by the Union Oil Co. of California some five and a half miles off the beautiful community of Santa Barbara.

Prompt, herculean efforts were made by Union Oil, by the Interior Department, and others to plug the leak.

The geologic conditions were such, involving tremendous pressures from the oil and gas deposits beneath the ocean beds and the unstable character of the strata above them, that some little time elapsed before the leak was brought under control. Meanwhile great quantities of oil had spilled onto the beaches and shoreline of Santa Barbara and vicinity.

I gather that, even now, there is some dispute whether the leak has been effectively plugged; however, I am informed, and, in fact, documentary evidence has been submitted that there was a slight oil leakage in that area long before any drilling was undertaken.

A few further basic facts are desirable for the record before we hear proponents and opponents of the proposed legislation. In 1953, the 83d Congress enacted legislation, settling, more or less, the long-standing "tidelands" dispute between the States and the Federal Government. The Submerged Lands Act gave to the States the submerged lands within their State boundaries, authorized for Pacific and Atlantic coastal States at 3 miles seaward from the line of mean high tide. The Outer Continental Shelf Lands Act, enacted the same year, asserted the paramount rights of the Federal Government to mineral deposits in the lands seaward of this 3-mile State sea boundary, and authorized the Secretary of the Interior to lease such deposits.

Pursuant to this authority granted by Congress, the Secretary of the Interior in February of 1968 offered for sale leases on areas of the Outer Continental Shelf off California. This sale was phenomenally successful from the point of view of the Federal Treasury. Some 71 leases were purchased, under the competitive bidding system required by the statute, for bonuses totaling \$602,719,261.60. Among the areas leased in this sale were tracts in the Santa Barbara channel beyond the 2-mile "buffer zone" established voluntarily by the Interior Department.

To date, three of these leases have been proven to be producible, and to April 1 of this year nearly \$1,300,000 in royalties, over and above the \$600 million plus in bonuses, has come into the Federal Treasury.

At this time, our country needs both oil and revenues. This is not to say that the California coast needs to be the source of the oil and revenues. But, certainly, as a basic fact, we do need both oil and revenue. Particularly the West Coast region needs oil.

Still another aspect of the situation should be made a part of the record. Last year we enacted Public Law 90-401, an amendment to the Land and Water Conservation Fund Act which provided that sufficient funds from mineral leasing on the Outer Continental Shelf should be covered into the Land and Water Conservation Fund to bring the income of the Fund up to \$200 million a year for 5 years. The Land and Water Conservation Fund is a primary source of revenue for Federal aid to the States for their State outdoor recreation programs, and for expansion of the Federal outdoor recreation program.

Also, as a lawyer, I must confess to another factor in the situation that has given me cause for some thought. A lease is a contract that

conveys a property right, and some of the property rights conveyed in the February 1968 sale are extremely valuable indeed.

We start with the \$600 million in bonus money that already has come into the national treasury. If this bill, S. 1259, would take away property rights from those who have duly acquired them under Federal law, we must give some thought to compensation for the lessees. I hope the witnesses will discuss this problem.

Now, in bringing these opening remarks to a close, I sincerely trust that my mention of some of the historic, economic, and legal problems involved in this proposed legislation will not be taken as indicating any opposition on my part to the bill. Far from it. My record during my 10 years plus in the Senate establishes that I am a conservationist. I deplore, greatly, the Santa Barbara tragedy, and am unshakable in my conviction that every reasonable action must be taken to prevent recurrence.

It is my earnest hope that the witnesses will discuss the problems I have mentioned. The primary purpose of a hearing of this kind is to bring out the facts, all of the facts, and to face up squarely to the problems.

If any members of the subcommittee wish to make a preliminary statement at this time, I would be glad to recognize them at this point.

Senator Allott?

Senator ALLOTT. I have none at this time, Mr. Chairman.

Senator Moss. Senator Metcalf, Senator Gravel, Senator Jordan?

It appears that none of the members of the subcommittee have preliminary statements, although I am sure they will have questions and discussion as we go along.

I am pleased, therefore, to recognize as the first witness the author of this bill, the able junior Senator from the State of California, and I want to also extend to Senator Cranston an invitation to remain and sit on the panel with the committee if he would care to do so during the remaining discussion that we have on this bill.

Senator Cranston, you are recognized, sir.

STATEMENT OF HON. ALAN CRANSTON, A U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator CRANSTON. Thank you very much, Mr. Chairman.

I deeply appreciate this opportunity for me and others to present arguments for and against the resolution that is the subject matter of this session. I am grateful to each of the members of the committee for his presence, and I also appreciate the invitation to join with you when I am finished with my testimony.

The blowout in the Santa Barbara Channel of a Union Oil Co. well which caused the situation that brings us together in this room occurred on January 27 of this year. On February 28, after visiting Santa Barbara, flying over the blowout area, walking on the beach, and attending and participating in hearings with the Public Works Subcommittee concerned with water pollution, I introduced Senate bill 1219, the measure before you.

This bill in essence would terminate drilling for oil in the Santa Barbara Channel. It would also suspend drilling wells off the Cali-

ifornia coast in the jurisdiction of the U.S. Government until satisfactory evidence is given to Congress that there will be adequate safeguards to prevent further spills like this if further drilling occurs in places other than the Santa Barbara Channel.

Today the oil is still leaking uncontrollably from that blowout. The sea is still covered with oil. Every few days the beaches are covered again with oil. This is true not only in Santa Barbara, but in places along the coast quite distant from Santa Barbara. I present to you petitions signed by more than 100,000 citizens of the United States, many of them from Santa Barbara, but many from elsewhere in the United States, urging support for this bill and that oil drilling be halted in Santa Barbara Channel. The petitions are almost 1 mile long. They are piled up here on the end of your bench.

Senator Moss. I observed that pile, and I was amazed. I have never seen such a long petition at any time. The record will note that it occupies a great deal of volume on the bench here before us.

Senator CRANSTON. I am tempted to ask that they be incorporated in the hearing record, but I refrain from doing that.

Senator GRAVEL. Will an attempt be made to verify those signatures to see that they are American citizens?

Senator Moss. At 25 cents a name. The petition will be incorporated by reference and since it is here deposited with the committee, we have it and can examine it if we desire to look at all the names as the Senator from Alaska suggests.

Senator CRANSTON. Thank you very much.

For one moment I would like to place the Santa Barbara situation in the general context of the environmental crisis that we face in America and indeed in the world.

It is increasingly recognized that we are poisoning and polluting the world in which we live together. The air we breathe is increasingly noxious. The food we eat is increasingly poisonous. The water we drink is increasingly polluted. Pollution is becoming a national scandal and a burning national issue.

The rivers, the lakes, and the oceans are increasingly unenjoyable and increasingly threatening to life and to health because of the general problem of pollution. The Santa Barbara blowout is simply one example but perhaps the most striking and vivid example that we have had. It is serving to call to the attention of many people the general threat that is occurring.

Santa Barbara is one of the most beautiful places on earth. It is not only of priceless value to those who live there, it is of priceless value to everyone in the United States who manages to get there. It is a national treasure visited by people from all over the United States and from all over the world.

You will see pictures and will hear testimony in the course of this presentation indicating what has happened there.

I recognize that we need oil for our society and for its security. I do not recognize that we need it from Santa Barbara. The unique beauty of Santa Barbara and the damage oil can do when accidents occur is not the only factor that is peculiar to the Santa Barbara area.

The geological formation in the channel is unique. There is oil 250 feet beneath the sea bottom with sands only separating the oil de-

posits and the sea. This blowout occurred in such a place, and the history since that blowout indicates that a leak in a place like that is incredibly difficult to stop. Nobody yet knows how to stop this particular leak.

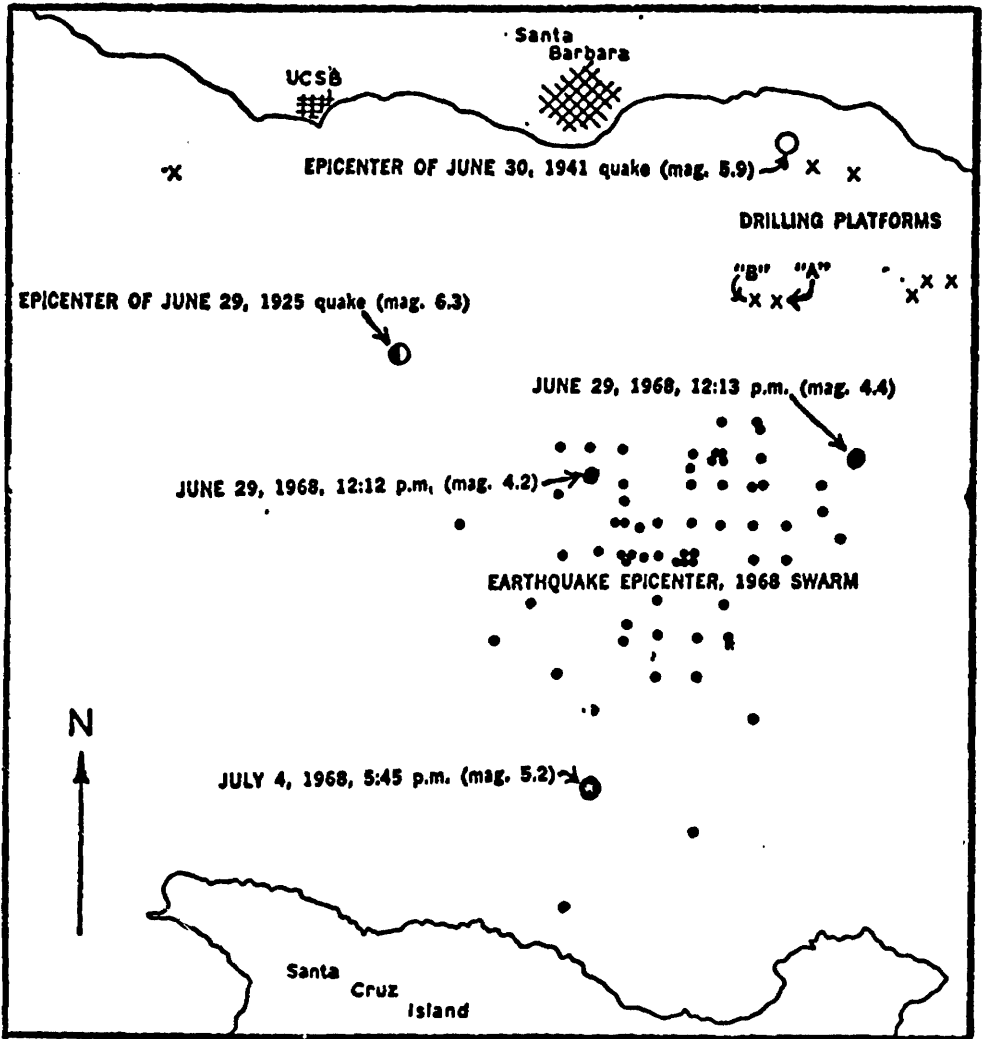
There is a unique earthquake hazard in the channel. I have here and will present to you for the record and for you to note a chart that was presented to the subcommittee of the Public Works Committee when it was in Santa Barbara. The chart was prepared by Dr. Arthur G. Sylvester, assistant professor of geology at the University of California, Santa Barbara. It shows that 66 earthquakes occurred in 6 weeks in June of last year in the Santa Barbara Channel in the immediate vicinity of this leak and in the vicinity of the other leases that presently exist there.

Something is happening here. It indicates that there might be a very large and disastrous earthquake which could lead to vast and uncontrollable spills.

There will be those who say it would do the opposite, would seal wells. I think nobody knows what would happen if an earthquake occurred there. Further earthquakes can be caused by the subsidence that occurs when you pull oil from the bottom of the sea. These threats, it seems to me, are special to this area and should be carefully considered.

I present this chart for the record.

Senator Moss. It will be incorporated in the record at this point.
(The chart referred to follows:)



Page 4 Santa Barbara News-Press, Friday Evening, March 7, 1969

The chart above locates the epicenters of 66 earthquakes that jolted the channel last year between June 26 and Oct. 15. The chart was prepared by Dr. Arthur G. Sylvester of the geology department of the University of California at Santa Barbara who, with other experts, have pointed out the danger of drilling oil wells in the channel because of the faulted ocean bottom.

Figure 4. Seismic activity in the Santa Barbara Channel.

Senator CRANSTON. Another special factor to be considered is the great depth at which, under these leases, there will be effort to drill for, find, and produce oil.

I believe that there are no places on earth where oil has yet been produced at these depths. The chances for accidents increase greatly in deeper and deeper water, and the chances of controlling blowouts or other accidents decrease proportionately. Accidents or blowouts are more likely to occur in those areas.

I do not underestimate the technological ability of the oil companies, but as their abilities are strained to capacity, the chances of accidents or blowouts rise immensely, if an accident occurs in one of these greater depths, divers cannot go down there to deal with it and to spend any time there. Blowouts and leaks elsewhere do not necessarily provoke the problems that they provoke when they occur in Santa Barbara.

In Santa Barbara there are tides and currents and winds that carry oil that comes to the surface of the sea when there is a blowout onto the shore, afflicting the people and the property there. This does not occur in most other places where oil is produced. There are blowouts that do not affect those on shore because the tides and winds carry the oil away. Furthermore in most other places where oil is produced there are not the rare beauties of Santa Barbara.

I have been unable in all my investigations to find out how many blowouts occur annually or how soon they are controlled.

Red Adair, of Texas, who is among the top experts, on earth in dealing with blowouts, has said that he was called for something like 50 blowouts last year in various parts of the world. They are apparently rather frequent.

I recognize that some of Red Adair's cases occurred in places without U.S. regulations. Under some foreign jurisdictions there may have been far less care applied to reduce the likelihood of blowouts.

Since the Santa Barbara blowout, there have been two blowouts in the Gulf of Mexico, and there was a platform fire in the Cook Inlet in Alaska, three accidents in the U.S. jurisdiction since Santa Barbara.

When Secretary of Interior Hickel appeared before the Public Works Subcommittee, he talked about a blowout that occurred in Cook Inlet when he was Governor of Alaska. I would like to read you his testimony because it is rather startling and foreboding. He said:

We had a blowout in Cook Inlet in 165 feet of water a number of years ago that blew for 14 months. Fortunately, it was a high pressure gas and we lit it and it burned and it burned for that period of time. You could see it for a 150 miles. My point—and this is why I am concerned—is that that could just as easily have been a 10,000 to 12,000 barrel-a-day well of oil. If you would have had that blowing for 14 months, you would have had oil from the Arctic to the Antarctic.

The oil industry in the United States is one of the most advanced industries in the world. It is able to find and produce oil at incredible depths undersea or underland, but this industry has not until now turned its immense skills to dealing with the mess that afflicts us when a spill occurs in the ocean.

The most primitive measures are presently available, and you will see pictures and hear other descriptions of them. They have consisted of throwing straw on the surface of the sea. The straw absorbs some oil. Then men in rowboats go out with shovels, two men and two shovels per rowboat, and shovel the straw into cans on the rowboat to be disposed of somewhere.

Another method was to float a boom around the oil to surround it or to prevent it from coming into a harbor. When heavy weather came, the boom was upset and shortly looked like spaghetti. Of course the oil and debris went in every direction.

Former Secretary of Interior Udall, who was in charge of the Interior Department when these leases were let, testified before the

Public Works Committee on March 10. He referred to this incident as the conservation Bay of Pigs.

He said that the administration in 1967 and 1968 was "hungry for revenues." He said there was "cockiness" that no blowout would occur. He said, "We were overconfident concerning the risks." He said, "The question of a possible blowout never really came up."

The U.S. Government, when it let these leases, had virtually no geological information about Santa Barbara Channel. The oil companies, for reasons that are perfectly sound from their competitive point of view, refused to share their geological information with the Government. So the Government had no knowledge when the leases were let of the peculiar geological circumstances that created so grave a risk in Santa Barbara Channel.

When it was considering letting these leases to get this quick money for a budget that was out of balance and a treasury that was depleted, the Department decided not to hold public hearings in Santa Barbara. The February 15, 1968, Interior Department memo on public hearings said, "We preferred not to stir up the natives."

The citizens of Santa Barbara cannot help but resent this colonial view of them.

I want to compliment Secretary Hickel and his staff for the sincere and careful efforts they have made, as the seriousness of the spill has become increasingly apparent, to deal with the situation and to reduce the danger of future blowouts. All drilling was stopped for a substantial period of time. Now five leases have been permitted to start drilling again.

Drilling on 66 leases is still suspended. This suspension indicates how seriously the Department views the situation in Santa Barbara Channel.

New, far tighter, interpretations of previous regulations concerning drillings have been promulgated by the Department, and I gather that still stiffer regulations or interpretations of regulations are now under consideration in the Department.

One group of oil companies involved in a Santa Barbara Channel lease that cost \$73 million in cash bonus bids has sued the U.S. Government for cancellation of the lease and refund of their millions of dollars of bonuses paid on the grounds that the new interpretations of the rules alter their leases and make them uneconomical to these oil companies.

I believe that those oil companies would be here testifying on behalf of my measure were it not for the fact that this suit is pending and it might legally be unwise for them to speak out.

For the record, the names of those companies that want out of Santa Barbara Channel are Pauley Petroleum, Inc.; Colorado Oil & Gas; Mesa; McCulloch Oil Corp. of California; J. M. Huber Corp.; and Huskey Oil Co. of Delaware.

Meanwhile, the Department of Interior is presently exploring all data relating to the Union Oil Co. lease, is examining the geological data that was not available to them when the lease was let, and is in negotiation with Union that may lead to a decision by Interior that no further drilling can be allowed under the Union Oil Co. lease.

Such a decision could lead to canceling Sun Oil Co.'s lease on the adjacent channel bottom, since the western part of Sun's lease drains

the same oilfield and involves the same geological structure that the Union Oil lease covers.

I cite the suit by the one group of oil companies and the situation involving Interior, Union, and Sun as evidence that oil companies and Government alike are considering halting drilling permanently in at least part of the Santa Barbara Channel.

My bill would go a step further and stop drilling in the entire channel. It is recognized by the oil companies, by the executive branch, and of course by myself and the cosponsors and the supporters of my measure that the oil companies would be entitled to compensation if their leases are canceled by this bill or by action of the Department of the Interior.

I recognize that the Government is not going to reach into the Treasury and take out many hundreds of millions of dollars to hand over to the oil companies. I have talked to the presidents of a good many of the oil companies involved and to other experts in this field, and I believe an equitable method could be worked out which would be acceptable to both sides, such as giving the oil companies a credit against bids in some other field.

This could be handled in the form of scrip which is used presently in dealings between oil companies and the Federal Government. Various factors would have to be taken into account in determining what costs should be repaid.

In essence I believe that there should be no compensation for risk capital spent by any oil company prior to the time it received a lease because oil companies that failed in their bidding or didn't bid at all invested risk capital. Obviously those who won the leases are not entitled to compensation when others did not get compensation for the same sort of expenditure.

I believe that the basic bid should be included in making repayment and that expenditures by a company, once a lease had been granted, in fulfilling the terms of that lease until the lease is canceled should also be compensated. A factor that I have not yet been able to determine to my own satisfaction, is what value should be attributed to the value of a field discovered by exploration subsequent to the granting of a lease.

Undoubtedly some of the companies could prove that they have found a field worth more than they paid for it. Undoubtedly the Government could prove that some companies had hit a field worth considerably less than the cash bid paid.

In summary it seems to me, that it was wrong to open up the Federal lands in the channel to oil development in the first place. It will be doubly wrong to perpetuate this policy by allowing further drilling. To continue oil development is unfair to everyone involved, and I believe it is not in the best interest of the oil companies themselves.

The channel has a potential for catastrophe. The instability and inadequacy of the floor of the channel make the potential danger to the Pacific coastline far in excess of the benefits we can derive from oil produced there.

A repetition of the Santa Barbara oil spill disaster would make oil pollution a political issue reaching all across this Nation. Another hole in the ocean floor, another round of desecrated beaches and

dead birds, and the people of the Nation will insist on elimination of all possibility of repetition not only in Santa Barbara but anywhere, I believe, that reaction could lead to an end of drilling where drilling should not be ended, an end to the availability of oil that should be available to us and to the oil companies for them to pursue.

I would like to add this: Many Americans erroneously consider the oil companies to be the villains of the Santa Barbara disaster. Nothing could be more unfair. It is not the basic responsibility of the oil companies to decide whether the opening of an oilfield is environmentally sound and in the public interest. That decision is a fundamental responsibility of Government. When the bids of the oil companies were accepted for the leases in Santa Barbara Channel, they proceeded to do their thing: they drilled for the oil in the Santa Barbara Channel subject to the regulations and to the supervision of the Secretary of the Interior.

When the blowout occurred, Union Oil Co., without knowing who would pay the cost, did everything within its power to halt the leak and to clean up the mess. The Department of the Interior did all it could. The leak still leaks and the mess is still a mess.

In view of the geological instability of the Santa Barbara Channel, the oil companies face enormous risks if they continue their operations there. I believe that the creation of an oil reserve there would best serve the interests of the Nation and of the oil industry. Then that field would only be tapped in a time of national emergency, if one comes, when our overseas sources of oil are cut off from us and hopefully it would come only at a time when advances in technology will greatly reduce the danger of blowouts to an absolute minimum and will insure that they can be promptly halted and the consequences cleaned up, if indeed they occur.

Finally, I would like to submit for the record a list of many, many organizations that support this measure, my bill. I will read you just a few of the names.

There is the County Board of Supervisors of Santa Barbara; the City Council of Santa Barbara; the chamber of commerce; the Federated Sportsmen; the Sierra Club; the American Association of University Women; the League of Women Voters. Some of these are Statewide organizations.

Elsewhere in California, the Los Angeles County Board of Supervisors; the Orange County Board of Supervisors; the Monterey Board of Supervisors; the California State Hotel & Motel Association, and many, many other organizations in this list which I submit for the record.

Finally, if I may, I would like to submit a statement in behalf of this measure by the man whom I have succeeded in the Senate from California, Senator Tom Kuchel, who represented California with great distinction for many years, was a specialist in Department of the Interior matters, a man who is still a resident of California, still deeply interested in the problems of California and in the national environmental problems that we all face together. He has made a strong statement in behalf of this measure, which I submit for the record.

That concludes my statement, Mr. Chairman.

Senator Moss. Those documents will both be printed in the record at this point.

(The documents referred to follow:)

LIST OF ORGANIZATIONS WHICH HAVE ENDORSED S. 1219 BY RESOLUTION OR MOTION

SANTA BARBARA

County Board of Supervisors.
 City Council.
 City Planning Commission.
 Chamber of Commerce.
 Citizens Planning Committee.
 Allied Improvement Association.
 Federated Sportsmen.
 Women's Club.
 Santa Barbara Beautiful.
 Sierra Club.
 American Association of University Women.
 League of Women Voters.
 Boat Owners Association.
 Audubon Society.
 Montecito Protective & Improvement Association.
 Santa Barbara Junior Women's Club.
 Santa Barbara Mental Health Association, Inc.
 Women's Council of the National Association of Real Estate Board (Santa Barbara Chapter).
 Santa Barbara YMCA.
 Santa Barbara Watchmakers and Jewelers Guild
 Royal Canadian Legion, Post 12 Auxiliary.
 Associated Student Council of Santa Barbara City College.
 Women's Architectural League.
 Eucalyptus Hill Improvement Association.
 The Home and Garden Club of Santa Barbara.
 Santa Barbara Chapter 37, California School Employees Association.
 Tierra de Oro Parlo No. 304, Native Daughters of the Golden West.
 Amvets Post #3.
 Exchange Club of Santa Barbara.
 Goleta Valley Railroad Club.
 Epsilon Sigma Alpha International Sorority, Theta Upsilon Chapter.

OTHER

Carpinteria Valley Association.
 Summerland Citizens Committee.
 Los Angeles Co. Board of Supervisors.
 Orange Co. Board of Supervisors.
 Monterey Co. Board of Supervisors.
 Santa Cruz Co. Board of Supervisors.
 Newport Beach City Council.
 City of Seal Beach.
 City of Laguna Beach.
 City of Huntington Beach.
 City of San Clemente.
 California State Hotel & Motel Association.

STATEMENT OF HON. THOMAS H. KUCHEL, FORMER U.S. SENATOR FROM THE STATE OF CALIFORNIA

SANTA BARBARA CHANNEL OIL POLLUTION CRISIS

The terrible despoilation along Santa Barbara's majestic channel and coastline has not come to an end, though many people mistakenly think so. One hundred days after the blowout of an oil well, erected on a platform 5½ miles out to sea, crude oil, at an estimated rate of 8,000 gallons per day, has continued to blacken and blight the waters of the channel from fissures deep in the ocean bottom. Many fear further massive eruptions.

"The problem, too," says the *Santa Barbara News-Press*, editorially, continues to be one of nationwide communication. Too many Americans today believe that

the channel oil problem is solved; that the Platform A leak is a thing of the past; that future oil leaks are ruled out by new drilling regulations. None of this is true."

Senator Cranston's bill, S. 1219, furnishes an excellent vehicle upon which the Senate Interior Subcommittee on Minerals, Materials and Fuels may determine the best way to proceed in dealing with the problems and, particularly, in preventing a recurrence of last January's holocaust at Santa Barbara, or elsewhere. The bill would ban drilling in the channel; it would direct the Secretary of the Interior to study whether oil production on the Outer Continental Shelf can continue without endangering our shorelines, both environmentally and commercially. It would require investigation into phasing out oil production when the public interest requires that leases be terminated. It authorizes the Secretary to study the establishment of criteria of environmental quality as a standard for development of petroleum resources on the Outer Continental Shelf. Every provision of this bill is worthy of consideration.

The Committee can proceed to cover other relevant subject matter. It can enquire into the methods and means of petroleum production in the entire adjacent Continental Shelf Area. It can take testimony on the value of the present leasehold contracts, the possibilities of exchange of other federal lands with mineral deposits for those leasehold areas which pose a continuing hazard to the shorelines, and, basically, the whole question of public interest and welfare involved in the development of offshore mineral resources.

This simple, elemental issue, demanding immediate attention is how best to prevent any further ravage to the beaches of beautiful Santa Barbara from oil operations in the Continental Shelf.

Senator Moss. We appreciate your very fine testimony, Senator Cranston. You have reviewed the factual situation as it has occurred and expressed your opinion as to what ought to be done now to deal with the problem that is upon us. You indicated in your testimony that the leak was still leaking. What do you propose be done about that?

Senator CRANSTON. I am not a technologist. I cannot submit any recommendations that would be superior to those by the experts. I hope they will find a way to end the leak, but they have been trying since January 28 without success.

Senator Moss. Do you understand that one of the factors in attempting to stop the leak is to reduce the pressures below and, therefore, it might be necessary to produce from the wells in order to reduce the pressure?

Senator CRANSTON. I recognize that in the particular place where this occurred that may prove to be the only solution. If so, so be it; but at the same time let's halt production in adjacent areas where there is this grave risk of further blowouts.

Senator Moss. There are leases, I think, that are State leases within the 3-mile offshore area. Would your bill apply to the State as well?

Senator CRANSTON. No, it would not. There is no power residing in the Federal Government that I am aware of to halt drilling in the State jurisdiction. However, the State land commission, the State body responsible for drilling in the tidelands and oil production, has suspended all drilling everywhere in California pending review in the same way that it is being reviewed here.

I would like to add that I served on that commission for 8 years and was responsible for many, many leases so that I am not unfamiliar with the general problem in the State as well as in the Federal jurisdiction here.

The legislature there has bills similar to mine that would deal with the problem in ways analogous to what I am proposing at the Federal level.

Senator Moss. That would be on the State level. Haven't there been a great many wells drilled off of Long Beach in the State area offshore?

Senator CRANSTON. Yes, there have been many wells drilled in many places off the coast of California without any catastrophe like the present disaster in the Santa Barbara Channel. Again the conditions are quite unique in Santa Barbara.

Senator Moss. Your opinion is that, because of the lack of knowledge of the geology and of those differing conditions, that drilling was permitted in Santa Barbara that was not safe, not controlled, whereas that same kind of drilling might have been perfectly satisfactory in the Long Beach area?

Senator CRANSTON. I believe so. I believe this also to be the case: That the State regulations were more stringent than the Federal regulations and the State's willingness to grant variances, which is what occurred in the case of the Union well where the blowout occurred, was far less liberal than the Federal Government's attitude toward variances.

We had testimony from Frank Hertig before the subcommittee of the Public Works Committee on this matter. He is the executive officer in charge of the State land commission. He stated that, in his opinion, the State regulations would have prevented this blowout from occurring.

Second, he stated unequivocally that they would not have granted the variance that was granted in the case of this well in the Federal jurisdiction.

Senator Moss. What did this variance consist of? Was that for the failure to set the casing on down the hole?

Senator CRANSTON. Yes; the casing was only set, as I recall, something like 1,000 or 1,200 feet and was not embedded in strong bearing sands.

Frank Hertig said on behalf of the State that they would never permit the casing to be halted in any place unless in bearing sand which would have meant 3,000 feet in the case of this well.

Senator Moss. Thank you, Senator Cranston.

Senator Allott, do you have questions?

Senator ALLOTT. Yes, I have a few, Senator.

I want to make it very clear that I don't consider myself in any way happy about what happened in the Santa Barbara Channel, as no one does. But we have a very difficult problem here, and I think we have to find solutions to it.

Now, looking at your bill, S. 1219, I want to ask you this first: Is it intended that drilling and production in the Santa Barbara Channel, under paragraph 1 of your bill, be terminated and that the leases be extinguished without regard to the investigation and study required under section 2?

Senator CRANSTON. Yes. But it applies only to drilling, not to production. There are some producing wells that would not be closed down by my bill.

Senator ALLOTT. Who would determine which wells would continue to produce under this paragraph?

Senator CRANSTON. Well, the language is meant to cover oil wells that are in process of being drilled but are not yet completed. An oil well that is completed and that is in process of production at the time of enactment of this measure would not be affected by it. So it would be an easy determination to make.

Senator ALLOTT. So this would, in effect, be an executive or congressional shutoff of all drilling and exploration in the Santa Barbara Channel?

Senator CRANSTON. That is correct.

Senator ALLOTT. But it is not intended that it would be in anyway controlling on any present production?

Senator CRANSTON. No.

Senator ALLOTT. Then the paragraph 2, "order the suspension of such drilling under all other leases issued pursuant to such act for areas off the coast of the State of California until the completion of the investigation and study pursuant to section 2 of this act"—you have disqualified yourself as an expert geologist, as I will disqualify myself also—but do you regard this area as a unique geological area?

Senator CRANSTON. Are you referring to the Santa Barbara area?

Senator ALLOTT. Yes.

Senator CRANSTON. Yes, I do.

Senator ALLOTT. Then why should the drilling of other leases on the Outer Continental Shelf in other areas of California be stopped if you regard this as a unique—and in your own words, and I am not sure but what I agree with you—and potentially dangerous situation. Why should it be stopped in other areas, for example, off of Long Beach where you believe that the geological structure is entirely different?

Senator CRANSTON. Perhaps, Senator, it is because I regard all of California as unique in terms of its beauty. I would like to see drilling for oil halted all along the beautiful coast of California until the sort of regulations that have been in the process of promulgation by the Secretary of the Interior have been put into effect and until we can have far greater confidence than we presently can have that those regulations will prevent blowouts in any kind of a geological formation.

I also feel that we should have somewhat more assurance than we now have that the art of cleaning up a mess when it occurs and halting a blowout when it blows has advanced beyond the present state of that art. I believe that we can expect that there will be progress in both fields rapidly as a result of the blowout in Santa Barbara and all the unhappy consequences.

Senator ALLOTT. I expect that if anyone had anticipated there would be a blowout, there would have been means and methods developed for taking care of it. But obviously no one did. Do you know when the lease was made on this particular tract?

Senator CRANSTON. The leak started January 28. The blowout occurred then.

Senator ALLOTT. No; surely it didn't start then.

Senator CRANSTON. You said leak or lease?

Senator ALLOTT. Lease.

Senator CRANSTON. I don't know the exact date of the lease.

Senator ALLOTT. Do you know when drilling started on this particular tract or when production started?

Senator CRANSTON. No; I don't know the exact date. That can be supplied for the record.

Senator ALLOTT. Had it been in production for some time?

Senator CRANSTON. No; I think there was no production. There was simply drilling.

Senator ALLOTT. It was in the process of being brought in?

Senator CRANSTON. Yes. I believe this was the fifth well drilled from this particular platform.

Senator MOSS. Would the Senator yield for one question? Isn't it true that off of this platform they had already drilled, I think, three or four wells that had been completed and they were on the fifth well when the blowout occurred?

Senator CRANSTON. That is right. I think it was the fifth well.

Senator ALLOTT. From this particular platform?

Senator CRANSTON. Yes.

Senator ALLOTT. Have there been any other blowouts in the Santa Barbara Channel?

Senator CRANSTON. Not that I am aware of. I don't believe there have been.

Senator ALLOTT. Now I would like to discuss with you a few of your ideas about a solution to this thing.

My figures indicate, in fact the chairman of the committee mentioned that all of these leases brought in \$602,719,261.60. Now, I have a copy of one of these leases, not the particular lease in question, but they are all the same. I find that the lessee is given the nonexclusive right to conduct within the area geological and geophysical explorations which are not unduly harmful to aquatic life.

Then, above that, the lessee is given the exclusive right and privilege to drill for, mine, extract, remove, and dispose of all oil and gas deposits except helium gas in or under the following described area of the Outer Continental Shelf as that term is defined in the act.

Now, you have said in your statement that of course it would be impossible for the Federal Government to pay these people off. In the last year, just two bonus sales on the Outer Continental Shelf has brought in some \$1,200 million, all of which goes into the general treasury.

Last summer or last fall the Congress passed a bill which authorized the tapping of these revenues, to the extent that Congress did not appropriate \$200 million annually for the Land and Water Conservation Fund. You are aware of that?

Senator CRANSTON. Yes, I am.

Senator ALLOTT. So that, basically, except as these moneys may be tapped for possible use on the Land and Water Conservation Fund, and that would be up to \$200 million annually, that would be an income to the Federal Government.

I am sure you will agree that a lease is a property right.

Senator CRANSTON. Yes, and I would assume that the winner of the lease has a vested interest of some sort in the oil discovered there.

Senator ALLOTT. So we have several elements here to be considered in making any arrangements with oil companies, and I shall be very interested in what they have to say. I have not talked with any of them, so that I don't know what they have to say. But, No. 1, the actual amount of money paid for the oil lease or bonus money paid for the lease; No. 2, the amount of money expended in the drilling of that particular well. And No. 3, and in which I probably disagree with you, in exploration costs in that area; and then we have a fourth element.

Senator CRANSTON. I do not believe they should be compensated for exploration costs spent prior to the granting of the lease, but anything spent after the granting of the lease seems to me to be something they should be compensated for.

Senator ALLOTT. Looking at it from a lawyer's point of view, I am not sure but what I would have to disagree with you on that.

Senator CRANSTON. I would have no objection if the Senate in its wisdom cuts down fairly on the cost to the Government.

Senator ALLOTT. Then there is the added factor of the property interest in the oil which has been discovered and brought to a state of production in these leases, and even perhaps in oil that they believe has been identified. So that you have all of these elements which would have to be considered to some extent, some way in attempting to arrive at settling with the oil companies.

Senator CRANSTON. Senator, there is one additional factor that probably should also in justice be considered. That is interest on the oil company's development during the time when it is halted.

Senator ALLOTT. That is perhaps true, too.

Now you have suggested the possible use of scrip. Frankly, I don't believe that we have any power even in the Congress of the United States to compel any oil company to accept scrip in lieu of their legal demand arising out of a cancellation if it would occur. But I would like to simply make this point: That in the case of the Outer Continental Shelf except for the partial tie-up of some of the moneys to the Land and Water Conservation Fund, all of the money goes into the Federal Treasury. If you gave scrip which they were entitled then to use, we will say, on the uplands of the Continental United States—in that instance the funds which arise from the bonus moneys go 37½ percent into schools and roads, and 52½ percent into reclamation, and your State is just a little bit interested in reclamation—so that you would have a diminishment of funds for these purposes. If those scrips were applicable, for example, to Kansas or Colorado or Montana, you would have a diminishment of the funds available for schools, roads, and reclamation in those States.

I for one would have to say that I would very vigorously oppose the scrip concept within these limitations.

Now, there may be other methods and as this proceeding goes along we may hear other ideas from various sources and get some other material.

I think that is all I have at this time, Mr. Chairman.

Senator CRANSTON. Senator, may I make one comment. If the effect of scrip would necessarily be to deny funds for schools, roads, or reclamation to the people of my State or any State, I would oppose that solution.

Senator ALLOTT. You understand the point I am making, do you not?

Senator CRANSTON. Yes, I do.

Senator ALLOTT. That since the moneys from the Outer Continental Shelf go for all practical purposes to the Federal Treasury and the lands or leases upon lands for which the scrip might be used go to these other funds that have been designated, you actually come into a conflict of interest between the schools and roads and reclamation.

Senator CRANSTON. If we are discussing it in an indirect sense, obviously, every penny, every dollar, millions of dollars that the

Federal Government receives from any source goes to schools or roads or reclamation or defense or food stamps, or what have you.

Senator ALLOTT. Well, this is earmarked by law upon the uplands. That was the point I was trying to make.

Senator CRANSTON. I think that we have to take into consideration all the uses served by funds and all the values affected by acquisition of those funds. In this case I think the acquisition is threatening to a very important part of American life, and I believe that all these factors should be taken into account just as we are seeking at this point in American history to determine what are the great priorities to consider in allocating our funds and resources.

Senator MOSS. Thank you very much, Senator Allott and Senator Cranston.

Senator METCALF, you are a little out of place. I almost missed you over there. Do you have any questions at this point?

Senator METCALF. I have no questions.

Senator MOSS. Senator Jordan?

Senator JORDAN. Thank you, Mr. Chairman.

Senator Cranston, you have made a very strong statement here. All of us were dismayed and I might say shocked at the damage that was done by this blowout. To your knowledge, is there any evidence of prior oil seepages in this area in the Santa Barbara Channel before any leases were made and before any drilling was started?

Senator CRANSTON. Yes. There have been moderate seepages that the people there have learned how to live with at a place called Coal Oil Point, so called, because black oil seems to seep out under the sea there. There is another slow and not large-scale leak at Point Conception nearby, but there has been nothing comparable to what has occurred with this blowout.

Senator JORDAN. In your statement you said that oil was found at a depth of 250 feet initially in some of the drilling.

Senator CRANSTON. Yes. That is the circumstance in the place where the blowout occurred.

Senator JORDAN. And also that the wells were drilled to a great depth, much greater depth than is customarily necessary to recover oil.

Senator CRANSTON. No. What I was referring to was the fact that these leases would, if continued, permit drilling for oil in what are unprecedented depths of water, depths where there has never been successful erection of platforms in the history of the oil industry. I believe this to be the case.

Senator JORDAN. In your opinion this adds to the hazards of this particular operation?

Senator CRANSTON. I believe it does.

Senator JORDAN. You testified, too, that this area is in the earthquake zone, that it is likely that earthquakes will occur within the Santa Barbara Channel. Have you had any earthquakes there recently?

Senator CRANSTON. There were 66 earthquakes in a 6-week period in June last year, small ones, but those small ones are often an indicator that a large one is on its way.

Senator JORDAN. None of them have ever ruptured the strata that contained the oil?

Senator CRANSTON. Not to the degree that would permit a leak to occur.

Senator JORDAN. Now, is this oil under pressure? Was it under pressure? When this blowout occurred there must have been some gas there that made the oil surface, was there not?

Senator CRANSTON. Well, apparently tremendous pressures were released. I saw the oil with gas mixed with it bubbling up, making a great commotion above where the blowout occurred.

I suspect that has quite a bit to do with the difficulty in containing it. Also the proximity of the oil to the sea bottom, a matter of 250 feet, has a great deal to do with the uncontrollable nature of that leak.

Senator JORDAN. When Secretary Hickel authorized the resumption of drilling on five leases in the Santa Barbara Channel, he said, "Director William Pecora of the Geological Survey has told me that he has the best possible scientific assurances that these operations will be undertaken with minimum hazard to the channel environment."

Do you disagree with Dr. Pecora?

Senator CRANSTON. Well, I would agree that they have applied the tightest regulation that they have been able to conceive of, and are demanding the greatest protections available. I am not convinced that those protections are adequate to reduce this particular hazard to an acceptable minimum.

Senator JORDAN. All of these leases in the Santa Barbara Channel were made more than a year ago, were they not?

Senator CRANSTON. Yes; they were.

Senator JORDAN. And the Secretary who made those leases now wishes he hadn't made them; he has said that.

Senator CRANSTON. That is correct.

Senator JORDAN. That is all I have at this time, Mr. Chairman.

Senator MOSS. Thank you, Senator Jordan.

Senator Gravel?

Senator GRAVEL. The Interior Department is presently conducting a study on this matter. Is there an overlapping here of authority? You are directing here that the Interior Department perform a study. They already are performing it. Would this not be sufficient?

Senator CRANSTON. They are performing a study. I am not sure that it goes to everything that should be studied. It does not make an investigation of methods to phase out all production under the leases were those leases canceled. Actually I gather they are exploring this to some extent because they are faced with the fact that they may themselves come to the conclusion that cancellation of the Union Oil Co. lease is necessary quite regardless of this bill; and they may also face a court decision that requires cancellation of the lease involved in the lawsuit that I mentioned. Then there will be the question of how to refund whatever sums are owed to those companies.

Senator GRAVEL. The State of California has not closed down any drilling activity in its lease area adjacent to Santa Barbara, have they?

Senator CRANSTON. Yes; they have suspended all drilling, not production but drilling in all places in California, and are letting no further leases at this time.

Senator GRAVEL. Is this the entire coast of California?

Senator CRANSTON. Yes.

Senator GRAVEL. So actually what you are asking for is no different from what the State has already decided to do?

Senator CRANSTON. As far as suspension of drilling; yes, that is correct, in all places except Santa Barbara. My measure would end it permanently in Santa Barbara.

Senator GRAVEL. Let me understand. The State has stopped all drilling in coastal areas of the State of California?

Senator CRANSTON. Yes, but not necessarily on a permanent basis.

Senator GRAVEL. Has the State performed a study in this regard, or are they waiting on the Federal study?

Senator CRANSTON. The State Lands Commission, as I understand it, is making a study as to what changes in their regulation and procedures are required to reduce the hazard.

Senator GRAVEL. So Secretary Hickel, in permitting these companies to go back into a drilling program, is apt to be less strenuous than the State administration has been thus far?

Senator CRANSTON. In that respect I believe that is true.

Senator GRAVEL. Thank you very much.

Senator CRANSTON. Thank you.

Senator MOSS. Your bill, under subsection (1), or the termination, uses the word termination in the Santa Barbara Channel, and in paragraph 2 talks about suspension. That is the point you are making about suspension in all of the outer shelf area now pending the study, but termination in Santa Barbara?

Senator CRANSTON. Yes, Mr. Chairman; that is correct.

Senator MOSS. When this committee had some informal hearings into this problem earlier, Dr. Pecora testified that the Federal Government has issued in excess of a thousand leases on the outer Continental Shelf as a whole.

I think that is more than just California, but \$5 billion had come into the Treasury from the royalties on those leases. That would indicate the great magnitude of the industry that we are talking about and consequently would underline the very seriousness of taking the steps called for in your bill.

You are aware of that, of course?

Senator CRANSTON. Well, this bill would simply delay letting of leases in places other than Santa Barbara until there were adequate assurances regarding blowouts and accidents. It would end drilling in Santa Barbara Channel so the magnitudes that you are discussing are really not affected by this bill.

I believe that oil production of the magnitude that you refer to, however, is affected by the threat to the entire oil industry if they are successful in persuading all those concerned that they should be given a second chance in Santa Barbara Channel, and they proceed and a new blowout occurs—I think the risk is considerable. When and if that new blowout occurs, I think there will be such a reaction that there may be steps taken to clamp down on the oil industry in ways that are not needed, that are unwise, that would deprive us of needed domestic sources, deprive us in our civilian activities of oil that we need and deprive us of sources that we may need for national defense.

Senator MOSS. Thank you, Senator Cranston.

One more question.

Senator GRAVEL. The liability established by the Secretary of the Interior now is an unlimited liability, is it not?

Senator CRANSTON. Yes, and that is the basic reason for the lawsuit. The companies who have filed suit do not believe that it is justifiable for a retroactive reinterpretation of a prior existing regulation to impose upon them a total liability when they had no such thought or commitment when they signed their lease.

Senator GRAVEL. Was there anything in writing?

Senator CRANSTON. The original language read as follows. There may be other portions that should be quoted but in the original lease there was this language:

Lessee is required to exercise reasonable diligence in drilling and producing the wells herein provided for; to carry on all operations in accordance with approved methods and practices including those provided in the operations for the continental shelf; to remove all structures when required under the lease to sufficient depths under the waters to prevent them from being a hazard to navigation; carry out at expense of the lessee all authorized and reasonable orders of the lessor relative to the matters in that paragraph and upon failure of the lessee so to do the lessor shall have the right to enter on the property and to accomplish the purpose of such orders at the lessor's cost provided that the lessee shall not be held responsible for delays and/or casualties occasioned by causes beyond the lessee's control.

That is where their liability is limited.

On February 26, 1969, after this blowout, the Secretary promulgated a further regulation which included a paragraph which reads as follows:

If the waters of the sea are polluted by the drilling or production operation of the lessee and such pollution damages or threatens to damage aquatic life, wildlife, or public or private property, the control and removal of the pollutant and the reparation of any damage to whomsoever occurring proximately resulting therefrom shall be at the expense of the lessee, and on failure of the lessee to control and remove the pollutant the supervisor, in cooperation with other appropriate agencies of the Federal and State or local government, or in cooperation with the lessee or both, shall have the right to accomplish the control and removal of the pollutant at the cost of the lessee, but such actions are not to relieve the lessee of the responsibility for damage as provided herein.

Senator GRAVEL. To your knowledge, has that operated in any way to deter drilling activity in any of the coastal areas?

Senator CRANSTON. This regulation has caused this group of companies who have filed a suit to pull their rigs out, to stop all drilling, to cease trying to persuade the Secretary of the Interior to grant them permission to proceed with their drilling under their lease. They want no more of that lease.

Senator GRAVEL. Thank you.

Senator MOSS. Senator Fannin, do you have any questions?

Senator FANNIN. Yes, Mr. Chairman.

Senator CRANSTON, I am just wondering about the Santa Barbara area. Over the years has there been a problem so far as seepages and contamination are concerned?

Senator CRANSTON. There has been nothing like what occurred with this blowout on January 28 of this year. There have been minor seepages from a place called Coal Oil Point and Point Concepcion of minor amounts of oil over many, many years but nothing that has polluted the water and destroyed bird life and desecrated the beaches and messed up boats in the way that this has.

Senator FANNIN. Has that been as serious as it has been, say, in the Santa Monica area? I recall over the years that when you go to the beach there you have the problem of oil seepage.

Senator CRANSTON. No. It has not been comparable to that, and in the Santa Monica area and in Manhattan Beach and El Segundo probably most of the oil comes from oil tankers that illegally flush oil residue out into the sea.

Senator FANNIN. A certain amount is attributable to the seeps that they talk about, or at least that is the way I have had it reported to me.

Senator CRANSTON. Some of it may have been attributed to that. We made a study when I was on the State Land Commission in charge of State land oil in California that indicated that most of that oil was refined and came from tankers rather than from seepage.

Senator FANNIN. In your legislation you say in section 2 under part 2, "Make an investigative study of methods of phasing out oil production under said Federal leases in the Santa Barbara Channel."

Now, of course, they have stopped the drilling but not the production, as I understand it. Is that right?

Senator CRANSTON. Drilling has been authorized to commence again under five leases. It is still in suspension under 60 leases. Production is still allowed under wells that were completed.

Senator FANNIN. Still continuing?

Senator CRANSTON. Yes.

Senator FANNIN. So then if they carry through with your request would there be reparation to the companies that have established wells and are now under production?

Senator CRANSTON. Yes; those in production would not be stopped. You could continue to produce under the provisions of this bill if you had a producing well completed at the time this law went into effect, if it did. Drilling to start or complete new wells would be halted and, of course, there would be fair compensation made to holders of leases. That is what is called for under the study in the final passages of the bill.

Senator FANNIN. I am just wondering if this bill is clear. When it says phasing out that would mean discontinuing; would it not?

Senator CRANSTON. Yes. Yes, the actual reference is meant to be to drilling and there, of course, would have to be compensation for whatever value was taken away from holders of leases.

Senator FANNIN. I know that you have put a lot of thought to this. We have heard many reports about the projection that we now have as far as percentage of production that is expected in underseas locations. In fact, some said that they may exceed our total potential on the face of the land and in consideration of that tremendous potential do you feel that it is wise to make a decision of this magnitude without much greater investigation than what has been possible to date?

Senator CRANSTON. Well, the measure does not call for ending on any permanent basis drilling and production in the Outer Continental Shelf generally. The ban on a permanent basis would apply only to the Santa Barbara Channel, so we are not talking about all the oil that the United States possesses.

Senator FANNIN. The Federal leases in the Santa Barbara Channel could be considerable. In fact, the field was estimated to be of great magnitude, is that right?

Senator CRANSTON. Yes, it is of considerable magnitude.

Senator FANNIN. You are still advocating that this be phased out without consideration of what may be brought forth in the way of new processes and new procedures that may be forthcoming?

Senator CRANSTON. If in time the state of development where spills can be totally controlled when they occur, and their likelihood greatly diminished, and also when we reach the point where underwater production is possible in considerable depth, so that there is no visible interference with the environment at that time I believe that this law could be repealed.

I would like to refer to one other point that keeps coming up from the oil companies and from others. The point is repeatedly made that we should hold some reserves available for crises of an international nature in case our oil supplies are cut off from the Near East or elsewhere. That is one purpose that a banning of drilling in the Santa Barbara Channel could serve. We would have a reserve there for times of emergency. Also it would be waiting for technology along the lines I just mentioned.

Senator FANNIN. In that case, would the timing be feasible that they could go back into production?

Senator CRANSTON. I would think the time would come for production without disturbing the environment, but I don't think the technology is that advanced at the present time.

Senator FANNIN. Is it really a question of economics? When you talk about the state of the art, it is doing what is required to give that protection that is really at issue, is it not?

Senator CRANSTON. Yes. I do not believe that the state of the art has not advanced to the point where, in the peculiar geological circumstances of the Santa Barbara Channel, that production drilling is presently possible without grave risk of further blowouts.

Also, I urge you to look carefully at the pictures that will be presented in the course of this testimony of the methods used to clean up the mess when it occurs, and to deal with and seek to contain a blowout when it happens. These methods are highly primitive and by no means comparable to the great skills that the oil companies have exhibited in every other aspect of their work.

Senator FANNIN. I certainly agree from the standpoint of protection of the area, but at the same time I am just wondering if we are not starting too early in making a decision in this regard pending the investigative nature referred to in your testimony.

Senator CRANSTON. I am afraid we are starting too late. This occurred due to great haste on the part of the Department of the Interior under the last administration because it wanted some money quickly to help balance the budget. Testimony by Secretary Udall indicated great regret that the decision was made to let these leases without considering possible results.

Senator FANNIN. But studies were not underway at that time to the extent that they are today; is that not true?

Senator CRANSTON. That is correct, but I think it requires far more study than it will be possible to give in a handful of months or even in a year or two. I think we have a longer period of time required to advance the technology to the place where it should be.

Senator FANNIN. Has testimony to that effect been placed in the record, or will there be testimony that would verify that?

Senator CRANSTON. There was such testimony before the Public Works Committee, with which I sat in Santa Barbara and here on the pollution aspects of all this, and I believe that there will be such testimony from experts today or tomorrow.

Senator FANNIN. Thank you, sir.

Senator CRANSTON. Thank you.

Senator MOSS. Senator Hansen.

Senator HANSEN. Thank you, Mr. Chairman.

I don't know anything about the oil business and I certainly do not presume to understand the complicated geology and the unique problems that have been encountered by the oil people in this area, but may I pose a hypothetical question to my distinguished colleague from California.

If the head of the USGS, Dr. Pecora, and his staff were to recommend the resumption of drilling or other certain procedures as the best way of stopping this final small leakage, would it be your feeling that their recommendations should not be implemented until all of the provisions of your bill have been complied with, Senator?

Senator CRANSTON. If no other approach to sealing the leak and stopping the flow of oil from it works, and if the experts in the Department come to the conclusion that further drilling and production from that particular place is the only way to end that leak and the spill from it, and if there is adequate concurrence in that view by other experts, then I would support that approach.

Senator HANSEN. How, under your bill, would that determination be made? Would that be left up to the Secretary of the Interior to say that an adequate study was made, that he would be willing to accept the recommendations of the experts with the USGS? How would we determine that there should be a resumption of drilling activity as a means of stopping the leakage?

Senator CRANSTON. Well, I have been hopefully assuming that by the time this bill is enacted, which I don't expect to happen overnight, that the leak will be halted. However I think you have touched upon a very relevant point that had not occurred to me. Perhaps there should be an amendment to the law that would provide that, notwithstanding all of the provisions of this bill, the Secretary of the Interior is empowered to take any steps required, including drilling and production in the vicinity of that blowout to stop the spill.

Senator HANSEN. I did have one further question, Mr. Chairman, but I think it has already been clarified. I, too, was concerned with subsection 2 under section 2 wherein your bill states, "Make an investigation and study of methods of phasing out oil production under said Federal leases in the Santa Barbara channel."

That implied, to me at least, that while you don't necessarily say that all oil production activity would be stopped, apparently you do feel that there must be serious consideration given to phasing out those activities.

Then I think you have clarified it some by saying you meant drilling and not oil production.

Senator CRANSTON. Yes. Perhaps tighter language is necessary there to make that point clear because that is what I intended.

Senator HANSEN. Have you any idea as to the amount of damages that might be contemplated under the provision of your bill, insofar as claims by oil companies operating under Federal leases now?

Senator CRANSTON. No, I do not. There have been vast expenditures by Union Oil Co. and by the Federal Government in cleaning up the mess, and to stop the leak. Suits may be filed that run into astronomical figures, but I don't think they are a true measure of the damage that has actually occurred. It is very difficult to measure it because you are dealing with intangibles like beauty and sand that is free of oil or rocks that are free of oil, and the lives of birds and other marine life. You simply can not put a price tag upon that.

Senator HANSEN. I do agree with you there. I am afraid I didn't make my point clear. I was wondering if you would have a figure that would reflect your estimate of what the oil companies might claim had been the damages they would sustain if the Government were to cancel all leases and bring about a cessation of all leasing activity out there.

Senator CRANSTON. I now understand your question. It is impossible to come up with anything like a precise figure, but you start with \$602 million paid for these leases. I think you have to consider expenditures not prior to the leases being granted but expenditures by the oil companies after they won leases in developing oil production under those leases.

I think you have to consider interest that has run on money during the suspension of activities. I think perhaps you have to consider the possessory interest that they have developed in oil found or that they have lost in oil not found. and I think that an appraisal could be made that would give you some kind of a figure that would be relevant there. This would get you I think probably up somewhere close to a billion dollars that we are talking about.

Senator HANSEN. Do you know what the daily oil production was in this area both on the Continental Shelf lands which are claimed by the State of California, and those lands beyond the 3-mile limit?

Senator CRANSTON. I don't have those figures.

Senator HANSEN. I have no further questions, Mr. Chairman.

Senator MOSS. Senator Allott has an additional question.

Senator ALLOTT. This is not a question, Mr. Chairman, but I note that under title 43 of the U.S. Code, under section 1334, there is a subparagraph (b)(1), and (b)(2), entitled "cancellation of lease, judicial review", and I think that both of these paragraphs should be placed in the record in full because they refer specifically to both producing and nonproducing leases and both refer to the leases or the regulation issued under this subchapter and in force and in effect on the date of the issuance of the lease.

I believe that since in one instance it provides for judicial review and in another one for a hearing, and they apply particularly to this situation, both sections should be in the record.

Senator MOSS. Without objection they will be made part of the record at this point.

(The data referred to follows:)

TITLE 43.—PUBLIC LANDS

§ 1335 (b) Cancellation of lease; judicial review.

(1) Whenever the owner of a nonproducing lease fails to comply with any of the provisions of this subchapter, or of the lease, or of the regulations issued under this subchapter and in force and effect on the date of the issuance of the lease if the lease is issued under the provisions of section 1337 of this title, or of the regulations issued under the provisions of section 1335 (b) (2) of this title, if the lease

is maintained under the provisions of section 1335 of this title, such lease may be canceled by the Secretary, subject to the right of judicial review as provided in section 1337 (j) of this title, if such default continues for the period of thirty days after mailing of notice by registered letter to the lease owner at his record post office address.

(2) Whenever the owner of any producing lease fails to comply with any of the provisions of this subchapter, or of the lease, or of the regulations issued under this subchapter and in force and effect on the date of the issuance of the lease if the lease is issued under the provisions of section 1337 of this title, or of the regulations issued under the provisions of section 1335 (b) (2) of this title, hereof, if the lease is maintained under the provisions of section 1335 of this title, such lease may be forfeited and canceled by an appropriate proceeding in any United States district court having jurisdiction under the provisions of section 1333 (b) of this title.

Senator Moss. Thank you very much, Senator Cranston. We appreciate your fine testimony and explanation of the bill that you have introduced, and it, of course, raises a great many questions. I think you have developed and explained it very well.

I again invite you to sit there with us as we hear the other witnesses. We will have your expertise in questioning if points are overlooked or not explained fully as we go along.

Senator CRANSTON. Thank you very much, Mr. Chairman. I want to thank you and each of the members of the committee for your attention and the careful thought you are giving to this matter.

If I may, Mr. Chairman, Congressman Teague was supposed to be the next witness. He has agreed that he would be happy to wait until Charles O'Brien, who is the deputy attorney general of California, has testified. Mr. O'Brien would appreciate the opportunity to testify next because he has to return to California tonight and if the hearing went on he would be unable to stay until tomorrow.

Senator Moss. We will be glad to accommodate Mr. O'Brien, recognizing that California is a great distance from here, and if he must return this evening he will indeed have to give his testimony at an early time. So we will call next Deputy Attorney General Charles O'Brien from California, and ask him if he would come forward now

STATEMENT OF CHARLES A. O'BRIEN, ESQ., CHIEF DEPUTY ATTORNEY GENERAL, STATE OF CALIFORNIA

Mr. O'BRIEN. Thank you, Mr. Chairman and members of the committee, I am Charles A. O'Brien, representing the attorney general of the State of California. The State of California has suffered the worst oil pollution disaster in the continental United States. As public officials of that State, we deem it to be a duty, not only to California citizens, but to the citizens of all States to testify before you concerning Senator Cranston's bill.

Senate bill 1219 will (1) cause an immediate termination of drilling in the Santa Barbara Channel; (2) suspend drilling in other areas off the shore of the State of California until after the Secretary of the Interior investigates and reports concerning means of drilling which will remove any threat to ecology and any threatened pollution.

Our interest in this bill is very direct. But we look beyond California, to other areas which may have their own unique beauty and values which must be shielded from manmade disasters. These areas will profit, as will California, as will the oil companies, from the studies which are required of the Secretary by this legislation.

From the outset, the position in our office should be very clear. I have spoken in terms of manmade disaster, not in terms of oil drilling.

We believe that—given adequate technology in the areas of drilling and cleanup—offshore drilling is a reasonable and proper operation. We further believe that certain areas must be viewed not as oil reservoirs, but as reservoirs of nature's bounty of beauty and life. And, save for the most extreme of man's emergencies, such places should be left unscarred. The Santa Barbara Channel is such a spot.

For these reasons, we support Senate bill 1219. The studies authorized by it before further offshore drilling is resumed will allow the Secretary to inventory current industry techniques. With this knowledge, the Secretary may better regulate activities on the Outer Continental Shelf. This will abound not only to the benefit of the State of California, but to wherever the Secretary may act in supervision of drilling operations.

Removing the Santa Barbara Channel from exploration and development by the industry will preserve for eternity a very, very small piece of the natural splendor of the United States.

Fruitful exploration of the wealth that lies beyond our shores depends upon utilization of the most advanced modern technology. The extreme hazards encountered in drilling for oil through the ocean floor calls for supervision adequate to assure that this technology is utilized. Waste caused by an oil spill as we have experienced is not only a loss of the natural beauty, the natural ecology, the man-hours required to clean up, it is a loss of the very valuable resource which was sought in the first place. Not only have we damaged the land, sea, fish, and fowl, which of course must be valued far beyond the oil itself, but we have lost large quantities of an irreplaceable natural resource. If this loss has been occasioned by our current lack of technology, is it not better, both for our ecology and development of our oil reserves, to hold from development these areas?

Is our technology adequate? The answer is not simple. Our experience on State oil leases would tend to prove that it might well be. Offshore drilling has been conducted on closely supervised State leases for many years without serious pollution. Our faith in our technology has been shaken severely, however, by the Santa Barbara catastrophe. If the January 28, 1969, spill was not caused by manmade error or by the failure to utilize the most modern and prudent of methods, then our ability to develop this resource is so sadly lacking as to demand a halt to all offshore drilling.

At least one group of oil companies operating offshore apparently believes that the technology is simply not up to the problem. On April 19, 1969, Pauley Petroleum, Inc., and five colessees, filed a petition in the U.S. Court of Claims to recover the bonuses paid by them for a lease in the channel. In addition, they ask development and exploration costs and loss of profits. The total damage is alleged to be in excess of \$230 million.

Pauley contends that:

(1) The United States knew or should have known that the Santa Barbara Channel area was characterized by deeper water, greater tectonic activity, a great density of subsurface faults and fault zones, and more frequent and more intense earthquake and other seismic activity than most, if not all, other areas in which offshore exploration for and production of oil and gas had theretofore been attempted and that each of these conditions increased the likelihood of well blowouts, pipeline breakage, and other causes of inadvertent spillage or seepage of oil * * * . (Pauley petition, par. 13.)

Pauley further charges that the United States knew or should have known that:

It was generally understood in the petroleum industry that the possibility of well blowouts is, roughly, inversely proportional to the available knowledge with respect to subsurface geologic conditions and that the geologic knowledge of the subsurface Outer Continental Shelf areas under the waters of the Santa Barbara Channel was even more sketchy and uncertain than the geologic knowledge available with respect to onshore oil-producing areas and most other submarine offshore oil-producing areas in the United States. (Pauley petition, par. 14.)

Perhaps the summary of these comments is contained in paragraph 50 of the Pauley petition: Pauley says that the parcels "are in deep water and in a known area of faulting which is subjected, from time to time, to earthquakes and tidal waves. Drilling in the leased areas required operations which reach to the presently known limits of the relevant technology. Moreover, the leased areas are in a channel heavily traveled by ships and are only a short distance from a heavily populated portion of the coast of California in and about Santa Barbara."

We cannot put it more clearly than that. We cannot assert that the oil industry technology is adequate to cope with the Santa Barbara Channel. We cannot tolerate another spill.

The studies required by Senate bill 1219 answer our problem, the oil industry's problem, and the Federal Government's problems. If there is adequate technology to drill offshore, that technology can be demonstrated to the Secretary. Until adequate technology is demonstrated, further drilling should be suspended.

Drilling must be supervised. The Secretary cannot adequately supervise unless he is aware of the full resources of the oil industry. The study required by Senate bill 1219 will cause the oil industry itself to indicate how safe their drilling can be. It will relieve the Secretary of attempting to regulate in guesses as to what the limits of current technology are.

If there is adequate technology to drill, there still appears to be no adequate knowledge concerning means of containing or controlling the oil loss should there be an accident. Again, the case in point must be platform A. One hundred and twelve days after the blowout, oil continues to escape from the ocean floor at the rate of at least 1,000 gallons per day. When will it stop? I know of no answer. Virtually every control method known has been attempted. There have been booms, and divers, and funnels, and two-man submarines, and dispersants and powdered cement diatomaceous earth, and perhaps other substances cast into, upon, or below the waters to stop the leak. It continues.

To date, there seems to be only one means of effectively and safely handling an oil spill. Take one man, one rake, one 10-foot punt, and one bale of hay. Are they to be the frontline of defense in an industry which has the technical sophistication required to find oil and drill into earth for 15,000 feet to get it?

We long since have lost track of the numbers of calls which we receive from numerous individuals and companies offering suggestions to clean up the oil. I cannot say which of these suggestions may have merit and which do not. That in itself may not be so alarming. But the fact is that apparently no one can say what an appropriate method

is. That is shocking. Experience has shown that man's heavyhanded cleanup can do more harm than the spill itself. The simple truth is that there has been little or no extensive research in this area. We develop the ability to create a problem, but haven't discovered the solution to our manmade mischief.

In February 1968, the very month in which the Santa Barbara Channel leases were awarded, the Secretaries of the Interior and of Transportation forwarded to the President "A Report on Pollution of the Nation's Waters by Oil and Other Hazardous Substances." That report states:

Present containment methods for use on the high seas and in rough water areas are inadequate and should be improved through development, test, and evaluation efforts. * * *

Mechanisms for controlling spills at the source are also inadequate. * * *

Pollutant recovery equipment and techniques are only partially developed. Oil skimming devices have been developed for use on inland waters and in spots and harbors; however, they are not universally available. Chemical solidification of spilled oil is an intriguing but underdeveloped technique. Techniques for burning spilled oil on the water are not well developed. Attempts to burn oil have met with limited success, particularly in the case of the more objectional heavy-oil fractions. Dispersant materials are commercially available, but their effectiveness in coping with major spills at sea is questionable. Further refinement of absorbent materials could improve the capability to cope with spills of all sizes.

Environmental protection techniques are generally not adequately developed and should be strengthened in all areas.

Techniques and equipment for the restoration of damaged resources are not fully developed and additional techniques and equipment are needed in all phases of this activity.

One year later, in Santa Barbara we are proving that report correct. As the Secretary stated, we had no booms which could contain the oil, no dispersants which dispersed (regardless of side effects), and we turned to men and straw. While we may have the ability to drill safely, we must, in the event of the inevitable mishap or mistake have the methods and materials to cope with such an event. The *Torrey Canyon*, the *American Eagle*, and now platform A have shown our incompetence in this area.

We believe that the studies required by Senator Cranston's bill will provide the means of meeting this problem. I should discuss one further matter—the question of what the State of California is doing to assure that there are no spills from State-leased operations. I am advised by the division of State lands that pending a full and complete review of both drilling standards and emergency measures, there is no new drilling on State-leased offshore drilling platforms. The State has gone further. It has canceled the taking of lease bids for offshore parcels. It has canceled all permits to drill new wells. It has refused permission to carry on any exploratory activity offshore pending the full and complete review I have mentioned. The State is exploring every means of assuring that future drilling operations will proceed with maximum safety. The California State Legislature is reviewing and acting on numerous bills in this area. Assembly bill 413 will require the licensing by the State water resources control board of any chemical or substance used for the cleaning up of oil in the waters of the State, and will provide that such chemicals may only be used under the supervision of the State department of fish and game.

Assembly bill 712 would require that the oil industry develop a plan subject to the approval of the California Disaster Office to combat substantial oil spills, and will require prompt reporting of such a spill to the California Disaster Office.

Assembly bill 1636 creates a tidelands oil pollution fund of up to \$5 million from oil revenues derived by the State to aid in expenses of removal of oil spills. Each of these bills will aid the State's ability to cope with a catastrophe similar to that which occurred off Santa Barbara.

I must emphasize, however, that our ability to control and to provide for the contingencies in the event of a disaster is limited to the State's portion of submerged lands. We must depend upon the Secretary of the Interior to regulate beyond the invisible 3-mile line in the sea. The safety of our ocean, our beaches, our fish, birds, and wildlife depends upon the Secretary's regulation. We must insure that the Secretary has the best information with which to regulate.

The spill from platform A and the benefit of hindsight—as set forth in the Pauley allegations and of her recent reports—indicate that it was a mistake to allow drilling in the Santa Barbara Channel. The Cranston bill would admit that mistake and provide for its correction.

Finally, I support this bill because it marks an important change of direction in Government's attitude. It would reject the dangerous American tendency to simply treat our natural resources as a national pawnshop—always handy to pay our bills.

I simply say that there are some places in this country that man cannot improve, that man should not exploit, that man cannot be allowed to despoil. The Santa Barbara Channel is such a place.

In conclusion, I would cite to this committee that there has been much discussion during Senator Cranston's testimony of what it would cost the Federal Government to abrogate these leases. We would only point out if we had another such spill and a suit were filed of the magnitude of the ones which have been filed in California, at this time what is coming into the Federal Treasury now should the victims prevail, and we think they would, then the Federal Government might suffer a net loss in this area. And with that, Senator, I will terminate my testimony.

Senator Moss. Thank you very much, Mr. O'Brien. I assume you are speaking for the administration.

Mr. O'BRIEN. For the people of the State of California, the Attorney General. Our office has filed a lawsuit against the oil company and our office has filed a claim against the Department of the Interior under the Federal Tort Claims Act, sir. The State at the present time, as Senator Cranston indicates, has halted all drilling, all exploratory work offshore along our entire coastline. Our legislature itself is moving and has introduced and is now in process of considering much stronger safeguards for our own protection, and we are at a point, sir, where we simply feel very strongly that the Secretary of the Interior should not have to advance by educated guess, that there should be a period for study, for consultation with the oil companies, as to what is feasible in the area and for the Secretary of the Interior to insist upon development of much better pollution control techniques.

Senator Moss. And your support would be for the bill which would terminate drilling in the Santa Barbara Channel but suspend it in the other areas until the state of the art had improved to a degree where you feel that it is secure to drill and to be able to control any spill that might arise?

Mr. O'BRIEN. Yes, sir.

Senator Moss. Thank you.

Senator Allott.

Senator ALLOTT. Did you say that the State of California has stopped all production in the Santa Barbara Channel?

Mr. O'BRIEN. Not all production, sir; all drilling.

Senator ALLOTT. All drilling?

Mr. O'BRIEN. Yes, sir.

Senator ALLOTT. It has been stated here that the Santa Barbara Channel is a unique geological place. Do you think this justifies, then, the cancellation and termination of all leases on the Outer Continental Shelf, simply because it lies off of the State of California? What about Texas, Louisiana, Mississippi, Florida, and the other States, and what about Alaska? What about the other States of the Union?

Mr. O'BRIEN. No, sir, I am saying that there are some areas that I think are of such great value and worth in esthetic and recreational purposes that they should be set aside and held in extremis, as Senator Cranston emphasized, to meet only a national emergency.

Secondly, we feel that there should be a pause in order to allow the Secretary to confer with industry to develop these techniques.

We simply feel, sir, that the oil company that is capable of going down 15,000 feet into the ground to bring oil forth can devise better pollution control than one man with a rake in a 10-foot punt using a bale of hay to contain spillage. I think the industry can and should do better.

Senator ALLOTT. Let me suggest that I think you miss the whole point of this thing.

I would grant that this method of cleaning up a spill, once it happened, would be as inadequate here as it was in the case of the *Torrey Canyon*, but do you know of any other such spill as this, or breakout in the many, many hundreds of offshore wells that have been drilled?

Mr. O'BRIEN. No sir, but following the *Torrey Canyon*, we had another shipwreck off the coast of Puerto Rico. Those are two such instances. We have had one break in the Santa Barbara Channel. All our geological information is that another such break is not only possible but may be very probable.

We are dealing with a geological area in which faults come at the strangest angles, in which the encrustation sedimentary cap is extremely weak, and the fact that it might not occur in one area is no assurance whatsoever that it could not approach in others, and my point, Senator, is that we need much better knowledge of the geological foundations off the coast, and we need a period for the Secretary to get that information and work with the oil companies in terms of delimiting these areas.

Senator ALLOTT. Don't you believe that this geologic information was available at the time these leases were granted?

Mr. O'BRIEN. To the oil companies, sir, but not to the Secretary of the Interior.

Senator ALLOTT. On what basis do you make that statement?

Mr. O'BRIEN. Because I think it is generally conceded by all parties concerned, sir, that in the interests of competition, the oil companies were not forced to disclose their own geologic information and research to the Secretary for fear that this information would get to their competitors.

We are simply saying that as much as we are for competition and the free enterprise economy, we certainly recognize that there is a value, too, in terms of reducing the risk in these severely disturbed geologic areas, and we think that information should be made available to the Secretary.

Senator ALLOTT. California is a long State. How long is it?

Senator CRANSTON. 1,200 miles.

Mr. O'BRIEN. 1,250, I think.

Senator ALLOTT. 1,200 miles, or something like this, with all sorts of geologic structures in it, and offshore. Is it not just as rational to say, on the basis of your statement, that the United States should stop production of all offshore continental leases, no matter where they may be?

Mr. O'BRIEN. No, sir. I think that is pushing.

Senator ALLOTT. Laying aside your own State pride, which I think is fine, don't you think this is true?

Mr. O'BRIEN. No, sir. I think there are some areas of America's coastline that are more prone to earthquakes, have more fault zones, are much more likely to have this kind of problem than others. There are other areas which the geologists tell us have fairly firm strata, that the risk there is much less.

We are simply saying that the Secretary and the oil companies should work together to mark off these areas, and put those in a much lower priority area for development.

Senator ALLOTT. I don't remember my geology too well, but I was always under the impression that you found oil not in places where there had been no stress, but rather where there had been faulting and as a result you had developed synclines and anticlines and this sort of thing. So you have a condition of stress, don't you, wherever you find oil?

Mr. O'BRIEN. Yes, sir; that is true. But my understanding of the state of the science of geology today is that prognosis in terms of danger areas is much more definite, that the geologists are able to cite specific areas which are high-risk areas, and in fact, when Pauley and the other oil companies filed suit, in their brief they argued that this had been established as a high-risk area.

Senator ALLOTT. We will be able to hear from these gentlemen later. Thank you very much.

Senator MOSS. Senator Jordan.

Senator JORDAN. Mr. Attorney General, I just have one or two questions, and maybe they are not relevant here.

Did I understand you to say that the State of California has stopped all drilling along the entire California coast?

Mr. O'BRIEN. Yes, sir.

Senator JORDAN. I am curious to know if that incurs any liability on the part of the State of California.

Mr. O'BRIEN. Well, there has been no question that the oil companies have accepted the fact that there needs to be a period for con-

solidation of intelligence and a very close scrutiny and analysis of the kind of formation that we are drilling into.

Senator JORDAN. They are quite willing that their drilling should be stopped indefinitely?

Mr. O'BRIEN. It is not indefinitely, sir. I again point out, Senator, that the probability of recovery in this lawsuit, and the possibility of the sums involved, are such as to make everyone have second thoughts about going ahead before we have an opportunity to put our heads together and figure out what the risks are.

Senator JORDAN. How long do you calculate that that is going to be?

Mr. O'BRIEN. I honestly cannot reply, sir. I don't know. We think the geological information is such that we should know within a relatively reasonable period of time, and it would be a time short enough to satisfy both the State, which depends upon these revenues, and the oil companies, which want to go ahead and explore. They believe that they could put it off for a short enough time to bring the information forward that would be beneficial to avoid high-risk development.

Senator JORDAN. Are you receiving the full cooperation of the oil companies in this matter?

Mr. O'BRIEN. Yes, sir.

Senator JORDAN. Thank you.

Senator MOSS. Senator Fannin.

Senator FANNIN. Thank you, Mr. Chairman.

Mr. Attorney General, do you represent also the Governor's office? You said "the people of California." Are you speaking for the Governor of the State of California?

Mr. O'BRIEN. No, sir. I am speaking for the attorney general. We are the people who filed the lawsuit against the oil companies and the Federal Government.

Senator FANNIN. Has the Governor been consulted in what you are discussing here today? Does he also favor the Federal legislation?

Mr. O'BRIEN. Well, actually, as Senator Cranston stated, sir, the State land commission, which is composed of our Lieutenant Governor, our State comptroller, two elected officials, and the director of finance, who is appointed by the Governor, are the determining body for State policy in this area. We represent them. They made this policy. I can only say, Senator, when the Governor disagrees with a position we have taken, I usually hear from him very quickly, and I have not heard from him.

Senator FANNIN. You have not heard from the Governor in this instance?

Mr. O'BRIEN. No, sir.

Senator FANNIN. So you assume that the Governor is in agreement with your position?

Mr. O'BRIEN. I think everyone in the State agrees at this time that a reasonable period for more research, more information gathering, and a pooling of brains in this area is badly needed.

Senator FANNIN. I certainly think that is true, but I was just wondering whether or not the State of California, the Governor's office, would favor Federal legislation or if they would like to have the opportunity to place State legislation into operation.

Mr. O'BRIEN. We are aware, sir, that in this area the Federal leases, what is done on the Outer Continental Shelf, what happens

in the Secretary of the Interior's shop, and the fate of this bill as deliberated upon by the U.S. Congress, are going to have enormous impact upon all of us in the State of California, the Governor and the legislature and all of us.

(See also State Resource Board letters on pp. 173 and 186.)

Senator FANNIN. But there has been a question of the rights of the State in this particular area as opposed to the Federal Government's rights. Is that true?

Mr. O'BRIEN. Yes, sir. We have contended that unfortunately we did not think big, and when General Fremont drew our State boundaries we only went out 3 miles, but we have been as vigorous in the protection of those 3 miles as any State.

Senator FANNIN. And a contention of beyond that?

Mr. O'BRIEN. No, California has historically been forced to go by General Fremont's pencil line drawing at the time of our independence from Mexico, sir. We did not think big enough in those days.

Senator FANNIN. But I know there have been contentions perhaps it has been by drillers or by people who have had leases, that the State of California should take precedence over the Federal Government in these instances.

Mr. O'BRIEN. As far as I know, sir, the only contention that has been advanced by the State beyond the 3-mile limit is that we have requested from the Secretary permission to go out farther in terms of pollution control. We have asked for his cooperation to go out and inspect the Federal rigs, so that we could be certain that our beaches would not be polluted by Federal action, but we have not contended that legally we are entitled to anything beyond the 3-mile limit.

Senator FANNIN. Thank you very much.

Mr. O'BRIEN. Thank you.

Senator MOSS. Senator Hansen.

Senator HANSEN. I have no questions.

Senator MOSS. Senator Cranston.

Senator CRANSTON. I would like to make a point relating to the very important matter that Senator Allott brought up.

We did have testimony from the Geological Survey in the course of the Public Works hearing that they were not given access to any geological information in the hands of the oil companies prior to the letting of the bids in Santa Barbara Channel.

This is the traditional way that the Federal Government approaches this problem. The Geological Survey has no budget of its own to make any thoroughgoing evaluations of the depths of the geological formations or the presence of oil in areas where leases are considered.

The Department of the Interior is now considering some new draft regulations which would require all oil companies to give them access to that information, but only after the granting of the leases.

They are considering, I gather, another version that would require that the oil companies give them that information prior to the granting of leases, but there has been no decision to seek to implement such regulations.

I believe that the State of California does get that information prior to the granting of leases to oil companies, for two reasons: One, so that they can evaluate the geological situation and determine whether it is wise to proceed or not to proceed, and the second reason is so that they can evaluate the bids.

If the Government knows as much as the bidders do, the Government can evaluate bids and decide whether they are too low, or acceptable, and determine whether it will be protecting the financial interests of the Government entity involved by accepting or not accepting a bid.

I believe that this is quite important relating to the income of the Government, quite apart from the question of the safety of proceeding with drilling in any particular place. I urge strongly that the Federal Government revise its procedures here.

The reason for the reluctance of the oil companies to give out that information is quite understandable. That information is of great value to the company that has developed it in determining its bid, and it is like a poker game. They don't want the other side to know what they have in their hand.

There are astounding intrigues between oil companies to learn what the other oil company knows.

The Federal Government is apparently reluctant to have that information, out of fear that people somewhere down the line might leak it, and the Government would be in trouble.

The State government decided to take those risks because of the values that accrued to the State if it took those risks.

Senator Moss. Thank you, Senator Cranston.

I think that would complete all the questions we have, Mr. O'Brien, and we do appreciate very much your coming here to develop the record for us for our consideration.

Mr. O'BRIEN. Thank you, sir.

Senator Moss. I will now call on the Honorable Charles Teague, Member of Congress from California. We are very glad to have you, Mr. Teague, and we appreciate your waiting until Mr. O'Brien completed his testimony.

STATEMENT OF HON. CHARLES M. TEAGUE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. TEAGUE. Thank you, Mr. Chairman.

I am Congressman Charles Teague of California. My congressional district includes Santa Barbara and Ventura Counties, and a portion of Los Angeles County, including Malibu Beach, so I have about roughly 150 miles of the Pacific Ocean.

Some 10 days before Senator Cranston introduced S. 1219, I introduced in the House H.R. 7074. The bills are somewhat similar.

My bill goes farther in one respect, in that it would provide for the cessation of drilling and production in the Santa Barbara Channel, but it does not go as far as the Senators, because it confines itself solely to the Santa Barbara Channel.

I have a comparatively brief statement. It is only three pages, double spaced, and I would appreciate the opportunity to read it into the record, Mr. Chairman.

Senator Moss. You may proceed, sir.

Mr. TEAGUE. Thank you very much for allowing me this opportunity to testify on a matter which is of grave concern to the constituents in my congressional district, and especially Santa Barbara County, Calif.

I think that Senator Cranston's bill S. 1219, is an excellent first step in focusing congressional attention on the real issue surrounding the oil problem in the Santa Barbara Channel.

As you will recall, earlier this year we had an extensive oil blowout from a Union Oil Co. platform approximately 5 miles off the coast of California in the lands recently leased by the Federal Government. The oil slick resulting from this blowout continues to plague the coastal cities in my congressional district, and as far down as the Malibu area in Los Angeles County.

Appropriately, the Union Oil Co., acting in a responsible manner, took the initiative in trying to reduce the flow of oil from the ruptured well, which effort was not entirely successful.

At the same time, it did what it could in restoring public and personal property along the oil soaked beaches and in harbors penetrated by this crude petroleum. Other witnesses probably will testify as to the success of those cleanup operations.

After the blowout, Secretary Hickel temporarily suspended drilling and production operations. However, some have now been permitted to resume.

In addition to the action taken by the Union Oil Co. and by the Department of the Interior, the House has passed what I feel is stringent oil pollution control legislation which will legally establish regulations and liability which Secretary Hickel has administratively instituted.

Probably under normal circumstances the reaction from Federal agencies and the industry involved would be adequate. However, Senator Cranston, Senator Murphy, and I have attempted to point out in public statements and even in testimony here in Congress the situation in Santa Barbara is unique, and not typical.

The economy of the city and county of Santa Barbara is not oil oriented and does not desire to become so oriented. This is not to say that people in the Santa Barbara County are reactionary or against progress. They welcome with open arms new industry, business, and institutions such as G. E. Tempo, General Research Corp., and UCSB. Santa Barbara is oriented to the future.

However, one of the main attractions for the city and county is its outward appearance, being old world Spanish or Mediterranean in character. This characteristic of Santa Barbara County is what must be preserved at all costs, and is the reason for the overwhelming public opinion to "Get Oil Out" of the channel.

This, therefore, is why Senator Cranston here in the Senate, and I in the House, have introduced legislation which would rescind oil leases in the Santa Barbara Channel.

Geological data which describes the stability of the ocean floor raises grave question as to the wisdom and safety of drilling in such a heavily faulted area. However, that factor really makes little difference to Santa Barbarans. They want oil activity in the channel stopped and the wishes of that community respected.

I very well realize that we have a practical problem involving reimbursement to the oil companies of possibly several hundred million dollars received from lessees in the channel, as well as possible other damages.

Thus we are faced on the one hand with possibly a billion plus dollars to be paid out of our Federal Treasury, and, on the other hand, with

the destruction of the Santa Barbara County economy. What should we do?

As a possible answer, I would like to suggest as an adjunct to your consideration of Senator Cranston's bill that you also seriously consider a quid pro quo arrangement which should be mutually satisfactory to the citizens of Santa Barbara, the Federal Government, the oil industry, and the residents of Ventura County, also in my congressional district, whose economy is partially dependent on oil revenues.

What I suggest you consider is an exchange of other federally owned oil lands for the Santa Barbara Channel. I am drafting legislation to accomplish this on the House side.

For example, Congress could pass legislation which would transfer the Naval Oil Petroleum Reserve No. 1, at Elk Hills, in Kern County, the next inland county to Ventura and Santa Barbara, which was established by President Taft in 1912, to the jurisdiction of the Department of the Interior, and, correspondingly, in the same legislation, could redesignate the Santa Barbara Channel as Naval Petroleum Oil Reserve No. 1, to be used for production only in time of a national emergency.

In considering this idea, you would probably ask, "What do we do with the State leases in the channel?" In this case, we could transfer to the State of California a certain portion of Elk Hills, which they could lease to oil companies now active in the State owned portion of the Santa Barbara Channel in exchange for a promise to not exploit the State owned portion of the channel unless the Federal Government reopens its adjacent waters.

If we concluded this entire arrangement, I feel everyone should be reasonably happy. The Santa Barbara environment would be left unmolested, the oil workers in Ventura County could continue to be employed, since Elk Hills is situated in Kern County 10 miles east of the back portion of Ventura County.

The present lessees in the channel would be satisfied, since they could be given credit, in the amount of their lease payments and a proportion of the costs that have already incurred from operating in the Santa Barbara Channel, toward their bid for oil exploration sites in Elk Hills.

The Navy would be happy, since oil exploration in the channel would be curtailed, and its Pacific Missile Range operations would again become unhampered.

The local Navy people out in California at Point Mugu are not at all pleased with oil rigs and other oil operations in the channel. They say it is harmful to their traffic operations from Point Mugu.

The Interior Department would be happy, inasmuch as it would be off the firing line and would be administering an oil source which the Director of the Geological Survey, Dr. Pecora, has indicated is equally rich in petroleum as the Santa Barbara Channel.

The citizens of this country would be happy, since their tax dollars would not be used to reimburse the oil companies in excess of a billion dollars. Rather, as I said, the companies would be given credit.

Thank you very much, Mr. Chairman, for giving me this opportunity to present this view. It might be a slightly different point of view, but certainly I consider it to be relevant to the issue here.

Senator Moss. Thank you very much, Congressman Teague, for your testimony, and your concrete and rather practical suggestion as

to how the lessees might be accommodated and be satisfied with moving from the Santa Barbara Channel.

There is one problem that I don't know that you have dealt with. As I understand, there is still some leakage going on. There is still an oil slick that shows up.

Mr. TEAGUE. Yes, I was shown some pictures today which were only taken 2 weeks ago, picturing very clearly considerable pollution on the beaches in the Santa Barbara area.

Senator Moss. My point, then, would be this: As I think I have mentioned to Senator Cranston, one of the ways of attempting to stop the leakage is to take off the pressure by production. Would your proposal immediately terminate all production?

Mr. TEAGUE. As the bill is written, it would. But again, like Senator Cranston, this might be an area where some tolerance might have to be engaged in. It is my understanding, however, that this was tried, and did not work. Perhaps some of the witnesses who follow me can give you more detail on that. It seemed like a great idea when it was started. I think these wells are producing at the present time, and apparently it is not relieving the pressure enough to shut down the leakage.

Senator Moss. I suppose it would depend a lot on whether that seepage is coming all the way from the production zone, or whether it is some that has been left in the sand that continues to escape and come to the surface. Maybe some of our geology witnesses can give us more enlightenment.

Mr. TEAGUE. I am sure you will have testimony on that, Senator.

Senator Moss. But as I recall, when we had our informational hearings before in this committee, and also when I was out there to look at the channel, one of the factors that was brought up again and again is the fact that the oil and gas down there is under great pressure. Of course that is one reason you had the blowout and now one of the factors is that the formation has been punctured in more than one place to relieve the pressure so that it will not push out again at some other place.

Thank you.

Senator Allott, do you have any questions?

Senator ALLOTT. I just want to explore one thing in your statement, Mr. Teague.

That relates to the top of your last page, there. You say: "What do we do with the State leases in the channel? In this case, we could transfer to the State of California a certain portion of Elk Hills * * *"

Mr. TEAGUE. I realize that is not easy to accomplish, Senator.

Senator ALLOTT. Do you think this is possible?

Mr. TEAGUE. Well, I think the prepared statement says "give." I said "transfer," in my oral statement.

Senator ALLOTT. Well, I think you might have some objections to that. I don't know what the income from the State oil land in California is, that is, the oil land offshore there.

Mr. TEAGUE. I was referring, of course, Senator, only to lease rights, rather than transfer of fee title.

Senator ALLOTT. Well, this would deprive California of that income.

Mr. TEAGUE. No, not if they had comparable oil potential in the Elk Hills area.

Senator ALLOTT. Well, this is an interesting idea. Perhaps something might be worked out of it, but I think we would have a little difficulty transferring a potential and valuable oil right of this kind to the State of California.

Mr. TEAGUE. I fully concede we would, Senator, but this is not an easy problem. I am searching for all possible solutions.

Senator ALLOTT. You recognize the problem as well as I do, I am sure.

Mr. TEAGUE. Yes, sir; I do.

Senator ALLOTT. Thank you.

Senator MOSS. Senator Jordan.

Senator JORDAN. Yes. I just want to develop a point you raised there, Mr. Chairman.

I am looking now at the transcript of the record when Dr. Pecora was before this committee, and you asked him this question:

Isn't your presumption thought, if you could produce it, you would reduce these pressures?

Dr. Pecora said:

Yes, this would be a standard conclusion, that every barrel of oil you take out is one less that may potentially seep into the ocean.

Dr. Pecora also said this:

We consider, for example, this whole oil seep in historic times has introduced more than one million barrels of oil into the Santa Barbara Channel.

Later on, I said, "Then simply to go away and leave it would not reduce the hazard," and Dr. Pecora said, "That is our conclusion. If we go away and leave it, these seeps will continue, and they might increase because of the equilibrium imbalance that has been caused already," presumably by the drilling.

Do you think there is any danger in going away and leaving this in its present state?

Mr. TEAGUE. Yes, I think there could be, Senator, but what my constituents are concerned about is what they consider to be a decided possibility of a blowout in some other portion of the channel, another blowout.

Certainly everything possible must be done to contain this one, as I believe I stated earlier, and I think Senator Cranston did. If it is necessary to continue to pump this well to contain the seepage as much as possible, then this is something that must be done.

Senator JORDAN. Thank you.

Senator MOSS. Thank you.

Senator HANSEN, do you have any questions?

Senator HANSEN. I don't think I do, Mr. Chairman.

Senator MOSS. Senator Cranston.

Senator CRANSTON. I have no questions. I simply want to express my pleasure that Congressman Teague has testified in the way he has. I am particularly delighted because it is representative of the bipartisan support that we have for this effort to end the hazard of oil production in the Santa Barbara Channel.

I am very, very grateful.

Mr. TEAGUE. Thank you, Senator.

Thank you, Mr. Chairman.

Senator MOSS. Thank you. We appreciate it very much.

Our next witness will be Hollis Dole, Assistant Secretary of the Interior, and I understand he will be accompanied by Dr. Pecora, the Director of the U.S. Geological Survey, and Mitchell Melich, the Solicitor of the Department.

STATEMENT OF HOLLIS DOLE, ASSISTANT SECRETARY OF THE INTERIOR FOR MINERAL RESOURCES, ACCOMPANIED BY DR. WILLIAM T. PECORA, DIRECTOR, U.S. GEOLOGICAL SURVEY, AND MITCHELL MELICH, ASSISTANT SOLICITOR, DEPARTMENT OF THE INTERIOR

Mr. DOLE. Yes, Mr. Chairman. I would request that Mitchell Melich, Solicitor for the Department, also accompany me.

Senator Moss. We are very happy to have all of you gentlemen. Be seated, if you will, please.

You may proceed, Mr. Dole.

Mr. DOLE. Thank you.

Mr. Chairman and distinguished members of your committee, I am honored to appear before this committee today to present the views of the Department of the Interior on S. 1219.

This bill would direct the Secretary to order termination of drilling on Federal leases in the Santa Barbara Channel off California.

It would also require the Secretary to order suspension of all such drilling under other Federal leases in other Outer Continental Shelf areas off California until a study is completed.

The bill also would direct the Secretary to undertake an investigation and study of drilling, producing, and transporting oil under the Outer Continental Shelf Act, and to report his findings to the President and Congress.

The Department of the Interior does not believe that enactment of S. 1219 is necessary. We do this because we believe that a portion of the action proposed on S. 1219 has already been taken, and also we believe the actions taken by the Department of the Interior during these past 3½ months eliminate the necessity for this proposed legislative action.

Our Department is fully cognizant of its responsibilities in connection with the increasing environmental concern which the American public now evidences. We know also that the Department has many obligations toward the American public.

One of these obligations is to do what we can to foster the development of the mineral resources of our Nation. Another is to assure that all environmental factors, including natural resource values and ecological relationships, are carefully considered. The balance of national needs guides all of our decisions.

Let me recount for you some of the steps the Department has taken since the blowout off Santa Barbara, Calif., 4 days after Walter J. Hickel became Secretary of the Interior.

On February 2, a few days after the blowout at the Union Oil platform, Secretary Hickel flew to Santa Barbara for a first-hand look at the problem, and on February 7, with concurrence by the President and the Department of Justice, he ordered all wells closed and drilling halted in the part of the Santa Barbara Channel under Federal jurisdiction.

The Secretary immediately initiated a broad safety review of all Outer Continental Shelf regulations. Department engineers began studying drilling procedures and revising the rules and regulations which were in effect in the Santa Barbara Channel at the time of the blowout.

Oil companies were invited to look at a draft of our proposals to see if the industry itself could suggest ways of improving the regulations—and they did in fact propose some tougher guidelines and rules.

Governor Reagan, at the request of the Secretary, agreed to have the California State oil and gas officials provide an additional review of our new procedures and regulations.

This review by California has been helpful. It also served as a first step toward closer voluntary coordination between State and Federal agencies concerned with the common objective of safer operations and of preventing pollution. This degree of official cooperation had not existed heretofore, but now we expect it to become the customary activity in future years at the Department of the Interior.

Geological Survey earth scientists—at the direction of Secretary Hickel—began a massive study of the offshore Santa Barbara area in mid-February. The study involved three teams of 24 specialists deployed over a 400-square-mile area.

Task force I examined the Rincon structural trend—a geological structure that extends from the land out under State and Federal waters.

This is a salient feature which needed to be looked at in greater detail than ever before because the Union Oil Co. blowout occurred on this structure. All company proprietary information was provided to the study team to expedite the subsurface geologic review.

Task force II studied areas where exploratory drilling was suspended, to determine the risk factors in possible resumption of operations.

Task force III probed the channel's sea floor to determine the nature of the sediments outcropping on the ocean bottom.

The scientific teams used a variety of sophisticated techniques to probe the geologic environment. For shallow studies, scuba diving was used by the geologists, while a submersible vehicle was employed for deeper observations.

The USGS research vessel *Polaris* also operated in the area, providing the latest continuous seismic profiling techniques. Also, remote sensing equipment from aircraft was used.

In addition to the aforementioned review boards and task forces, a panel of 14 scientists named by the President's Science Adviser, Dr. Lee A. DuBridge, and chaired by Dr. John C. Calhoun, vice president of Texas A. & M. University, conducted a 2-day study and inquiry at Santa Barbara.

On their recommendation, Secretary Hickel ordered temporary pressure-relief pumping in the critical area as a safety precaution. The step was taken in the interest of safety only, and was not a resumption of drilling or production, which was stopped on February 7.

The panel recommended that this pumping continue at a maximum rate. This procedure was to reverse the hydraulic pressure gradient indicated by the existing oil seep.

The Secretary ordered a moratorium on all scheduled oil leasing on the Outer Continental Shelf, and a review of the criteria upon which decisions to lease offshore lands are made.

He issued an order making it clear that Federal lessees are absolutely liable for pollution cleanup, regardless of whether or not they are at fault.

The panel of distinguished scientists and engineers named by the President made recommendations on cleaning up the pollution and on fighting possible future pollution. Many of their ideas already have been followed and proved helpful in limiting the damage off Santa Barbara and the seepage has declined substantially.

With our modern technology, we can get the problem at its source. First, we have put into effect more stringent operations procedures and regulations to safeguard our environment. The new order issued March 28, 1969, controls oil drilling and production not only off Santa Barbara, but in all Federal waters off the entire State of California. The order sets a new high standard which the Department hopes all coastal States will follow.

Some of the more important new provisions call for the following:

(1) More casing is required on all wells, including specific requirements for near-surface casing to prevent blowouts in shallow formations.

(2) Any major variance from the new casing requirements must be submitted for approval to the Geological Survey headquarters in Washington, D.C.

(3) Tests to insure isolation of zones of oil, gas, and fresh water from each other must be witnessed by Geological Survey representatives.

(4) Pressure tests in each casing string now are required to meet a standard of not more than 10-percent pressure decline in 30 minutes.

(5) Blowout prevention requirements are more stringent and, in some cases, additional preventers are required.

(6) While the drilling is in progress, blowout preventers will be tested daily rather than weekly, as required before.

(7) A weekly blowout prevention drill is required for each crew, to assure proper training in emergency duties.

(8) A standby blowout preventer assembly and a safety valve will be kept on the rig floor to aid in case of the potential loss of control during drilling.

(9) Safety valves now will be required both above and below the Kelly, which is part of the drive mechanism for drilling.

(10) Warning devices are required to indicate automatically the condition and level of the drilling mud in the hole during drilling and withdrawal procedure.

(11) Additional safety and antipollution devices now are required on platforms. These include gas detector and alarm systems, fire-fighting systems, automatic shutdown devices for the wells, and equipment on the platform, pipeline alarm, and auxiliary power equipment for safety.

(12) Pollution control equipment is required to be located nearby each fixed platform, drilling ship, or floating platform, and must be available prior to undertaking drilling operations. This includes booms to control the spread of oil slicks, skimming apparatus to remove oil slicks from the surface of the water, and approved chemical dispersants.

(13) More scheduled and unscheduled inspections of all operations will be conducted by representatives of the Geological Survey. Failure to comply with orders and regulations can result in immediate suspension of operations.

In addition, revisions and additional requirements in the Outer Continental Shelf operating regulations have been proposed, applicable to all Outer Continental Shelf area. These are now open for public comment.

At the same time, a second major action was taken. An order was signed which turned the existing 2-mile buffer opposite the Santa Barbara State Oil Sanctuary into a permanent ecological preserve. Until this order was signed, the area had no special legal status. This new Santa Barbara Ecological Preserve is 21,000 acres.

In addition, all unleased areas south of the Santa Barbara Ecological Preserve will be held as an additional buffer zone. No drilling or production will be permitted in this 34,000 acres. The buffer will help protect the preserve and maintain the esthetic view from Santa Barbara. The ecological preserve and its buffer thus will total 55,000 acres.

About half of the remaining Federal lands in the channel are not leased. Before any consideration is given to leasing these areas, the public will be consulted, and its recommendations carefully considered.

The Department also is pushing for new legislation to strengthen the Federal Government's role with regard to oil pollution and spills generally.

While we do not believe that our actions in protection of the environment should be swayed to any degree by either the past or prospective Federal income from OCS, or the heavy financial commitment made by numerous oil companies interested in offshore production, we believe, nevertheless, that it would be appropriate to inform this committee as to the private expenditures and Federal revenue attendant to operations on the Federal OCS off California.

On May 14, 1963, 57 oil and gas leases located on Federal lands off the coast of California were purchased for a total bonus of \$12,807,587. None of the leases was located in the Santa Barbara Channel. Twenty-six exploratory wells were drilled on these leases, without a discovery of oil or gas. By the end of 1967, all of these leases had been relinquished.

On December 15, 1966, a 1,995-acre tract of Federal lands in the Santa Barbara Channel was offered for lease. The tract was subject to subsurface drainage by wells located on an adjacent State lease. It was sold for a bonus of \$21,189,000.

Seventy-one additional tracts covering 363,000 acres in the Santa Barbara Channel were sold for a total bonus of \$602,719,261 on February 6, 1968. This brought the total of Federal oil and gas leases issued in the Santa Barbara Channel to 72.

By February 7, 1969, the date on which all oil and gas operations in the Santa Barbara Channel were halted by the Secretary of the Interior, 72 wells had been drilled or were in the process of being drilled in the Santa Barbara Channel.

Twenty-seven of the wells were actively producing oil, and two more were completed for production but had not yet been put on production. Twenty-nine had been permanently abandoned, four were in some stage of temporary abandonment, and the remaining 10 were in some stage of being drilled or completed.

The first producing well on Federal land in the channel was completed in June 1968. State wells offshore had been producing for decades. Since June 1968, about \$1½ million has been collected and placed in the U.S. Treasury as the Federal share of production from the Santa Barbara Channel.

It is estimated that approximately \$150 million was spent by oil and gas companies on geological and geophysical exploration of the Federal lands in the channel prior to any tracts ever being offered for lease. And, of course, it is a matter of record that oil companies paid a total of \$622,908,262 in bonuses for the 72 leases.

It is also estimated that industry spent an additional \$100 million in drilling exploratory and development wells, and in constructing platforms, pipelines, and producing facilities subsequent to the leases being issued.

This represents an estimated total investment by industry of approximately \$870 million—all of this risk capital.

In March 1969, companies with leases in Santa Barbara Channel were directed by the Secretary to furnish the Department of the Interior with complete geological and engineering information on a lease basis for use, along with our own information, in an intensive review. This was important to ascertain whether the geological structures in the channel were safe for production and drilling. Companies have complied with this unprecedented request.

After receiving the information, Department scientists and engineers conducted detailed studies of each operation. After concluding that, as far as humanly possible, blowouts could be prevented, the Secretary allowed operations on five leases to resume. These had been interrupted by the Secretary's earlier order.

The programs we are developing in response to the Santa Barbara accident are serving as a model for our future actions along the Nation's entire coastline. We will continue to look ahead to tomorrow's environment as much as we look at today's development of our resources—for use of tomorrow's population.

Natural oil and tar pollution has long been known in this region. Many references to natural oil slicks appear in reports published as much as 200 years ago, a century before drilling began in the channel area.

Careful surveys undertaken by Federal and State agencies charged with protection of marine flora and fauna and by other qualified marine scientists indicate that the marine life of the channel has not been greatly affected thus far. Plankton are back, as are the fish, now that the slick has been greatly diminished. Except for wild fowl, damage to wildlife has been highly exaggerated and misunderstood by many people in the country.

Qualified technical observers on the scene estimate that the leakage into the ocean at the height of the blowout period in late January reached 300 to 500 barrels of oil daily. Currently, the pollution seepage is estimated to be less than 10 barrels per day.

Technical procedures are being considered that hopefully will reduce the seepage from the Platform A area still further and, if successful, will be applicable to many natural seepage sites near Santa Barbara—alleviating a situation that has persisted along the Southern California coastline for thousands of years.

Mr. Chairman, I have with me copies of the proposed new amendments to the OCS operating regulations, which have been published in the Federal Register and are currently under review. Such regulations will be applicable to all OCS areas, once they are promulgated.

I also have a copy of OCS Order No. 10, dated March 28, 1969, which extensively revised operational procedures off California, and the Federal Register notice which set aside the Santa Barbara Channel Ecological Preserve.

Furthermore, I have a listing of the Federal OCS leases in Santa Barbara Channel, giving the name of the company or companies, with lease number and the bonus paid into the Federal Treasury.

I would be pleased to make any or all of the above-mentioned documents available to the committee.

This concludes my prepared statement. I would be pleased to attempt to answer questions from the committee at this time.

Senator Moss. Thank you, Mr. Dole.

I think all of the documents to which you referred would be valuable in evaluating the steps that have been taken to date that deal with this problem and others that are still proposed, and therefore, unless there is objection, I will order that they be printed in the record following your testimony to further illuminate what you have had to say at this time.

(The documents referred to follow:)

ORDER REGARDING DRILLING AND OTHER OPERATING PROCEDURES OFF CALIFORNIA—OCS ORDER No. 10, MARCH 28, 1969

1. The applicability of OCS Order No. 2, March 31, 1965, to operations off California is terminated and the following requirements substituted therefor. Each Application to Drill (Form 9-331-C) submitted for approval shall include the casing, cement, mud, and blowout preventer programs for the well which shall comply with these requirements. All approvals required herein shall be granted in accordance with 30 CFR 250.

A. WELL CASING AND CEMENTING

All wells shall be cased and cemented in a manner which will prevent communication between separate fluid-bearing strata through the well bore, directly or indirectly, except hydrocarbon bearing zones to be commingled, and will prevent release of fluids or hydrocarbons from any stratum through the well bore, directly or indirectly, into the ocean. Casing strings shall be installed in sufficient number and be of adequate size, strength, and of suitable material to withstand collapse, bursting, tensile, or other stresses.

Casing program design safety factors shall be of sufficient magnitude to provide optimum protection while drilling and to assure safe operations for the life of the well.

For the purpose of this Order, the several casing strings in sequence of normal installations are drive or structural casing, conductor casing, surface casing(s), intermediate casing, and production casing. All depths refer to true vertical depth (TVD).

(1) Drive or Structural Casing

This casing shall extend to a depth of approximately 100 feet below the ocean floor to provide hole stability for initial drilling operations. This casing may be set by driving or drilling into this depth. If drilled in, this string of casing shall be cemented with a volume sufficient to circulate back to the ocean floor. In case this string is set by drilling, the drilling fluid shall be treated to ocean water to avoid pollution. This casing may be omitted on fixed platforms if there is geological evidence that hydrocarbons will not be encountered while drilling the hole for the conductor casing and is not needed for hole stability.

(2) Conductor Casing (First String)

This casing shall be set before drilling into shallow formations known to contain oil or gas or, if unknown, upon encountering such formations. Conductor casing ordinarily shall extend to a minimum depth of 300 feet or to a maximum depth of 500 feet below the ocean floor or to such greater depth as may be necessary to extend into a competent (consolidated) formation. The casing shall be cemented with a volume sufficient to circulate back to the ocean floor.

(3) Surface Casing—General Principles

Surface casing shall be set in a manner which will protect fresh water sands and provide well control until the next string of casing is set. Determination of proper surface casing setting depth shall be based on all geologic factors including the presence or absence of hydrocarbons in the interval above the surface casing setting depth and water depth on a well-for-well basis. The surface casing setting depth and that of subsequent casing strings shall take into account formation fracture gradients and hydrostatic pressure to be contained within the well bore.

(i) *Surface Casing (Second String).*—The second string of casing ordinarily shall extend to a minimum depth of 1,000 feet or to a maximum of 1,200 feet below the ocean floor, but may extend to a greater or lesser depth as may be required in order to set casing into a competent bed. In the event conductor casing is set at least 450 feet below the ocean floor, the second string of casing may be set to a maximum depth of 1,500 feet below the ocean floor. This casing may be omitted if there is geologic evidence that hydrocarbons will not be encountered above the depth at which the next string of casing shall be set. Request for modification or omission of this surface casing requirement must be submitted as a major variance to U.S.G.S. headquarters, Washington, D.C., for review and action.

(ii) *Surface Casing (Second or Third String).*—In the absence of hydrocarbons above 3,500 feet below the ocean floor and the casing required in 3(i) above is not set, surface casing must be set before drilling below 3,500 feet below the ocean floor. The setting depth shall be as shown in the table below. When hydrocarbons are encountered above 3,500 feet below the ocean floor and the casing required in 3(i) is set and the proposed total depth of the well is 3,500 feet or greater below the ocean floor (TVD), a third string of surface casing shall be run before drilling below the following setting depths unless the following setting depth requirements have already been met:

Proposed total depth of well from rotary table (TVD in feet)	Setting depth below ocean floor (TVD in feet)	
	Minimum	Maximum
3,500 to 4,500.....	1,150	3,500
4,500 to 6,000.....	1,500	3,500
6,000 to 9,000.....	2,250	3,500
9,000 to 10,000.....	2,500	3,500
10,000 to 11,000.....	2,750	3,500
11,000 to 12,000.....	3,000	3,500
12,000 to 13,000.....	3,250	3,500
Below 13,000.....	3,500	3,500

(iii) *Casing Cementing.*—The surface casing(s) shall be cemented with a volume sufficient to circulate back to the ocean floor or into the next larger string of pipe. A temperature or cement bond survey shall be run for the full length of the casing unless good cement returns are observed. If the annular space is not adequately cemented by the primary operation, the operator shall either (1) recement, (2) squeeze the shoe of the casing with cement, either by drilling out and squeezing or by squeezing through perforations at the interval of competent formation nearest the shoe, or (3) displace with cement in sufficient quantity to fill the annular space.

(4) Intermediate Casing (Fourth String)

A string of intermediate casing shall be set when required by well conditions. Sufficient cement shall be used to cover and isolate all zones behind the pipe which contain oil, gas or fresh water. When a liner is utilized as an intermediate string, the pipe overlap and cement procedure used shall be tested by a fluid entry or pressure test to insure a seal between the liner top and next higher string and this test shall be witnessed by a Geological Survey representative.

(5) Production Casing

Production casing shall be set prior to completion for production. The production string shall be cemented in a manner which will cover or isolate all zones which contain oil, gas, or fresh water, but in any case not less than the volume of cement required for 500 feet of annular fill above the casing shoe shall be used. Where hydrocarbon bearing zones are to be commingled fresh water zones shall be isolated. The Application to Drill (Form 9-331-C) shall contain a statement to the effect that all zones which contain oil, gas, or fresh water shall be protected by the production casing cement. When a liner is utilized as production casing, a seal between the liner top and next higher string is required as in the case of intermediate liners. When intermediate casing is utilized as production casing, it shall conform in all respects to the requirements for production casing.

(6) All casing strings except the drive or structural casing will be pressure tested to 2/10 psi per foot of depth (but to a minimum of 200 psi), or such other pressure test as may be approved, prior to drilling the plug after cementing. Corrective measures will be taken if the pressure declines more than 10 percent in 30 minutes. Drilling shall not be commenced after cementing any string until a time lapse of—

(a) 24 hours, or

(b) 12 hours under pressure. Cement is considered under pressure if one or more float valves are employed and are shown to be holding the cement in place or when other means of holding pressure is used.

All casing pressure tests will be recorded on the drillers' log.

(7) Requests for major variances from the requirements of (1) through (6) above cannot be acted on at the field level but must be submitted to the headquarters office of the Geological Survey for review and action.

B. BLOWOUT PREVENTION**(1) Blowout prevention equipment**

Blowout preventers and related well control equipment shall be installed, used, and tested in a manner which will prevent blowouts. Blowout prevention equipment adequate to prevent blowouts shall be installed before drilling below the Conductor Casing (First String) as indicated below and shall be maintained ready for use until drilling operations have been completed. Before drilling below the Conductor Casing, at least one remotely controlled blowout preventer will be installed with provisions for circulating the drilling fluid to the drilling structure.

During drilling operations below the Surface Casing (Second String) the blowout preventer equipment shall include a minimum of (a) three remotely controlled blowout preventers of adequate capacity, including one equipped with pipe rams, one with blind rams and one hydril-type; (b) a drilling spool with side outlets if side outlets are not provided in the blowout preventer body; (c) a manifold; and (d) a fill-up line. During drilling operations below the Intermediate Casing the blowout preventer equipment shall include a minimum of (a) four remotely controlled blowout preventers of adequate capacity, including at least one equipped with pipe rams, one with blind rams, and one hydril type; (b) a drilling spool with side outlets if side outlets are not provided in the blowout preventer body; (c) a manifold, and (d) a fill-up line.

Blowout preventers and related control equipment shall be pressure tested when installed, before drilling out after each string of casing is cemented and not less than once each week while drilling. Blowout preventers shall be actuated to test proper functioning at least once each day while drill pipe is in use. All blowout preventer tests shall be recorded on the driller's log. A blowout prevention drill will be conducted once each week for each drilling crew to insure that all equipment is operational and that crews are properly trained to carry out emergency duties.

An approved inside blowout preventer assembly and drill string full opening safety valve properly positioned for maximum use, in case loss of well control is indicated, shall be maintained on the rig floor at all times.

In addition to the top Kelly cock a safety valve shall be installed at the bottom of the Kelly of such design that it can be run through the blowout preventers. The bore hole shall be kept full of mud at all times.

Before starting out of hole with drill pipe, circulate off bottom until the annulus has been displaced and the mud is properly conditioned. An approved mechanical device for measuring the amount of mud required to fill the hole shall be utilized when going in or out of the hole with drill pipe. The volume of mud required to fill the hole will be watched and anytime there is an indication of swabbing, lost

circulation, or influx of formation fluids the required blowout prevention equipment shall be installed on the drill pipe and the drill pipe shall be run to bottom and the mud properly conditioned. The mud shall not be circulated and conditioned except on bottom (unless well conditions prevent running the pipe to bottom).

The mud in the hole shall be circulated or reverse circulated prior to pulling drill stem test tools.

(2) *Variances*

Substantial deviations from these requirements must be justified to and approved by the headquarters office of the Geological Survey on an individual well or field basis. Deviation from this program will be required when necessary for the proper control of a well.

C. MUD PROGRAM

The characteristics, use, and testing of drilling mud and the conduct of related drilling procedures shall be such as will prevent the blowout of any well. Sufficient quantities of mud having the characteristics required to prevent blowouts shall be maintained readily accessible for use.

Mud testing equipment shall be maintained on the drilling platform at all times and mud tests shall be performed frequently.

The following mud system monitoring equipment must be installed (with derrick floor indicators) and used throughout the period of drilling after setting and cementing the Conductor Casing (First String):

(1) Recording mud pit level indicator to determine mud pit volume gains and losses. This indicator shall include a warning device.

(2) Mud volume measuring device for accurately determining mud volumes required to fill hole on trips.

(3) Mud return or "full hole indicator."

2. The applicability of the operative portion of OCS Order No. 5 to operations off California is suspended and the following requirements are substituted therefor.

All wells completed for flowing production shall be equipped with an approved storm choke or similar subsurface safety device which shall be installed in the tubing to prevent escape of oil, gas, or other fluid into the ocean in the event of damage to the well or its equipment. Such equipment shall be installed and tested at regular intervals at a depth of 100 feet or greater below the ocean floor. When an unsatisfactory test is obtained the valve shall be removed, repaired, reinstalled, and tested. All flowing wells shall have the tubing-casing annulus sealed below the ocean floor.

Artificial lift equipment required for non-flowing wells must be of a type that will automatically shut-down and not cause escape of oil, gas or other fluid into the ocean, in the event of damage to the well. Safety valves shall be installed at each well head on platforms and tested at regular intervals. All oil and gas gathering lines shall have check valves at the flowline manifold assembly.

Deviation from these requirements must be approved by the headquarters office of the Geological Survey.

3. *Gathering Pipelines.*

Production from existing wells and commencement of producing operations from new wells will not be authorized until all gathering pipelines which transport oil, gas, condensate, or other oil field fluids from a well or platform to the point of sale have been inspected. The inspection shall confirm that all such lines have, in good working order (1) automatically controlled shut-off valves, (2) properly engineered corrosion protection, (3) necessary check valves, and (4) such other safety equipment which will prevent spillage of oil, gas, and other fluids into the ocean.

4. *Inspections*

Inspections, both scheduled and unannounced, will be conducted frequently by Geological Survey personnel. Failure to permit inspection or to comply with all applicable operating regulations will result in immediate suspension of operations and further actions as provided in the lease and applicable regulations.

5. *Production Platform Requirements*

Production platforms will have the following safety and anti-pollution devices installed and in proper operating condition:

(1) Gas detector and alarm system at strategic locations on platforms.

(2) Approved firefighting system.

(a) Automatic sprinkler system in well bay areas.

- (b) Closed loop firewater system with standby firefighting pump.
 (c) Portable fire extinguishers located in strategic areas.
- (3) High and low level or pressure alarms and shut down devices in all production vessels and water separation devices.
 (4) Remote and local automatic platform and well shut down devices.
 (5) High and low pressure oil pipeline alarm and control devices to shut down shipping pumps and to shut in all wells in event of actuation.
 (6) Approved sewage disposal system.
 (7) Curbs, gutters, and drains in all deck areas to collect contaminants for or pumping to shore for treatment.
 (8) Auxiliary power supply equipment.
 (9) Approved waste water handling and disposal system of the agency having jurisdiction.

6. Pollution Control Equipment

Standby pollution control containment and removal equipment shall be maintained on or immediately available to each platform, floating drilling ship, and floating platform. This equipment shall include inflatable or other acceptable booms, skimming apparatus, and approved chemical dispersants, to be operational in the vicinity of the platform or floating drilling rig. All equipment shall be available prior to the commencement of drilling operations. The equipment and plan of containment shall be approved by the Geological Survey. This equipment will be regularly inspected. Additional equipment and containment procedures can be required by the Geological Survey from time to time.

Federal OCS leases in Santa Barbara Channel

Purchasing company or companies and lease number

	<i>Acres</i>
Atlantic-Richfield-Standard of California:	
0167-----	\$3, 222, 250. 00
0215-----	1, 181, 491. 20
Gulf-Mobil-Union: 0168-----	564, 000. 00
Humble-Atlantic-Richfield-Standard of California:	
0169-----	1, 175, 731. 20
0171-----	152, 985. 60
0173-----	2, 520, 390. 08
0175-----	813, 904. 44
0176-----	7, 624, 281. 36
0191-----	213, 811. 20
0195-----	1, 532, 638. 40
0200-----	151, 718. 40
0201-----	155, 630. 04
0206-----	151, 866. 72
0211-----	634, 291. 20
0212-----	2, 131, 891. 20
0213-----	242, 611. 20
Union-Mobil:	
0170-----	2, 016, 000. 00
0172-----	505, 000. 00
0202-----	1, 012, 000. 00
0203-----	5, 567, 000. 00
Humble:	
0177-----	622, 080. 00
0178-----	5, 201, 280. 00
0180-----	1, 180, 800. 00
0181-----	6, 664, 320. 00
0183-----	11, 600, 640. 00
0184-----	1, 463, 040. 00
0186-----	36, 060, 812. 00
0187-----	27, 831, 142. 00
0188-----	12, 123, 254. 00
0190-----	21, 021, 120. 00
0198-----	120, 100. 00
0199-----	621, 528. 00
0222-----	213, 120. 00
0223-----	2, 724, 480. 00

See footnote at end of table, p. 54.

Federal OCS Leases in Santa Barbara Channel—Continued

<i>Purchasing company or companies and lease number</i>		<i>Bonus</i>
Humble—Continued		
0231	-----	\$11,600,640.00
0232	-----	1,324,800.00
0235	-----	45,262,080.00
0238	-----	9,020,160.00
Humble—Standard of California:		
0174	-----	224,499.60
0179	-----	611,251.20
0182	-----	2,062,771.20
0189	-----	323,020.80
0193	-----	2,822,313.92
0194	-----	582,105.60
0196	-----	1,780,928.20
0197	-----	13,241,045.16
0204	-----	265,651.20
0205	-----	265,651.20
0207	-----	624,095.28
0208	-----	622,771.20
0209	-----	421,171.20
0210	-----	202,291.20
0217	-----	10,121,011.20
0221	-----	611,251.20
Shell: 0185	-----	1,854,720.00
Signal Oil & Gas: 0224	-----	225,558.00
Union of California:		
0192	-----	760,000.00
0216	-----	12,176,000.00
Union-Gulf: 0219	-----	12,153,600.00
Union-Gulf-Texaco-Mobil:		
0220	-----	3,014,000.00
0227	-----	35,722,000.00
0228	-----	2,021,760.00
0229	-----	36,177,000.00
0230	-----	3,018,000.00
0233	-----	4,038,000.00
0234	-----	56,378,000.00
0237	-----	521,280.00
0241	-----	61,418,000.00
Pauley-Ashland-Colo. Oil & Gas-J. M. Huber-Kewanee-		
Midwest-Husky:		
0218	-----	43,503,147.00
0226	-----	30,351,447.00
Superior-Sunray DX-Sun-Marathon: 0240	-----	38,380,032.00
Continental-Cities Service-Phillips ¹ : 0166	-----	21,189,000.00

¹ Drainage sale of Dec. 15, 1966.

Senator Moss. At the present time, the drilling is suspended in the channel, but production is going on in the Federal wells there. Is that correct?

Mr. DOLE. This is correct, Mr. Chairman.

Senator Moss. Approximately what is the volume of production that is being taken from those Federal wells in the channel?

Mr. DOLE. Mr. Pecora.

Dr. PECORA. In the area of about 10,000 barrels per day.

Senator Moss. 10,000 a day?

Dr. PECORA. Yes.

Senator Moss. Is there enough pressure for this to flow, or is it pumped?

Dr. PECORA. I don't know the answer to that question. There are pumps normally set down in the well hole to protect the flow and to move the pressure up.

That can be checked.

(The information referred to follows:)

From the Phillips' lease, wells newly completed will flow small quantities for a limited time only. The company normally installs a gas lift at the time of well completion.

From the pressure drawdown tests on the Union lease, the three wells presently completed in the uppermost oil sands have to be pumped. The two wells completed in the lower oil sands are flowing wells.

Senator Moss. Do you have any figures at hand on the pressure in the wells themselves? There are several, but I mean the maximum.

Dr. PECORA. The production to which I refer, Mr. Chairman, is on the Phillips' lease, which is the only producing lease on Federal acreage in the channel.

In addition to this, the Union lease has been permitted a pressure drawdown which results in a recovery of oil which is being sent to a shore installation for treatment.

There are pumps on the Union lease downhole. They are called Rada pumps. Their purpose is to have a continual pressure withdrawal up the well boring, relieving the side walls of the fluid, so that this fluid may then pass up to the wellhead.

Senator Moss. I see.

Mr. Dole testified that it is estimated that about 10 barrels a day is leaking from the well there now. Is that a recent estimate, or are you checking it daily now?

Dr. PECORA. If I may, Mr. Chairman, the figure of 10 barrels a day was referred to as a pollution seepage, not the total natural seepage from the sea floor itself, because there are containment procedures that are in effect at the present time, including inverted funnels, tents, and skimming vessels, which collect the oil before it disseminates on the water.

The records that were kept daily beginning in late March are available to us.

I have some records which show a relationship on 10-day periods which would be a better reference plane than a daily period, because there is variation.

Over three 10-day periods, April into early May, the collection procedures resulted in an average of five to 10 barrels per day being collected. Therefore, this was not being seeped into the channel as a pollutant.

In addition, the skimming devices collected between two and five barrels additional a day, so that the total collection would be in the order of seven to 12 barrels a day.

Now, it was the estimate of the Geological Survey observers at the time that there has been a trend of higher proportion of collection with time.

That is, 6 weeks ago, it was estimated that these collection devices were picking up one of every three barrels that was coming out of the ground—out of the sea floor. Currently, it is estimated that the collection devices are picking up two out of every three barrels that are coming out of the sea floor.

The conclusion one draws from this is that the collection devices are becoming more and more effective. However, the Geological Survey observers have stated that in their opinion over a period of 2 months that the total amount of seepage appears to be decreasing.

If this is a fact, the natural seepage coming out of the sea floor from this lease is either due to one of these factors: Either the remedial pressure drawdown procedure which was permitted is working, or the seepage is bridging itself by automatic filling of the fractures, or the pressure gradient is being relieved by the seepage itself—any one of the three devices, or any combinations thereof.

So the the total seepage that appears to be emanating from the sea floor has been in the general order of magnitude of 10 to 25 barrels a day, as we have been able to calculate it, and observe from photographs and measurements.

Senator Moss. And you are unable to determine which one of the three factors is coming into play to cause the decrease, if it is indeed decreasing?

Dr. PECORA. Mr. Chairman, this is the key of the entire problem.

As Senator Cranston referred to in his statement, we don't know which of the models are active here, and there are four different models: (1) that the blowout pressure pressurized the upper sand and what we are getting now is merely a reduction of that upper sand pressure; or (2) a second model that new fractures were opened up in the uppermost sands, and that indigenous oil and gas are now seeping out, or (3) that there is a continuing communication from intermediate or (4) greater depth through different zones, and that this works itself into the seepage phenomenon.

We don't know which of these models is the correct one. At the present time, I don't think anyone can tell, but if we continue to do experimental work that lies ahead of us, we might be able to determine how to stop this lead.

Senator Moss. Thank you, Dr. Pecora.

Now, Mr. Dole, your testimony is that the Department does not feel that the legislation which is before us is necessary, and the reason you feel this, I gather from your statement, is because you are already making the studies that are called for, and your production has been limited to areas where you felt it was necessary to relieve the pressure.

Does that summarize it fairly?

Mr. DOLE. That summarizes it very well, Mr. Chairman.

We feel that we are well advanced on the studies. We have plans to continue these, and we are taking many precautions which we feel sure will take care of the ecology.

Senator Moss. Is the map that is posted there one that you caused to be posted, or is that some one else's?

Mr. DOLE. No, sir. I have never seen that map before. We do have a map, however.

Senator Moss. I wondered about these zones that you spoke of that have been set aside. Just where were they located?

Mr. DOLE. I could point them out from here but inasmuch as Dr. Pecora is there by the map, maybe he could.

Senator Moss. We will ask you, Dr. Pecora, if you could point them out for us.

Dr. PECORA. That in yellow is now known as the Ecological Preserve, the permanent Preserve, and it adjoins the Santa Barbara Oil Sanctuary.

Senator Moss. This is a Santa Barbara Sanctuary, and this extends out seaward from that. Is that correct?

Dr. PECORA. Yes; and originally it represented a 2-mile buffer zone, which was provided by Secretary Udall when these leases were offered for sale.

Mr. DOLE. May I interject that the blue is the 3-mile State ownership. The blue is the 3-mile limit off of Santa Barbara that the State has set aside.

Dr. PECORA. Beyond the Ecological Preserve, Secretary Hickel has allowed these leases adjacent to the Ecological Preserve, to be classed as a new buffer zone, with no drilling or production to be permitted in that zone, so that the buffer area beyond the State's 3-mile line now extends beyond 2 miles, and in this case, 6 miles more.

Senator Moss. But the greatest depth would be 6 miles out. Is that correct?

Dr. PECORA. From the 3-mile limit; yes.

Senator Moss. The pink areas that are adjacent to the shore are what, State leases?

Dr. PECORA. Those are State leases, and there are more than three dozen State leases within that 3-mile zone.

Senator Moss. Thank you. I just wanted to visualize where that area was.

Mr. DOLE. For a scale, each one of those squares is 3 statute miles, by 3 statute miles.

Senator Moss. I see. Maybe that is the reason I could not estimate it well. I am thinking in terms of sections, but these are 3 miles by 3 miles.

Mr. DOLE. They are Federal leases. The green are Federal leases that have been let. The white are those that will have a public hearing before anything is done on them.

Senator Moss. Thank you, Mr. Dole.

Now, Dr. Pecora, or Mr. Melich, do you have anything to add to this before we have general questioning?

Mr. MELICH. Mr. Chairman, the only thing that occurred to me is whether you would want for the record the claims that have been filed, and the lawsuits that have been filed in connection with this Santa Barbara incident.

Senator Moss. I think that would be helpful to our record to explain to us the magnitude of the problem that we are confronting here. Could you supply that for the record?

Mr. MELICH. Yes; we will supply those. They exceed over a billion dollars to date.

I think it would be a good thing to have them in the record.

Senator Moss. All right.

Mr. MELICH. We will furnish them.

Senator Moss. Without objection, they will be printed in the record if you will supply us with the claims that have been filed to date, and the amount of the claims that are made in the Santa Barbara Channel area.

(The documents referred to follow:)

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C., May 21, 1969.

Hon. HENRY M. JACKSON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR JACKSON: Pursuant to a request by the Minerals, Materials and Fuels Subcommittee in their consideration of S. 1219, I am enclosing the following materials regarding claims which have arisen out of oil spillage in the Santa Barbara Channel.

(1) A claim against the United States in the amount of \$500,000,000 brought by State of California, the County of Santa Barbara, the City of Santa Barbara, and the City of Carpenteria, on February 18, 1969.

(2) A claim against the United States in the amount of \$300,000,000 brought by *John Masterson, et al.* on February 25, 1969.

(3) A Complaint for Mandatory Injunction filed in the United States District Court for the Central District of California by the County of Santa Barbara and the City of Santa Barbara on April 4, 1969.

(4) A petition filed in the United States Court of Claims by *Pauley Petroleum, Inc., et al.* on April 9, 1969, asking damages in the amount of \$230,720,042.

(5) A Notice of Claim in the amount of \$200,000 filed by Mr. and Mrs. Henry L. Dalton on April 11, 1969.

(6) A claim against the United States in the amount of \$36,000 filed by Stanley Gene Sherman on April 30, 1969.

(7) Copies of a memorandum dated May 20, and a memorandum dated April 14 from the Office of the Solicitor, Department of the Interior.

Sincerely yours,

MITCHELL MELICH,
Solicitor.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C., May 20, 1969.

To: Solicitor.

From: Acting Associate Solicitor, Territories, Wildlife & Claims.

Subject: Claims arising out of oil spillage in the Santa Barbara Channel commencing on January 28, 1969.

Supplementing our memorandum of April 14, 1969, concerning the above-identified matter, we have received an additional administrative claim presented under the Federal Tort Claims Act.

On April 30, 1969, Stanley Gene Sherman filed "Claim for Damage or Injury" (Standard Form 95) asking for property damage in the amount of \$36,000 for "damage to lobster traps and fishing business" allegedly from oil spillage in the Santa Barbara Channel.

C. BREWSTER CHAPMAN, Jr.,
Acting Associate Solicitor, Territories, Wildlife and Claims.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C. April 14, 1969.

To: Solicitor.

From: Assistant Solicitor, Branch of Territories.

Subject: Claims arising out of oil spillage in the Santa Barbara Channel commencing on January 28, 1969.

(1) On February 18, 1969, the State of California, County of Santa Barbara, City of Santa Barbara, and City of Carpenteria, filed "Claim for Damage or Injury" (Standard Form 95) in the amount of \$500 million for damages to "real property, water, and various types of personal property and the use thereof and to fish and wildlife along the coast." Claimants allege that the damage was caused

(1) by the negligence of the Department of the Interior in permitting drilling without adequate investigation to establish reasonable safeguards and standards, (2) the negligence of Donald W. Solanas, Regional Oil and Gas Supervisor, in failing "to appropriately inspect and supervise the drilling" and (3) the operation was an ultra-hazardous activity.

(2) The Wall Street Journal of February 19, 1969, reported that the State of California filed suit in the Santa Barbara Superior Court, State of California, against Union Oil Company of California, Texaco Inc., Mobil Oil Corporation,

and Gulf Oil Company. The complaint asks for damages in the amount of \$560 million. Plaintiff alleges that the defendants negligently and carelessly carried on their drilling operations thereby proximately causing the oil spillage.

(3) On February 25, 1969, Standard Form 95 was presented by *John Masterson, et al.* in the amount of \$300 million for damages from the oil spillage to their property fronting on the shoreline of the Pacific Ocean. This claim is in the nature of a class action by the named claimants who are members of the Shoreline Property Owners Association and for the benefit of all owners and lessees of property fronting on the Pacific Ocean and its bays and estuaries.

(4) On April 4, 1969, a complaint for Mandatory Injunction was filed in the United States District Court, Central District of California, by the County of Santa Barbara and the City of Santa Barbara against the Secretary of the Interior, D. W. Solanas, Regional Supervisor, and various oil companies to enjoin the defendants from drilling and producing oil or gas on leases in the Outer Continental Shelf in the Santa Barbara Channel. It is alleged that the oil pollution and drilling operations if permitted will cause irreparable damage to the shoreline, destruction of shore birds and animal life, destruction of shore and marine installations, etc.

(5) A petition was filed in the United States Court of Claims on April 9, 1969, by *Pauley Petroleum, Inc., et al.*, asking for damages in the amount of \$230,000,000. Plaintiffs seek to rescind leases on the grounds that the Department of the Interior terminated drilling operation on February 7, 1969, and by its new regulations of February 17, 1969, has imposed absolute liability on the plaintiffs. Because of these regulations, there was a material change in the circumstances, thereby making it economically unfeasible to continue with the operations. Plaintiffs also allege mutual mistake and an unjust taking. Plaintiffs allege lease acquisition costs of \$73,854,594; exploratory costs of \$6,565,598; and anticipated profits of \$150,000,000, a total of \$230,720,042.

(6) On April 10, 1969, a notice signed by Santa Barbara County District Attorney was served on Don Solanas, Regional Oil and Gas Supervisor, USGS. This notice states that the Department, Solanas and the oil companies are maintaining a public nuisance with their OCS drilling operations which constitutes a misdemeanor under State law. It orders them immediately to discontinue and abate the nuisance and advises that each day of continued operations after receipt of the notice shall be deemed a separate and distinct criminal offense.

(7) On April 11, 1969, Mr. and Mrs. Henry L. Dalton filed a notice of a claim in the amount of \$200,000 for damage to their real property, fronting on the Santa Barbara Channel. The claim is filed in the form of a complaint and alleges the negligence of the United States caused the damage. Claimants do not assert their right by statute, but it would appear that the claim is filed under the Federal Tort Claims Act.

C. BREWSTER CHAPMAN, Jr.,
Assistant Solicitor, Branch of Territories.

Senator Moss. Senator Allott.

Senator ALLOTT. Mr. Secretary, I want to welcome you here in really your first appearance before this committee, except for your confirmation, and thank you for a very comprehensive statement.

I would also be very remiss if I did not express my appreciation, and I am sure that of the committee, to Dr. Pecora for the very excellent briefing that he gave to this committee upon this matter earlier this year in executive session.

Along that line, Mr. Chairman, I would like to suggest that before these hearings are closed that it would be appropriate for Dr. Pecora to go over this matter again, so that we could place it in the proper context, and so that we can place the investigations and steps they have taken in their proper context in evaluating this very serious problem, because it may not be a problem to me in Colorado, but to the people of Santa Barbara it is a real one, and we all know it.

I have one question which I would like to ask Mr. Melich, and I would like to have him supply a letter for the record on this.

That is, in view of the provisions of the leases used in this area, and particularly the proviso clause of paragraph 4(i), upon what basis

can the Secretary make lessees absolutely liable for pollution cleanup, regardless of whether or not they are at fault?

I would like to have your answer to that as Solicitor for the Department, so that we can put it in the record.

Senator MOSS. If you would care to do that by writing, you may. You may respond orally if you would like to.

Mr. MELICH. I would like to make one statement.

This, Senator Allott, is of course a question which in the legal fraternity is creating considerable discussion, and there are, as I pointed out, a number of lawsuits pending against the U.S. Government, and I am wondering whether this should be a matter of record in view of the litigation that we have.

We have discussed this matter with the Justice Department, which is handling these cases, and I wonder whether or not it should go in the record, because the Justice Department has to defend these lawsuits. We would be disclosing our theory of this case. Being a lawyer, I think you recognize that.

Senator ALLOTT. I will be happy to discuss it with you privately, but I may still insist that it go into the record.

Mr. MELICH. Very well.

Senator ALLOTT. Because I do not believe that this is a valid premise of law, and I think it violates the terms of the lease.

I think you would give anyone in here, by such a regulation—and it has been reduced to a regulation now, has it not, or has it?

Senator MOSS. That has been reduced to a regulation, this absolute liability for cleanup.

Mr. MELICH. It is on for public hearing now. It is in the new regulations.

Senator MOSS. It has been published in the Federal Register, and will be subject to hearings. Is that right?

Mr. MELICH. There is considerable thought being given to holding public hearings on this new regulation.

Senator ALLOTT. I am thinking in terms of this: If you had an oil tanker which encountered a hurricane, and it broke up, you would make the oil tanker, under this same theory of law, absolutely liable, and I think this violates the basic premises in most of these areas that you are liable for negligence.

You would be liable for violation of existing regulations, of existing drilling regulations, of existing procedure regulations, but I cannot see how the Department of the Interior can impose an absolutely liability after the fact, when our laws expressly provide otherwise.

I will be happy to talk this over with you privately but I may still want an answer from the Department in the record.

Mr. MELICH. We will abide by your request, then, Senator.

Senator MOSS. Senator Jordan?

Senator JORDAN. Yes.

Mr. Secretary, can you or any of you identify on the map the exact location of the drilling that blew out?

Dr. PECORA. Yes; we will be glad to. Platform A, located in the northeastern part of that lease. Platform B is on location, but has had no drilling.

Senator JORDAN. For the record, how would you describe it, as being how far offshore with respect to Santa Barbara, the city itself, and so on?

Dr. PECORA. It has been recorded as 5½ to 6 miles southeast from Santa Barbara.

Senator JORDAN. Thank you.

Now, are there any other wells in that area presently producing oil that might be tapping the same oil reservoir as the drilling that blew out?

Dr. PECORA. The answer is "No, sir." This is a new oil structure which has been discovered since the lease sale, and the exploratory drilling that was permitted after the leases.

This structure is a local structure at this portion of the Rincon Trend. There are other producing structures easterly, where the State leases and the Federal leases are both draining the same oil pool, and there are other oil pools on the land, but specifically this one structure covers the two leases, and the name in Spanish has been given to this oil pool structure, Dos Squadras, Two Squares. The structure covers both these squares. The Sun lease and the Union lease as operators would be involved in that one structure.

Senator JORDAN. And there are no other producing wells that would serve as relief valves for this pool?

Dr. PECORA. That is correct, sir. New wells would have to be drilled.

Senator JORDAN. Now, you have enumerated some 13 new provisions in your statement that are in the nature of regulations. Is that true, Mr. Secretary?

Mr. DOLE. That is correct.

Senator JORDAN. And it is your opinion and the opinion of the Department that these new provisions would accomplish what the bill purports to do?

Mr. DOLE. This is our analysis of it, yes, sir.

Senator JORDAN. Thank you.

Senator MOSS. Senator Hansen?

Senator HANSEN. Referring to the last response you made, Mr. Secretary, did I understand you to say that these thirteen points you have just listed would accomplish what the bill purports to do?

Mr. DOLE. What the bill is proposing to do; yes, sir.

Senator HANSEN. In your judgment if this legislation were passed as it presently is before us, would the steps you have taken and are in the process of taking be expedited just as rapidly and orderly as you intend to implement them or would their implementation be slowed up?

Mr. DOLE. I probably should modify my previous statement to you. Senator Hansen, in that many of the factors in the bill we feel are covered by this, and we do not see the need for it.

Senator HANSEN. Well, I assume that there is no argument among any of us as to the public desire and our individual desires to try to stop insofar as we possibly can every drop of this oil seepage. That is a fair statement, is it not?

Mr. DOLE. That is a fair statement, indeed.

Senator HANSEN. Would it be fair to say that you believe some of the things that you are doing now and which you expect to do will be useful not only in bringing this oil spill under control but will also serve equally as well in developing other offshore oil structures? Would these steps that you have taken and that are being con-

templated be enhanced or slowed down with the passage of the legislation?

Mr. DOLE. Well, I think, Senator Hansen, that I should say these 13 points refer to the drilling regulations. These are the points that we feel that our regulations do cover within the Santa Barbara Channel.

Now, as far as stopping all drilling in the channel, we feel this should not be undertaken until a thorough review of the geology and an analysis of all the work has been completed and then a determination made; and also that the work of the DuBridge Committee in advisory status should be considered with our decision also.

Senator HANSEN. Would it be your purpose, in cooperation with the U.S. Geological Survey, to study this whole problem and to take whatever steps and implement whatever procedures seem indicated to you in order to stop the seepage and to alleviate those conditions which have exacerbated the spill in the past?

Mr. DOLE. Yes, indeed. This Union Oil structure where the blowout occurred is unique in this area, and it is the study of this and the understanding of this particular structure and the control of this that is our great concern.

Senator HANSEN. Does this proposed legislation, in your judgment, cloak you with any authority you may not now have that you feel would be helpful in meeting the problem, or do you think that you have adequate authority now to bring the seepage under control?

Mr. DOLE. It is my opinion that we have this, but I would like to refer this to Mr. Melich, if you please.

Mr. MELICH. Of course, the Secretary has wide discretionary authority. I think we can do what we are doing now. Of course, going to the other question of whether we could terminate, I think that is something that is a very serious problem in that this bill requires the termination of all drilling.

Then you get into this question of liability. The problem, of course, is deeper than that because the leases have already been issued and, as has been pointed out here, if the Secretary does have that authority and he does terminate then the question is, What is the liability? Our interpretation is that, of course, these people who have been damaged would have a claim against the Federal Government under the Tort Claims Act.

Senator HANSEN. If I could direct a question to Dr. Pecora, please. Sir, is it possible, having examined all of the facts that are available to you and making the investigations that I know you have been engaged in, that this oil spill could be lessened through further drilling and thereby relieve these pressures that are contributing to the present spill?

Dr. PECORA. Yes, sir. Senator, may I respond in this fashion, that until we know what the model of the seepage is, we are groping in the dark. So, having set up four models as to what might have caused this situation, we asked that the DuBridge Panel review the situation in great detail. The Secretary particularly wanted a group of specialists on the panel rather than an across-the-board intellectual group to examine not only the geological characteristics, the sea floor characteristics, but also the reservoir characteristics. On May 12 and 13 a meeting was held in Los Angeles with the members of this DuBridge

Panel, members of the Geological Survey, and members of the oil company and their partners, and at separate sessions the Department of the Interior presented the summation of its information and analyses and in the afternoon the company presented its summation with appropriate diagrams and documents. The panel has been kicking this around, and we are looking for the advice of this outside group of consultants to form an independent body of advice. From all of this review there will come a general body of opinion which will determine the course of action that should be the best under the circumstances and, as I mentioned earlier, if it is the conclusion that it can be tested, that merely we are dealing with highly pressurized upper sand, then it might be appropriate to merely permit shallow drilling to relieve those pressures.

If it is an appropriate conclusion that there is intercommunication, then this shallow drilling won't do the trick. If it is possible to determine that merely the upper sands are degenerating their indigenous accumulation, it might be possible to seal off some upper horizon and stop the seep by that method.

We think we will have to do more than just what is being done now, because the present procedure has provided two circumstances; one, a containment as much as possible of that which is escaping, and, two, a pressure draw down on the existing wells in sequence. As one became stabilized, the next one was put on, and as that one became stabilized, the third one was put on to determine if there is any intercommunication of one zone with another zone.

We believe from the surveys and the result of the data we have looked at that the seepage is diminishing, but we don't know whether this could be proved to the satisfaction of the consultants and if it is diminishing, whether it is on a slow down curve, so that it may take decades, if not years, to completely stop it.

Therefore, we believe something more than what is being done now should be done, and we don't believe anything should be done without the advice of a thoroughly competent outside panel.

Senator HANSEN. Is it your opinion that possibly some of the steps indicated to bring this source of pollution under control would be unnecessarily delayed by the language in the bill which reads: "The Secretary of Interior shall immediately order the termination of all drilling for oil, gas or other minerals in the Santa Barbara Channel," et cetera.

Dr. PECORA. If the Secretary interprets that language to permit remedial drilling, then I would see no difficulty from an operational point of view. If it refers to all drilling, then it would in fact interfere with a proper course of action to cease.

Senator HANSEN. And could indeed delay the steps that you feel may very well need to be taken in order to come to grips with the problem?

Dr. PECORA. On an operational basis, yes, sir.

Senator HANSEN. I have no further questions, Mr. Chairman.

Senator MOSS. Thank you.

Senator CRANSTON?

Senator CRANSTON. Mr. Dole, I am a little disappointed that the Department came out in opposition to the measure, particularly since on May 11 Secretary Hickel said the following on a nationwide radio or television interview. He said:

There is an oil sanctuary in front of Santa Barbara that the State of California set aside. I believe that with these new reserves, for example, in Alaska and even possibly prior to that we should have respected the people's wishes and not had drilling in front of that sanctuary.

I think that is the problem in front of the sanctuary. He is referring to the sanctuary created there where there is no drilling in one portion.

The other drilling in Santa Barbara, most of it is adjacent to State drilling, which is not the problem.

Is it proper to infer from that statement that if Secretary Hickel had the power he would not proceed with drilling in the Santa Barbara Channel?

Mr. DOLE. I think in the first place, Senator Cranston, that Secretary Udall was the one that granted these leases.

Senator CRANSTON. I am well aware of that.

Mr. DOLE. And that, as mentioned in my statement, here four days after Secretary Hickel came on board this happened. So your question about if you had it to do over again would he do it, I can't answer that because he wasn't the one that was responsible for this drilling.

Senator CRANSTON. Do you see anything wrong with holding the Santa Barbara oil in reserve for emergency as Secretary Hickel would seem to indicate might well be desirable, according to that statement?

Mr. DOLE. I didn't get quite that context out of that, Senator Cranston. But I would respond to your question in this way: that I feel that in light of the tremendous amount of energy that we need for this world of ours in the years to come that it behooves us to find out as much as we can about the terrain so that we will be able to have it available.

Senator CRANSTON. Then it would follow that in view of the controversy and problems that we face in Santa Barbara Channel, it might be wise to do just enough to establish what is there and then suspend drilling so that there is a reserve that can be relied upon in times of emergency when overseas supplies may be cut off?

Mr. DOLE. Of course, this is a legal point, and private enterprise is out there drilling it up and I wonder if Mr. Melich would like to respond to that.

Senator CRANSTON. I am not referring to the legal matter involved, I am referring to the policy matters relating to reserves.

Mr. DOLE. I think, Senator Cranston, that we do get into a legal matter, do we not?

Senator CRANSTON. I would like to pursue the legal matter after a few other points have been covered. If you don't want to comment on the reserves, I will go on.

Senator ALLOTT. I think what Secretary Dole is saying, if I understand him, is that what you have is a question here of whether you could get such drilling as you are talking about done by private oil companies when they would not be permitted to develop the leases.

Senator CRANSTON. I am sure you couldn't.

Senator ALLOTT. Isn't that it?

Mr. DOLE. This is correct, Senator Allott.

Senator CRANSTON. I can't understand, frankly, why you oppose all portions of the bill. In your first page you say that a portion of the

action proposed in this measure has already been taken. You are referring to the studies and I can understand that you feel that the portion of this bill may have been covered by actions you have taken. You have not referred to the special problems in the Santa Barbara Channel in any significant way in your testimony. Could you spell out in a little more detail why you feel a measure halting drilling in Santa Barbara Channel is not in the public interest.

Mr. DOLE. A large part of it, Senator Cranston, has to do with the legal implications that would be involved if we did halt.

Senator CRANSTON. Going to the legal implications, I wholly concur with the reservations expressed by Senator Allott concerning the propriety and legality of retroactive liability regulation. So I would like to ask this, which is not a legal question at this point: If the Department of the Interior is so confident that there will be no further spills in the Santa Barbara Channel, why is it so eager to escape all liability and to fix all liability on oil companies?

Mr. DOLE. I don't believe it will be a true statement to say that the Department says that there will never have been another oil spill in the Santa Barbara Channel or anywhere else.

Senator CRANSTON. I didn't quote you as saying that.

Mr. DOLE. This would be a presumption on our part, that would not in my opinion be warranted. So the rest of your question was?

Senator CRANSTON. Well, I am curious as to why the Interior Department feels it is so necessary to escape all liability and fix that liability on oil companies if you really have no great concern about further spills occurring.

Mr. DOLE. If the oil companies are liable and we fix it there then they have recourse in the courts to settle their claims if they think they are not. Here we have the one that the people, our lessees, can turn to.

Senator CRANSTON. Do you feel there is any greater degree of risk in the Santa Barbara Channel than in other places in the Outer Continental Shelf?

Mr. DOLE. We know now the conditions about Santa Barbara and we know that this is a very special situation. There are other places that we are in offshore that we feel there is very little risk.

Senator CRANSTON. In other words, you do feel there is greater risk in the channel?

Mr. DOLE. That particular structure is an unusual one. Would you like to comment?

Dr. PECORA. Senator Cranston, there are other risks in other parts of the Continental Shelf not shared by southern California and there are some risks in southern California that are unique to southern California, but I think all Outer Continental Shelf operations are hazardous and the factors that make them hazardous must be recognized and guarded as much as humanly possible. You remember my testimony before the earlier committee that the regulations that existed then were more than adequate to prevent this disaster, and the new regulations are just that much more than adequate; so that we could reduce to an absolute minimum the factor of a human error or human judgment or natural catastrophe. There are different kinds of risks attendant upon oil drilling. Whether onshore or offshore.

Senator CRANSTON. That really goes to the question of where the risks are greater and where it is wise to concur when you befall risks or where it is necessary to avoid them.

On page 9 the process that was gone through in exploring the geological structure is described and finally Mr. Dole said after concluding that as far as humanly possible blowouts could be prevented and the Secretary allowed operations on five leases to be resumed. What standards were applied in determining that as far as humanly possible blowouts would not occur?

Mr. DOLE. This is a technical question which the Geological Survey participated in. May I ask Dr. Pecora to respond to that?

Dr. PECORA. The situation on the Union lease involved, as you brought out in your statement, a very shallow capping formation of 250 feet or so and a thick section of producing hydrocarbon zone. This unique situation does not exist anywhere else in the channel. This situation of having an oil-bearing structure so close to the floor is unique to this lease and its adjoining lease, the Sun Oil lease, as you pointed out.

In other leases the depth of protective formation is in excess of 2,000 feet. This then permits a weight known as geostatic pressure to hold down the hydrocarbon so that with the casings in place the pressurized sands encountered by drilling have a double protection of not only the geostatic pressure but also the casings themselves which are well bonded because of the character and the formation penetrated.

This is the key to the other leases. As our team of geologists and engineers reviewed in detail each of the leases that will be suspended by the secretarial order, the conclusion was reached that there was an abundance of protective sedimentary formation and because of the reservoir characteristics encountered that the new drilling regulations would be much more than adequate, so much so that the statement was used as far as humanly possible.

Senator CRANSTON. Does the presence of oil as close to the bottom of the sea as you have indicated exist with only sand between the oil and the water, about 250 feet of sand, does that circumstance create a special difficulty in avoiding leaks and blowouts?

Dr. PECORA. Let me first, sir, correct the statement about sand. It is jargon in the profession to use oil sands when we are dealing with sandstone and siltstone and shale. These are formations and bodies which can maintain an opening when drilled through it so that we are not really dealing with unconsolidated sands. The shortage of capping formation introduces the problem that the conductor casing which is the first penetrating casing which is cemented with a thorough bond must be short, as it was on the Union lease. It would be much better protection, obviously, if the hydrocarbon bearing formations were at slightly greater depth. This is one of the factors that now can be evaluated as a result of the drilling information we have encountered thus far.

But on the other hand, as it is apparent in the Gulf of Mexico if the producing zone is down 10,000 or 12,000 feet, you have the risks of excessive bottom pressures which create a risk in themselves and the well blowout to which you referred in Alaska was the result of such a gas blowout from the deep zone.

So that one balances one risk against another, but knowing the risk one measures against it. This is all that one can do in our science and technology.

Senator CRANSTON. In reference to places other than the vicinity of the Union blowout, what is the deepest water that platforms successfully can be erected any place?

Dr. PECORA. In the channel, sir?

Senator CRANSTON. No, anywhere.

Dr. PECORA. I would say that 85 percent of the platforms are in less than 150 feet of water. The deepest water for a fixed platform is about 350 feet. I will check that. It is about that order of magnitude.

Senator CRANSTON. Is one designed for erection in 480 feet of water in the channel?

Dr. PECORA. None has been designed nor approved by the Geological Survey.

Senator CRANSTON. What is intended to be the production method in these areas that are 400, 500, 600 feet deep?

Dr. PECORA. Experimentation has been going on in extremely deep water—this is in excess of 500 or 600 feet—for the purpose of bottom hole well application. That is without any fixed platform.

Senator CRANSTON. Are the hazards increased as you go to greater depths? Is the ability to deal with hazards or accidents decreased?

Dr. PECORA. For technology in waters worked out from the tidelands of Louisiana to 300 feet of water, so long as a fixed platform is contemplated, I see no additional hazards. It is the compatibility with the geological structure below the sea floor which is creating the hazard essentially.

Senator CRANSTON. What if no platform is proposed and another method is intended? Are there increasing difficulties and hazards in dealing with a spill or an accident of any sort if one occurs in the greater depth?

Dr. PECORA. I would prefer the question be asked of our industry representatives, because the state of technology at the present time is not my forte; but it would seem to me that in the absence of any established technology at the present time that one would have to be convinced that the technology can handle that situation.

Senator CRANSTON. Do you know what would happen if Humble had a blowout or an accident on the well they are presently drilling in over 1,000 feet of water in track 334?

Dr. PECORA. Yes; with the blowout preventers which exist on the drilling vessels and the casing procedures which are being used there would be a simple problem of killing the well or closing it in.

Senator CRANSTON. Suppose the present drill shift there was incapacitated and a blowout did occur there. Is there other equipment in the area that could anchor in those depths of water and proceed to drill a relief well which is often deemed desirable when there is a leak?

Dr. PECORA. The drilling on the Humble lease involved rather deep drilling with casing and blowout preventers. It is my understanding, and I can check, this, Senator, to be exact about it, that the safety devices are sufficient to handle that situation.

Senator CRANSTON. You indicated that it is impossible to guarantee that there will not be a blowout and, I, of course, understand that fully. Do you feel that it is possible to guarantee that if another blow-

out occurs spillage can be stopped in short order and cleaned up in short order with the present state of the art?

DR. PECORA. Your question, sir, refers to a statement made during your presentation and I believe I can answer that question raised in your statement as well as this one if you would permit me a few minutes to summarize the duration of blowouts in the past, and what we might expect. If I may, Mr. Chairman?

Senator MOSS. You may.

Dr. PECORA. I have used the figure that in more than 15 years of drilling in the Outer Continental Shelf there have been 25 blowout incidents in drilling 8,000 wells, but this involves 10,000 completions so that the ratio there on a statistical basis is 25 in 10,000. I would like to summarize some points which will answer Senator Cranston's questions that he raised earlier, about the duration of blowouts.

Using the 25 incidents in detail, there were six blowouts that were controlled in less than 1 hour. The shortest was 4 minutes. For less than 1 day, there are an additional six for a cumulative total of 12 blowouts which were controlled in less than 1 day.

In less than 2 days, there are an additional four, for a cumulative total of 16.

In less than 2 weeks, an additional four, for a cumulative total of 20 in less than 2 weeks.

The Santa Barbara blowout took 10 days to control. Greater than 2 weeks, an additional five for a cumulative total of 25.

The longest was 3 months. In substance, you will find that most of these blowouts are the result of gas blowouts.

There were 17 because of gas, four just oil, and four gas and oil.

Santa Barbara was gas and oil.

In loss of life there were two incidents, one where seven casualties were experienced and in the second where 22 casualties were experienced.

It was the potential loss of life that was a problem in how to handle the Santa Barbara blowout. There were six cases where the platform or drilling vessel was completely destroyed largely because of fire in nine cases. The blowout in the Santa Barbara platform presented the problem of potential fire, and explosion. As far as oil pollution was concerned, the longest and, I think, most extensive pollution was that one in the Santa Barbara Channel because of the hydrodynamics of the channel itself.

A few weeks later one of the blowouts occurred in the gulf referred to by Senator Cranston in his statement that had a measured pollution contribution of 2,000 barrels plus or minus 100 barrels. This had been measured because of some tests that had been run just before the storm broke the tube and I would say these are the two greatest blowout incidents.

With the character of the new drilling regulations and the fact that you have an industry that is once burned and many times warned it appears to me, sir, that if through some freak accident another blowout should occur it is my opinion that it could be controlled in a shorter time and with less damage to environment.

Senator CRANSTON. How many days will it take to control the current spill?

Dr. PECORA. Sir, it may take years.

Senator CRANSTON. How do you estimate the current flow? In Mr. Dole's testimony it says currently the pollution seepage is estimated to be less than 10 barrels per day. How can you estimate that?

Dr. PECORA. There was an estimate of the actual pollution which is escaping the collecting devices.

Senator CRANSTON. Escaping the collecting devices?

Dr. PECORA. Yes, not being collected.

Senator CRANSTON. Can you really measure that accurately?

Dr. PECORA. The collecting devices are measured accurately because the fluid is taken to the platform, separated from the water, and brought ashore for putting into the system, so that the collection devices are accurate recordings.

Senator CRANSTON. Is relief pumping still going on there?

Dr. PECORA. Yes, sir. In addition, a new technology has been introduced known as gas lift. Air is introduced under pressure beneath the vents and this has increased the collection of the seepage from the sea floor. This does not increase the pollution damage. It is merely increasing the seepage rate, because it is our belief from the observations and measurements that a tidal variation of a few feet will have an effect upon the amount that is being discharged into the sea. It is that sensitive.

Senator CRANSTON. When the Department of the Interior, long before Secretary Hickel became Secretary, granted these leases, did it have access to the geological information that oil companies had relating to the geological structures here? Did it have information relating to the presence of oil here? Did it have access to information indicating how far beneath the bottom of the sea that oil was?

Dr. PECORA. The Geological Survey did not have as much information as collectively was contained in the files of the various companies. We had abundant information of our own because studies have been going on in this region for many, many years. Specifically, the first geological report in the Santa Barbara Channel was published about 1907 by Ralph Arnold, one of the Geological Survey geologists. Reports on land and on offshore islands had been made by Survey geologists so that it is improper to conclude that Geological Survey was ignorant of the situation.

However, it is only fair to state that collectively the oil companies had much more information than existed in the files of the Geological Survey. So my answer to that question, sir, is that without any question of doubt we did not have as much information on the detailed reservoir conditions as existed in the oil company files.

Senator CRANSTON. I have just three more questions.

Do you believe, Mr. Pecora, that it may prove desirable to terminate the Union lease?

Dr. PECORA. I would say that if the effort is successful in ceasing the seepage, which is our primary goal right now, then it is up for a policy decision as to whether to—

Senator CRANSTON. Let's suppose that the leak continues indefinitely.

Dr. PECORA (continuing). If the leak continues indefinitely, I would recommend to the Secretary that we make some other effort to reduce the pressure drawdown, whatever it may be.

Senator CRANSTON. I am referring now to termination of the lease. Could you envisage circumstances where it might be desirable to terminate both the Union lease and the Sun lease that is immediately adjacent to, and drawing from, the same pool?

Dr. PECORA. Senator Cranston, I don't think I could in good conscience make that recommendation to the Secretary unless the seep were sealed off first.

Senator CRANSTON. Well, let's assume, then, that the leak is sealed off. I am not asking you for a statement of "Yes, we will find it," but can you conceive of circumstances, taking all factors into account, where you might conclude that it would be desirable to terminate that particular lease and conceivably the Sun lease?

Dr. PECORA. If the technology gives us confidence that having sealed off the seep, the seep will remain sealed off, then it is up for grabs all over again. If, on the other hand, there is enough doubt as to the permanence of the seep, then I think one would have to factor that into any policy decision.

Senator CRANSTON. I would like to ask: Dr. Melich, do you believe that you have the power to terminate leases under the present law, should it become desirable to do so?

Mr. MELICH. We think we have. However, there is some divergence of opinion on this subject because of lawsuits that have been filed and matters that are pending.

Senator CRANSTON. So there is a legal question?

Mr. MELICH. Yes, sir; there is a serious legal question. The position that we take is that we do have.

Senator CRANSTON. This is my last question: Is the procedure at all clear that you would follow, in the event that you determined to exercise this power and succeed in terminating the lease, as to how you would compensate the company holding the lease?

Mr. MELICH. Well, I think that their action then is to file a claim under the tort claims statute and go into the Court of Claims to determine it and whatever they recovered, if they recovered, Congress would have to appropriate the money.

Senator CRANSTON. Thank you very much. Thank you for your patience.

Senator MOSS. Senator Allott has one question.

Senator ALLOTT. Just one question: You have covered it twice, about the lack of information, Dr. Pecora, from the oil companies. Did you have any information or were you able to get any information from the State of California about their wells on the State land?

Dr. PECORA. The State of California has in the past been more reluctant than the oil companies to give us any information on the core holes in the channel as well as information on tracts under State jurisdiction, both on land and offshore.

This is quite proper because the State law prevents employees of the State of California from giving such information. But, nevertheless, it is the hope of the Secretary of the Interior that the negotiations that have been going on with our counterparts in the State structure that perhaps the Federal and the State Governments can show the way how careful and good planning together can lead to a greater benefit to the people for the work offshore.

Senator ALLOTT. So you have no information from the State of California?

Dr. PECORA. That was my answer; yes, sir.

Senator ALLOTT. Thank you.

Senator MOSS. Thank you very much, Secretary Dole and Mr. Melich and Dr. Pecora. We appreciate your testimony. It deals with a complex and serious problem, and it has taken a rather long time, but we appreciate having this from you, and it may be that we will ask you to come back again at a later time as we get all of the information before us, but for now you are excused. Thank you very much.

Mr. DOLE. Thank you, Mr. Chairman. We await your further pleasure.

Senator MOSS. Thank you.

I would like to inquire of Mr. George Clyde, who has been waiting here all day, would it inconvenience you to come at, say, 11 o'clock in the morning?

Mr. CLYDE. Not at all, sir.

Senator MOSS. It is now 5:30 and many other obligations are awaiting. This committee has a short hearing beginning at 10 in the morning, which I expect will be concluded by about 11. If you could come then we could hear you in the morning and then pick up the remainder of our hearing that is scheduled for tomorrow afternoon at 2 o'clock. If you could accommodate the committee in that respect, I would appreciate it very much.

Mr. CLYDE. Perfectly agreeable to me, Senator.

Senator MOSS. Thank you.

We will now stand in recess until—well, we have a 10 o'clock hearing, but 11 a.m. to hear Mr. George Clyde, and then in the afternoon proceed with the other witnesses on the agenda.

(Whereupon, at 5:30 p.m., the committee was recessed, to reconvene at 11 a.m. Tuesday, May 20, 1969.)

SANTA BARBARA OIL SPILL

TUESDAY, MAY 20, 1969

U.S. SENATE,
SUBCOMMITTEE ON MINERALS, MATERIALS, AND
FUELS OF THE COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to recess, in room 3110, New Senate Office Building, Senator Frank E. Moss (chairman of the subcommittee) presiding.

Present: Senators Frank E. Moss, of Utah, Gordon Allott, of Colorado, Len B. Jordan, of Idaho, Clifford P. Hansen, of Wyoming, and Ted Stevens, of Alaska.

Also present: Senator Alan Cranston, of California.

Staff members present: Jerry T. Verkler, staff director; Stewart French, chief counsel; and Charles Cook, minority counsel.

Senator Moss. The subcommittee will come to order.

We will resume our hearing on S. 1219.

Mr. George Clyde, county supervisor of Santa Barbara County, agreed to wait over until this morning to present his testimony. We will call on Mr. Clyde now.

We are very happy to have you here. Santa Barbara is about as far as you can get from Washington. We know you have had a long trip. We do appreciate your coming to testify on this most important bill which we are considering.

I see you have a prepared statement. You may proceed in any manner you choose. You may wish to read it; you may wish to put it in the record and highlight it. The choice is yours, sir.

STATEMENT OF GEORGE CLYDE, COUNTY SUPERVISOR, SANTA BARBARA COUNTY, CALIF.

Mr. CLYDE. Thank you, Mr. Chairman.

If I may, I would like to present my statement. I have made certain deletions and additions to it. I think I can proceed better if I present my statement.

Senator Moss. Sometimes I encourage witnesses to put in their statements and comment on them, and then I wished I had had them read it in the first place.

Mr. CLYDE. As you say, I am a member of the Board of Supervisors of Santa Barbara County and I am here in that capacity. We are here today to testify on legislation which will determine the future of a significant, valuable part of this country. But before we talk about that future, we must talk about the present and, very briefly, about the past.

The current blowout, the voluminous spill and the tide of thick oil started 4 months ago and blackened miles and miles of our beaches.

Today, the oil continues to spill in polluting, contaminating quantities, which continually feeds and replenishes the large slick in the channel.

Today, or possibly yesterday or tomorrow, depending upon the whims of tides and winds, the oil washes ashore to foul our beaches.

I would like to pass among you the small pictures, and if necessary the small pictures can be kept for your records—the small pictures can certainly be kept—some pictures that were taken. This large picture was taken of the spill as it occurred on May 6, which was the ninth day of the spill.

I also have some other pictures which can go in your record. There are about seven in number, I believe. They were all taken within about an hour or hour and a half of each other on Sunday, May 4, between 8:30 and 10 a.m.

The first two pictures show a beach at Montecido, about 4 miles east; the second show Ledbetter Beach, parts of Santa Barbara, where President Nixon landed, and it was clean at that time when he landed back in April; another one shows a different type of oil coverage, taken at the same time, the same day, on May 4, in Santa Barbara.

Then there are a couple of closeup pictures showing what the oil looks like on the beaches. If you would pass those around, I would appreciate it.

I would also want to point out that those beaches were that way between 8:30 and 10 on that Sunday morning. Most of those beaches were clean, at least to appearance and picture taking, by noon, because we had some 300 men who are now working each day, including, many of them, on Sundays, cleaning the beaches. This is every single day, as of today. Some are working on earlier pollution, but many are working on each day's new deposits.

I also want to read and put into the record a press release by Lt. George H. Brown, of the Coast Guard, released on May 15. It says:

Aerial surveillance conducted May 14 and 15, 1969, indicated seepage in the vicinity of the Union Oil Co. platform A continues at an undiminished rate. Numerous slicks, streaks, and patches of oil ranging in consistency from iridescence to black oil were noted in the area from Pitas Point to Goleta Point out to 6 miles. The irregularity and scattered nature of the slicks makes more definitive description difficult. No new deposits of oil were noted on the beaches.

As I say, the oil comes in some days, and some days it does not come in. The news press article of the 17th, which was Saturday, indicates that certain beaches were heavily contaminated again on that day.

Through generations, Santa Barbara City and County has fought hard and successfully, to maintain the area as a desirable place to live. As a result of this, it is an area which draws tourists, retirees from all walks of life, educational institutions, and research-type, smoke-free industries. We have done this ourselves through stringent zoning ordinances. Therefore, in 1968, 80 percent of the income of the south coastal section of Santa Barbara County came from these environmentally oriented sources. This is what we wanted, and this is what we have made profitable.

Now, with what is happening, this whole environment is threatened, and if drilling is allowed to continue, this environment is doomed. It is purely and simply a case of letting one industry suffocate many others and destroy a way of life.

If I may briefly explain this map, which is our map, we do things backward. The blue is the land masses. These are the islands off Santa Barbara. This is the Santa Barbara coastline, the city of Carpinteria down here the city of Ventura, and here is Goleta. Pitas Point, I believe, is right here, which I referred to, and Goleta Point is off here.

This is a State sanctuary, enacted in 1955, which extends 16 miles in width, 3 miles offshore. This is the buffer zone that was alluded to yesterday, which I will allude to.

The area in yellow was the area offered in December 1967 and bid upon in February 1968. The entire yellow area was offered for bids by the U.S. Government.

The X's indicate the areas that were either nonbid on by the oil companies or rejected, or the bids were so low that the Government rejected them. I think the Government rejected four, five, or six bids, and the rest were not bid on by the oil companies. I will discuss those in a couple of moments.

As a result of this ongoing spill, the Secretary of the Interior has taken several steps, many woefully inadequate. His establishment of a permanent ecological preserve, and the adding of six previously offered parcels as an additional buffer, sounds great but means practically nothing. The ecological preserve had, in effect, been in existence before as a buffer to protect the State sanctuary. That is that area in darker green and that was established earlier.

The fact that he made it a permanent ecological preserve may have added some strength to it, but undoubtedly what the Secretary giveth, he, or his successor, can taketh away.

The adding of the six-parcel buffer really is nothing. These six parcels all were offered for lease in February 1968. Five of them were so poorly thought of by the oil companies that they did not even bid on them. The bid on the sixth was so paltry that the Government rejected it. What of substance did the Secretary give? It was nothing. It was meaningless froth. It was sham.

The six parcels that I have referred to are shown here (indicating). This one was rejected and the others not even bid on by the oil industry.

For the rest of the area, the 71 leased parcels, the Secretary of the Interior issued new regulations and he has proposed other regulations which are now subject to review and comment. He has also permitted drilling to start in some of those, in five of those parcels, which is one of our reasons for supporting this bill.

We believe that these regulations, both issued and proposed, really do little, if anything, for our particular problem in the Santa Barbara Channel, although they may be beneficial to other less hazardous areas. It is our belief that they will not prevent the inevitability of more disastrous spills if drilling is allowed to continue in the channel.

The current blowout came on the fifth of a proposed 180 wells to be drilled on this one 9-mile square lease alone.

Again, for your identification, this is the blowout platform (indicating) and this is the lease that we are talking about right here

(indicating) at the moment. As I said, it was the fifth well of a proposed 180 wells. The projected drilling program in the Federal waters is just in its infancy.

If drilling continues, we are talking about 1,000 to 4,000 more wells on these 71 leases.

Yesterday, Dr. Pecora said, if I understood him correctly, that there had been a history of 25 blowouts in some 10,000 offshore wells. This means an average of $2\frac{1}{2}$ blowouts per 1,000 wells. This could mean 10 more blowouts in the Santa Barbara Channel if drilling is allowed to continue. And that figure is based on an average, not on the hazardous conditions in the channel.

Regardless of new regulations, the simple laws of chance dictate more uncontrollable, devastating spills.

Among the Secretary's new regulations is one covering pollution control equipment. Gentlemen, it provides for the identical equipment—booms, skimming apparatus, and chemical dispersants—which have proved ineffective in the current spill.

What we are saying is that the technology has not developed to the point where either prevention or abatement of such a catastrophe in the Santa Barbara Channel is possible. Both oil industry and Department of the Interior officials have testified before congressional committees—and testified again yesterday here—that there is no guarantee against future blowouts.

Just last week, Dr. John Calhoun, Chairman of the President's Scientific Panel studying this specific problem, said: "It would be foolish" to say there could not be future accidents. This is the dilemma in which all those who even think of resuming drilling find themselves.

Dr. Lee DuBridge, President Nixon's Science Adviser, rightly tells the science panel that there is "an absolute need for prevention of oil spillage resulting from the drilling."

The panel's chairman then has to comment, "It would be foolish to say that you couldn't have an accident, just as the Interior and industry spokesmen testify that no prudent petroleum engineer could guarantee that there would not be future blowouts."

Accidents and blowouts will happen, and, gentlemen, we cannot survive any more blowouts or accidents.

What we are saying is that the Santa Barbara Channel and its surrounding area present unique problems. But I think the oil industry says all this much better than I can.

I will file with you copies of this suit that was referred to by Mr. O'Brien yesterday. They are suits brought by oil companies against the United States Government. I think it is necessary to quote about four paragraphs from these suits. They state the case, really:

At the time when the United States solicited bids and substantial bonus payments for oil and gas leases under the waters of the Santa Barbara Channel, the United States knew or should have known, as plaintiffs did, that hazards beyond the control of the operator accompanied offshore petroleum exploration and production, including both hazards created by the natural environment and hazards created by the activities of other men, such as collisions of ships with drilling platforms or equipment and damage to pipelines to shore by ship anchors.

13. The United States also knew or should have known at this time, as plaintiffs did, that the Santa Barbara Channel area was characterized by deeper water, greater tectonic activity, a greater density of subsurface faults and fault zones, and more frequent and intense earthquake and other seismic activity than most, if not all, other areas in which offshore exploration for and production of oil and gas had theretofore been attempted and that each of these conditions increased

the likelihood of well blowouts, pipeline breakage, and other causes of inadvertent spillage or seepage of oil.

14. The United States likewise knew or should have known at this time, as plaintiffs did, that it was generally understood in the petroleum industry that the possibility of well blowouts is, roughly, inversely proportional to the available knowledge with respect to subsurface geologic conditions and that the geologic knowledge of the subsurface outer continental shelf areas under the waters of the Santa Barbara Channel was even more sketchy and uncertain than the geologic knowledge available with respect to onshore oil-producing areas and most other submarine offshore oil-producing areas in the United States.

15. Thus, when the United States solicited bids and substantial cash bonuses for oil and gas leases under the waters of the Santa Barbara Channel in which the Government proposed to lease oil and gas rights was only a few miles from a heavily used and intensively developed stretch of the coast of California and that, in addition, the channel area was a habitat for many species of marine and other forms of wildlife.

You will note that in each of the allegations the suit contends that the United States "Knew or should have known" of these conditions.

Well, if the Federal Government didn't know these things when it let the leases, it most certainly knows them now and must do something about it.

Along the same line, we have the recently-released testimony of Mr. William T. Pecora, Director of the U.S. Geological Survey, given before a House committee. After stating that this is "a horrible situation to be placed in," he said:

If we are asked as a fact-finding agency to come up with a fair market value for a lease sale that is being proposed, we have to do it by extrapolation from other knowledge we have into the unknown area.

We have to do it by theoretical analyses, by knowing what a similar situation is worth. We have to arrive at fair market value from what is available in the published arena for reference, or do it from scuttlebutt.

The people of the United States can rightly ask the question: "Should this bid have been higher on which the lease was given?"

Mr. Pecora was talking of money. I think the more important questions the people of the United States should rightly ask are:

Should these bids, with all this lack of knowledge, have ever been let? Wasn't the granting of these leases a risk that borders on willful negligence?

Referring to Dr. Pecora, I think this committee should remember that he was and still is head of one of the sections of the Interior Department which was so bent on getting this area leased as quickly as possible. It was this section that was, as testified to yesterday, cocky about the offshore drilling program and extremely confident of there being no problems.

I think it is significant and not merely a slip of the tongue, that Dr. Pecora yesterday referred to "our industry representatives."

Very frankly, this reflects an attitude we have constantly found over the past 2 or 3 years in the Mineral Resources Section of the Interior Department.

I think it is also significant that we have had no one here from the Federal Government to testify as to past, present, and future human environmental factors.

Incidentally, as an aside, I might comment that the president of Standard Oil was quoted rather lengthily talking about the possibility of oversupply now on the west coast, and commenting to the stockholders that Standard Oil Co. of California would be in a good position if there were oversupply because it has the most stations and in areas where you have oversupply the one that has the most

stations comes out the best. So I think we are faced with the possibility of an oversupply instead of an undersupply.

A week ago Sunday, Secretary Hickel indicated that, with the discovery of new reserves in Alaska and elsewhere, it might be possible to take a look at the leases directly off the sanctuary in the Santa Barbara Channel.

This is a step in the right direction. He made a distinction, however, between those leases off the sanctuary, and other leases in the channel. There is no distinction. If a well blows out and spills occur—as they will—it does not make any difference where in the channel this occurs. Such spills will further pollute our waters and beaches.

You will get testimony as to what the tides and winds do. It doesn't make any difference that this happened to be $6\frac{1}{2}$ miles off. If it happened off in deeper water and spilled there, you would have had the same problem. Maybe not on the Santa Barbara coast; it might have been down around Los Angeles. You would have had the problem somewhere.

There are those who say the solution is to drill and produce the entire channel as fast as possible. In this way, they contend that you remove the oil and pressure and there can presumably be no more leaks.

In this way you may also, they say, solve the natural seeps that have been with us from time immemorial and have never caused more than very minor inconvenience. I would like to stress that.

They go on to indicate that such an action would prevent a future earthquake from possibly causing a damaging spill. We have lived very easily with our natural seeps and the possibility of an earthquake-caused spill. We would prefer to go on living with our trust in Mother Nature and without these devastating manmade offers of help.

Here we come to a most important point. The statement has been made time and time again that these leases have been let, that they are valid contracts and, that while maybe we should not lease any more lands in the channel, we should allow these leases to be developed.

As I pointed out earlier, if such development is allowed, you are sealing the fate of Santa Barbara and the surrounding area—you will have more disastrous blowouts and spills. If you let these 71 parcels be developed, there will be nothing worth saving when the question of additional leasing comes up.

At some point, and we have now reached it in the case, human values become more important than monetary gain, whether it be the monetary gain of the Government, the oil industry or both. At this point, the Government should use, by some methods, its inherent right of eminent domain for public good.

No, I don't think this administration or Congress can or will want to hide behind the admitted mistakes of the previous administration. When past mistakes become known, swift corrective action should and must be taken. This administration is moving boldly in other areas against what it considers mistakes of the past—it should move no less boldly against this tragic mistake.

We support Senator Cranston's bill, S. 1219, and any legislation which will ban drilling in the Santa Barbara Channel. A ban on such drilling is our primary goal for it is here that the greatest threat of uncontrollable spills exists.

Finally, I want to stress again that the ban should be on all the channel—not just a part of it—for pollution and severe damage will occur to the coastline regardless of where the spill occurs.

I should like to file with you copies of a resolution of the board of supervisors supporting a permanent ban on drilling in the entire channel, and I should also like to pass around, for the file, copies of a news press supplement of March 7, 1969, which shows some pictures of the early days of the spill and the platform. It does not show the current condition. There is some reference to methods of cleanup. It does show the boat and how they have been cleaning it up.

Thank you, gentlemen. We are deeply appreciative of the opportunity to testify before you.

You will have further testimony from people from Santa Barbara who are much more technically oriented than I am this afternoon, but I will be happy to attempt to answer any questions.

Senator Moss. Thank you, Mr. Clyde.

The resolution of the board of supervisors will be included in the record.

(The document referred to follows:)

**RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SANTA BARBARA,
STATE OF CALIFORNIA**

Resolution No. 69-60

IN THE MATTER OF REQUESTING THE PRESIDENT OF THE UNITED STATES, THE GOVERNOR OF THE STATE OF CALIFORNIA, THE DEPARTMENT OF THE INTERIOR, AND THE STATE LANDS COMMISSION TO PERMANENTLY HALT ALL OIL WELL DRILLING OPERATIONS IN THE FEDERAL AND STATE WATERS OF THE SANTA BARBARA CHANNEL

Whereas, the County and City of Santa Barbara are possessed of unique natural beauty, particularly in the shoreline area; and

Whereas, due to the beauty and natural setting of Santa Barbara, tourism is one of the principal industries and essential to the economic well-being of the area, and the same natural resources of climate and beauty have made it one of the most attractive residential and recreational areas available; and

Whereas, the Legislature of the State of California has recognized these facts in establishing a sanctuary offshore of the City of Santa Barbara in which no oil leases or oil drilling operations are permitted in order to preserve the natural beauty of the area; and

Whereas, in spite of assurances from the Department of the Interior and the oil industry that adequate safeguards would be implemented to prevent pollution of the ocean, beaches, and harbor, there has been a major and disastrous oil spillage from the drilling operations on a lease in federal waters. This spillage has created a hazard to public health and safety and has resulted in incalculable damage to the natural resources of Santa Barbara as well as loss of income to hotel and motel owners, fishermen, restaurant owners, and other waterfront related businesses, has resulted in extreme hardship and financial loss to commercial and pleasure boat owners, and has caused significant depreciation of beach front property land values; in effect the oil industry is profiting at the expense of property owners and previously-established businesses; and

Whereas, it is known that the geological structure of the Channel is fundamentally unstable and it has been demonstrated that great uncertainty exists as to the consequences of drilling well holes into the faulty and weak structures of the Channel floor; so long as any oil drilling operations continue in the Santa Barbara Channel there exists the constant danger, indeed, the extreme likelihood that there will be another major oil spillage; in fact, structural failures and weaknesses, earthquakes, human accidents, collisions by vessels, and other catastrophies or acts of God are unpredictable and beyond the scope of "valid assurances" or "valid guarantees;"

Now, therefore, be it and it is hereby resolved as follows:

1. That the President of the United States, the Governor of the State of California, the Department of the Interior of the United States, and the State Lands Commission be, and hereby are, respectfully requested and urged to order permanent cessation of all oil drilling operations in federal and state waters in the Santa Barbara Channel.

2. That the Clerk be and he is hereby authorized and directed to forward certified copies of this resolution to Richard M. Nixon, President of the United States; Walter J. Hickel, Secretary of the Interior of the United States; Senator George Murphy; Senator Alan Cranston; Congressman Charles M. Teague; Ronald Reagan, Governor of the State of California; Senator Robert J. Lagomarsino; Assemblyman W. Don MacGillivray; and the California State Lands Commission.

Passed and adopted by the Board of Supervisors of the County of Santa Barbara, State of California, this 10th day of February, 1969, by the following vote:

Ayes: George H. Clyde, Joe. J. Callahan, Daniel G. Grant, Francis H. Beattie, and Curtis Tunnell.

Noes: None.

Absent: None.

Senator Moss. The news supplement and the copies of pleadings in various suits filed will be incorporated by reference, and will be in the files of the committee, but will not be reproduced in full in the record when it is printed.

I might add at this point I also have a letter from Thomas L. Kimball, executive director of the National Wildlife Federation, supporting the principles of S. 1219, which will be made a part of the record.

(The document referred to follows:)

NATIONAL WILDLIFE FEDERATION,
Washington, D.C., May 20, 1969.

Senator FRANK E. MOSS

Chairman, Minerals, Materials, and Fuels Subcommittee, Senate Committee on Interior and Insular Affairs, New Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: Thank you for the invitation to comment upon S.1219, "to direct the Secretary of the Interior to take certain actions, and make an investigation and study, with respect to drilling and oil production under leases issued pursuant to the Outer Continental Shelf Lands Act."

Rather than appearing, I should like to request that this letter be made a part of the record for the current hearings.

We support the principles expressed in S.1219, including that which would terminate drilling in the Santa Barbara Channel and suspend all drilling offshore from California until an investigation and study can be completed and evaluated. We also are convinced that such a study, going into the determination of methods which will remove the threat of oil production and other damage to the environment and ecological community, has much merit. In previous testimony before other Committees of the Congress this year, the National Wildlife Federation expressed the belief that oil production should be terminated in areas offshore from outstanding public recreational beaches and/or wildlife areas and such a prohibition certainly should include the beautiful area off Santa Barbara.

We recognize that the U.S. has benefited financially from offshore oil leases and believe there is an obligation to make restitution to any firm which is prohibited from exploiting its lease. Therefore, we hope the Subcommittee will seriously consider a plan which, in principle, would exchange oil leases in the Santa Barbara Channel for those of equal value which are located ashore.

Again, we thank you for the opportunity of making these observations.

Sincerely,

THOMAS L. KIMBALL,
Executive Director.

Senator Moss. We certainly appreciate your testimony, and recognize the responsibility that evolves upon you as a member of the board of supervisors of Santa Barbara County.

I suppose none of us can comprehend fully the great damage that has come upon you and the apprehension you have. I know we have an appreciation of it. I want to assure you that the committee will be looking at the matter and trying very hard to find a solution that will give us as much assurance as humanly possible that there will be no continuation of recurrence of the oil spill.

We had testimony yesterday about the continued seepage of oil still coming to the surface, and some of your pictures verify that fact. What is your answer to the suggestion of some that in order to relieve the pressure you must produce from the wells? I know you referred to that very briefly in your statement. Would you prefer that there be a cessation immediately, just hoping that the leakage subsides, or are you willing to accept the word of some of the experts who say that if the oil can be withdrawn and the pressure reduced, then you wouldn't have any problem, or the problem will diminish more quickly?

Mr. CLYDE. Senator, the reference in my testimony was to statements which have been made. They were not made here. They have been made that the solution to the overall channel problem was to get the oil out of all the channel.

What you are referring to, I believe, is the particular pool and the particular lease and the particular leak that we have now.

Senator Moss. Yes.

Mr. CLYDE. As it was testified yesterday, this is a comparatively restricted pool, restricted to the Union lease, and to a portion, I believe, of the Sun lease that adjoins it.

If further drilling of the shallow sands, or any further drilling, is the ultimate, I would prefer it to be the ultimate solution. I would prefer to try some other solutions.

I think that you will have testimony this afternoon as to one possible solution. I don't know.

Dr. Pecora mentioned four models. I don't know what they are going to come up with as to possibilities. I would like them to try everything, and I know they have tried a great many things. I know the Union Oil Co. and its partners have expended a great deal of money and a great deal of effort doing a great many things. I would like them to try every reasonable measure before they do more drilling.

I am concerned that even with the new regulations, the greater casing and everything else, that in this area you may have another blowout.

If you have another blowout and oil coming again through the fractured area, the thin crust or the thin sands, you will have this repeated.

So my answer to you directly, sir, is that if it is the ultimate solution, yes, I will accept it as the ultimate solution on this lease, if this is what they finally come up with.

Senator Moss. Accepting that on this particular rather confined pool of oil, as the geologists say it is, you would then like the Cranston bill to apply and have a termination of the drilling in all of the Santa Barbara Channel?

Mr. CLYDE. That is correct.

Senator Moss. Would your recommendation apply to the State as well as to the Federal Government?

Mr. CLYDE. Our resolution calls for a ban on drilling in all waters, and it is addressed to both the Federal Government and the State of

California. It calls for a ban on drilling of all waters in the Santa Barbara Channel.

Senator Moss. How extensive is the Santa Barbara Channel? Is all of this area you show on your map considered the Santa Barbara Channel?

Mr. CLYDE. I believe it is referred to as the Santa Barbara Channel. This was the Santa Barbara Channel leasing program. I think it would be considered the Santa Barbara Channel.

Again, I think the testimony, if there is an opportunity in time, will come out this afternoon in questions, probably.

Again, because of the peculiar winds and tides a spill anywhere can go anywhere in that channel. It just so happens that this was in winter, and, as a result, I think, Santa Barbara got the worst amount of it.

I have heard experts indicate that if this spill had occurred in summer, the tides and winds would have taken it down and the majority of oil would have landed in the Los Angeles area, on the Los Angeles beaches. It depends on the time of the year. Some of this has gone down as far as Malibu, I think. There will be testimony on that this afternoon.

Senator Moss. Is that point in the upper left Point Magu?

Mr. CLYDE. No. Point Magu is down near Los Angeles. This is Ventura, and Point Magu is probably in this area [indicating].

Then the other side heads up to San Francisco. This actually lies east and west, Senator. Everybody thinks we refer to it as north and south, but it is east and west. The Los Angeles area is east of us.

Senator Moss. One of the relevant facts I learned as a boy is, if you laid a straight line down from Reno, you come out west of Los Angeles.

I recognize the coast runs more east and west than any other direction. I was trying to explore the extent of the channel. It would be roughly the lands lying between the three offshore islands and the mainland.

Mr. CLYDE. Well, you have four offshore islands. This smaller one is an island and a very important one. So, really, this is the channel. I think it is depicted on the map.

Senator Moss. Thank you very much, Mr. Clyde. I appreciate your testimony. I am very much concerned about the great problem you have and the need to find a solution for it.

Senator Allott?

Senator ALLOTT. I just arrived a few moments ago, Mr. Chairman. I will defer to Senator Jordan.

Senator Moss. Senator Jordan.

Senator JORDAN. Thank you, Mr. Chairman.

Mr. Clyde, you make a very strong statement for the Cranston bill. Let me ask you this: Are the hazards of wells in operation controllable? That is, in producing wells in the channel.

Mr. CLYDE. Is there a hazard in producing wells?

Senator JORDAN. Yes.

Mr. CLYDE. I think there is a hazard in producing wells, Senator. I don't think that the hazard is as extreme as it is in these wells. Again, I am not a technician on this. But if you do have a broken pipeline, if you do have a broken well line somewhere, they do have

various valves to stop it. But even if those don't stop it, it seems to me you are dealing with something that is already in existence, that you can get down and cap that particular one. You are not dealing with something that has blown out of control and is permeating other sands. I think to answer your question, yes; it is a hazard. I think it is a lesser hazard.

Senator JORDAN. I am not an oil man, but I wondered if there was a hazard of collision with the platform of a producing well, a hazard that a hurricane might break them.

Mr. CLYDE. Luckily, we don't have hurricanes. I think earthquakes are possible hazards, and I think collision is a hazard. There is no question about it.

Senator JORDAN. Have you had any difficulty with the State wells that have been drilled in the channel?

Mr. CLYDE. We have had no difficulty compared to this, and we have had comparatively very minor difficulty. I think it ought to be pointed out again, if I may go to the map for one instant, and my figures are subject to minor correction, I think that through this entire area, all the way to the Santa Barbara County line—I have forgotten how many leases have been let on the State lands—there have been about 170 in this entire area that have been drilled, of which, again, I think, about 120 or 130—I am sure the oil people can correct me—are oil wells, and the others are gas. At least at the present levels, and as far as I know, these fields are depleting. In other words, there is one I have been told that is tending to be in its last years.

What we are talking about out in the channel is a very rich area, and an entirely different factor. We are talking about 170 wells, and—this has not been disputed—out here in the Federal area we are talking about 1,000 to 4,000 wells.

Senator JORDAN. But it is only one well that caused all the trouble, one blowout.

Mr. CLYDE. That is correct.

Senator JORDAN. When you are talking about 170 wells on State land, I was wondering what the comparable hazards are.

Mr. CLYDE. Again referring to Dr. Pecora's statement, 2½ out of every 1,000. Well, we have only had 170 drilled there.

Senator JORDAN. We were told yesterday that there has been a prohibition on more drilling on State leases in the area. Are you aware of that?

Mr. CLYDE. It is my understanding that I believe the prohibition is on this area. They were actually doing very little drilling at the time. But there is a prohibition on this area and I think it goes beyond this area.

Senator JORDAN. Is there a Cranston bill or its equivalent before the State legislature?

Mr. CLYDE. I don't believe there is an equivalent of the Cranston bill before the State legislature at the present time.

Senator CRANSTON. Yes, there is or will be a bill that is comparable.

Mr. CLYDE. There is a bill on control. Whether there is a bill to limit or not, I don't know.

Senator CRANSTON. I believe so.

Senator JORDAN. I wondered why the concern is with the Federal drilling. Although the blowout occurred on Federal land I think you

have an exposure on the State's leases as well. I wondered if a comparable effort was being made to control the drilling on the State land.

Senator CRANSTON. There are measures being submitted to the legislature that, if enacted, would roughly do what this bill before this committee does.

There are two aspects that make the problem more serious in the Federal domain. One is that in part of the Federal lands under the sea you have these very shallow deposits of oil, very close to the surface of the sea, with the strange geological circumstances that led to the blowout in the Union well.

Second, you get to greater depths as you move away from the shore. I gather the greater the depth, the greater the likelihood of danger of accidents and uncontrollable accidents.

Mr. CLYDE. Could I make one further comment, Senator, in connection with that?

The State is not the problem at the moment. The reason, as I testified, that we are back here is that the Secretary has already started allowing drilling to resume, and presumably, if he allows it on five leases, it will be a step-by-step process on the total 71, or a major portion of them. This is what we fear is our problem. I am sure if we get Federal approval, we will be able to get State approval for drilling.

Senator JORDAN. Wouldn't it be important to get the State prohibition first.

Mr. CLYDE. There was no drilling going on. You are the threat, sir. The Federal Government is the threat. There was no drilling going on by the State. There was one well that was in the process of being drilled. There had not been any for 6 or 7 months.

Senator JORDAN. There was only one well that blew out. Isn't one well a threat?

Mr. CLYDE. One well is a threat, but it is a question of magnitude, sir. I think that is our major problem. We have gotten from the State, to begin with, a sanctuary. We would like to extend it and expand it. We will pursue it. But it seemed to us that where the work is going on now is in the Federal area. There is practically no work going on in the State leases.

Senator STEVENS. Would the gentleman yield?

Senator JORDAN. Yes.

Senator STEVENS. Mr. Clyde, from what I understand, what you say, there is no drilling in the tidelands area of California on leases?

Mr. CLYDE. That is correct.

Senator STEVENS. Isn't there slant hole drilling off the beach?

Mr. CLYDE. Not that I know of.

Senator CRANSTON. It has all been suspended.

Senator STEVENS. For what area?

Mr. CLYDE. For the Santa Barbara Channel.

Senator STEVENS. The whole channel area?

Mr. CLYDE. For all of Santa Barbara Channel.

Senator CRANSTON. It has been suspended for the entire State.

Senator STEVENS. Is this by act of the State legislature?

Mr. CLYDE. No.

Senator STEVENS. On what basis?

Mr. CLYDE. By the State land commission.

Senator STEVENS. On what basis do you say it is a sanctuary?

Mr. CLYDE. I tried to cut down my testimony so I didn't go into a great deal of history. In 1955, this area here (indicating on map) was set aside by action of the State legislature as a sanctuary under which there would be no drilling for oil, to leases et, provided there was no draining of the sanctuary by wells on lands not owned by the State of California. On the shoreward side we have zoning ordinances and the charter of the city of Santa Barbara which prohibits oil drilling. These wells are on State-owned property so it is the State draining its own oil, so this was no problem.

In 1965, when the Supreme Court ruled that the area from the 3-mile limit out to this area, 3 miles from the island, was Federal Government property, then we immediately had a threat.

It was the result of negotiations and discussions with the Department of Interior that this original buffer zone, which has now been made an ecological preserve, was established by the Federal Government so that the claim couldn't be made by the State that if there was a well in that area it was draining oil from the State and opening up this entire sanctuary.

Senator STEVENS. What is the area covered by this bill?

Mr. CLYDE. The bill is 16 miles this way and 3 miles out. The bill before you covers the Santa Barbara Channel.

Senator STEVENS. It is much greater than the sanctuary you have from the State.

Mr. CLYDE. This is true.

Senator STEVENS. Are you seeking a similar sanctuary from the State along the whole coast of the Santa Barbara Channel?

Mr. CLYDE. We would like to prevent all drilling, yes. Senator Cranston indicates that there is a specific bill against drilling in the State lands.

As I said, with limited resources, we are hitting at where we think the problem exists at the moment and taking it a step at a time.

Senator STEVENS. Thank you, Senator.

Senator JORDAN. I have no further questions.

Senator MOSS. Senator Hansen?

Senator HANSEN. No questions.

Senator MOSS. Senator Cranston?

Senator CRANSTON. I have just one question.

Would you briefly outline for the committee the nature of support for this ban on drilling coming from the business community and business interests in the county?

Mr. CLYDE. We have resolutions that I think have been filed with this committee from the chamber of commerce, from the motel and hotel owners, from the city councils of the city of Santa Barbara and the city of Carpinteria. We have them from the real estate board.

Senator MOSS. And a few of your citizens signed a petition.

Mr. CLYDE. Yes; but the Senator restricted it to the business organizations.

I think the Advertising Club did, too. There are others. There are innumerable ones who have adopted it. But the real estate board is one, and the motel and hotel, the chamber of commerce—almost every organization has supported a ban on drilling. They haven't named, in most cases, a specific bill, as we didn't in our resolution, but supported the idea of a ban on drilling.

Senator Moss. Thank you very much, Mr. Clyde. You have made a very fine statement. I think you have brought to us the point of view and the desires of your people in Santa Barbara County. I want to assure you that we are seriously working at this matter. We recognize the grave problem we have and we want to find the optimum solution. We appreciate your coming to be with us.

The committee will now recess until 2 o'clock, at which time we have six very important witnesses scheduled to appear. We will try to start that hearing promptly so that we may finish, if possible, this afternoon, without running too late.

(Whereupon, at 11:50 a.m., the subcommittee recessed, to reconvene at 2 p.m. the same day.)

AFTER RECESS

The subcommittee reconvened at 2 p.m., Senator Frank E. Moss, chairman of the subcommittee, presiding.

Senator Moss. The subcommittee will come to order. We will continue with our hearings on S. 1219. The committee met this morning and heard from Mr. George Clyde, who is a county supervisor of Santa Barbara County. This afternoon we have several important witnesses.

First, we would like to call on Mr. Harry Morrison, vice president and general manager, Western Oil & Gas Association. I think you have some gentlemen who will accompany you, Mr. Morrison.

STATEMENT OF HARRY MORRISON, VICE PRESIDENT AND GENERAL MANAGER WESTERN OIL & GAS ASSOCIATION; ACCOMPANIED BY HARRY PISTOLE, HUMBLE OIL & REFINING CO.; FRANK R. DAVIS, PHILLIPS PETROLEUM CO., AND J. K. CASSELL, STANDARD OIL CO. OF CALIFORNIA

Mr. MORRISON. Thank you, Mr. Chairman.

Mr. Chairman, I have filed with this committee a copy of my statement. However, we have made certain changes and extensions.

Therefore, if I may have the privilege, I would like to read the statement as it has been amended.

Senator Moss. That will be satisfactory. You may proceed to do that at once.

Will you tell me who your friends are?

Mr. MORRISON. Yes, sir. I am about to do that.

My name is Harry Morrison. I appear here today on behalf of the Western Oil & Gas Association, of which I am vice president and general manager.

The Western Oil & Gas Association is a petroleum trade association whose members are engaged in the production, refining and marketing of petroleum and petroleum products in the six far-Western States of California, Arizona, Nevada, Oregon, Washington, and Alaska. Its members account for approximately 85 percent of the production and 90 percent of the refining and marketing in those States.

I am accompanied today by three industry representatives who will assist me in answering any questions you may have. These gentlemen are: Mr. Harry Pistole, Humble Oil & Refining Co. Mr.

Pistole is responsible for production in the Western region area for Humble. On my right is Mr. Frank R. Davis, of Phillips Petroleum Co. Mr. Davis is production superintendent for Phillips in the Santa Barbara Channel. On my immediate left is Mr. John Cassell, a petroleum engineer with the Standard Oil Co. of California.

Senator Moss. We welcome all of you gentlemen here. We are glad to have you before the committee.

Mr. MORRISON. Thank you, sir.

Our association is opposed to the enactment of S. 1219 for reasons which I will first state briefly and then in some detail.

We believe that enactment of a new law along the lines of S. 1219 is neither necessary nor wise. It would not serve the long-term best interests of the people of the United States. The short explanation of why S. 1219 would be an unwise law is that this Nation—as I will attempt to illustrate in detail in a few moments—must continue to discover and develop all of its potential petroleum resources. And by “all” we include those resources in the Outer Continental Shelf off California generally and specifically those in the Santa Barbara Channel area.

In addition, the bill is not necessary to protect the public against further incidents such as that at Santa Barbara. The Secretary of the Interior already has made the emergency suspensions of operations, or methods of operations, to study the problem there, has studied it and has revised and strengthened his regulations as he deemed necessary to protect the public interest.

He has since permitted work to resume on five leases subject to the newly revised and strengthened regulations, as covered under OCS Order No. 10. Reason, in our opinion, does not now dictate any need whatever to terminate drilling in the area.

As Dr. Pecora has testified before another committee of Congress, and before this committee yesterday, these regulations are much more stringent than those presently in effect on adjacent State leases.

Although not pertinent to the bill, so that there can be no misunderstanding of our position, in approving these revised and strengthened regulations, we would like to make it clear that we are meeting these regulations in both spirit and letter, but we are opposed to the absolute imposition of liabilities without fault.

We would direct your attention to the fact that while paragraph 1 of section 1 would direct the termination of drilling on these leases, it makes no provision for repayment for the property rights which would thus be taken.

In the absence of any qualifying language, we must assume that said termination would be permanent. Thus, the leases—which were bought and paid for in the open market under then-existing regulations and law—would have no value, and very costly and valuable property rights apparently would be confiscated without due process of law. I am not an attorney, but to me, a layman, this appears to be of somewhat doubtful legality.

Paragraph 2 of section 1 would suspend drilling operations on all other Federal leases off the coast of California pending completion of the study authorized by section 2.

As already noted, we believe suspension of drilling now to be unwise. Also, we are of the opinion that you will find that this study is under-way and it is a continuing thing in the Department of the Interior. That was also testified to in some detail by Dr. Pecora yesterday.

The provision 2 of section 2 directing an additional study to determine "methods of phasing out oil production" from the Santa Barbara Channel leases leaves us somewhat in the dark.

Presumably, however, any proposals made as a result of this study would deal with such presently unanswered questions as reimbursement for property rights. Your committee has already heard a good deal of testimony on that.

And now, with your kind indulgence, I will turn to the broader issues at stake. In my remarks which follow I hope that I can impress upon this committee why you—as custodians of one of our greatest natural resources supply areas—cannot afford to wall off those deposits which may lie beneath the seabed off the California coast.

Petroleum now supplies over 74 percent of the energy consumed in this country. In 1967, Americans used nearly 4.7 billion barrels of oil. Eighty percent of this supply was met by domestic crude oil and natural gas liquids production—over 3.7 billion barrels—while imports accounted for 20 percent, or close to a billion barrels.

Our Nation's total energy needs are expected to triple by the year 2000. In this same period petroleum demand will more than double. One can better understand the task facing the petroleum industry by considering that in the first 109 years of the oil industry, Americans consumed close to 100 billion barrels of oil. But in less than a third of this time—from 1968 to the year 2000—the Nation's domestic demand for oil is expected to represent a cumulative total of 233 billion barrels. That is an immense and stupendous number.

Despite the fact that requirements loom so big for the future, exploratory drilling in the United States has been sharply declining. Since 1958, the number of exploratory wells drilled in the search for new domestic petroleum deposits dropped 33 percent—from over 13,000 wells drilled 10 years ago to 8,878 wells in 1967.

The decline in exploration has had a serious effect on the Nation's proved reserve supply. In 1958, the Nation's proved crude oil reserves totaled 30.5 billion barrels and represented a 13-year supply.

By the end of 1968, however, the adequacy of our proved reserves had dropped to a 10-year supply, totaling 30.7 billion barrels.

So they went from 30.5 billion 10 years ago, proved reserves, to 30.7 billion 10 years later, an increase of a mere 200 million barrels of crude oil reserves.

They have stayed about the same, just an increase of about 200 million, but the demand has risen at such a great rate that it is clear that reserves are simply not keeping up with demand.

In fact, the actual reserves dropped 670 million barrels in 1968 from the year 1967, so that there was an actual drop in those reserves in the past year.

How much oil we have, or how much we use, is, however, really of secondary importance. The issue of first concern is when will the demand begin to painfully outrun our ability to produce.

As we have noted earlier, the United States is already importing about 20 percent of all petroleum supplies. This represents a constant outflow of American dollars to the detriment of our balance of payments.

The disparity between the steeply rising curve of world consumption and the productive capacity curve with slower rise will indeed be

felt by the United States if we do not take steps now to fully develop the potential oil and gas resources of our Continental Shelf.

The relatively shallow onshore deposits in this country which could be readily located have long since been found. But the cost of finding our offshore deposits will require an even greater capital outlay.

While it is not accurate to say that the State of California has been "drilled out," it has in fact been explored so intensively that there is at the present time not much expectation that any large increases in reserves will be found in the upland portions of the State. In fact, in those areas where one might expect to find oil—in upland California—our people have drilled one dry hole for every 1.7 square miles.

Until recently, the State's production was trending downward, while it has been temporarily reversed by opening the East Wilmington field to development and by intensified secondary recovery operations, many regard the State's upland areas as being "over the hill."

Because it is virgin territory adjacent to long prolific onshore oil fields, the industry regards continuous exploration in the Santa Barbara Channel and all other Outer Continental Shelf areas of promising potential as essential to maintaining a safe reserve/supply ratio.

You may well ask about the well-publicized potential increases to our proved reserves on the north slope of Alaska and may well wonder if the proving of these reserves may not make it unnecessary to develop some of our offshore areas in the south 48. We do not know how much oil we will get from the north slope. It is still an unknown quantity now. Therefore, we believe it would not be good judgment to jeopardize the future development of such readily accessible areas like the Santa Barbara offshore field and all other Continental Shelf areas of promising potential just because we think we will get a lot more oil from the north slope.

The north slope development has been a tremendous boon to Alaska, to the south 49 and to the free world, but we believe it will only just help to meet the demand of our U.S. economy.

Offshore oil operations are worldwide in nature. At the present time, active offshore exploration is being conducted adjacent to 35 countries, with 15 more expected to be added to the rolls shortly; U.S. companies have been the leaders in the development of the world's offshore oil resources and 50 percent of the present global effort is owned and financed by them.

Since other countries have recognized the importance of searching for new deposits of petroleum beneath the sea floor, it seems reasonable to expect that our Government would continue to encourage similar development. If our Government takes the position that it cannot endorse offshore operations in the Santa Barbara Channel, it may well encourage the taking of a similar position by foreign governments affecting offshore operations everywhere in the world.

The Outer Continental Shelf and slope adjacent to the United States consists of 1.2 million square miles. Less than 1 percent is under lease, that is, 9,375 square miles. The minuscule amount of land has yielded income to the United States of \$4.4 billion.

Outer Continental Shelf oil and gas revenues are now a major source of financing for the land and water conservation fund, which is used

to buy new parks and recreational lands. By law passed last year, this fund now receives up to \$200 million per year from OCS revenues. There are about 7,100 producing wells on the Outer Continental Shelf, and there must be more if we are to meet the staggering demands of our economy in the next 31 years.

In short, we as a Nation have no choice other than to continue to find and develop oil wherever it may be within our boundaries or under adjacent waters.

In the 13-year period between 1968 and 1980, oil's capital outlay to find, develop, refine, transport, and bring oil to market is expected to exceed \$200 billion. Most of this outlay should be spend in this country for reasons of national security.

These expenditures will be made in the United States if there remain attractive unexplored prospects on our Outer Continental Shelf.

The national interest of the United States requires the maintenance of a strong domestic petroleum industry with a supply capacity sufficient to meet such emergencies as the Middle East crisis of June 1967. In addition, foreign oil sources may become economically less attractive for U.S. importation as the foreign producing nations call for ever-larger payments for oil produced within their boundaries.

This, coupled with the constant threat of expropriation such as we witnessed in Cuba, Mexico, and now in Peru, makes exploration and development in the United States an integral part of national security.

Several suggestions have been made for trading off the Santa Barbara leases. Some of these include trading the as yet undeveloped Santa Barbara Channel area for proved reserves upland. Others would trade Santa Barbara for completely undeveloped areas.

The main point we would like to drive home here is that all of the potential areas in our country should be developed because we are going to need all the oil we can get. Any trading off of the Santa Barbara Channel would have a negative effect on national reserves.

As to making Santa Barbara a petroleum reserve, the lead time to obtain adequate production would be at a minimum of 3 years, unless drilling to an extent not now contemplated in the bill is permitted.

In other words, if the drilling were cut off now, that reserve would stay there. There would be no development. It would take 3 years or longer to bring it into a position of providing any production that would be meaningful or significant in the event of a national crisis. It is obvious that S. 1219 was introduced at a time when emotions ran high with respect to the extremely unfortunate blowout which occurred on a Federal lease in January 1969. At the time of the bill's introduction it was not known to what extent the environment and the ecology might be damaged; now, however, a clearer picture of the resulting damage is beginning to emerge.

You will understand, I am sure, that I cannot discuss the mechanical features of the January blowout in the Santa Barbara Channel because the matter is before the courts.

There is another good reason. I don't know. There is no question but what we deeply regret what happened in Santa Barbara—we just wish it hadn't happened—not simply because of the problems it has caused within and to the oil industry but certainly because of the problems and difficulties it has caused for the people of Santa Barbara.

Although we do not say that such an occurrence would never happen again, such occurrences are rare. This is borne out by the industry's drilling record offshore on both the gulf and Pacific coasts.

As you heard Director Pecora testify yesterday, and these results were arrived at separately, incidentally, more than 10,000 wells have been drilled on Federal and State submerged lands in these areas and 99.75 percent were drilled without incident--many under extremely difficult conditions.

We can say with certainty that there is a far greater probability of a major air disaster or a forest fire than a repetition of the events of January 28.

And it is interesting to note that when the air disaster occurs we will not shut down the airlines; when forests burn they will be reseeded and not closed.

Gloomy as these probabilities may be they are among the many risks that each of us lives with daily. We attempt to determine the cause of our problems, take corrective action to avoid any repetition of them, and go on. So should it be with the Santa Barbara Channel. Operations should be allowed to resume.

Much has been said about presumably high pressures. The term "tremendous" has been used in the Santa Barbara Channel. Actually, our people, who have drilled all over the United States, tell me that pressures are more normal in the channel than they are elsewhere. By normal, we mean there are fewer changes in pressures as a well is drilled, and the range in pressures is smaller. This is specifically true, for example, in comparing the channel with the Gulf of Mexico. There is no problem with pressures in the Santa Barbara Channel.

On April 1, 1969, five Santa Barbara Channel leases were allowed to resume operations. At that time, the Secretary of the Interior said:

I am putting into effect the most stringent possible regulations we can devise to safeguard our environment. These regulations set a new high standard which I hope all of our coastal states will follow.

This illustrates the redundant nature of S. 1219. Under existing legislation for conservation and prevention of waste, the Secretary has thoroughly examined drilling activities there and has promulgated new stringent regulations for resumption of operations.

In fact, the drilling regulations parallel efforts to achieve maximum safety by the industry itself. Among many things, the regulations require that each operation, that is, each platform or floating drilling vessel, have immediate access to booms and skimming apparatus along with approved chemical dispersants.

This equipment is now immediately available to all of our operations in the channel and is the best that is available today. However, we are not satisfied to merely use the best now available.

In order to develop better open-ocean booming and skimming equipment, the American petroleum industry, acting through the American Petroleum Institute, has impaneled some of the best talent in our industry, charging them to develop recommendations for systems which would efficiently contain and clean up oil spills. This work is presently proceeding and the results should be available within a very few months.

Earlier I mentioned that a brighter picture is emerging with respect to possible ecological damage. During the past few months, there has been considerable newspaper and magazine comment about the effect of the oil spill on the marine life in the Santa Barbara Channel.

Unfortunately, much of this comment has not been accurate and many persons have been honestly concerned about the welfare of mammals, fish, birds, and the general ecology of the channel.

Right after the January 28 blowout the association asked Dr. Wheeler J. North, Caltech marine biologist—that is, the California Institute of Technology—to put together a small team to find out the immediate effect on the plants and animals in the channel. We paid the researchers for their time, but Dr. North acted as coordinator and took no pay. We told him we did not want any review of any of his findings. He found no damage of any significance at that time.

We have since given a grant of \$220,000 to the University of Southern California for them to conduct a year-long study of the effect of oil pollution in the Santa Barbara Channel on ocean animals and plants. The study will be made and published with absolutely no review or interference by the oil industry.

As to whales, the Santa Barbara Channel was polluted during the annual migration of gray whales northward to the Arctic. Five whales beached during the migration and it was thought that they may have been affected by oil. It was subsequently determined that the cause of death of two of the whales could not be adequately determined without an autopsy. Autopsies were made by the Federal Water Pollution Control Administration Laboratory and showed no oil involvement. The other three whales died of clearly non-oil-related causes, according to the Bureau of Commercial Fisheries.

Later, reports hit the Nation's press that the sea-elephant/sea-lion population of California's San Miguel Island was threatened. These reports were based primarily on the inability of untrained reporters to distinguish between a dead seal and a sleeping seal.

Seals are completely somnal. They apparently sleep all the time and you have to kick them to get them to move around.

It is true that a half-mile stretch of beach not too far from the main herd area on San Miguel was coated with oil, but Federal personnel who watch the herd closely found no oil-related deaths.

A report from Dr. James L. Naviaux, Director of the National Wildlife Health Foundation, printed in the Congressional Record (April 25, 1969, pages S4083-S4084), confirms the finding "that the marine mammals on San Miguel showed no signs of injury from the oil pollution."

As I got on the airplane to come here Sunday, there was a story in the newspaper that morning that an observer had reported 150 sea-lion pups dead on San Miguel Island. This is a case history of misunderstandings and what can happen.

When I got here Monday, there was a story in the Washington newspaper, not that they were presumably dead from oil, but that they had died from oil.

Yesterday after the hearing, we called our office and we asked them if they had checked out this report. They told me this: As to the recent report of 150 sea-lion pups recently reportedly found dead on San Miguel, the California Fish and Game Department and the United States Park Service have checked it out. They told us that

this is the whelping season, and it is quite normal to find that many sea-lion pups dead at any one time. Many of the pups are stillborn, and others are born and die very quickly, very soon. So this is a normal thing that happened, and they said there was no connection with the oil.

But these stories get in the paper, and good people, who don't like that kind of thing to happen, are normally, and as one would expect, perturbed.

As a result of the January 28 blowout, there was considerable oil on the waters of the Santa Barbara Channel during the month of February.

The month was extremely stormy with all of the rivers draining into the Pacific Ocean running at or near their peak. A large amount of fresh water was discharged into the Pacific Ocean which, biologists tell us, either killed or drove away a majority of the ocean fish in the near-shore waters.

Because of the stormy conditions, and to a lesser extent the oil pollution, few sport fishing boats departed from coastal harbors.

Commercial fishing in the immediate channel area adjacent to the blowout on platform A was reduced during most of February. However, a sharp upswing was recorded in March—this, according to the California Department of Fish and Game—and present indications are that commercial fishing is normal.

As to sports anglers, their average catch was reduced slightly but the big problem is they are staying away because they are being told that the fishing is not good, whereas Lupi Saldana, in the Los Angeles Times of May 16, quotes the manager of Cabrillo Landing at Santa Barbara, in the center of town, as saying that there really hasn't been any damage done to the fisheries by the oil.

The manager said that "rock cod fishing has been good and a few salmon have been beginning to show but we haven't been able to get the message across to the fishermen."

Unfortunately, some damage was done to the sea bird population in the channel. However, the California Department of Fish and Game informs us that the birds are now reproducing and that the reduced population has increased by at least 1,000.

As to the beaches—and you have seen the pictures of this morning, and other pictures that, I think, will be introduced—they have been cleaned and a force of almost 300 men is being maintained at industry expense to keep them that way.

Incidentally, I would like to point out that Supervisor Clyde also, perhaps inadvertently, used the possessive pronoun "our". He said, "It was our men who are doing that work."

The oil industry is paying for the 300 men and will continue to pay for them as long as there is oil on the beach, and will continue to have that force at work to get the oil off. This activity, of course, will be sharply reduced as the oil disappears from the channel.

I, too, have some pictures. These are color pictures that were taken on May 9. They show—and I would like to briefly describe them, Mr. Chairman, and then hand them to you—not for the record, as I understand, but for inclusion in the files—people on the beach, a few people; they show some children playing. This is on May 9. This

is the Carpenteria Beach. Here is another beach west of Santa Barbara, clean.

I have another picture showing the Santa Barbara East Beach, east of the wharf. Looking at that map, it would be to your right on the map. It shows children playing. The Santa Barbara West Beach is clean.

And also a picture taken in front of the Biltmore Hotel where the oil did come up over the breakwater, got on the rocks. It has been sand-blasted and steam-cleaned. The beach is clean.

I have three pictures of the harbor at Santa Barbara, where the rocks have been sand-blasted and steam-cleaned.

And also some pictures showing the kind of work that needs to be done to clean up the beaches. What happens with this oil spill is that it tongues into the shore. It doesn't all come up at one point. It will lap in.

There is one picture that shows a series of dark elements along Summerland Beach, and where the oil companies are cleaning it up and moving it out.

There is another picture that shows the kind of thing that they run into.

Here is another picture that shows on one side of a pier at Rincon, where we have not gotten to it, where the oil is on the rocks, where you can see what it looks like, where immediately to the right there has not been any oil pollution because the oil has tongued in.

I don't want to attempt to convey the impression in any sense that the beaches are, (a) not hurt; or, (b) that a single cleanup of this kind solves the problem.

What I wish to convey to you is that the beaches can be cleaned. When that leak is completely stopped, those beaches can be cleaned for the last time and Santa Barbara will not be destroyed, which is the adjective that we have heard.

Along that general line, there have been some differences of opinion with regard to the condition of Santa Barbara. The Santa Barbara Chamber of Commerce has been running some advertising in national newspapers, which I will also hand to you, Mr. Chairman, which say, "Santa Barbara like it is today. Come play with us this summer."

And then there is some small type that says it is a very nice place, and it is. Then there is some other type that says "People are relaxing, playing, and strolling on our beaches today."

The pictures for this series of ads were taken, subject to correction, on or about April 26 and 27. The photographer, a commercial photographer who took the pictures, stated that he took about 1,000 pictures and he didn't find any trouble on the beaches.

I would also like to point out, so that there is no misunderstanding, that the Santa Barbara Chamber of Commerce, the people represented in that business and industry there, have felt the effects of this spill because of the adverse publicity throughout the Nation, some of which, as I pointed out, is not exactly correct.

They approached the oil industry and said, "We have a problem and we would like some help." The four partners on the platform on tract 402, which is where the leak is, said to them, "We will be glad to help you."

They have provided the money. So this money is paid for by the oil industry. I am not trying to cop a plea; I merely want to be sure it is

understood that we are paying for it. Somebody might say, "Well, after all, you worked up the ads."

Well, we did not work up the ads. All we are doing is paying the bills when they come to my attention, properly approved. We are not looking over the copy for review. We have nothing to say about the copy.

I would like to hand these to you for your perusal.

Senator Moss. Thank you.

Mr. MORRISON. One further point that has been under quite some discussion, and I think you may hear something about it later today, bears on the Santa Barbara Channel operations, is the consideration of forces of nature such as wind, waves, and earthquakes. Industry personnel and earthquake authorities have given specific attention to earthquake design to provide platforms that can withstand forces in excess of the maximum earthquake ever anticipated in the Santa Barbara Channel area.

These criteria even exceed design requirements specified by the California Uniform Building Code. I am informed that the structures are designed to be twice as strong as the requirement specified by the code.

In any case, they far exceed the code. In addition, there are automatic shutdown valves on pipelines and subsurface safety valves in producing wells to provide additional safeguards to pollution prevention.

Since the turn of the century in our area, extensive oil operations have been successfully conducted in areas subject to earthquakes without detriment to the environment.

You were told yesterday that there were 66 earthquakes in the channel in July of last year, but I would point out that there was absolutely no loss of oil.

Actually, when an earthquake of any strength, and these 66 were not, admittedly, of any great strength—when an earthquake of any great strength occurs, it will act to shut off the well, because what happens is that you have underground movement so that there is a shearing across, so that the well is actually specifically shutoff. It isn't broken open; it is closed.

Right at the bottom of the ocean level, where perhaps one might think that is where the shearing might not take place, there are automatic shutoff valves, and there is very little oil anyway, and there is no pressure because the shearing has cut off the pressure.

The pipelines to shore have been pointed out as another possible loss. Well, our people lay these pipelines in S-curves so that they can be flexible, not only for earthquake purposes, but there are currents and forces. You don't lay a rigid line that is subject to break anymore than you build a rigid building that would be subject to break. Pipelines are planned this way.

And if there were a break in the pipeline, there are automatic shutoffs that would take over. This would leave a certain small amount of oil in the line, but there is a differential weight to sea water, which weighs more than the oil, which would minimize the escape of that oil.

As I think a final proof about earthquakes, we have had many strong quakes in California, many in the San Joaquin Valley, where there is a tremendous amount of oil production, many of them in southern areas of Los Angeles County where, as you know, there is a tremendous amount of oil production.

We don't mind saying that we live in earthquake country because we don't fear them. We have no record of any pollution to the surface from subsurface damage to an oil well from an earthquake.

In summary, we believe that the enactment of S. 1219 is unnecessary. The Secretary of the Interior is already examining the drilling operations there on a lease-by-lease basis in the interest of safeguarding the environment. We believe the petroleum demands of the United States and the diminishing supply of onshore oil make the development of the Nation's crude supply essential, and we believe that trading the Santa Barbara Channel for an already developed area would add nothing to the Nation's proved reserves.

The companies that are members of Western Oil and Gas Association have years of experience in developing in the United States and elsewhere in the free world the millions of barrels a day of oil that provide most of the energy for our modern civilization. They are on the constant search for new techniques and better ways to do the job. The sum of their total knowledge as geologists, explorationists, and drilling and producing experts far exceeds the exposure to and the knowledge of any other group not working in the oil industry, although I may say we are always ready to accept advice. They have assured me that they believe that they have the technology and the ability to produce oil anywhere in the United States without overall significant harm to any other part of our society. This is their goal and this is their promise.

Mr. Chairman, we thank you for this opportunity to present our views on this vital matter to you and to the members of your subcommittee. We would be happy to try to answer any questions you may have.

Senator Moss. Thank you very much for your testimony, Mr. Morrison. We appreciate the position you have stated.

Is it the commitment of the Western Oil and Gas Association to continue to spend the moneys necessary to clean up whatever leakage there is now, and to go on finding a way to shut it off entirely?

Mr. MORRISON. Your question, sir, was with the Western Oil and Gas Association. That commitment has been made by the partners on 402. What they have said, as I understand it, is, "We had the spill," and they are cleaning up, and they are working on it, and they are going to get it to where it is completely stopped and cleaned up.

Senator Moss. What you are saying is that Union was the operator but there are others who were involved?

Mr. MORRISON. That is right, sir.

Senator Moss. And they are all sharing in the expense incurred?

Mr. MORRISON. Yes, sir.

Senator Moss. You said early in your testimony that our imports were about 20 percent. Aren't our imports limited to 12.2 percent by the oil import program?

Mr. MORRISON. As I understand it, they are. I believe this included some from Canada, and also they are not limited to 12.2 percent in district 5. As you probably understand and know, in district 5 the imports are limited to the difference between demand on the one hand and production on the other.

In district 5, the demand is about 1,950,000 barrels a day, and the production is about 1,250,000. There is 200,000 that comes in from Arizona, from the four corners, and the balance is 500,000 which is

imported. So at that point you have a total production of 1,250,000 and imports of 500,000, which would be a higher percentage than 12.2.

I believe, subject to correction, that that makes up the difference between the 12.2 and the 20.

Senator Moss. Your figure was for the overall U.S. imports?

Mr. MORRISON. That is right.

Senator Moss. There is one other matter that is probably technical, but perhaps the record should reflect it. The whole \$200 million in the Land and Water Conservation Fund is not chargeable to Outer Continental Shelf revenues. There are the usual forms of revenues that go into that, the Golden Eagle Passport, and so on. It is simply that Congress provided that any deficiency, any up to \$200 million that did not go from these other sources, would then be earmarked with revenues from the Outer Continental Shelf. It may be a good part of \$200 million or it may be a lesser part of that, depending on what the other sources of revenue are.

Mr. MORRISON. Thank you very much, Mr. Chairman. I stand corrected on that.

Senator Moss. I don't want to diminish the importance of having that revenue assigned in that way. It means that the States who get half of the money, or more than half of the money, from the Land and Water Conservation Fund and the Federal Government, are able then to plan their program for acquisition of outdoor areas and preservation of them as recreation areas, knowing they are going to have \$200 million to spend.

One of the great problems we have had in recent times is not knowing where we can turn for the money when we did find these places and were willing to set them aside. But we still didn't have the funds to purchase them with the pressures that have been on our budget in the last few years.

Oftentimes we just didn't have the money and a lot of these places were not acquired. Land speculation set in and we got into many troubles that we would have liked to avoid. I just wanted to clear that point.

It is the testimony of the Western Oil and Gas Association, and the members that you represent, that you think the state of the art is sufficiently perfected now that with the additional precautions that have been laid down by the Secretary you could continue the drilling for petroleum in the channel without any appreciable danger of a blowout, admitting there always could be one for some unexpected reason?

You think it has been minimized almost to the diminishing point? Is that what you are saying?

Mr. MORRISON. Yes, sir; that is our position.

Senator Moss. For that reason and for the demands you talk about, the growing demands for petroleum, you think you ought to be permitted to continue and we shouldn't have a bill of this sort?

Mr. MORRISON. Yes, sir; that is our position.

Senator Moss. Do any of you gentlemen who are accompanying Mr. Morrison have anything to add before we have general questioning? You are all available for questions, I take it.

Mr. PISTOLE. Right.

Senator Moss. I will ask Senator Jordan if he would like to ask questions of any of the gentlemen before us.

Senator Jordan. Thank you, Mr. Chairman.

I would like to get into perspective the dimension of the area we are talking about not only as to size but also the dimension of the reserves that are involved here. Just what is your concept of these geographical limits of the Santa Barbara Channel as described in subsection 1 of S. 1219, Mr. Morrison?

Mr. MORRISON. I don't believe, Senator, that the Santa Barbara Channel has ever actually been legally described. However, as a Californian, I would say it was from Point Mugu to Point Conception.

May I rise?

Senator Moss. Yes; you may go to the map, if you like.

Mr. MORRISON. Point Mugu, as pointed out this morning, is probably just off the map to the right, and Point Conception is up in the upper left-hand corner. I believe that is the area.

You have the island of San Miguel, Santa Rosa, and Santa Cruz. It is called a channel. You have these three islands, plus the fourth smaller one.

If you look there, it is just about north and south, in straight lines. Between the two areas is the layman's conception of what the Santa Barbara Channel is.

Senator Moss. How many miles would that be?

Mr. MORRISON. How many miles is that, Frank, do you know?

Mr. DAVIS. About 70 miles.

Senator JORDAN. What is the total area? What is the average length between the California shore and the islands?

Mr. MORRISON. It is about 25 miles. It is about 25 miles by 70. It about 1,800 square miles, I believe.

Senator JORDAN. What is your estimate of the value of the reserves that we are talking about in subsection 1 in the Santa Barbara Channel.

Mr. MORRISON. First of all, we don't know what those reserves are because, in order to determine reserves, you have to do a good deal of drilling, and you have to know a lot more. You have to drill it out pretty well to have some good idea. There have been many estimates made. I am not trying in any way to not answer your question. I am trying go answer it the best way I can. If I just gave you a number, I might be misleading.

This is an extension, or a part, of a geographical and geological formation which runs from Newhall, which is a town at the north edge of Los Angeles County, and runs out under the ocean.

In terms of miles or area, it might be considered to be one-third of the total, the area upland. That area that has been drilled out, which is the Newhall area, the Ventura avenue, probably would run about 2 billion barrels ultimate recovery.

So if 2 billion barrels is one-third, then two-thirds would be 4 billion barrels.

In 1958, when we first formed our Offshore Operations Committee, not long after the State Shell-Cunningham Act, the chairman of that committee estimated, without really knowing, 4 billion barrels reserves. I will not say that those are the reserves, but those are the kinds of estimates that we are talking about.

Senator JORDAN. The figure you just gave would be in the neighborhood of 6 billion barrels?

Mr. MORRISON. That, sir, would be the total including the already developed upland area. I took 2 billion on the upland and I extended it out, the upland being one-third, the offshore being two-thirds, so about 4 billion barrels.

Senator JORDAN. How does 4 billion barrels compare—and I am not an oilman—with the annual consumption of oil?

Mr. MORRISON. 4.7 billion, sir, is the annual consumption in the United States.

Senator JORDAN. This is less than 1 year's reserve with the present use?

Mr. MORRISON. That is correct.

Senator JORDAN. Why would the industry object to setting aside this area as a reserve, as a known reserve, or reasonably known reserve, for emergency use?

Mr. MORRISON. If you don't drill out an area—and by drilling out, I mean prove it out to great depths, to a very extensive knowledge of the area—and if you don't produce it, if you just say, "Well, it looks like there are 4 billion barrels of reserve there," and a great deal of work is not done and it is set aside, then when the emergency arises there is the necessity of actually putting that province into production.

It is difficult enough to put a province into production in peacetime, or in a time when war is not imminent. But during a time when the crisis would arise, and there were tremendous other demands for material and men, with the normal leadtime of putting a province like this into production you might say 3 years, but to do it under war-time crisis conditions it might take 5.

So that is the reason that we believe that, although some people may think there is merit to setting aside reserves for wartime, we think the best way to provide oil ready and waiting for us is to have it in production, meeting demands, available.

Senator JORDAN. Do you recognize any unique characteristics of the area known as the Santa Barbara Channel?

Mr. MORRISON. I assume, sir, you mean with reference to the geology?

Senator JORDAN. I am thinking of the argument presented by the sponsor of the bill and others as to the unique character of the Santa Barbara area requiring special consideration.

Mr. MORRISON. If that unique character has to do with some possible difficulties in drilling, or some dangers in drilling because of unique substructures, highly varying pressures that one might meet which one could say would lead to a blowout because you have to take into consideration varying pressure changes, the answer is "No, we do not consider it as unique." We consider it as a very normal field.

Senator JORDAN. You are speaking geologically now, that you consider it a very normal field.

With respect to the nature of the drift from drilling, the water currents, the fact that any pollution that arises in Santa Barbara Channel tends to drift inward to the shore, does that give it any uniqueness as compared with other areas along the California coast?

Mr. MORRISON. I am not familiar with all of the areas along the California coast with respect to drift and current.

However, it is my understanding, but not my knowledge, though I have been informed, that the statements heretofore made are true, that there is a tendency for the water to drift, for the currents and winds to move the oil, at times, shoreward. I do not take issue with that statement, as I have been informed.

With reference to the other parts of California, I do not know. I may say that one of the things that we are doing on the ecology study, the one that I mentioned in my prepared text with the University of California at Santa Barbara, is measuring these drifts and currents, much work of which has been done and much more work will be done.

Senator JORDAN. You stated in conclusion a statement that I don't believe you substantiated with enough facts to make it convincing to me, at least.

You say, "If our Government takes the position that it cannot endorse offshore operations in the Santa Barbara Channel, it may well encourage the taking of a similar position by foreign governments affecting offshore operations anywhere in the world, everywhere in the world."

Isn't that a little far-fetched, that conclusion?

Mr. MORRISON. Really, Senator, I don't think it is. That may be a subjective viewpoint. I got a letter the other day from the Province of Queensland, if that is what they call them in Australia, and there have been some difficulties in Australia.

He wanted to get some information. He heard what the American Petroleum Institute was doing. He mentioned some problems in the North Sea.

I suspect, sir, that if this move were to be made, that on the basis of beauty, esthetics, damage, were to be made a basis for the cutting out of drilling, that the same arguments can well be made by the people of Australia with reference to the great barrier reef.

Certainly, the beautiful beaches of Holland, Belgium, and the beautiful countryside of eastern Britain—these people might have the same point of view.

Senator JORDAN. You think that denial of offshore drilling in the Santa Barbara Channel might be the catalyst to stop drilling elsewhere in the world?

Mr. MORRISON. Yes, sir.

Senator JORDAN. Mr. Morrison, given the benefit of hindsight, what could have been done to stop that blowout?

Mr. MORRISON. I don't know, because I am not familiar with the work that the contractor or the oil people were involved in.

Senator JORDAN. Do any of your colleagues care to reply to that?

Mr. DAVIS. Senator, we are unable to answer this question with any degree of certainty because we have not been advised of the conditions under which this occurred. I believe you will understand this, because of the court litigation and also because it is another operator.

Senator JORDAN. Are we to understand that this is one of the hazards of offshore drilling that is likely to occur x percent of the time?

Mr. MORRISON. If I understand your question, it is that one of the hazards of drilling is blowouts?

Senator JORDAN. Yes. Is this one of the hazards that go along with drilling offshore, the possibility of a blowout?

Mr. MORRISON. I think that possibility of a blowout accompanies drilling upland and on the Outer Continental Shelf and in the State waters.

We have made ourselves, I hope, sir, quite clear, in that we are not stating that this cannot happen. Blowouts can occur.

Do you want to enlarge on that, Frank?

Mr. DAVIS. While I concur with Mr. Morrison, I would like to point out that his testimony has revealed that in our opinion, under the new rules and regulations, and with the new techniques that will be devised and that are being used now, they are adequate to hold this to the bare minimal, and we think with a reasonable degree of certainty in our drilling.

Otherwise, we wouldn't be here with the idea of objecting to this bill.

Senator JORDAN. Do all of you agree that there are no unique characteristics of the Santa Barbara Channel that warrant special consideration?

Is there anyone on the panel who disagrees with that?

Mr. PISTOLE. Senator, I would like to address the problem of drilling in the Santa Barbara Channel specifically, and whether or not there is a unique problem in the Santa Barbara Channel.

I have been responsible for my company's operations in many parts of the United States, including the Gulf of Mexico, for their drilling operations, and I have to tell you frankly that my experience tells me the Santa Barbara Channel, in terms of drilling without blowouts, is a much easier problem than in the Gulf of Mexico.

This goes strictly to the geology.

I am going to take out tract 402 because I really do not have the facts under 402. I think you are aware, as most of us are, that that is in the courthouse, that the operator has testified at more than one hearing as to what he would do with hindsight. I don't have the facts to try to second guess him.

As far as our own operations, we simply find two things that are highly favorable in the Santa Barbara Channel. We are drilling in an area of normal pressure with very gradual changes in pressure with depth. We do not have normal faults to contend with, where you go from normal to extremely high pressures, as you do in much of the coastal part of the country.

You put these two things together and you have a drilling condition that is favorable insofar as preventing blowouts.

Senator JORDAN. Your conclusion is, then, that it is no more hazardous to drill in the Santa Barbara Channel than elsewhere offshore?

Mr. PISTOLE. Yes, sir, very definitely. In fact, less.

Senator JORDAN. Do you all agree to that?

Mr. DAVIS. Yes, sir, I do agree to that.

Mr. CASSELL. Yes, sir.

Mr. MORRISON. That is correct.

Senator JORDAN. That is all.

Senator MOSS. Senator Hansen.

Senator HANSEN. Thank you, Mr. Chairman.

I don't have a great many questions. I would like to ask a couple of a general nature.

First of all, there is no one, insofar as you gentlemen know, who is not concerned over this spillage of oil; who are eager and anxious to do whatever is necessary in order to avoid at almost all costs a repetition of it; is that a correct statement?

Mr. MORRISON. That is a correct statement, Senator.

Senator HANSEN. From what you know of the studies that have already been undertaken by the U.S. Geological Survey, under Dr. Pecora's excellent direction, do you know of any additional measures that he has not suggested, that might be taken or should be taken? Are there measures or steps that could ensue, different from those that have been indicated by the U.S. Geological Survey, were the bill before us for consideration now to be passed?

Mr. MORRISON. No, sir, we do not. I could say that because, as Dr. Pecora testified, these new regulations were developed by the USGS, but they consulted with us because our people are experts in the field and we made further suggestions.

I cannot be specific because I was not party to those. But there were further suggestions which we felt strengthened it. So at that time, I think I am correct, because of that, in saying that at this time we would have no further suggestions that could further strengthen those regulations.

Senator HANSEN. Is it fair to assume, on the basis of what Dr. Pecora and his staff may now conclude, that additional drilling may be indicated in order to relieve or to obviate the problem that you are faced with now?

Mr. MORRISON. Are you referring, sir, to tract 402?

Senator HANSEN. I am referring to drilling anyplace within the Santa Barbara Channel and the judgment of the U.S. Geological Survey that may possibly relieve some of the pressures or some of the conditions that contribute to the problem now, without any specific location intended.

Mr. MORRISON. This is a distinct possibility, that this could happen.

Senator HANSEN. Could it be that stopping all drilling, or any further development at this time, might be adverse to steps that Dr. Pecora would recommend taking in order to obviate this problem?

Mr. MORRISON. Again, you are referring to the entire channel?

Senator HANSEN. I am.

Let me say this: Broaden it however you want to. I am interested, as I know practically all Americans are, in two things: One, our national security and; No. 2, trying to come to grips in a meaningful, comprehensive way with this problem so as to bring it under complete control as quickly as possible and to assure as best we can no possible repetition of it.

Now, within that general framework, what I want to ask you is: Is there a possibility that, based upon the information Dr. Pecora has, he might want to take steps which conceivably could be denied him were this legislation to be passed?

Mr. MORRISON. You mean that he might want to recommend a great deal of drilling in the channel in order to relieve the downhole pressures and reduce the seepage?

Senator HANSEN. I have no idea what he might recommend. I simply ask you in your judgment is it conceivable that he might have fewer options to deal with the problem if this legislation were passed than he would without its being passed?

Mr. MORRISON. I can't honestly say, sir, that it would make any great difference, except for one point. If he were precluded from recommending drilling as a possible means of meeting the immediate problem and the overall problem, this bill would preclude him from recommending that.

Senator HANSEN. I think you have answered my question.

Do you other gentlemen have any further statements to make with respect to that particular response?

Mr. PISTOLE. Only, one Senator. You asked about additional comments with regard to the new regulations.

I did participate in my own company's recommendation to Dr. Pecora, and also as a part of the petroleum industry panel that studied the problem.

We gave the USGS our very best recommendations. I think they took the very best of the individual company's practices and combined them in these reservations.

Senator HANSEN. I didn't mean to imply by my question that in my judgment any steps should be taken.

I just don't hesitate to say, though, that I have great respect for Dr. Pecora's judgment, and I think whatever he suggests certainly will reflect his objective conclusion as to the best steps that may be taken to preserve and protect the public's interest.

I am just wondering about that part of it.

Mr. MORRISON. We agree.

Senator HANSEN. Let me say just for the record that I share the concern that has been manifested by the very distinguished junior Senator from California. I have some relatives living in an area not too far from there, and I know from them, firsthand, how concerned everyone is about this problem.

My approach may be a little bit different, perhaps, than that which has been suggested by others. I think this is a very technical, complicated, involved problem, and I am not presently informed enough to try to suggest legislatively what the Department and the various agencies of the Government ought to do.

I certainly do echo the concern of others that I hope they will take all possible steps to bring the problem under control and to see that there is no repetition of it.

I have no further questions, Mr. Chairman.

Senator MOSS. Thank you.

Senator CRANSTON?

Senator CRANSTON. Thank you.

I would like to say first, Senator Hansen, you have been smart enough to spot a real flaw in the bill which should be corrected. I will seek to prepare amendments to correct it, to make certain that if the Secretary of Interior feels that drilling should be carried on at any point in the channel in order to stop leaks that cannot be stopped in any other way, that this bill would not prevent that.

I will prepare an amendment to cover that very important point which you discovered.

Mr. Morrison, you spoke in your prefatory remarks on the nature of the association and its membership.

Have you received objections from any oil companies to your testifying against this measure?

Mr. MORRISON. Pauley Petroleum, which is the company that was partners with eight or nine others, I believe, that filed a lawsuit that has been discussed already, wanted us to be very sure to include in our testimony that we were opposed to this unlimited liability without fault.

I discussed at great length with the attorney for Pauley Petroleum this statement because, of course, they are in a position where they are filing a lawsuit to get their money back because they said they are asked to do something which they cannot now do because of the unlimited liability clause which has been added.

Other than that, Senator, they have said that they believe this statement is fair enough and they have not objected nor have they taken a position that they wished to testify otherwise.

Senator CRANSTON. Of course, they could not testify, or I gather they should not testify, while involved in a lawsuit. But is that the only portion of your testimony that any oil company found objectionable?

Mr. MORRISON. There was no portion that they found objectionable, Senator.

I said that Pauley wanted to be sure that we put that in.

Senator CRANSTON. I would like to ask Mr. Davis this question, which relates to some remarks he made a bit ago.

If you were not advised on the conditions under which the Union spill occurred, and if information relating to that occurrence and its causes may be tied up in court for a rather endless time due to the lawsuit that has been filed, how can you be certain that you will be able to prevent the exact same thing from happening again when you don't really know what happened?

Mr. DAVIS. Senator, we cannot be certain. We have made this very clear. But based on our experience in drilling, and particularly in the Santa Barbara Channel, where we have three platform operations at the present time, and having drilled in excess of 75 wells, I am convinced, based on the knowledge we have gained and the practices that we used, that we can do this with a reasonable degree of assurance that it will not occur in our operations.

Senator CRANSTON. But you stated you don't know what happened in this blowout.

Mr. DAVIS. I could not testify, sir, as to what happened. That is true.

Senator CRANSTON. You stated that you felt that new regulations will prevent it from happening again. But if you don't know what happened, how do you know that the new regulations will apply to what happened?

Mr. DAVIS. I know what the new regulations are, and I know that they are the best and the most stringent that have been imposed. They are the type of operations and regulations that we operate under. It is on that basis that I make this judgment.

Senator CRANSTON. Another point relating to that: If you are really not certain of what happened in this case in what is a somewhat unusual geological circumstance, how can you make an economic determination of your risk of liability under the unlimited liability regulation of the Department of Interior?

Mr. DAVIS. How could we make an economic analysis?

Senator CRANSTON. How could you really make an estimate of the economic liability and risk that you run under the unlimited liability

interpretation of the regulation of the Department of Interior if you don't really know what happened in this case?

Mr. DAVIS. Senator, I am not sure I can answer that to your satisfaction or even to mine, but I do know that unlimited liability is—well, even the word “unlimited” is of such a magnitude that it does bother us.

This is the position that the industry is taking, that we do object to this inclusion.

Senator CRANSTON. Senator Allott has raised the real question, as I do, about this unlimited liability. I guess we should address this to Mr. Morrison.

Do you believe that the unlimited liability provision can apply retroactively to Union Oil Co.?

Mr. MORRISON. No, sir.

Senator CRANSTON. Do you believe it can apply retroactively to other companies under the leases granted before that regulation was reinterpreted?

Mr. MORRISON. No, sir.

Senator CRANSTON. It would seem to me, and I think it seems to the Senator from Colorado, that U.S. property is involved in this; that the United States stands to make a profit if these or other leases continue.

It is done under U.S. laws. It is done under U.S. regulations.

It seems to me that the United States would share in the responsibility. In this respect, I agree with the position you have taken.

I would like to ask you the same question I asked the Assistant Secretary of the Interior yesterday. If the risk of further spills is virtually nil, why are you concerned about assuming unlimited liability?

Mr. MORRISON. We don't know exactly what could happen in the interpretation of the unlimited liability section. We can conceive of a situation in which a great deal of inequity would arise.

I believe it was Senator Gravel who raised the question as to what would happen if a U.S. naval vessel hit one of our tankers. Yet, under this section, the oil tanker company would be liable for the unlimited liability.

There are other instances that I am sure one could bring to mind in which there would be actually no fault.

There is a situation that was described to me that under this section there might be a slick caused by the pumping of bilge of, may I say, a non-oil-connected vessel, which is not unknown, as you know, flowing into the channel past an oil rig.

We don't know but what the interpretation could be, “There is oil there. Prove it isn't yours.”

It doesn't make any difference. There is unlimited liability causing a problem.

Senator CRANSTON. You mentioned or expressed in your statement great concern about the outflow of American dollars in relationship to foreign crude. It really is the oil companies who aggressively go out of the United States to search for that oil and to import it, is it not?

Mr. MORRISON. Yes, sir.

Senator CRANSTON. Isn't it the low cost of foreign crude that has hurt exploration in the United States more than anything else under current circumstances?

Mr. MORRISON. Senator, you are getting into an area in which our association has some differences of opinion. Although I don't want to try to duck a question, I cannot speak for the Western Oil & Gas Association on the interrelationships between the price of foreign crude and the price of domestic crude.

Senator CRANSTON. Are some companies that you represent, and perhaps not others, seeking to bring in more foreign crude because they make a larger profit on that than on domestic crude?

Mr. MORRISON. I am sure that could be true.

Senator CRANSTON. Is it true that the major oil companies were cutting back purchases of crude oil in California last year because of an oversupply?

Mr. MORRISON. Senator, I don't know, and the reason I don't know is that we have a sign in our office that says we don't know anything about imports in this respect. We are not involved in the pricing of crude. I simply can't answer that question.

Senator CRANSTON. Senator Jordan, in his questioning of you focused on one statement that occurs on page 6 of your testimony in part, where you say, "If our Government takes the position that it cannot endorse offshore operations in the Santa Barbara Channel, it may well encourage the taking of a similar position by foreign governments affecting offshore operations everywhere in the world."

I want to concur in the Senator's view that that is a somewhat exaggerated statement particularly in the light of deep concern about producing in Santa Barbara Channel, but there is deep concern also about protecting rights and needs of the petroleum industry and of the Nation to produce oil elsewhere in Outer Continental Shelf locations where the danger is not comparable to the Santa Barbara Channel.

If that was the position, it is hard for me to believe that other countries would stop letting oil be produced anywhere offshore.

But let us assume for the moment that your testimony is correct and that was the outcome, would this injure the outflow of capital from the United States?

Mr. MORRISON. No.

Senator CRANSTON. On the bottom of that same page, you come to a conclusion saying, "In short, we, as a nation, have no choice other than to continue to find and develop oil wherever it may be, within our boundaries or under our adjacent waters."

I am sure that is a statement that, upon reflection, you would like to modify, or would you like to explain exactly what it does mean?

Mr. MORRISON. It really doesn't occur to me that I would want to modify. To use the language you used the other day, Senator, this is our thing, this is our assignment. Does that answer your question?

Senator CRANSTON. Yes; it does, and it explains, I think, the necessity for a governmental agency to do exactly what I said yesterday.

I recognize that your purpose is to find and produce oil wherever you can in the cheapest possible way, to make the largest profit, and that makes utterly necessary legislative oversight and executive oversight to insure that you produce it in ways consistent with conservation and with the human environment, and that you do not interfere with a place like Santa Barbara Channel if it can be prevented, when there are great dangers to the environment there.

I am glad that the Government is here to prevent you from producing oil on the Capitol Mall between here and the Lincoln Monument if it was discovered that oil was there.

Unmodified, according to your statement, you would go after oil if oil was found there.

Mr. MORRISON. We have developed oil, and I suppose it is presumptuous for me to compare the city of Los Angeles with Washington, D.C., in this sense—we have found oil within the confines of many cities in the United States and have produced it, and are capable of producing it, without any harm to the environment, through the use of, as you know, Senator, our so-called oil drilling districts.

I don't really want to comment on whether we would drill for oil on the Mall. We would not contemplate putting up a rig at that point, no, sir.

Senator CRANSTON. Do you feel that the sanctuary which is marked in green off Santa Barbara Channel should be repealed so that you could go for oil if oil does exist there?

Mr. MORRISON. No, sir; because we made a thorough agreement and understanding, at the discretion of the Legislature of the State of California involved in the granting of leases elsewhere within the 3-mile limits of the State lands of California, that that was to be a sanctuary, and we have no intention of going after it.

Senator CRANSTON. Yesterday, I was seeking to ascertain from Mr. Pecora or other representatives of the Department of Interior what sort of problems are faced in deep water.

He indicated that he really did not know what problems were faced there, and suggested that I ask those questions of representatives of the oil companies.

First, what is the deepest water in which a platform has successfully been erected thus far?

Mr. MORRISON. Senator, if you don't mind, I would like to divide that, if we may.

Mr. Davis is thoroughly familiar with drilling in relatively more shallow waters, and Mr. Pistole is thoroughly oriented to the problems of drilling in deep water.

If you would like us to, we can very shortly ask Mr. Davis to start with the shallow waters and go into the deep, or if you want to we can ask Mr. Pistole to go right to the deep waters.

Senator CRANSTON. Start either way, deep or shallow.

Mr. MORRISON. Let us start with the shallow waters and go to the deep. That is the way one usually does it.

Senator CRANSTON. All right.

Mr. DAVIS. If I understand your question, it had to do with deep water. Would you care for me to discuss in any detail the drilling and producing in shallow waters?

I am speaking now of up to 300 feet, where we already have platforms and are producing.

Senator CRANSTON. Are you the expert in the shallow water?

Mr. DAVIS. Yes, sir.

Senator CRANSTON. On that score, it was stated by you or others at the table that there is nothing unusual about the Santa Barbara Channel; as a matter of fact, it is easier than the gulf to produce without blowouts.

Where else is oil being produced where the oil is not more than 250 feet beneath the bottom of the sea and in tidelands or Outer Continental Shelf, drilling and production?

Mr. DAVIS. Senator, I don't know other places where it would be producing that shallow.

Senator CRANSTON. Doesn't that make it rather unique?

Mr. DAVIS. No, sir. We have operations on land, and we actually don't consider drilling in the water, as far as drilling is concerned, any different than drilling on land.

We have operations of shallow oil and shallow gas. We have this in other areas. It is not an unusual situation.

Senator CRANSTON. What makes it unusual is, in part, the effect upon the environment. When you have a spill on dry land, it doesn't float all over the place for scores of miles having the consequences that occurred in Santa Barbara Channel.

You will grant, certainly, that it one difference.

Mr. DAVIS. Yes, sir. I live in Santa Barbara, and without question, if you want to get away from the drilling aspects, Santa Barbara is unique in that it is a very beautiful city and it has beautiful beaches. But in relation to drilling is what we are relating our discussion to in this regard.

Senator CRANSTON. In relationship to drilling, if a blowout occurs in the course of drilling, the consequences will affect many more people in a far larger area if it occurs in the ocean than if it occurs on dry land; would it not?

Mr. DAVIS. This would be a reasonable assumption; yes, sir.

Senator CRANSTON. If a blowout occurs when you are drilling in the water, is it harder to stop it than it is when you are drilling on dry land?

Mr. DAVIS. From the platform drilling, which I am discussing with you, and which we have experienced, I would consider it the same because we have the same equipment on the water as we do on the land. That is the blowout preventers that we use to automatically close and control the well.

Senator CRANSTON. Mr. Pecora placed great reliance on the automatic blowout preventers in his testimony as far as future blowouts are concerned. Why didn't they prevent the blowout in the Union well?

Mr. DAVIS. Again, I do not have the information as to what happened on the Union well. I am led to believe that the preventers worked properly on the Union well, that this was not the problem.

Senator CRANSTON. Is there less likelihood of controlling a spill if it occurs, and is there more likelihood of a spill occurring, if the oil is very close to the surface of the land, whether it is under water or not under water?

Take the 250-foot case of the Union well as against, say, a 2,000-foot case. In which case is there a greater likelihood of a spill occurring?

Mr. DAVIS. Senator, the depth of the producing pay in my opinion is really not relevant to the blowout. The blowout generally is related to differential pressures which causes the bottom waters or bottom gas or bottom oil to move upward.

Our technology and the things that we use can just as easily control this at 250 feet, particularly in a normal area, which we consider this as far as drilling as it will if we encounter it at 2,000 feet.

Senator CRANSTON. Is it more difficult to control if there are unstable structures and cracks of fissures between where the oil is and the surface of the land, whether under water or not?

Mr. DAVIS. Well, you are asking me a hypothetical question, so I suppose I will have to try to give you an answer based on your imaginary conditions.

Certainly, the weaker the structure, the less possibility of containment.

Senator CRANSTON. Is there a weak structure in the vicinity of the Union Oil Co. well?

Mr. DAVIS. Are you speaking of now or before?

Senator CRANSTON. Both, now and before.

Mr. DAVIS. Senator, I would have to assume that there is some sort of a weakness there because of the leaking and seeping that is going on.

Senator CRANSTON. When there is such a weakness and seeping, is that not evidence that there is something about that particular geological location that makes drilling there more hazardous than elsewhere, where you don't have that unstable situation?

Mr. DAVIS. Again, if you are referring to the Union area, I cannot answer that, because I simply don't know.

Senator CRANSTON. Refer to a general area that has those characteristics which we are hypothetically considering.

Mr. DAVIS. Hypothetically, if you have a weak structure, then it would be more of a problem.

Senator CRANSTON. Thank you very much.

Now I would like to go into deep water.

What I would like to ask is, first, what is the deepest water in which a platform has successfully been erected and where there has been production, drilling and production, without spill?

Mr. PISTOLE. As far as I know, 340 feet in the Gulf of Mexico is the deepest platform anyone has chosen to drill today.

Senator CRANSTON. 340 feet?

Mr. PISTOLE. Right.

Senator CRANSTON. Do you know of plans to erect platforms in deeper water in the Santa Barbara Channel?

Mr. PISTOLE. Senator, I think I will answer you this way: We are far along in design studies that would say that, from a structural or design standpoint, meeting all earthquake, all wave force, and other criteria, platforms can be built in 1,000 feet of water.

We have not placed an order and have no intention of placing one immediately. But designwise, we have looked at this within our own company. We have consulted outside people that we think can contribute to the problem, who are specialists in the field. This kind of gets to be like designing a building.

Senator CRANSTON. What is the deepest water which production has been achieved without platforms?

Mr. PISTOLE. Senator, I really don't know. The deepest underwater completions that we have made have been 60 to 70 feet, something like that. There is no reason not to make them deeper.

Senator CRANSTON. What is the deepest well that you are either drilling or contemplating drilling under your lease in Santa Barbara?

Mr. PISTOLE. We have drilled in 1,300 feet of water. We are currently drilling in 1,000 feet of water.

Senator CRANSTON. You have never produced at those depths?

Mr. PISTOLE. Except for tests.

Senator CRANSTON. Dr. Pecora referred to this as either of experimenting or experimentation yesterday.

What language would you use to describe it?

Mr. PISTOLE. I would use the language that the operations we are conducting are carefully planned, considering engineering design factors and the forces of nature that are involved.

Our design we are convinced is sound. Our control is redundant. Our control, as you know, when we are drilling in this depth of water is at the floor of the ocean, not at the surface.

The problem of floating drilling is the same at any depth. You do have the problem of suspending a riser. This is a mechanical design problem.

Senator CRANSTON. When there are difficulties in the course of drilling or production, are divers used to go down to seek to remedy the situation or to see what went wrong?

Mr. PISTOLE. We have not used a diver in the last year in the Santa Barbara Channel in this connection.

Senator CRANSTON. Are they often used by your companies in underwater production?

Mr. PISTOLE. In underwater production?

Senator, I have to say it this way: Much of the early underwater completion equipment, much of the early underwater drilling equipment, was designed to be diver-assisted. The equipment we are using is designed to operate without benefit of the diver.

Senator CRANSTON. If anything went wrong, would divers serve any useful purpose in going down to see the problem?

Mr. PISTOLE. With our present design and present depth of water, I don't think so.

Senator CRANSTON. In regard to the tract 334 well that you were drilling in 1,000 feet of water, what would you do if there was a blow-out or a spill on that well in the course of drilling it if the antiblowout devices, the valves, failed to work?

Mr. PISTOLE. Senator, that is a tough question to answer from this standpoint: Our casing programs are such that, based on any hydraulic pressure we can anticipate, we can close in the preventer at any time.

Our drill pipe carries in it a permanent back pressure valve. The control system to the block preventer is redundant in the sense that we have two separate systems to close them.

We have five preventers on the bottom of that assembly.

I think the answer I am trying to give you is we have, to the very best of our ability, designed to where we have more than one backup built into the rig.

I think the final answer is, if you really got a blowout in that depth of water, as I think in any depth of water, your final answer is a relief hole.

Senator CRANSTON. The final answer is what?

Mr. PISTOLE. Is a relief hole. As you are undoubtedly aware, we have two rigs equipped so that each of them could serve the same purpose for the other.

Senator CRANSTON. If the drill ship you are now using was incapacitated and there was a need for a relief well to be drilled, do you have an alternate ship available immediately?

Mr. PISTOLE. Yes, sir. We have two vessels completely equipped to drill in 1,300 feet of water.

Senator CRANSTON. You have two vessels and they are available there for standby purposes?

Mr. PISTOLE. Yes, sir. Not for standby purposes. Each of them is drilling.

Senator CRANSTON. For backup purposes.

Mr. PISTOLE. But they could be diverted.

Senator CRANSTON. On the matter of the geological data that oil companies acquire, and the information they derive from exploration as to the presence of oil or the absence of oil, is it your opinion that the new regulations that are said to be now in draft form, requiring oil companies to give all data to Government after bids have been taken and contracts and leases awarded, are proper?

Mr. PISTOLE. Senator, I think I should defer this question to the member of our panel who is an explorationist. I am a manager of drilling and production. My personal opinion is I don't see it that way, but I will defer here to Mr. Cassell.

Senator MOSS. Mr. Cassell, would you respond to that?

Mr. CASSELL. Yes, sir.

If I understood the question correctly, it was, "Would it be proper to have regulations which required the release of all data after leasing?"

Senator CRANSTON. All leases, showing geological presence of oil and so forth.

Mr. CASSELL. If I am not mistaken, we already have those requirements at the time the leases are awarded.

Senator ALLOTT. Would you speak louder, please?

Mr. CASSELL. I believe the USGS was empowered to require the companies to make such information available upon request. Of course, they customarily receive all the data from the wells that are drilled on the leases, and I think the other data, geophysical, whatever there may be, is also available to them on request.

This is without respect to new or additional regulations.

Senator CRANSTON. Do you feel that that information should be made available to the Department of Interior from oil companies prior to the opening and letting of bids, and granting of leases?

Mr. MORRISON. Senator, may I answer that?

As I understand it, I believe you are referring to the recently published regulations.

Senator CRANSTON. No. I am referring to some regulations that I understand are in draft form and under consideration and not necessarily yet decided upon by the Department of Interior, that would require oil companies to give geological information and all information they get from exploratory drilling to the Geological Survey in the Department of Interior prior to the granting of leases.

Would you approve of those?

Mr. MORRISON. Let me apologize for taking the witness away from you. I didn't mean to do that. I will give him back.

In any matters that are still under consideration, sir, since this, I believe, is a Western Oil & Gas Association presentation, it may be that you would find an individual opinion which would not reflect the oil industry.

I have no objection at all to John answering the question as to his own opinion, but those proposed regulations will undoubtedly be under study and there will be an industry position arrived at.

I would hope so, unless there is a marked difference of opinion, in which case everybody would speak for themselves.

Senator CRANSTON. If one or the other of you could comment on that question, I would appreciate it.

Mr. CASSELL. I think what Mr. Morrison suggested is, that I render my own opinion and not speak for the industry.

Senator CRANSTON. Yes.

Mr. CASSELL. My own personal opinion is that the release of proprietary data upon which competitive bids are based prior to the date that such bidding occurs is inconsistent with the concept of competitive bidding. That is my own opinion.

Senator CRANSTON. Is that based upon the presumption that information given by one company to the Government for the Government's use might reach another company?

Mr. CASSELL. Yes, sir.

Senator CRANSTON. Do you feel that the Government, without that information, is able to really evaluate bids and decide whether or not a bid is going to bring proper revenue based upon knowledge which it could have of the presence of oil there?

Mr. CASSELL. Senator, I am reluctant to answer a question with a question, but this thought comes to mind; The Government always has at its option the right to reject any bid. They also have their own prerogative of studying any area prior to the award of the bid and prior to the sale, at any time they see fit.

The question is, if they have such knowledge as to enable them to determine in their own minds what they believe to be the real value of a piece of property, and they would then presumably reject any bid that fell short of that measure, would they also reject those bids that exceeded that measure, thereby protecting the person who submitted the bid from acquiring a piece of property on which he might go broke in the process of trying to develop it?

Senator CRANSTON. My question really goes to this: Should not the owner of a property that is being leased know the value of that property to the best of his ability before he leases it?

Mr. CASSELL. Very well, I think I agree with that concept. Should it not be incumbent upon the owner to determine that value himself rather than to look to those people who are asked to competitively bid upon it to determine it for him?

Senator CRANSTON. I think that is a legitimate question. It leads to this question: In testimony given, I think, yesterday, it was indicated that some \$200 million, or some such figure, was spent by oil companies in determining the presence or absence of oil in various places in the channel and learning what they could about geology.

You were then suggesting that the U.S. Government should spend \$200 million so that its knowledge would match that of the oil companies before granting leases.

Mr. CASSELL. Senator. I think one thing you might be prone to overlook in that observation is that much of the \$200 million is redundantly spent. The various interested parties participating in the sale each spend their own money over and over again for essentially the same or comparable data.

Senator CRANSTON. You have a good point there. There would be a substantial expenditure, however.

Senator MOSS. The chair hesitates to interrupt, but I think we are beginning to debate back and forth.

I think the position of the witness is clear, and I understand the Senator's point of view.

What I am looking at is the clock. We have a number of people who have traveled all the way from California to be here to testify today. We want to hear them. In fairness, of course, we will hear them.

I would ask the panel to respond quickly and the committee to accept the answer or point of view of the witness and not draw it out.

Senator CRANSTON. One further question: Granting that the Government would be better able to evaluate bids with that information regarding the presence or absence of oil, would it also be better able to evaluate the wisdom of granting leases in relationship to the geological faults that might be present if it got the information?

Mr. CASSELL. Yes; I think the fuller knowledge they had in their possession would better enable them to judge the wisdom with which leases should be awarded.

Senator CRANSTON. I would like to make a closing remark, if I may.

The absence of that information would seem to me to indicate that the Government let these leases without being able to evaluate whether the bids were good or bad in terms of potential revenues and also has led to the letting of these leases without knowledge of the Government of geological faults and instabilities that were a major contributing factor to the spill that occurred.

Senator MOSS. Thank you.

Senator ALLOTT?

Senator ALLOTT. I will try to do some of this by remarks rather than extended questioning, Mr. Chairman.

I think an examination of the complete records will not disclose that the Government was entirely ignorant of the nature of the structure under the Santa Barbara Channel.

While the statement was made by Dr. Pecora that the oil companies did not divulge their information to him, if I were an operating man for an oil company and had to gamble \$100 million on seismic research in an area and gamble another \$200 million or \$300 million on a lease, plus development after that, I think my stockholders would look at me with a wary eye if I were foolish enough to turn it over to the Government at the present time.

It isn't that it is the fault of the Secretary of the Interior, this one or his predecessor, but human beings are human beings, and these things have a way of leaking out.

I think it is no secret here that there are no secrets around Washington, and you can find out almost anything if you just want to keep your ear to the ground and make proper inquiries.

I want to say this, too: I think the remarks in the statement about the reserves and the very serious situation we are in in the United States I concur in wholly, because I have made studies in this area myself and have tried to keep up on it.

I think someone, before I came in this afternoon, made the statement that our annual consumption was 4 billion barrels of petroleum, or 4.7 billion barrels, and that the estimated reserves in the entire channel were 4 billion.

Mr. MORRISON. And that was really an estimate; yes, sir.

Senator ALLOTT. So if you take the whole channel, itself, you do not have, at best, any more than comparably a 1-year supply of oil for the United States.

Mr. MORRISON. Correct.

Senator ALLOTT. That is the way I read the figures.

Then I would like to comment very briefly on one other thing because I think these thoughts should be a part of the record. I would like to do it by questioning, but that takes too long.

As to the unlimited liability, about which I have very many grave misgivings, would it be possible for you to secure insurance on an unlimited basis or a bond on an unlimited basis for such an operation?

Mr. MORRISON. Generally speaking, the companies I have talked to have indicated to me that there would be a great deal of self-insurance required.

Senator ALLOTT. If it would be impossible—I don't think a company can self-insure itself to limitless liability, and this would violate the general law of liability which is that a man is responsible for his acts of omission or commission—what would happen? Wouldn't the net effect of this be to raise the price of oil?

Mr. MORRISON. Certainly, sir.

Senator ALLOTT. I don't see how it can be otherwise. I think these thoughts ought to be in this record, because they are things that have to be considered in trying to arrive at a solution to this problem.

That is all I have.

Mr. MORRISON. May I say our people don't really know how to operate under this. As I understand, I believe it was the attorney for the Department of the Interior who said they were contemplating public hearings, and we hope that there will be, because we will certainly wish to testify.

Senator MOSS. Senator Cranston?

Senator CRANSTON. Do you believe that the Secretary of Interior under present law has the power to terminate the Union lease or any other lease?

Mr. MORRISON. No, sir.

Senator CRANSTON. You do not.

Senator MOSS. Thank you very much, gentlemen. We have questioned you at some length. It was obvious that there are many questions that are puzzling the members of the committee. We are trying to get the record as fully developed as we can.

We do appreciate your coming here to give us your point of view, and I think you responded very forthrightly. We appreciate it very much. You will be excused at this point.

As the Chair said, we are getting into a very tight dilemma. All of the witnesses before us for the remainder of the day are from the west coast. We know they are here to testify today, so we are going to hear them even though it takes some time.

I will ask the witnesses to try to be as precise as they can in their responses, and we will try to show as much restraint as we can as we pose the questions.

Thank you very much, gentlemen.

Mr. MORRISON. Mr. Chairman, may I have permission to file a supplementary statement after the hearings are concluded and before the record is closed?

Senator Moss. Indeed.

I would like to make that as a general announcement. This record will not be closed for 2 weeks, and in that 2 weeks time any witness who was called can file a statement, or any other person who has a contribution to make to the issue will be entitled to file a statement simply by sending it in writing to this committee or to me personally, and we will see that it is made a part of the record.

Mr. MORRISON. Thank you.

(The additional information referred to follows:)

WESTERN OIL AND GAS ASSOCIATION,
Los Angeles, Calif., June 2, 1969.

Senator FRANK E. MOSS,
Chairman, Subcommittee on Minerals, Materials, and Fuel,
Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR SENATOR MOSS: I would like to thank you and the members of your Subcommittee for the courtesy extended the delegation from this Association during our appearance before your Subcommittee on Tuesday, May 20, 1969.

We also appreciate the opportunity to supplement our statement.

At the outset, I would like to make it clear that Pauley Petroleum, a member company of this Association, does not agree with many of the statements made in our presentation to the Subcommittee. They have asked me to advise you of this point. They are the only member of ours who has expressed disagreement.

During questioning by Senator Cranston, there was considerable discussion pertaining to geologic and geophysical data obtained from federal lands and utilized in developing bids when such lands are offered for lease. This testimony is found on pages 234-239 of the official transcript. Our Association has a definite position on this matter. We are opposed to compelled disclosure from a prospective buyer to a prospective seller of information expensively come-by on the part of the buyer when it can be assumed the prospective seller (the Government) is to use this information in order to reject offers to buy when they consider the offers too low, while accepting offers which they may consider too high.

We presently file a great deal of information on oil and gas wells drilled on the Outer Continental Shelf with the United States Geological Survey. It is kept confidential. Apparently there is some thought in Government to require prospective bidders on OCS acreage to submit their interpretations of geological and geophysical data obtained from unleased acreage to the USGS prior to a lease sale. The Government believes this would enable them to establish a minimum value for the land. As we understand it, any bid which did not meet the value established by the Government would be rejected although nothing is said of returning monies paid in excess of the value established by the Government.

We believe the "marketplace" is the best place to determine value. Something is worth what someone is willing to pay for it. Our exploration work is not perfect and many times the Government benefits by our mistakes. A prime example is the acreage quitclaimed to the federal government on the Pacific Coast off the states of Washington, Oregon and California. Federal leases totalling 859,338 acres and for which \$47.4 million in bonuses were paid to the federal treasury were quitclaimed as being of no commercial value. Here the Federal Government received \$47.4 million and we found no oil. Thus the Federal Government benefited by our mistakes. I have attached a chart showing the aforementioned information.

During questioning by Senator Hansen we did not make it clear that we believe S. 1219, if enacted, would "tie the Secretary's hands" as regards authorizing remedial drilling which could be a valuable tool in alleviating the seepage problem in the Santa Barbara Channel. We believe continued drilling is necessary to draw down reservoir pressures.

During the course of our testimony we furnished your Committee with our estimate that 4 billion barrels of oil underly the Santa Barbara Channel. Senator Allott noted that this was comparable to "a one-year supply of oil for the United States". His statement is correct. However, the importance of this oil can best be understood if we narrow the perspective and compare the 4 billion barrels in the Channel with California's present remaining recoverable crude oil reserves (including Elk Hills) of 4.337 billion barrels. Thus the Channel would represent a 99.078% increase in California's total reserves of oil.

Dr. Robert R. Curry of the University of California at Santa Barbara testified at length, qualifying himself as an expert witness, about the geology of the Santa Barbara Channel and drilling and operating practices therein.

Dr. Curry apparently has only limited data and correspondingly limited geologic knowledge of the Santa Barbara Channel. Our industry, and particularly the affected companies, have access to seismic data, core hold data, well logs and foundation borings that refute his assumptions. Consequently, his assumptions are based upon less dependable data. We believe that with knowledge of this data, Dr. Curry would not refer to the Santa Barbara Channel as unique geologically.

His statements regarding casing setting and cementing, well control, and drilling practices show a complete misunderstanding of recognized acceptable safe practices.

The following sets out in particular several of the areas of concern where Dr. Curry demonstrates either misunderstanding or lack of knowledge.

The oil-bearing portions of the stratigraphic section in the Santa Barbara Channel, particularly in the area of present concern, consist of normal sandstone, shale, and siltstone strata interbedded in the same manner as prevails onshore for these same rocks. "Cap rock" strata are numerous and occur at varying depths. They serve as normal barriers to vertical fluid migration as attested to by the discrete occurrence of oil-bearing sandstone separated by shale from overlying water-bearing sandstone. The upper sandstones and shales are definitely segregated at varying depths. This is borne out by the fact that the multiple oil sandstones have individual and distinct water tables at various depths. This explains the 10 to 15 separate oil and water contacts throughout the upper 5000 feet of rock strata. Oil migration, therefore, is in a lateral direction rather than vertically as postulated by Dr. Curry. The fact is that the same reservoirs present offshore have been produced to the point of near exhaustion in other offshore and onshore areas with no replenishment of the oil removed.

Dr. Curry asserts that the Santa Barbara Channel is characterized by "unique" high-angle reverse faults. We submit that high-angle reverse faulting is commonplace throughout and characteristic of California oil-field provinces. Furthermore this type of faulting is not known to promote the vertical migration of fluids.

Contrary to Dr. Curry's assertion that a normal, safe surface casing program cannot be successfully installed in portions of the Santa Barbara Channel, we submit that hundreds of wells have been drilled in the Santa Barbara Channel and the casing adequately installed and cemented back to the ocean floor. This has resulted in isolation behind the casing of the various zones as desired, and demonstrates that good cement-to-formation seals can and have been achieved.

Thank you again for your courtesy in allowing us to file these supplementary remarks.

Very truly yours,

HARRY MORRISON,
Vice President and General Manager.

WESTERN OIL & GAS ASSOCIATION, QUITCLAIMED LEASES OFFSHORE AS OF MAY 26, 1969

	Federal leases		State leases		Combined Federal and State leases	
	Acres	Bid	Acres	Bid	Acres	Bid
Washington.....	132,480	\$7,100,000	72,000	\$150,000
Oregon.....	413,913	27,500,000	13,600	28,996
California.....	312,945	12,800,000	12,637	17,700,000
Total.....	859,338	47,400,000	98,237	17,900,000	957,575	\$65,300,000

† Estimated.

Senator Moss. The next witness will be Mr. Edwin Foss, of the Sun Oil Co. Mr. Foss, we are glad to welcome you.

STATEMENT OF R. EDWIN FOSS, EXECUTIVE VICE PRESIDENT, SUN OIL CO., ACCOMPANIED BY MYRON ELLIOT AND CLYDE WHEELER, SUN OIL CO.

Mr. Foss. Thank you. I do have two associates with me I would like to introduce to the committee. One is Mr. Myron Elliot, on my right, manager of our offshore California operations and on my left is Mr. Clyde Wheeler, vice president of the DX Division of Sun.

Senator Moss. We are delighted to have you gentlemen with us. You may proceed.

Mr. Foss. I am happy to have the opportunity to appear before you today as you consider bill S. 1219.

I am R. E. Foss, executive vice president of Sun Oil Co. and chief executive officer of its DX Division. My company, along with Marathon Oil Co. and Superior Oil Co., acquired tract 401 in the Santa Barbara Channel.

While I am representing the Sun Oil Co. here today, I feel that I am also representing the broader interests of the industry, of the American consumer, and of the security and welfare of our Nation when I strongly urge that the Government take no action which would permanently ban oil drilling in the Santa Barbara Channel.

The enactment of such legislation as proposed in S. 1219 would present serious problems, not only to the companies involved, but also to the Nation in its ever more difficult task of meeting its energy requirements.

These problems are related to having enough oil and gas reserves in this country to avoid being so dependent on foreign sources that we could be vulnerable to political acts in other countries.

In a comprehensive report issued last year, the Department of the Interior predicted that U.S. crude oil production would have to rise 59 percent and natural gas production 54 percent over their respective 1965 rates if U.S. energy demands are to be satisfied in 1980.

Yet despite increasing need for oil and gas, a recent report showed that there was during 1968 an absolute decline in U.S. proved reserves in all categories—crude oil, natural gas, and natural gas liquids. In relative terms, the country's proved reserves of crude oil have dropped from nearly a 13-year supply in 1959 to less than a 10-year supply in 1968, while proved reserves of natural gas went from a more than 21-year supply to less than a 15-year supply.

Our problem is more than maintaining our economic progress and a high standard of living. It is a matter of our national security. We have had two warnings in times of comparative peace, when the Arab nations in 1956 and 1967 (twice in barely more than a decade) shut off oil supplies from the Middle East, placing countries of the free world who are dependent on imported oil in difficult straits.

Without reserves in this country on which we could draw, thanks to wise conservation and proration practices, the economies of the United States and of many European countries would have been badly damaged.

Fortunately, during the emergencies the oil industry was able to supply the Nation's needs. The general public was never fully aware of the seriousness of these emergencies and the job that was done by the industry.

Imagine the dangers we would face in time of actual war if we allowed ourselves to become too dependent on imported oil, with the conflict stretching out over a long period and with long-distance ocean transportation extremely vulnerable to enemy action.

So it is imperative that we not only keep up our pace, but that we quicken it if we are to find the tremendous reserves our country needs to maintain a safe level of self-sufficiency. Where are these new reserves coming from?

We have combed our land areas in the United States extensively, and the search is becoming less and less encouraging. So, despite the tremendous cost, we have been turning to the very expensive work of exploring for and producing petroleum from formations under the sea.

The Director of the U.S. Geological Survey, Dr. W. T. Pecora, recently predicted that within 10 years oilmen may be drilling into ocean bottoms under water more than a mile deep, and that at least a third of the Nation's oil production will come from offshore.

He pointed out that in 1968 offshore production amounted to 8.1 percent of the total production in the country, compared with 6.8 percent in 1967. The USGS forecasts probable recoverable reserves of offshore oil to exceed 100 billion barrels and possibly 200 billion barrels.

Performing this feat will take imagination, highly refined methods and techniques, and a great deal of economic boldness. But the oil industry has never backed down on a financial risk if the incentives and freedom to operate are there. If political problems and restraints do not arise, oilmen will find a way to get the oil without great risks to our environment. But we must be allowed to drill.

The Santa Barbara Channel is an area where we know there is oil. We have been finding it and are preparing now to develop it. The potential of this area is far too important to the Nation not to be developed. If the Government should take measures which would prevent drilling there, and thereby set precedent for similar decisions elsewhere along our Nation's coastlines, we would be passing up one of our last known frontiers for oil and gas reserves needed by our country every day.

Even in Alaska, where there are such big hopes today, offshore areas offer a great deal of promise, and the industry will make every effort both offshore and on the frozen north slope to operate in ways that will find and produce the reserves we need while protecting the environment. We cannot afford to pass up any opportunities to bolster our Nation's energy supplies.

We in the industry are indeed concerned over the unfortunate incident in the Santa Barbara Channel which has brought such consternation and which is responsible for the bill which you are now considering. No one regrets it more than the oil companies. We are very pleased, of course, to know that the damage to marine life was far less than originally feared, and we are proud of the instant and highly effective action taken to clean up and restore the damaged area on shore. We realize that every reasonable precaution must be taken to see that such an incident does not happen again.

Senator Cranston's bill apparently is based on the assumption that drilling on the coast of California would be inherently unsafe. I would not be coming before you today in opposition to this bill if I was not

fully convinced that we can drill for and produce oil we have found without any unreasonable risk of another pollution problem.

Unless I was so convinced, financial interest of my company would preclude opposition to the bill.

Senator Moss. Senator Allott will have to leave, but he would like to ask you some questions before he leaves. May he proceed?

Mr. Foss. Certainly.

Senator ALLOTT. I am sorry, but I will have to leave very shortly.

There seems to have been a common assumption by the junior Senator from California from his questions that, basically, the drilling for oil in the Santa Barbara Channel at the site of the Union well is inherently unsafe because there is only an overlay of some 250 feet above the oil-bearing sands. Would you comment on that?

That is the reason I waited until you got to this point. I don't think the testimony supports that, the overall testimony from Dr. Pecora and the Assistant Secretary yesterday, but I would like to have you address yourself for just a moment to that specific question, if you would.

Mr. Foss. As to whether this area is particularly more unsafe than other areas?

Senator ALLOTT. Suppose you say that there is 1,000 feet overlay instead of 250 feet. Does that make this inherently more unsafe to drill?

Mr. Foss. I think the best way of answering is that we have a number of places where we are drilling, and have drilled, not very far from there—actually in the San Joaquin Valley—where we have drilled many wells, where the sands are very close to the surface. We are drilling them, drilling them effectively, with no undue risk. I agree with the statements made earlier, that the mere depth is not the factor.

Actually, as we get much deeper, we encounter much higher pressures. This is where, I think, we really have the biggest fear of a blowout. Here we have less pressures and we certainly feel that we can adequately protect ourselves. We feel that the regulation is certainly adequate to protect the drilling operations from the hazard of blowout.

I don't have any idea what the consequences have been of this cleanup job, but certainly it has been high, and if we were not sure we could continue our operations in a safe way, we would be most concerned about them.

Actually, in this area, we do not feel there is any undue risk here.

Senator ALLOTT. Thank you very much, sir. I hope I can return before you conclude.

Senator Moss. Thank you, Senator Allott.

Would you proceed, Mr. Foss?

Mr. Foss. While I come before you as a company executive, I also speak as an engineer with a California oil background. I graduated from California Institute of Technology in engineering. I worked as a rotary drilling rig helper and as a drilling engineer offshore near Elwood, Calif.

I later became chief engineer, California production superintendent and vice president in charge of west coast production for Barnsdall Oil Co., a pioneer in offshore drilling before it became a part of Sunray DX, which now is the DX Division of Sun Oil.

As one with actual experience in drilling and production in California and off its shores, I say that with the many advances in techniques and equipment made in recent years, and with safeguards which have been provided, we can with every reasonable assurance drill with safety in the Santa Barbara Channel, as well as in other offshore areas.

The experience we have had recently was, to say the least, a most unusual one. More than 12½ billion gallons of oil had been safely produced off the California coast. Oil operations conducted for many years along the Texas and Louisiana gulf coast also are evidence that offshore wells can be operated with a high degree of safety.

Many of us who have been around the Nation's oil areas have seen oil being pumped from beneath an egret rookery on Avery Island, La., a horticultural showplace, and have watched fish being caught in quantity from drilling rigs in the gulf.

On land, my own company is producing oil from beneath the landscaped grounds of the Oklahoma capital. Acres of blossoms at an east Texas rose farm blanket an oil-producing field. In Los Angeles, soundproofed oil rigs have been disguised as office buildings and operate amidst garden-like surroundings. It can be done.

Oilmen do have a concern for the protection of wildlife. The DX Division of Sun Oil only a couple of years ago delayed development of a major gas discovery for an entire winter in consideration for 48 of the rare whooping crane birds. The wells are located offshore and three-quarters of a mile within the refuge near Corpus Christi, Tex.

Just 24 hours after the wellheads were in place on the discovery in mid-October 1967, four dozen whooping cranes returned to their winter playground. We realized the big whoopers are extremely shy and that undue disturbance might cause them to abandon their ancestral wintering grounds. So we moved out our drilling rig and postponed further drilling activities until the next spring.

Today that field has been developed and gas is flowing into pipelines and the big birds return each year.

In the Santa Barbara Channel we cannot promise, nor can anyone else, that no oil will ever be seen on the water, since smatterings of oil have occurred on beaches in the vicinity for centuries because of natural fissures. The Bulletin of the American Association of Petroleum Geologists included a discussion on this area in August 1963, before any drilling had started there.

It told of scuba diving geologists finding unique tar mounds formed by escaping oil and of pictures being taken during the winter of 1961-62. A map accompanying the article located such mounds in three localities. The Point Conception area, Coal Oil Point near Goleta, and off Carpinteria. So, with or without drilling, there will be small amounts of oil on the water and on the beaches in the future, just as in the past.

However, with the added knowledge we have gained as a result of the recent incident, and with appropriate safeguards which have been adopted, we have every reason to believe that a repetition of this rare accident can be avoided. In fact, we feel it may be possible to reduce and perhaps eliminate natural leakages in the area by producing these shallow formations and thereby decreasing the pressures in these oil sands.

Members of the industry, including Sun Oil Co., paid to the Federal Government more than \$600 million for the various tracts in the offshore sale last year. They have spent many millions of additional dollars testing and exploring, which has contributed significantly to the economy of the area in many ways, including jobs.

Our own group currently has under construction a new drilling platform to be set in tract 401 on which we have discovered significant reserves. The platform itself represents quite a large expenditure, and includes elaborate precautions to assure safe as well as accurate drilling.

From atop this one platform which will be painted blue to blend with the ocean scene, two rigs will drill up to 60 holes. Elaborate precautions against accidents include sophisticated instrument systems, such as automatic shutdown and fail-safe devices, and backup standby equipment to prevent spillage of oil or danger to the crew. All equipment will be operated by electric power through a submarine cable from shore. An auxiliary generating plant will cut in automatically in case of a power failure.

All oil and salt water produced from the wells will be piped ashore by pipeline to a plant in Ventura County for separation and treatment. Waste water will then be returned to the ocean in a purified state.

We, and others like us, have paid big sums expecting to drill. We believe that we should be allowed to do so, not just for our sake, but also for the sake of the Nation. We feel that the wise course is to develop our available energy resources, while insuring insofar as humanly possible, that no damage occurs to our own environment or the environment of the fish, fowl, and game which also constitute valuable resources for our use.

We believe that the issues raised by the Santa Barbara situation involves far more than just oil companies and the wildlife conservation groups or Santa Barbara residents. Instead, it is an issue involving the whole concept of properly preserving and developing all natural resources for the ultimate benefit to man.

It should not and cannot result in an either-or decision. It must be resolved as a both-and commitment. The oil industry, as it has in the past, must be conscious of the environment in which it operates—whether it is in a metropolitan setting such as Los Angeles or whether it is several miles offshore.

It must be committed to conserving those natural resources which are esthetically necessary to man. But it must equally be conscious of, and committed to, its objective of providing those natural resources which supply energy to man.

We call upon the Federal Government, the State of California, and all interested citizens to view with concern the alternatives of prohibiting the development of our energy resources. At the same time, we call upon the oil industry to creatively seek solutions to preserve and conserve what nature has given us.

The answers lie neither in expressed anxiety nor in confused silence. The answers lie in rational confrontation of concerns and creative cooperation among the groups involved.

To pass measures, in the shock of this one unfortunate situation, which would deprive the Nation of the immense amount of energy to be found under the Santa Barbara Channel or our other coastal

waters, would, indeed, be a disservice beyond measurement to this country.

Gentlemen, I appreciate the opportunity to appear before you to give our thinking on this vital matter. To summarize my remarks, our Nation urgently needs more oil and gas for its economy, its progress, and its security. Santa Barbara offers a prime source of new petroleum reserves. You can be assured that every reasonable precaution and new knowledge will be applied to avoid environmental damage.

In short, this Nation is not facing an either-or choice between preserving nature's beauty and wildlife and developing nature's petroleum resources. Both must be realized.

I believe that after you look into the situation thoroughly, and hear the testimony from all sides, you must come to the conclusion that we as a nation cannot afford, and have no need, to lock up beyond our reach such a valuable deposit of a much-needed resource.

Senator Moss. Thank you very much.

You are speaking of the number of holes to be drilled off of one platform. Is that directional drilling that will go out in various ways from the platform?

Mr. Foss. That is correct.

Senator Moss. How far of an offset can you drill as a practical matter? How far out can you reach?

Mr. Foss. This, of course, depends on the depth. But I have my expert who designed this. I will let him answer the question.

Senator Moss. Would you tell me, Mr. Elliot?

Mr. ELLIOT. Yes; it does depend on the depth, Senator. In the general area of our interest in the channel, we can drill as far as over 2,000 feet away from the platform.

Senator Moss. 2,000 feet, laterally, you could go?

Mr. ELLIOT. Yes.

Senator Moss. Another thing I wondered about, after your wells are completed, is it necessary to retain the platform, or can the wells be completed and be completely under water as they are producing?

Mr. Foss. No; the platforms will remain and our immediate producing facilities will stay there, the separators, the other equipment to control and work on the wells.

Senator Moss. So it is necessary to retain the platform under the type of completion that you will do there?

Mr. Foss. That is correct.

Senator Moss. Senator Hansen, have you any questions?

Senator HANSEN. No, thank you, Mr. Chairman. I have no questions.

Senator Moss. Senator Cranston?

Senator CRANSTON. I just have two very brief ones, I think.

In regard to the question that Senator Allott asked before he left, if an area of oil is not only 250 feet beneath the bottom of the sea or beneath the surface of the land, but if, in addition to that fact, it is geologically unstable, if there is a record of earthquakes in the area, and if there are fissures in the geological structure, are there not greater hazards in producing there than in a similar place with oil 250 feet down where you have solid structure?

Mr. Foss. Senator, I don't believe there are any additional hazards there so far as producing the wells. We certainly can visualize none.

Drilling the wells, completing them, offer no additional operational problems. I would suggest, and I think it has been alluded to several times, that now that we know so much about this area, we know there is production there, we know there is oil in the sands, we suspected it for a long time—we had an idea it was there—now we do know much more about it.

At the same time, this is, as you expressed, an area where it is faulted, where there are fissures. We know that oil has seeped up out of some of these sands and is seeping now.

There are some very, very good reasons why we should go in and produce that oil and remove it and reduce the pressures. Actually, if you want to put it this way, we get rid of the oil so it is not there and will not cause trouble in the future. I think there are many advantages in actually getting the oil out of the ground.

Senator CRANSTON. Is it just as easy to plug a leak under water as it is on the ground?

Mr. Foss. Operationally there is no difference. You have to get down to the place where the sand that is producing and pump mud, pump other things into it, and shut that particular zone off, or actually produce it and reduce the pressures and stop the flow.

Senator CRANSTON. If I may ask just one more question, there is one aspect of your testimony and of other testimony that frankly I don't fully understand.

You speak of maintaining oil reserves for times of emergency when overseas supplies may be unavailable to us. But you and others then proceed to talk in terms of producing from those reserves.

Producing would seem to me to be synonymous with depleting them and not holding the total reserve for emergency.

Could you explain that situation?

Mr. Foss. What I am talking about is you have a reserve at all times. We have to produce to supply the demands, the current demands. We should also have sufficient reserves available for an adequate supply in times of emergency when we have to produce additional oil over and above our normal demands, either to supply our own needs or the needs of the western world.

Senator CRANSTON. You state on page 3 that we know there is oil in Santa Barbara Channel. I gather there is pretty good information as to how much oil is there, although certainly not final information as to how many barrels.

Why does that not constitute a supply that can be held in reserve for emergency rather than going into total production and ultimate depletion and elimination of that reserve?

Mr. Foss. On our tract, we have drilled eight wells that have given us some ideas of where the oil is, given us enough encouragement to go ahead and drill more wells and explore out to find additional reserves. We have no idea how much we have there. We merely know that there is enough to proceed.

Senator CRANSTON. When you speak of reserve, you mean finding oil which you will then produce?

Mr. Foss. That is correct.

Senator CRANSTON. Thank you.

Senator MOSS. Thank you very much, Mr. Foss, Mr. Elliot, and Mr. Wheeler. We appreciate your testimony. It will be very helpful to our record.

Mrs. Lois Sidenberg is president, Carpinteria Valley Association, Legislative Action Committee. She will be our next witness.

STATEMENT OF LOIS SIDENBERG, PRESIDENT, CARPINTERIA VALLEY ASSOCIATION, CARPINTERIA, CALIF.

Mrs. SIDENBERG. Thank you, Mr. Chairman.

Senator Moss. We are happy to have you, Mrs. Sidenberg. We would appreciate it if you would go right ahead.

Mrs. SIDENBERG. Thank you, Senator Moss.

It is a privilege to be here.

I have a statement which I would like to present to you as it took me a week to prepare, and I have traveled 3,000 miles to present it. However, it is very brief.

Senator Moss. You go right ahead. We are anxious to hear it.

Mrs. SIDENBERG. If I may beg your indulgence, I would like to preface it with a few comments I have jotted down in some messy notes.

Yesterday and today I have listened to discussion on Senator Cranston's bill. It has had an "Alice in Wonderland" quality, at least, that is, to me.

It seems to me that the gentleman from the Interior Department, and the gentlemen from the oil companies, and some of the members of your committee, are not talking about the same place and the same problem which is disturbing the people of Santa Barbara and most of the State of California.

The casualness which the Interior Department adopts when stating that it may be 10 years or forever before the leak is stopped permanently in our channel makes my blood run cold. The talk of continued drilling and production to possibly relieve the pressure causing the present leak and to forestall other major blowouts makes me think of a surgeon who might say, "We will take a chance on cutting off your leg to see if it wouldn't cure your sore toe."

Practically everything that has been offered or is being put into effect by the Interior Department strikes me as dodging the issue. For instance, in discussing cleanup of pollution, if you had seen the massiveness of this spill, no methods could have cleaned it up. Cleanup operations continue to be futile, as you have heard.

Oil continues to flow onto the beaches. Cleanup crews work around the clock. It is like cleaning out the Aegean stables. As soon as the wind shifts, oil in great quantities washes back up on the beaches.

Boats have been cleaned, but if one is invited to sail, it is with the provision that one will clean the boat again that same day.

There are a number of other things that came up that seemed to me needed comment.

Someone mentioned the fact that the Chamber of Commerce of Santa Barbara had put a number of advertisements in the paper saying how beautiful Santa Barbara was. We had trouble with that.

The problem is this: The motel owners and hotel owners in the Santa Barbara area have suffered immeasurable damage from this oil spill. This is just the time of the year when people throughout the State and throughout the Nation make their reservations and their plans for their summer holidays.

The oil companies, apparently, are financing this advertising campaign. However, when a number of us took exception to the first advertisements that went in the press, which included a photograph of people galloping gaily along the beach, the next series of advertisements omitted that particular picture because of the fact that the chamber of commerce realizes it could boomerang.

As an example of that, I have a repulsive picture I would like to present to you.

Mr. Morrison presented photos to you taken on May 9. This was taken on Wednesday, May 14, on one of our public beaches. It is not my feet. These are the feet of a friend of mine. It shows you what happens when you walk on the beach.

The sand is clean on the top. As you continue, you hit these layers of oil. I hope it isn't too repulsive.

I have a sore toe. Otherwise, I would have done the same thing. Now, if I may, I would like to continue with my prepared statement.

Senator Moss. You may proceed.

Mrs. SIDENBERG. You will hear all the scientific and technical reasons why oil drilling and operations should not continue in the Outer Continental Shelf of our channel and other areas along the California coast.

You have heard some of the economic effects on this area from the oil drilling disaster. Mr. Fred Hartley, president of Union Oil, is reported to have said:

We should not fall prey to the beautification extremists who have no sense of economic reality.

For half a century or more, economic reality for Santa Barbara has meant taking fair advantage of an unusually attractive human habitat. Our beautification extremists built a community to attract visitors, to induce the affluent to build fine homes, to enhance an atmosphere compatible with education and, in more recent years, to attract unusually fine talent to research and develop enterprises. The efforts of our uneconomic visionaries is sizable revenue to the area and a flourishing economy—that is, until oil took over.

You have heard that for almost 4 months now crude oil has been fouling our channel waters and, in spite of constant cleanups, still blackens many of our beaches and shorefront areas when the wind shifts, with no end in sight.

But you have not heard how this is affecting the lives of the people, of our children. Just one incident—last week two youngsters playing on a private beach became covered with oil. When consulting a noted pediatrician the mother was told that great care must be exercised in removing the oil or the children might suffer from kidney trouble for the rest of their lives. How many other children using our oil-infected beaches and ocean will be affected in some manner by this pollution? That will be for some time in the future.

We must emphasize that ours is a unique area. No price can be set on the preservation of its natural beauty, on its unusual environmental aspects which we have worked so diligently to preserve.

The members of the association which I represent have long opposed oil development in our channel waters. Our eyes are offended by ugly platforms and rigs which now disfigure the formerly serene view of sea and channel islands.

We are constantly aware of the dangers inherent in drilling and production, and we are convinced that oil operations are totally incompatible with our environment. We are entitled to a clean sea, a clean shoreline and beaches, and clean air. These are our natural resources, and they should be respected and protected by our Government.

The first article of a joint resolution now before the Congress states:

The right of the people to clean air, pure water, freedom from excessive noise, and the natural, scenic, historic, and esthetic qualities of their natural environment, should not be abridged.

Here we find the two basic issues: Shall the people have the right to determine the environment in which they wish to live? Is it the responsibility of Government to respond to the wishes of the people, or of special interest groups?

In our case we see the failure of a governmental agency which did not take into consideration the damaging effects their decision might have on the natural environment and on people. Granted such a decision may have been considered proper at the time, the results have been disastrous.

According to the Santa Barbara News-Press, in his broadcast remarks related to the Santa Barbara Channel oil problem, Interior Secretary Hickel made a point which needs emphasis.

He referred to oil reserves on Alaska's North Slope and mid-continent shale deposits in the Colorado area, and indicated that in light of these supplies and their potential, the development of channel oil was ill-conceived.

With such reserves he said, we should not "have to drill in spots where there is scenic beauty, or where there is marine life, or where there is some reason not to drill because of their economic values * * *."

Secretary Hickel said, in effect, that the will of the people of Santa Barbara should have been respected when Federal offshore drilling was considered. What concerns us today is that an initial error not be compounded.

Why, if the basic channel oil drilling ruling was a mistake, should the mistake be allowed to continue? Why should not the drilling in this quake-prone and esthetically vulnerable region be stopped immediately and permanently?

Why talk about stricter operational restrictions, oil company cleanup responsibilities, and whatnot, when the answer to the desecrations is the ultimate end to channel oil operations? And no one can convince us that any restrictions, no matter how stringent, will make drilling and production in our channel foolproof.

The Santa Barbara oil disaster has acted as a catalyst to bring the problems of national and worldwide pollution and destruction of the environment into focus.

Gentlemen, for more than two decades I have been involved in the activities of numerous organizations concerned with public affairs on local, State, National, and international levels.

Never, in all this time, have I seen such a unanimous expression of feeling on any issue as has been exhibited in opposition to the oil operations in the Santa Barbara Channel. This is a phenomenon which has completely united all elements of our society regardless of age, political affiliations, economic position and social status.

There are numerous examples of the enormous concern this issue has generated and been manifested by the people: Newspapers in this area and throughout the State have been inundated with letters, which still continue, expressing opinions of extreme concern and calling for action to alleviate the situation.

I am sure you are aware of the thousands of letters and telegrams to the Congress from this area and throughout the Nation relative to the Santa Barbara oil disaster and its implications.

Senator Cranston has mentioned to you the vast number of resolutions he has put into the record which support his objectives, the objectives of his bill. These have been adopted by 13 city councils and county boards of supervisors.

Thirty-five of such organizations as the League of Women Voters, chamber of commerce, real estate board, service organizations, businessmen's organizations, sportsmen, and conservation groups, representing thousands of members, have also adopted resolutions which support the provisions of Senator Cranston's bill.

You have before you approximately 100,000 signatures on petitions which call on the President of the United States and the State of California to take whatever action is appropriate to terminate drilling in the Santa Barbara Channel, to cancel leases, to stop production, and to declare the channel a sanctuary until such time as it can be convincingly demonstrated that its oil reserves are needed for a national emergency.

These were distributed by the Santa Barbara Committee to Get Oil Out.

I submit to you that it is significant that not only do these petitions contain many signators of those directly affected—that is from the California south coastal area and I would like to interpolate that the oil has continued on down the line, sometimes as far as Redondo Beach, a distance of over 125 miles.

There are complaints about it there. That Los Angeles County is very much concerned about the contamination of their beaches, that booms have been put across the Ventura Harbor a number of times to keep the oil from coming into their harbor—but from the remaining 49 States of the Union as well.

Expressions of dismay, and support for the purposes set forth in the petitions, have also come from American overseas residents, and from concerned nationals of such countries as Great Britain, Canada, and Australia.

As regards the people of the Santa Barbara area and their sympathizers, I would impress on you their unswerving determination to see this issue resolved to their satisfaction.

However, Santa Barbara's problem is more than a local situation. It is a problem of vital concern to the whole State, country, and world. It is not just a question of beauty or a few dead birds. It is a question of our use or abuse of our whole environment, as well as of the best interests of the people versus vested special interests.

There are then two basic questions which concern us all.

First, can appropriate control be exercised over such industrial and commercial ventures, private or governmental, which, by their very nature, are contributing to the destruction of our natural environment?

Second, will the Government respond to the wishes of the people on these issues? Your favorable action on this bill would be a milestone on the road to calling a halt to such damaging ventures. It would say to the people of this country: "Yes, your voices are being heard."

One of your former colleagues, Senator Thomas Kuchel, said earlier this month in Santa Barbara: "The highest responsibility of those in public service is to maintain the natural resources as we have them; and in this area which has become world renowned as an area of recreation and beauty, there should be no commercial developments with respect to minerals of the sea at a time when there are other areas from which to extract minerals."

Every day the number of Americans are increasing who have come to understand that the health and well-being of the Nation call for new environmental safeguards. What is needed—not only in Santa Barbara—but other regions being unconscionably polluted—are increasing numbers of public servants dedicated to the public's right to a clean atmosphere and surroundings.

In urging your support for Senator Cranston's bill I speak for all the people of Santa Barbara and this country to whom the beauty of our natural surroundings, the clarity of our air and water make life worth living.

These are priceless aspects of our heritage. Once destroyed they can never be replaced. Loss of revenue to the Federal Government, and possible loss of income to the oil companies cannot be equated with the loss of these irreplaceable environmental assets.

In this particular case the only answer is—get oil permanently out of the Santa Barbara Channel according to the provisions of Senator Cranston's bill, and suspend all drilling off other areas of the California coast until it can be assured that in these areas it will not be hazardous.

Thank you, very much.

Senator Moss. Thank you, Mrs. Sidenberg.

That is a very fine statement. It represents, I know, the viewpoints of a great many people. We have listened to a great many organizations that have taken a similar position, as well as the petitions that have been signed by many residents of California, and citizens outside of California.

I would assume that you would support the addition that Senator Cranston indicated he thought ought to be in his bill, that drilling to cure the oil leak, whatever is necessary to do that, ought to go forward, is that correct?

Mrs. SIDENBERG. No, I am afraid I can't. I would like to agree with Senator Cranston. I think Dr. Curry will give you some very good reasons why this may not be practical.

Senator Moss. We will certainly listen to him.

I was thinking, as I saw your foot picture, that there is a lot of oil in that sand out there on the beach still. As long as the leak goes on, I guess there will continue to be oil in the sand.

Mrs. SIDENBERG. What I meant by that was to say that I just don't believe that that is the way of solving the problem. I don't believe that is the way of stopping the leak. I think Dr. Curry has some very good arguments that maybe this is not a favorable way of doing it, that it is not a way that will be practical.

Senator Moss. We will be glad to hear that. That is one of the puzzling aspects of this problem.

Senator Jordan?

Senator JORDAN. No questions.

Senator MOSS. Senator Hansen?

Senator HANSEN. I have no questions.

I want to compliment Mrs. Sidenberg for her interest and her willingness to come back here to present her testimony. She has been a very articulate and persuasive witness.

Mrs. SIDENBERG. Thank you.

Senator MOSS. Senator Cranston?

Senator CRANSTON. I have no questions, but I join in complimenting the witness for her fine presentation.

Mrs. SIDENBERG. Thank you.

You have seen pictures that were taken of the original oil. That is our 100 days where they say there is just a little dribble coming out. This might be impressive. Look at the pictures on the front page and the pictures on the back page.

Senator MOSS. I saw it in the earlier days and I can testify that there was a lot of oil leaking.

Thank you, Mrs. Sidenberg.

The next witness will be Robert R. Curry, assistant professor of environmental sciences at the University of California at Santa Barbara. We are very glad to have you, Dr. Curry, and we look forward to having your testimony before the committee.

Senator CRANSTON. Could I ask the witness a couple of questions relating to his testimony before he gives it?

Senator MOSS. Yes.

Senator CRANSTON. Are you employed part time by the U.S. Geological Survey of the Department of Interior?

STATEMENT OF ROBERT R. CURRY, ASSISTANT PROFESSOR OF ENVIRONMENTAL SCIENCES, UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CALIF.

Mr. CURRY. Yes, I am.

Senator CRANSTON. Has Mr. Pecora's staff reviewed your testimony?

Mr. CURRY. Yes.

Senator CRANSTON. Did you make any changes in it after they looked at it?

Mr. CURRY. I have changed a few words and made some slight changes, yes.

Senator CRANSTON. In its present form, does the staff of the Department of Interior find it essentially accurate?

Mr. CURRY. Yes.

Senator CRANSTON. Thank you very much.

Senator MOSS. Thank you.

Will you proceed, please?

Mr. CURRY. I am Robert Curry, an assistant professor of environmental science at the University of California at Santa Barbara. I hold a doctorate in geology and geophysics from the University of California at Berkeley and a master's degree in ecology.

I would like to divert from my prepared statement somewhat to give you a slight preamble.

It is my opinion that the outcome of today's discussions are more far-reaching than the Santa Barbara Channel, and I wonder if the subcommittee today truly appreciates what they are going to be in for in the next few years.

This subcommittee will, I predict, find a much greater percentage of its time in the next few years devoted to wrestling with the problems of the conflict between continual demand for old-fashioned fossil fuels and a wakened public demand for environmental quality.

Petroleum development in Alaska and on the Colorado Plateau will in all probability result in public outcries as great or greater than those you are considering here today.

Since there are members of this subcommittee whose home States are Alaska and Colorado, they will be directly affected.

The National Fossil Fuel Policy as a whole needs a thorough review in light of our rapidly dwindling supplies. We have heard about that in testimony from the oil company people today. I personally feel that the solution to the Nation's urban problems and our respect abroad lie within the province of this subcommittee. Your votes lie on the side of environmental responsibility.

I am speaking here this afternoon as a professional geologist with knowledge of the particularly unique geologic conditions in the Santa Barbara Channel region. I would like to explain why I feel that, due to its geologic structure and nature, the Outer Continental Shelf of the Santa Barbara Channel is not suitable for exploration and recovery of oil by existing techniques.

Portions of the Santa Barbara Channel are unlike all other U.S. and most other world offshore oil fields in that this channel consists of several thousand vertical feet of virtually unconsolidated porous and permeable sand. These are not oil sands in the usual petroleum geologist's sense of a consolidated sandstone rock more or less saturated with oil but are geologically very young sands deposited directly on the sea floor.

In addition, many parts of the channel lack any sort of "cap rock" structure to trap the oil within the unconsolidated sands and the only thing that keeps the oil from seeping out continuously and rising to the sea surface is a thin—less than 100 feet deep—veneer of less porous, water saturated, fine sand and silt recently deposited on the sea floor and not yet saturated with oil soaking slowly upward from the sands below. The lack of structurally competent horizons above or within the oil-bearing sediments of the channel precludes a normal safety-conscious casing routine for many parts of this area. This is despite rulings by the Secretary of Interior. It is simply impossible to meet the requirements for certain parts of this channel.

There is nothing to which one can cement the casing that will hold it rigidly. The mere setting of caissons for the construction of offshore oil-drilling platforms on the Federal lease tracts—where the capping silts are thinnest because furthest from their shoreward sources—allows the oil-saturated sands to come into contact with sea water. In other words, leaks occur in even establishing the platforms, without drilling whatsoever.

Even the dragging of a ship's anchor can release oil where the sediment cover is very thin.

Once the sediment cover is disturbed it may take thousands of years to recover by natural slow—fractions of an inch per year—sedimentation.

So-called tar seeps exist along recent fault traces and areas disturbed by submarine landslide or human activity. They seep tar only because, after a short period of time, the petroleum leaks out so slowly that most of its volatiles dissolve into sea water or are lost to the atmosphere before it reaches shore resulting in tar with a specific gravity about equal to that of sea water; that is, some floats and some sinks. These natural seeps are distinctly different in quantity and quality of material than are the artificially induced leaks.

A further unique quality of the Santa Barbara Channel is its fault density, nature of movement along the faults, and earthquake and fault offset frequency. We geologists cannot directly map the locations of fault planes beneath the thin sea-floor silts but, judging from the geologic structure of the Santa Barbara coastal plain, the onshore portion, the previous testimony of the petroleum companies regarding the Santa Barbara oil spill, and the lack of stratigraphic correlation between adjacent well records for existing wells in the channel, I conclude that the area is highly faulted with high-angle reverse faults. That is a specific kind of geologic fault, not ordinarily found.

These faults act as passageways for oil and gas migration from deeper consolidated oil source rocks to the unconsolidated thick channel sands. In other words, the oil is not forming in the sands from which it is being drilled or produced. It is forming from much older rocks deep within the crust, migrating up these cracks or faults into the sands which are being drilled.

It is because of this connection through to the lower portion—and this is, by the way, one model which I believe to be the most valid model being considered by Dr. Pecora—it is because of this connection below that the leak is difficult to stop at present. It is because of this connection below that we cannot simply talk about depleting that reservoir that they are presently attempting to pump and shutting off the supply of oil, reducing the hazard.

The Santa Barbara Channel is an area of great structural complexity and frequent large earthquakes. By frequent, I mean a magnitude of six plus every few decades. Santa Barbara County is, in fact, in the geographic center of the locus of damaging earthquakes recorded in the United States. Figure 1 is a map produced by the National Earthquake Information Center, showing the damaging earthquakes in the United States through 1966.

I think you will see that not San Francisco, not Los Angeles, not Alaska or Hawaii, but Santa Barbara, Calif., is the locus of most of the damaging earthquakes ever recorded in this country. This is an official Government source, unaltered. It does not include the post-1966 earthquakes.

It is probably safe to say that more damaging earthquake energy has been released from earthquakes epicentrally located within 60 miles of the Santa Barbara Channel than in any other area of a 60-mile radius in the United States. Three major short periods of damaging earthquakes have occurred in this area since 1925. These have not been single earthquakes but have been episodes of smaller earthquakes.

Offshore oil structures in the United States have not yet been disastrously damaged by earthquakes beneath or near them because they have not existed in areas of high earthquake potential until the last few years.

The statement earlier today that the earthquake swarm of last summer did little damage and released little oil is exactly true. There were no offshore oil structures existing on Federal leases where those earthquakes were epicentrally located last summer. The first platform was not begun until after that earthquake swarm existed.

The United States has never lost an astronaut in space yet, but most believe that it will eventually happen and this is a calculated risk the astronauts take, of their own volition, and with few others suffering the consequences of their actions.

This is the same for the airline accident that witnesses earlier referred to, that the passengers choose the airline of their own volition and take that risk of their own volition. The birds and people of Santa Barbara do not take that risk of their own volition. Santa Barbara is far different in risk potential per human being.

GEOLOGIC CONSIDERATIONS UNIQUE TO THE FEDERAL OUTER CONTINENTAL SHELF LEASE LANDS

There has been much discussion that if the Federal lands are so dangerous, why shouldn't we shut off the State lands first. There are distinct geologic differences. Deeper water and thinner oil-free sediment cover as well as simple lack of geologic knowledge create greater risks in the Federal portions of the channel lease lands.

Due to the lack of consolidated cap rocks, the permeable sands, and the high fault density, no unusually great pressures are to be encountered at depths of 10,000 feet or less in the Santa Barbara Channel. This has been stressed by the petroleum representatives today, and I am stressing it, also. To me, that represents a different thing than they are trying to make you believe.

The fact that there are no unusual pressures in the rocks of the Santa Barbara Channel forcing up oil from under the ground, indicates clearly to me that the oil is free to move out of the ground. There is nothing to hold it in. There is no capping rock to create an unusual pressure potential, such as there is off the Gulf of Mexico.

This is precisely the source of the chief hazard in the Santa Barbara Channel; namely, that the oil and water interface are very delicately balanced. As a matter of fact, the rate of leaking from the present leaks in the Santa Barbara Channel varies as a function of the changing tide. Just a few feet of change of tide creates a slight difference in pressure and creates a speedup or decrease in rate of leaking. This is a very, very delicate balance.

Thus, a completely cased well, cased as drilled, has the same potential for drilling accident in any area of the channel of similar geologic structure. However, the weight of a given column of drilling allows the oil and gas in the drill hole to rise closer to the sea floor in deeper water. Statements to the contrary by petroleum company representatives are absolutely in opposition to the laws of physics.

In an only partly cased hole, the closer the oil rises to the surface, the greater its possibility for leaking to the surface along fault planes intersecting the hole.

Santa Barbara Channel does not have a hazard for blowouts. Santa Barbara Channel has not had a blowout. A blowout is where oil is gushing out of the drilled well hole. This is not what has happened here. Oil has come up partially through the uncased portion of the well and leaked out along fault planes.

It is interesting to discuss this concept of blowouts. Mr. Morrison gave us the figure, as did Dr. Pecora, that there were 2.5 blowouts per 1,000 offshore wells drilled in the U.S. offshore waters so far.

This is the record, 0.25 percent record. It is interesting that the Santa Barbara Channel has yet to be drilled to approximately 4,000 wells.

At this rate, we will have, we will predict, under normal situations of a relatively safe offshore model such as the gulf coast, 10 more blowouts in the Santa Barbara Channel, predicted on the basis of Dr. Pecora's figures and the petroleum companies' figures in your record.

I feel this is a conservative estimate since we are not dealing with the same kind of a geologic situation. This is a different sort of a situation.

The State tidelands, to summarize this portion, differ from the Federal tidelands in that the State tidelands have a thicker section of capping sediments which have not yet been soaked with oil.

Therefore, it is easier to build a platform on State lands especially since some of these platforms have been built from artificial islands a short distance offshore, thus, further protecting the sea bottom from leaking. That is an additional amount of pressure, counteracting that differential of pressure allowing the oil to leak. But as we get farther offshore from the sediments swept offshore during the rainstorms, then the sediment cover is thinner.

You are, and have been, discussing the potential remedies for existing and future leaks.

It is necessary for this subcommittee to consider the validity of proposals by the Federal Government and petroleum companies for new safer drilling in the Santa Barbara Channel.

I feel that the risks associated with plans and remedies reported in the press as under consideration are great. A better casing program is not of value if the casings cannot be cemented to a solid rock unit.

Proposal 1: Pump the reservoir dry so it will not leak.

This is simply in theory but difficult and risky in practice. In the first case, the major reservoirs of oil in the sands in the channel owe their existence to oil migrating from other older source rocks to those porous sands.

Once pumped or escaping oil begins to flow through these sands it rapidly erodes channelways through the thousands of feet of sediments and increases its natural rate of flow in that direction.

Pumping floods out or increases the permeability of these unconsolidated sands and thus increases the rate at which pumping must occur to prevent leakage. Once you start a pumping program, you have to continually pump faster and faster in order to keep the thing from getting ahead of you.

We do not know how fast oil can refill the existing shallow reservoirs of unknown size, and to try to pump them dry and fail is asking for certain trouble, since the permeability of the whole field will have then been increased and existing capping sediments may be woefully inadequate.

Even if the reservoir could be "pumped dry" it would only remain so for a short period of time since lateral subsurface pressure gradients of unusual magnitude exist in this area because of the overall tectonic motion of western California traveling northward at an inch or more per year and having to jog westward to pass around the deep San Joaquin Valley structural basin.

Compressive pressures exist along the Santa Barbara coast and channel islands sufficient to squeeze the land surface upward more than a foot every 750 years. This is not very much in terms of something you think about as a rate of sedimentation, but this is a lot of pressure laterally.

I have just returned from working in the Santa Barbara Channel and discovered one area on Santa Cruz Island which is rising at the rate of a foot every 180 years. This is among the fastest known rates of rise of the land reported anywhere in the United States.

Proposal 2: Cement the fissures so they cannot leak.

Firstly, the entire sea floor will leak if disturbed where it is without capping by impermeable bedrock.

Secondly, once oil and gas are flowing in a fissure or channelway forcing concrete into it merely restricts its flow so that it increases its erosive power and detours around the cement plug or carries it away.

This plan for stopping leaks is not unlike trying to build a concrete dam across a river without first diverting the water. It would work with very viscous cementing agents if the sands were consolidated into rock, but not in the Santa Barbara case.

Lastly, my own proposal would increase the rate of sedimentation in the areas of the channel now leaking and not disturb the channel floor in other areas.

I would propose that existing structures be removed from the channel sea floor and that oil-free silt and fine sand, in which a cementing agent or plastic be introduced to set it up over a period of time, be pumped or transported to areas above sea-floor seeps and leaks and allowed to deposit several 10's of feet of sediment cover over the leaks.

This would increase the pressure on the oil seeps beneath the ground and eventually overcome the slight amount of differential pressure allowing the leak to move upward.

Oil will still leak out for a short time, but as it slows down due to the less permeable water-soaked sediment capping, it will lose some of its volatiles, form tar, and begin to cement the sediment together to form its own capping.

Economically and esthetically disastrous leaks will still occur during major earthquakes, tsunamis, and submarine landslides as they have at intervals for the last 75,000 or more years, but the Government and oil industries can in no way be considered as legally responsible for these natural occurrences.

Note that I have said in that statement that disastrous oil spills have occurred in the geologic past. There is evidence that they have, during

earthquakes, approximately 60,000 years ago. A larger occurrence than the current occurrence.

I would like very briefly now to just hit six points that were brought up in testimony by the oil companies. I want to be sure that we are not confusing statements.

It was said that the structures, the oil platforms, are designed for twice the magnitude of earthquake which they would expect to occur, or which they are told might occur.

I remind you that an earthquake magnitude of 6.2, because of the logarithmic scale, is twice as great as an earthquake of 6. This is approximately the design size.

We have had earthquakes in the Santa Barbara Channel of 8, 100 times as great.

Transfer pipes, if broken, would leak more oil than already lost in this particular oil leak that started this whole thing which you are discussing today.

That is despite the safety valves. In other words, there is a great deal of oil stored in the pipes leading to shore.

Beaches can be cleaned only during a period, a unique period, of beach building, which goes on in the spring, and which began soon after the leak occurred.

Then it is possible to make a beach look fairly clean, though not very clean under close scrutiny, because there is clean white sand constantly being deposited over the oil which washes up on the beach.

As winter storms begin to degrade the beach, that oil comes to the surface and concentrates on the beach again. We know from measurements of the last few weeks that many hundreds of thousands of barrels of oil exist in the beach sands of Santa Barbara beneath the white veneer.

Last, the reserve size of the Santa Barbara Channel.

One of you gentlemen very sharply and did catch the fact that the total reserves of the Santa Barbara Channel are only a portion at maximum of the Nation's use for a year. The Nation's use per year is growing faster.

I will point out that Alaskan reserves on the north slope are predicted to be 10 to 100 times larger—10 at the most conservative and 100 times by most estimates—larger than the Santa Barbara reserves.

This is a substantially different amount of oil than we are talking about here.

That concludes my testimony.

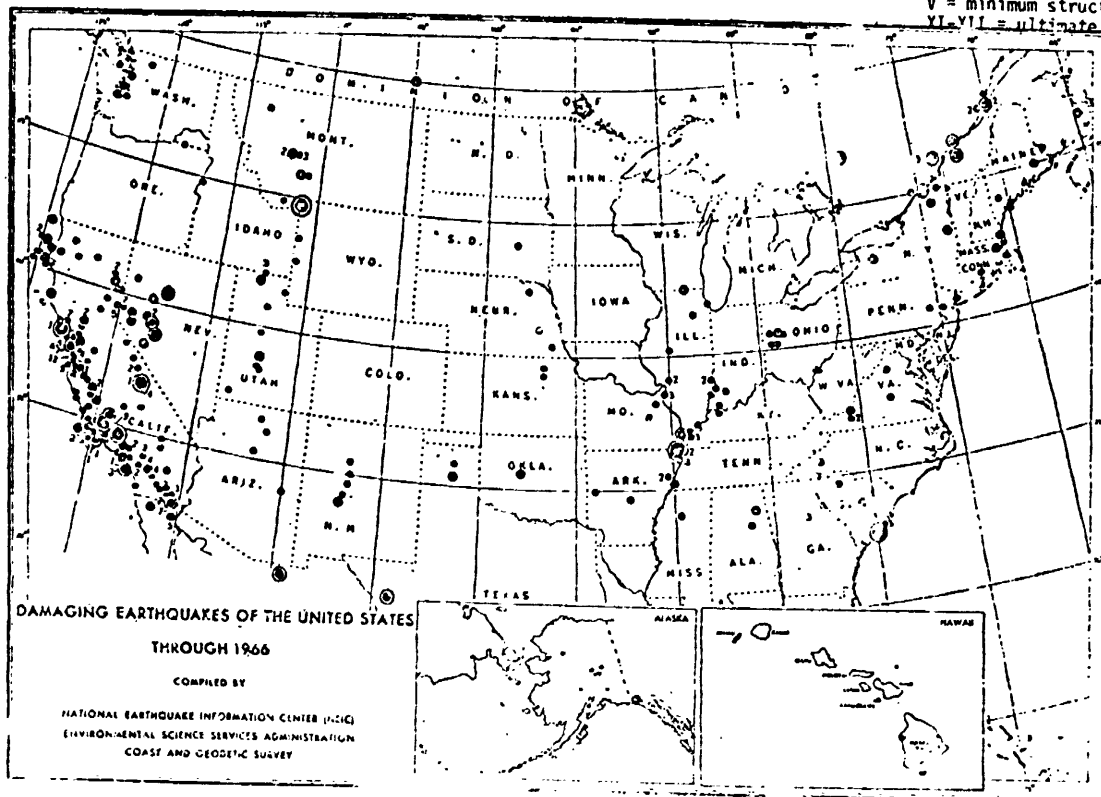
(The document referred to follows:)

Figure 1.-- Damaging Earthquakes of the United States through 1966.

- Earthquakes of intensity V-VI; ● earthquakes of intensity VII-VIII;

- ⊙ earthquakes of intensity IX-X; ⊚ earthquakes of intensity XI-XII.

(Mercalli Scale of physical damage.)
 V = minimum structural damage
 XI-VII = ultimate catastrophe



NOTE: This summary includes only those damaging earthquakes epicentrally located on land.

Senator Moss. Thank you, Dr. Curry. That is a very fine paper, and technically very informative.

Your solution about putting sediments out there that have some sort of a cement-like substance in them is intriguing. Is there any cost estimate on that at all? Is there anything you could give as to what it might cost to do that?

Mr. CURRY. If we use the existing pipes which are already laid on the channel floor by the oil companies to transport oil shoreward, to transport the sediments offshore, and if we used, as a sediment source, the near-shore silts, merely pumping them up into barges and pumping them offshore, I believe, though I cannot give you an honest cost figure, that it would be a relatively inexpensive program, certainly much less expensive than a shallow drilling program, for instance, to relieve the pressures. The Department of the Interior is considering this proposal.

Senator Moss. You are thinking in terms, then, of silts from the floor of the ocean close to the shore and moving them out farther?

Mr. CURRY. Right. You might get in trouble with such a thing because if you took too deep a layer of silts close to shore you could cause a leak near shore.

The best thing to do is not mess with the floor at all but take your sources of sediments from elsewhere, in nearby lagoons which are silting up because of the Corps of Engineers.

Senator Moss. Are there many lagoons of that sort that might be utilized?

Mr. CURRY. There is one at Carpinteria and one at Goleta, within about 8 miles of one another, which do have a very large quantity of silt.

Senator Moss. The thing that bothers me is that the ocean seems like such a big and bottomless place. I wonder how much you would have to drop in there before you put a layer on the bottom.

Mr. CURRY. You are entirely correct. If you try to spread it over the whole channel, the 75- by 25-mile basin, you would have, indeed, a very difficult job. But if you merely try to put it over the areas of known leaks, I think it would not take a great amount. And that is where the pipes are.

The Corps of Engineers would love to do such a thing.

Senator Moss. Your feeling is that the technique they are talking of, of releasing the pressure by getting out the oil from below, would be ineffective.

Mr. CURRY. It would only work temporarily, if one of their models is right. And I don't happen to believe that that model is right. Therefore, I don't believe it will work at all.

Senator Moss. You think that that reservoir down there would refill from other lateral sources and, therefore, having pumped it out, you haven't gained anything in curing the seepage?

Mr. CURRY. Correct. Due to the faults intensity down to the deeper source rocks, I feel they would refill at a rapid rate.

Senator Moss. Is there an area of considerable depth where there is a great amount of oil under high pressure?

Mr. CURRY. There is not a great amount of oil, but below approximately 10,000 feet in the area of the Rincon structure, near the Union Oil platform, there are shows of oil in hard bedrock sands.

These exist throughout the Santa Barbara Channel, in the deep wells drilled in 1,000 to 2,000 or 3,000 feet of water. The deepwater sands show up. The oil is finally disseminated throughout the large source rocks, if they are the source rocks. But they are very large and there is, indeed, a great area from which to tap oil.

For instance, oil is oozing out of the rocks on the north side of the range 30 miles north of Santa Barbara, from the same rocks which we find at 10,000 feet in the Santa Barbara Channel. It is conceivable that we will be drawing oil from the source rocks in the Ventura basin ultimately.

Senator MOSS. I certainly appreciate your testimony. It comes from an experience background that makes me respect it very highly. I thank you.

Senator ALLOTT?

Senator ALLOTT. We have had testimony here that indicates that the Rincon structure is relatively small. What is your estimate as to the reserves in that structure, part of which, I understand, is under State lease and part of which is under Federal lease?

Mr. CURRY. This, again, depends upon the model which is eventually predicted as being correct.

If my particular favorite model is correct, that the Rincon structure gains its oil through a fracture system from deeper rocks, the reserves of the Rincon structure are substantially larger over a long period of pumping. There may be perhaps a billion barrels. However, if one of the models is correct, where the structure system is tight and oil does not come from below, and the thing would be pumped completely dry, then the Rincon structure would have—well, I sincerely do not know, but in the neighborhood of 50,000 to 100,000 barrels perhaps might make a little difference.

Senator ALLOTT. It depends upon what is in the structure then. Apparently, the oil companies themselves do not have the concept of the Rincon structure that you do, at least from what we have heard; is that correct?

Mr. CURRY. That is entirely correct; yes.

Senator ALLOTT. I am not questioning your technical ability, Doctor. I couldn't. But have you had access to their data?

Mr. CURRY. Yes, I have.

Senator ALLOTT. But you simply arrived at a different conclusion?

Mr. CURRY. Their data which I saw did not counter any of my own preconceived ideas based upon other knowledge. It was in agreement with ideas I already had.

It is important since I am not supposed to release the fact that I had their data.

Senator ALLOTT. In the Secretary's testimony yesterday, you were here, I think, when he read the some 13 or 14 steps that they were taking to ascertain the difficulties and to attempt to cure them.

I assume, since your proposal, No. 3, was not mentioned, that you do not think that any of the 13 or 14 that he did mention would be advantageous?

Mr. CURRY. No; that is not true. Some of their ideas are certainly meritorious and worthy of consideration. Their ideas are entirely the function of their ability to gain knowledge on the actual model on which it is presumed to be correct.

If they gain information, according to his recommendations, that points to my particular model, which is one of the four models which they will consider, I believe that they would consider my recommendation. Perhaps they have worded it slightly differently, but I do know from talking with Dr. Pecora today that he has considered my thought spontaneously, of his own origin.

Senator ALLOTT. He has what?

Mr. CURRY. He has considered a proposal similar to mine, to pump sediments onto the surface and seal them with something permeable, a plastic sheet or plastic goop. It was a consideration which he briefly considered and then bypassed in favor of others which were more in line with the models that were being discussed by the DuBridge committee, for instance.

Senator ALLOTT. It seems to me, Doctor, that you argue against yourself here in a way.

For example, proposal 2 which you discuss. You say that, "Secondly, once oil and gas are flowing in a fissure or channelway, forcing concrete into it merely restricts its flow so that it increases its erosive power and detours around the cement plug or carries it away."

Is that sort of a supersealer?

Mr. CURRY. That is right.

Senator ALLOTT. You would have exactly the same effect upon the oil underneath as you would have with the cement plug.

Mr. CURRY. Right. But I am trying to very gently increase the pressure on these very delicately balanced areas.

Another interesting way to do this would be to pour charcoal on the icecap and ignite it, thus letting the water rise about 4 feet, but it would also destroy a good deal of the United States.

All we are trying to do is very delicately increase the sediment cover and not pump the material in under pressure, as has been tried and proven to fail by the oil companies so far.

They are trying to pump cement into the faults to plug them up at depth. That is a different situation.

Senator ALLOTT. Don't you have the reverse of what you are talking about happening in oilfields, which are not anywhere near depleted; that is, they plug themselves up by the tars and other things in the oil; don't you have that?

Mr. CURRY. Definitely, especially in your State of Colorado where I learned oil geology. That is precisely what goes on. That is precisely what I would expect to go on in the Santa Barbara Channel and what must go on, naturally, because we know that they have had major leaks and they have stopped. We don't know how long they have taken, but they have stopped.

Senator ALLOTT. Is there any record in the Santa Barbara Channel of an earthquake increasing the flow from the natural oil leaks that have occurred there over the years, and that occurred there before the first white man came there?

Mr. CURRY. There is no historic record, but there is a geologic record of just this, yes. There is a geologic record in which, in the sediments of the old sea floor which have been raised slightly above sea level, we see a large mass of oil outpouring which occurred at the time when the land surface was raised approximately a half foot. This would indeed be a large earthquake.

Senator ALLOTT. Just one other question. I want to give my colleagues a chance.

You said that the estimates of the Alaska reserves were perhaps 10 to 100 times?

Mr. CURRY. Ten to 100 times as great as the Santa Barbara reserves. We are talking about things of the magnitude of 100 billion barrels.

Senator ALLOTT. Where do you get your figures on that?

Mr. CURRY. From published oil company sources, which I can dig out of my briefcase.

Senator ALLOTT. I think somebody is pretty optimistic. They may be that large. I haven't known of anybody who is very responsible who is placing the reserves in Alaska on the North Slope in that area. There is a possibility.

Mr. CURRY. If you would talk to Senator Gravel about the amount of money presently being spent and the amount being spent in developing that field, I think you will see that simple prudence of cost-benefit analyses suggests that it must be that great.

Senator ALLOTT. There is always the possibility, but many oil companies may go home without finding oil.

Mr. CURRY. You are absolutely correct.

Senator ALLOTT. You know of your own knowledge what the experience has been on the continental area of the United States in the last few years.

Mr. CURRY. Right.

Senator ALLOTT. Costs of producing and the costs of even finding wells have gone up phenomenally.

Mr. CURRY. Especially in Alaska, but absolutely, most conservatively, it is 10 times the size of Santa Barbara.

Senator ALLOTT. Forty billion barrels?

Mr. CURRY. That is correct.

Senator ALLOTT. That is higher than I have ever heard anybody state it.

Mr. CURRY. I just got back from there.

Senator ALLOTT. I don't think you measured it.

Mr. CURRY. I certainly didn't.

Senator ALLOTT. There is one other thing, Mr. Chairman.

I frankly can't reconcile the testimony, all the testimony, of Dr. Curry with the testimony of the Secretary yesterday and Dr. Pecora.

The Senator from California, since I was absent when Dr. Curry first started his statement, handed me a note which said it was established before he began his testimony that he works part time for USGS and that Pecora's staff reviewed his testimony and finds it "essentially accurate."

Mr. CURRY. I voluntarily sent them a copy.

Senator ALLOTT. I am very happy to have that. But I must say that in my own feeble way I find this statement inconsistent in many respects and unreconcilable with the statements made yesterday.

Mr. CURRY. I concur with you.

Senator MOSS. It may be that the committee would like at some later time to ask Dr. Pecora, since he is available, to come in and comment further, if you would care to do so.

Senator ALLOTT. Did Dr. Pecora see this or was it a member of his staff?

Mr. CURRY. I do not know that he did. I mailed it to him personally and received a telephone call last night from one of his staff members asking me to go over it with him.

Senator ALLOTT. Thank you.

Senator MOSS. Senator Jordan?

Senator JORDAN. I have no questions, Mr. Chairman, but I would suggest that since the witness used part of his time in rebuttal of the oil companies' testimony, the oil companies would be permitted to file a supplemental statement.

Senator MOSS. They will be permitted to file any supplementary statement. As I announced before, they will have 2 weeks' time to send in written comments or rebuttal that they wish to make.

Senator HANSEN.

Senator HANSEN. Dr. Curry, is it your feeling that there is a rather wide area of ocean bottom in the Santa Barbara Channel that would be extremely risky to initiate or to continue drilling operations on at the present time?

Mr. CURRY. It is likely that there is a relatively small proportion of the Santa Barbara Channel which is known to be relatively risky for one particular kind of a problem, and there is a very large area of the Santa Barbara Channel which we simply do not know anything about. We don't know its risk potential.

Senator HANSEN. Is it your recommendation that all drilling should be stopped in the whole area?

Mr. CURRY. That is my recommendation, with the reservation of the amendment which Senator Cranston has already discussed be allowed.

Senator HANSEN. Do you mean that only such drilling might be permitted as would seem indicated to relieve pressures to stop seepages now, presently occurring; is that right?

Mr. CURRY. Correct.

Senator HANSEN. So, with that one exception, it is your recommendation that there be no drilling anyplace within this channel?

Mr. CURRY. That is correct.

Senator HANSEN. That is because of the danger of a possible spill or seep?

Mr. CURRY. That is correct.

Senator HANSEN. Then do I understand that of the various proposals that you have studied, including those made by the U.S. Geological Survey, you suggest proposal No. 3, that this is the step you think might best be taken to resolve this whole problem and to prepare the channel so as to strengthen it?

Mr. CURRY. I suppose I will have to degrade my presentation somewhat and say that is not entirely true. These three proposals which I discussed in my prepared testimony were prepared before I heard the Department of Interior current considerations, and they are merely considerations.

They are subject to change, I am told. I do have confidence that the Department of the Interior, specifically Dr. Pecora, if allowed to exercise his own unpolitically motivated, scientific opinion, can come up with a perfectly valid and excellent technique of trying to alleviate the present leaking problem, if he is allowed to do so on his own scientific ability and not with consideration for various political motives.

Senator HANSEN. Does your response imply that you question, at the present time, whether or not he will be permitted to do that?

Mr. CURRY. Essentially, yes.

Senator HANSEN. What is the basis for your statement?

Mr. CURRY. That the statements of Mr. Dole are not precisely in agreement with my opinion, my impression, of Dr. Pecora's own views on this particular subject.

Senator HANSEN. Do I understand you to say that Secretary Dole doesn't share Dr. Pecora's views and, as a consequence, his are not likely to prevail?

Mr. CURRY. Well, Dr. Pecora had to prepare a set of statements to give to this subcommittee without having a firm knowledge in his own mind as to what the geologic model was. Therefore, he was forced, by mere timing of this hearing, to come up with a series of recommendations that I don't believe he would make after he has all the data at hand. That is what I mean.

Senator HANSEN. You are saying that the recommendations and the observations he presented to this committee yesterday you do not think would reflect his feelings as of today?

Mr. CURRY. No. He would make those public statements today as he did yesterday, definitely. But he wants to have more data. He understands, for instance, the data on leak rates are entirely important and entirely relevant to the model which is assumed. He understands that there are disparities between the various estimated rates of leak rates.

He would like to know what the real answer is before he makes a firm decision. So I don't think he is going to try anything unless he is politically pressured into it, which, after all, he may be.

Senator HANSEN. What evidence do you see of his being politically pressured into assuming a position that his conscience could not countenance?

Mr. CURRY. He is charged by the Mr. Secretary of Interior with stopping the leak in the Santa Barbara Channel, period.

Senator MOSS. Aren't you really saying you really think Dr. Pecora needs more time to get the data and work the models before he can give a final definitive answer?

Mr. CURRY. That is correct.

Senator MOSS. He is giving us an interim answer based on partial knowledge at this time.

Mr. CURRY. That is correct.

Senator ALLOTT. How can you make such a summary judgment at this time? Do you have some peculiar knowledge available to you that is not available to all of these other people?

I think what you don't understand is this: There is no one on this committee who doesn't regret the occasion at Santa Barbara. There is no one on this committee who would want any such thing to happen in their own State. Of course, we don't have seashores, but we have oil shales.

Mr. CURRY. And you will see a heck of a mess there.

Senator ALLOTT. This is something you have to realize, that no one on this committee wants this to happen. But I think you are being a little bit unfair in your judgment of Dr. Pecora. I think you are being unfair, also, in your judgment, of Mr. Dole.

I talked with Mr. Dole at some length, not on this matter. While I am not a geologist, certainly, by any means, I am convinced that he is a geologist of some considerable knowledge.

Mr. CURRY. I have very great respect for him. This is precisely why I am making these statements, because I have such great respect for Dr. Pecora's scientific abilities.

Senator HANSEN. I just wanted to pursue this a little further.

I have known of Dr. Pecora for a number of years. I am aware of the high regard in which he is held by his colleagues. To my knowledge, I have no evidence, and I repeat that for emphasis, no evidence at all, that Dr. Pecora, in his professional career, has ever prostituted his convictions in order to assume a politically expedient position. Do you have any evidence that he has done that?

Mr. CURRY. Absolutely not. I don't believe he would.

Senator HANSEN. Then I don't quite follow you in your expressed view or concern about the need for time. I am sure that any of us, given the benefit of hindsight, might do things differently than would seem to be indicated at the present moment. But I don't think we can do anything about that. Time alone will take care of that. But don't you think that at this given moment, and that at the time Dr. Pecora faced this committee yesterday, he gave his best, honest, considered judgment of the situation and tried to evaluate it just as objectively as he possibly could?

Mr. CURRY. Essentially, I do.

Senator HANSEN. Essentially? Now you qualified it a little bit.

Mr. CURRY. Yes. There are a few minor points.

Senator HANSEN. Could you be specific? I would like to know specifically if you could pinpoint any area in which you feel he may have tempered his response or his presentation yesterday that would reflect other than his honest opinion. I would like to have that.

Mr. CURRY. Yes. He, in his testimony yesterday stated, for instance, that State wells on Continental Shelf areas had been producing for decades and that there hadn't been any problem from those.

This is in fact technically true. He is in fact technically absolutely correct. What he didn't say is that those wells had been producing from artificial islands at the ends of piers, in deeper, capped structures under very, very different geologic considerations.

This is something which I know he knows. He is a very intelligent man. I know he has these State records at his disposal. But he should not make statements. After all, he is an employee of Secretary Hickel and doesn't want to in any way embarrass the activities of Secretary Hickel to, with all due haste, get the leak stopped, which you are hearing testimony on today. That is Secretary Hickel's job.

Senator HANSEN. Just for the record, Mr. Chairman, I would like it to be known that I don't share Dr. Curry's convictions or feelings at all that Dr. Pecora would make any statement false in any extent simply to protect Secretary Hickel or any other Secretary.

Mr. CURRY. It is not false in any extent. It was entirely true.

Senator HANSEN. It was entirely true?

Mr. CURRY. Correct.

Senator HANSEN. Then I am afraid that I am engaged in some semantics with you. If it is entirely true, then I can't see really what you are saying, if what he says is entirely true.

Mr. CURRY. I merely said he did not say all of the truth in every case.

Senator HANSEN. I have one to two more questions.

I first tried to find out from you how much area you think ought to be subjected to this sort of treatment that you propose. I asked if you thought it was a big area. I think if it is a big area, then, obviously, that would be of interest.

Mr. CURRY. No; it is a small area.

Senator HANSEN. Then, if it is a small area, is there any good reason in your judgment for oil exploration not being permitted in other parts of the Santa Barbara Channel outside the small area?

Mr. CURRY. Yes, sir.

Senator HANSEN. Why?

Mr. CURRY. Because it is only leaking in a small area. My recommendation is the way to stop the leak, not a way to stop future leaks. If you want to drill somewhere else, then you will have to do this somewhere else, too.

Senator HANSEN. And you are saying if we drill anyplace else in the Santa Barbara Channel—is that what you are implying?

Mr. CURRY. No, sir. I am saying we don't know a lot about the rest of the Santa Barbara Channel. We do not have sufficient data about the rest of the Santa Barbara Channel to assure ourselves to be able to say that you can drill anyplace else you wish outside of areas which we know something about and know to be dangerous. That is all.

Senator HANSEN. Would you make any estimate as to the number of square miles of surface that you think are more than potentially hazardous, potentially dangerous, but of real danger that should be treated?

Mr. CURRY. Twenty-seven.

Senator HANSEN. Twenty-seven square miles?

Mr. CURRY. Correct.

Senator HANSEN. Do I understand you to propose that you think the most practical way to come to grips with this, is to deposit sediment over this area?

Mr. CURRY. That is merely a suggested way. That is not the most practical way I know of, no.

Senator HANSEN. It is not the most practical way?

Mr. CURRY. No.

Senator HANSEN. Do you know of a better way?

Mr. CURRY. No, I do not. But it is a practical way. I don't like to be entirely negative. I like to come up with some positive suggestions. There are other ways, I am sure.

Senator HANSEN. At this moment, do you know of any better way?

Mr. CURRY. I do not, but I certainly do not know of all the other ways.

Senator HANSEN. Have you any idea or would you venture a guess as to what it might cost to cover 27 square miles with sediment?

Mr. CURRY. I would not ask that they be tens of feet thick. I would ask that they be a few feet thick, perhaps three feet thick, and I do not have an estimate, no.

Senator HANSEN. I have no further questions.

Thank you, Doctor.

Senator MOSS. Senator CRANSTON.

Senator CRANSTON. To clarify one point, I didn't understand that you meant to cover the whole 27 square miles with sediment. Did you?

Mr. CURRY. No, not the entire. That would be the tracts which would be treated. There would be four tracts which would be treated.

Senator CRANSTON. How many square miles would that involve?

Mr. CURRY. How many actual square miles of area to be treated?

Senator CRANSTON. Yes.

Mr. CURRY. Perhaps no more than two or three.

Senator CRANSTON. I would just like to say on this matter of lack of knowledge of what should be done in this collision of testimony from experts, that I was talking with one of the officials of Union Oil Co. not many weeks ago and his view was that if the company was permitted to do what it wished to do and which it was inhibited from doing by USGS, they wouldn't have had to stop the leak, which, to me, is a further example of the fact that we are working in the dark here. It is very dangerous to proceed when so little knowledge among people who should be the most knowledgeable seems to exist.

Senator Moss. Thank you very much, Dr. Curry. Your testimony was very stimulating. It raised a lot of questions but it supplied a great deal of information. From this we may get a little better idea of how we should proceed.

(Subsequent to the hearing the following letter from Dr. Pecora, U.S. Geological Survey, was received:)

U.S. DEPARTMENT OF THE INTERIOR,
GEOLOGICAL SURVEY,
Washington, D.C., June 25, 1969.

Hon. FRANK E. MOSS,
Chairman, Subcommittee on Minerals, Materials, and Fuels, Interior and Insular
Affairs Committee, U.S. Senate, Washington, D.C.

DEAR SENATOR MOSS: Thank you for bringing to my attention the testimony of Dr. Robert R. Curry, a witness before your Subcommittee during the hearings on Bill S. 1219, on May 20, 1969.

I am quite aghast at his incredible testimony, as it appears in the record, and feel sure that the witness either misunderstood the questions put to him or was confused in his replies. A few points can easily be clarified, and should, to make the record complete.

(1) In response to a question put by Senator Cranston, Dr. Curry stated that his prepared statement was read by my staff and declared to be essentially accurate. The statement was in fact carefully read by a senior member of my staff, Dr. John G. Vedder, who has some 20 years of intimate knowledge of the geology of Southern California. Inasmuch as several points were misleading, inaccurate, or too generalized, Dr. Vedder sought to bring his views to the attention of Dr. Curry. Having read the printed testimony, Dr. Vedder reports that very few changes were made in the original text; that at no time did he say the statement was "essentially accurate"; and that the statement as recorded is not "essentially accurate."

(2) Dr. Curry testified that he is an employee of the Geological Survey. On a few occasions his services have been used by our Water Resources Division in Wyoming and Alaska projects related to geomorphology of landscape. He has not been employed by the Survey for work related to the Santa Barbara Channel. He has not requested nor been shown or given by my staff any information relating to the petroleum problem under review by way of those hearings.

(3) His testimony, as recorded, implies that the Director of the Geological Survey might have been, or might yet be, subjected to political influence in technical areas by his superiors in the Department of the Interior. With sincere candor, I can report to the Subcommittee that neither Assistant Secretary Dole, himself a distinguished geologist, nor Secretary Hickel has ever attempted to modify my professional conclusions or recommendations and both have relied completely on my technical judgments.

(4) I believe that any witness appearing before you has the right to self expression or interpretation of facts as he knows them. On the issue of geological and engineering information of the Federal OCS lands in the Channel, it seems

unlikely that the witness had access to abundant proprietary information which would have permitted him to speak with the assurances of a more knowledgeable witness on the subsurface geology of the OCS.

Sincerely yours,

W. T. PECORA, *Director.*

Senator Moss. Our next witness is Dr. Alan Allen, a marine scientist from California.

STATEMENT OF ALAN A. ALLEN, MARINE SCIENTIST, GENERAL RESEARCH CORP., SANTA BARBARA, CALIF.

Mr. ALLEN. Thank you, Mr. Chairman.

I feel that my presentation deals with a problem, the aspects of which have been greatly belittled and distorted since its origin. It deals with the true magnitude and extent of the Santa Barbara oil spill.

I would like to take this opportunity to read my written testimony to put this problem in its proper perspective.

Senator Moss. If you would like to proceed that way, you may do so; or if you would like to summarize, you may do so.

Mr. ALLEN. The true magnitude of the Santa Barbara oil spill can never be determined accurately. Since the leak is an uncontrolled flow of oil and gas from fissures in the sea floor, it is inaccessible and subject to change in both location and flow rate.

Once the oil surfaces, its movement and ultimate area of contamination are equally unpredictable because currents and winds in the Santa Barbara Channel change rapidly.

In spite of these conditions, it was possible during the first few days of the spill to determine the approximate volume of oil on the ocean's surface at any given time. The oil slick was observed and photographed from the air repeatedly.

From these surveys, the area covered by oil has been conservatively estimated. The thickness of the oil film has been estimated from observations and measurements of the slick as well as theoretical calculations.

Putting together these areas and thicknesses gives an estimate of the volume of oil on the surface at any given time. From the volumes, it is easy to determine the average daily flow rate required to produce that much oil on the surface.

The importance of making these estimates available is emphasized by the gross inconsistencies between oil flow estimates reported by officials on the scene and the apparent volumes of oil observed, measured, and collected throughout the Santa Barbara Channel.

In addition, scientists must have accurate estimates of the magnitude of the spill in order to effectively evaluate its effects, study its movement, correlate it with previous spills, and evaluate the chemicals, equipment, and procedures used in its control.

I must apologize that the next portion of my presentation is not as I had wished. I had prepared colored slides which I had hoped to show, but we were unable to secure a projector. You can refer to the figures that are enclosed in testimony as I refer to them. I think they should illustrate the points.

Figure 1 shows the southern California coastal region with the channel islands approximately 30 miles offshore. The figure indicates

the extent of total oil slick coverage at several times after the spill began on January 28, 1969.

The contaminated region covered approximately 32 square miles within 48 hours and spread to include many hundreds of square miles by the 8th day. Beyond this time most of the contaminated waters were covered by a thin iridescent film with scattered patches of heavy dark crude oil. While data are still being gathered on the extent and degree of beach contamination, it is evident that well over 100 miles of coastline were affected by the oil.

Figure 2 illustrates the extent of pollution during the first 2 months of the spill based on information obtained to date. I might point out that in figure 2 the numbers indicated along the coastline indicate the number of days between the start of the spill and the first arrival of oil on that beach.

The heavy level of contamination near Santa Barbara consisted of beach deposits ranging from several inches of dark black crude oil over the entire tidal zone to brown water-in-oil emulsions spread in patches one-eighth to one-fourth of an inch in thickness.

The light levels of contamination might be compared to the occasional deposition of iridescent films and irregular, dull wafers of coagulated oil that can be observed near Coal Oil Point (10 miles west of Santa Barbara) as a result of natural seepage in that area.

While it is possible that some beach contamination was and continues to be the result of natural seepage, unrelated to the leak at Union's platform A, the levels of contamination combined with the times of arrival preclude the possibility that natural seepage alone could account for the beach deposits.

The winds and ocean currents acting during the weeks that followed the spill have been studied and correlate well with the expected and subsequently reported regions of contamination.

However, it is conceivable that some surface pollutants were introduced by other man-caused sources such as bilge pumping, fuel transfers, and so forth, thus adding to the level of contamination.

Estimate of oil film thickness.—With the availability of oil slick coverage data, compared and found to be in close agreement with estimates made by the U.S. Coast Guard and other independent observers, it is possible to assess the magnitude of the Santa Barbara oil spill. This exercise involves the identification of some reasonable estimates of the overall average thickness associated with a large slick of crude oil on sea water. Figure 3 helps to identify, in part, such a thickness. Average oil film thickness (in inches) is plotted against the quantity of oil (in barrels) that could be spread uniformly for 1 square mile at that thickness. The chart indicates that iridescent oil films are on the order of a few hundred thousandths to a few millionths of an inch in thickness.

Optical interference phenomena associated with the reflection of light off oil films of this thickness (on the order of one wavelength of visible light) account for the bright bands of color or silvery sheen observed.

Dr. P. C. Blokker,¹ a research chemist with the Shell Laboratory in Amsterdam, has performed laboratory experiments and has made physical deductions about the spread of large quantities of oil on sea

¹ P. C. Blokker, "Spreading and Evaporation of Petroleum Products on Water," published in proceedings on Fourth International Harbor Conference, June 1964, Antwerp, Belgium.

water that help to identify reasonable estimates of the thickness of an oil film after a given period of time.

Dr. Blokker notes that, when large quantities of oil are spilled, iridescence occurs only at the edges of the oil film. Most of the oil spreads as a uniform thin layer, unless broken by heavy seas or winds, and reaches a final thickness that may vary from 10 to 100 microns (four ten-thousandths to four one-thousandths of an inch) dependent upon the properties of the oil and the purity of the water.

Large quantities of oil spilled on heavily contaminated waters may acquire a final thickness on the order of 1 millimeter (four one-hundredths of an inch).

Careful examination of Dr. Blokker's work, coupled with my own findings and those of other independent observers of the Santa Barbara spill, leads to the conclusion that wherever crude oil appeared as a distinct blue-black slick a very conservative estimate of the minimum thickness of the oil film after spreading for at least 24 hours would be on the order of one one-thousandth of an inch and very reasonable as high as one one-hundredth of an inch.

Since this estimate is for the outer regions of the oil slick, and the oil would certainly be thicker near the center of the slick, it is safe to assume that a very low estimate of the overall average thickness is at least a few thousandths of an inch.

Recognizing the possibility that the observed oil films might represent a water-in-oil emulsion containing as high as 50 to 70 percent water, an appropriate reduction in the assumed average thickness would leave one one-thousandth of an inch as a most conservative estimate of the overall average thickness of the dark blue-black slicks of crude oil.

Flow estimates.—During the early aerial surveys conducted to determine the extent of oil coverage, the regions of contamination were established on a map while subsections within each region were assigned percentages of dark oil coverage.

These estimates, being subject to human judgment, were corroborated where practicable with aerial photography and other independent surveys. In any case, the resulting errors due to overestimates in some areas would likely be canceled by underestimates in other areas of the slick.

It is also important to note that a significant error could be tolerated while attempting to establish a conservative estimate of the spill, since there has been no effort to account for the oil removed by evaporation and chemical treatment.

The footnote on evaporation indicates that depending on the wind, 5 to 20 percent of a typical crude oil at 20° C. can evaporate in 1 hour, according to P. C. Blokker.

I might also mention that the graph showing the evaporation as a function of time is pertinent here.

This means that the total quantity begins to level off at about 25 to 30 percent.

Using approximately 413 barrels per square mile—corresponding to $\frac{1}{1000}$ -inch thickness in figure 31—in conjunction with 24 square miles of dark oil coverage—75 percent of total area—nearly 48 hours after the spill began, it is apparent that the required average daily flow rate is approximately 5,000 barrels per day.

This procedure has been repeated for each of the areas of contamination determined on the third, sixth, eighth days following the start

of the spill. In each case the results consistently substantiate the very conservative estimate that at least 5,000 barrels of crude oil had to be released into the Santa Barbara Channel each day. These volumes of crude oil are further substantiated by the quantities of oil removed from surface waters within the Santa Barbara Harbor.

It is obvious that the many thousands of barrels removed from such a small portion of the total contaminated region could only account for a small fraction of the total quantity released. It should be emphasized that this estimate is a very conservative one. In an attempt to identify a realistic though less conservative estimate of the oil flow rate, it can be assumed that much greater thicknesses existed near the source and that at least 25 percent of the oil had evaporated by the end of 48 hours.

Based on the observations of several witnesses who had traveled through the oil near platform A, one might conclude that the oil within a region 100 by 100 yards was approximately 1 inch thick and consisted of a 50 percent water-in-oil emulsion.

It might further be assumed that a region somewhat less than half a mile on a side consisted of 50 percent water in oil with an average thickness of one-fourth inch, and surrounding that region was another approximately 1 mile on each side covered with oil $\frac{1}{100}$ -inch thick.

Using these assumptions, which, of course, are subject to interpretations through an untrained "eye for oil" and possible exaggerations by witnesses, one can determine the extent to which the original flow estimates might be altered.

The inclusion of this 1 square mile of varying thickness near the source, and a 25-percent loss due to evaporation, results in an estimated average daily flow rate, based on 2 days, of 16,000 barrels per day—three times the conservative estimate.

The more conservative estimate of 5,000 barrels per day yields a cumulative flow of over 52,000 barrels of oil spilled before the leak was temporarily controlled during the 11th day. Oil seeped to the surface at a very low rate for approximately 4 days, at which time, on February 12, the flow of oil increased significantly.

It was very difficult to estimate the new flow rate since the channel was still heavily contaminated with oil from the previous major leak. However, based on estimates of the width and thickness of the oil stream near the platform together with observed and calculated drift rates, it was determined that at least several hundred barrels of oil were being released each day. Repeated estimates seemed to indicate that on the order of 500 barrels per day was reasonable.

This level of contamination continued, with a few sudden changes in leakage rate at the end of February, until during the first few days of March when the flow of oil was once again significantly reduced.

Using the same procedure as before, it was estimated that the seepage of oil from the seabed had been reduced by at least half its previous rate. Experiments to examine the oil slick and measure its draft rate resulted in an estimate of approximately 200 barrels per day, which is believed to have remained unchanged until the present time. This estimate is sufficient to account for known volumes of oil skimmed from the surface near platform A.

Figure 4 illustrates the cumulative quantity of oil spilled, based on the most conservative estimates of oil flow rate. As indicated, over $3\frac{1}{4}$ -million gallons of oil have already been released into the Santa

Barbara Channel and the flow of oil still continues to contaminate surface waters, beaches, and harbors. We have only begun to under-
the full effect of this massive contamination.

Thank you, Mr. Chairman.
(The documents referred to follow;)

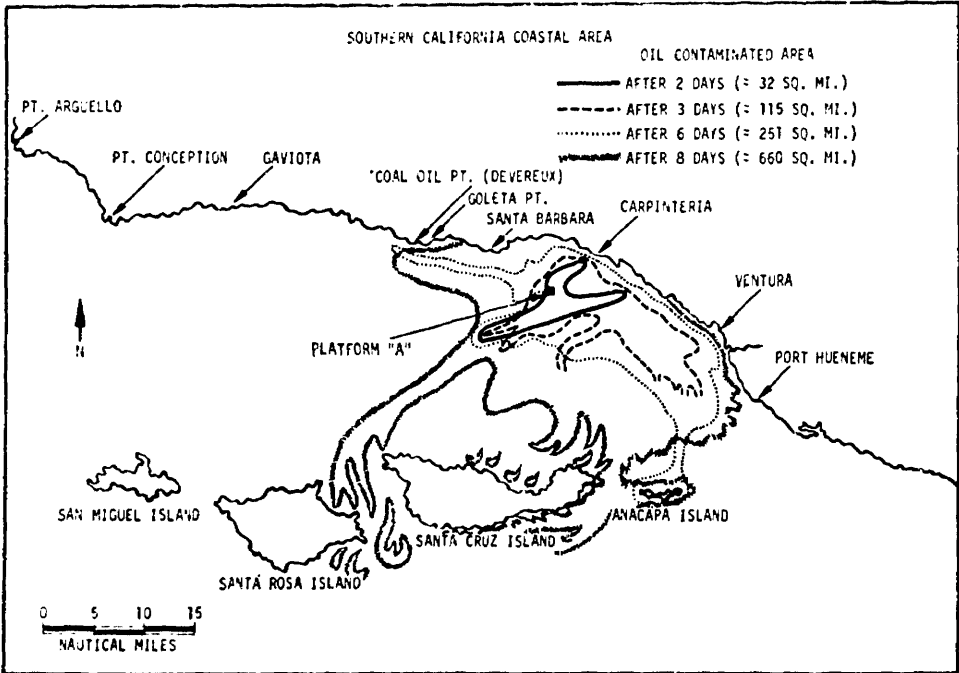


Figure 1. Contaminated Areas After 2, 3, 6, and 8 Days

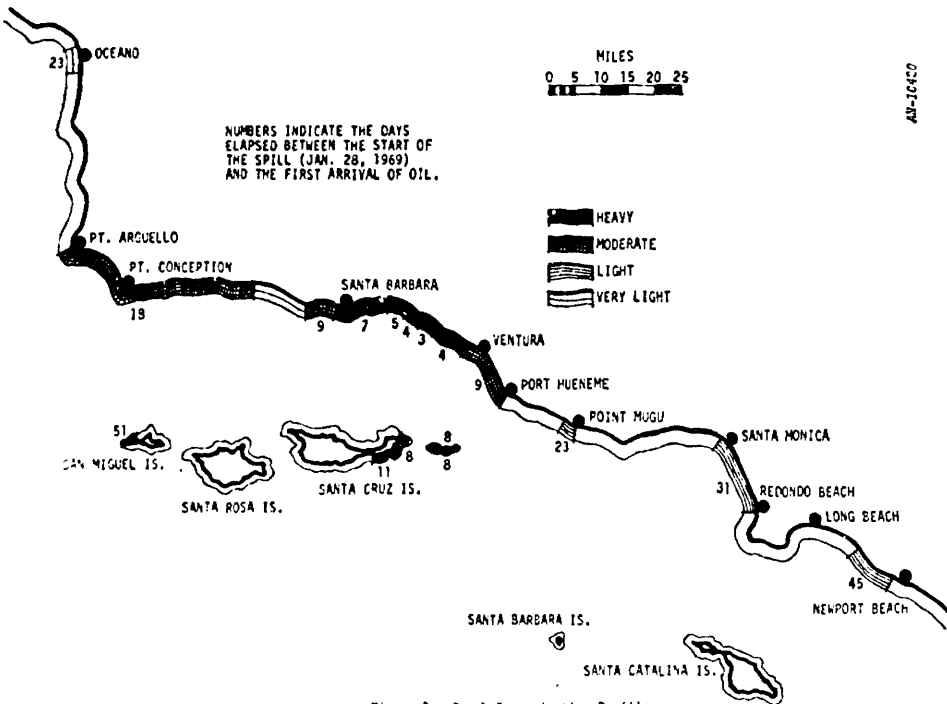
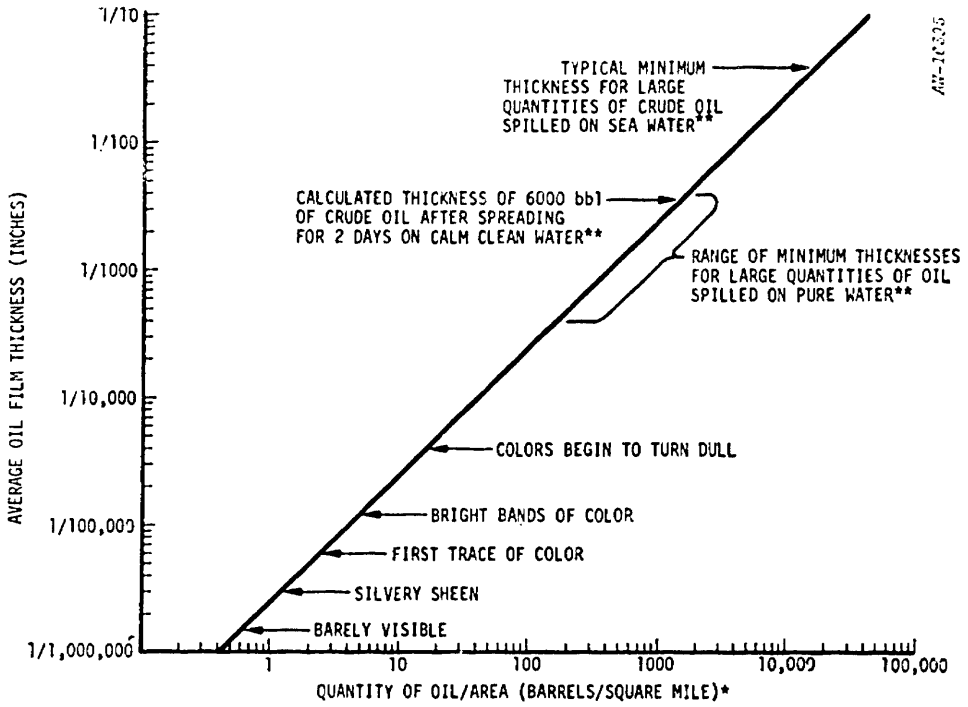


Figure 2. Beach Contamination Profile



*1 BARREL = 42 U.S. GALLONS; 1 SQ. MI. = 1 SQ. "STATUTE" MILE

**BASED ON LABORATORY-SCALE MODELS AND PHYSICAL DEDUCTIONS BY P. C. BLOKKER

FIGURE 3. Characteristics useful in estimating oil flow thickness.

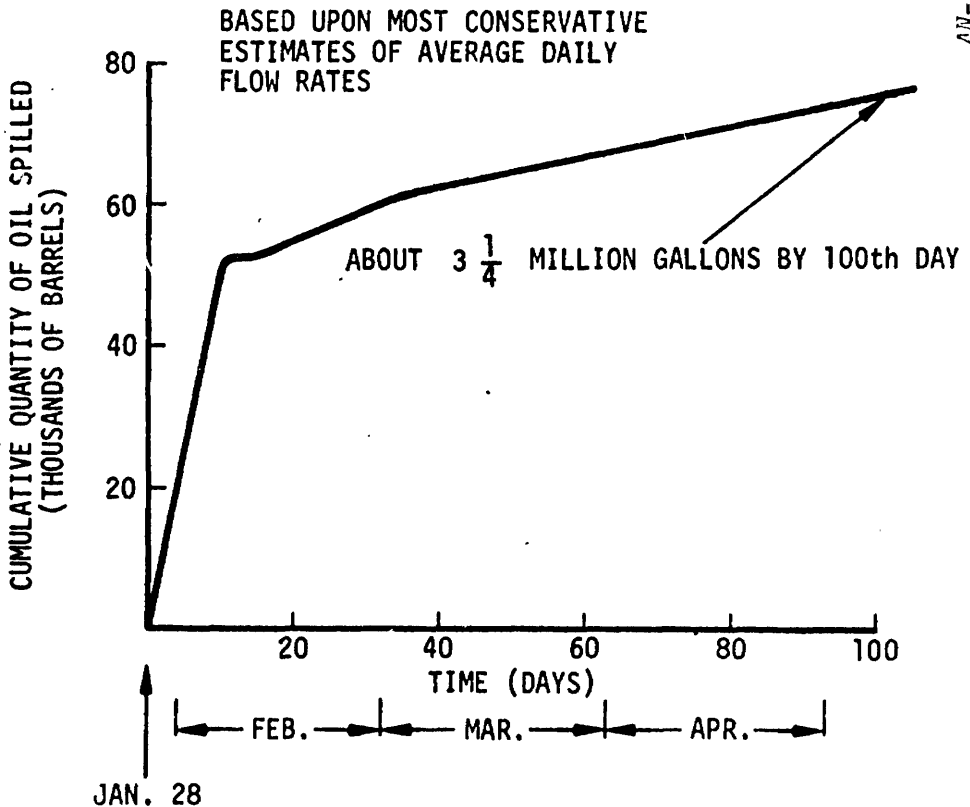


Figure 4. Cumulative Oil Flow vs Time

Senator Moss. Thank you, Mr. Allen. What is your estimate of the amount that is being released at the present time daily in the channel?

Mr. ALLEN. The present calculation is based on one that I deduced approximately 3 weeks ago and that is 200 barrels per day. This was in agreement with all estimates of the present flow rates since approximately March 4.

Senator Moss. That is considerably below the estimates given by the earlier witnesses we had. I don't know if you heard them yesterday or not.

Mr. ALLEN. Yes, sir; I did. It is essentially a factor of 10 difference.

Senator Moss. Your estimate is about 200 barrels a day?

Mr. ALLEN. Yes, sir.

Senator Moss. What happens to oil after it gets onto the surface of the water that does not wash up on the shore? What becomes of it?

Mr. ALLEN. There are lots of things that happen to it. If I can put them in order of importance, the first thing that happens is that it spreads. If it spreads initially to a thickness of about 2 centimeters within about a minute to a minute and a half, if it is coming up sufficiently to induce that thickness, it spreads very, very rapidly within minutes to the order of a millimeter.

From that time on, depending on the surface tensions of the water and the degree of contamination in the water, it spreads out very, very slowly, which as I indicated is on the order of 1/10,000ths of an inch. Evaporation takes place immediately and I have already quoted the extent to which it evaporates in the first hour and subsequently after that.

Another important thing which occurs is the biodegradation. This is a very slow rate of loss through biodegradation which is completely neglected in any of these calculations because the oil is degraded through this mechanism so slowly and after a period of time it would be beyond the time frame which I covered.

Senator MOSS. Does biodegradation—

Mr. ALLEN. Small bacteria consuming the products.

Another loss of oil arises through a sinking of oil from heavily contaminated waters containing silt. The water off Santa Barbara was very rich from silt as a result of the recent storms, so a great amount of oil was lost through that mechanism which I do not take into consideration.

Senator MOSS. The silt would come into the water; the oil would attach to the silt and it would sink?

Mr. ALLEN. Exactly. There was clearly evidence from aerial photographs which you can see where massive slicks moved into the Ventura River area. As it moved into that area, you could see the slick being held back, first, and as it penetrated into the silt region, it broke into thin strips which would very quickly sink.

Senator MOSS. I thank you for your every very learned and technical discourse on this. It certainly gives our record a lot more information about the precise location of the slick and where it came ashore and the amounts that were there and this is very helpful to us.

Senator Allott?

Senator ALLOTT. I have no questions.

Senator JORDAN. No questions.

Senator HANSEN. No questions.

Senator CRANSTON. No questions.

Senator MOSS. Thank you very much, Mr. Allen, we appreciate it.

Mr. Fred Eissler is our last witness. We have kept you a long time and we apologize for that, but we have had to wait, too.

STATEMENT OF FRED EISSLER, SIERRA CLUB, SANTA BARBARA, CALIF.

Mr. EISSLER. We are very appreciative of the time you have taken on this and the other committees have.

Mr. Chairman, I am Fred Eissler, a resident of Santa Barbara, and the representative for the Sierra Club.

In spite of the impression given that the Santa Barbara oil disaster is over and suitable measures have been taken to prevent another one, oil continues to spill from the Union Oil platform off our shores for the 113th consecutive day. Beaches and coastal scenery are repeatedly contaminated and wildlife suffers. There is no end in sight and no guarantee that another catastrophe will not occur unless

action as proposed in S. 1219 is taken to remove drilling and producing operations from the channel. The Sierra Club strongly urges the enactment of the bill before us and its implementation with dispatch.

Those of us who daily witness the oil disaster are seeing for ourselves the problems of a technology that accentuates exploitive benefits at the expense of the quality of our environment in default of adequate public review. The Secretary of the Interior tells us that he would have "made a different decision" from his predecessor about selling leases in the channel, yet he has now permitted the oil companies to begin their hazardous drilling again.

Local communities are distressed at not being consulted about this and other bitterly controversial decisions with a long-term effect on their environment. Not once was a public hearing scheduled prior to the sale of leases in February 1967, nor were public hearings scheduled before the recent adoption of new drilling regulations, or the present order to resume drilling.

Far-reaching policy is being made behind closed doors by a few professional groups. A process essentially at war with democracy is now being perpetuated as the DuBridgde Committee meets in private, forming private conclusions from private information.

And yet geologists we have consulted continue to tell us that the only assurance that another catastrophe will not occur is to remove the oil operations from the channel. The new drilling and casing regulations are inadequate. Safeguards in the present or foreseeable state of the art of oil recovery cannot contend with the geological conditions in the channel region.

They affirm what a channel lease-holder now intends to prove in court (*Pauley Oil Co. v. United States*, April 1969). The legal document repeats what citizens declared to be the case prior to Federal sale of channel leases; what the oil companies knew then, evidently without caring; and what, according to the Pauley brief, the Federal Government knew then, that:

* * * hazards beyond the control of the operator accompanied off-shore petroleum exploitation and production in the Santa Barbara Channel * * * [that] greater tectonic activity, a greater density of subsurface faults and fault zones, and more frequent and more intense earthquakes and other seismic activity * * * increased the likelihood of well blowouts, pipeline breakage, and other causes of inadvertent spillage * * *.

The passage of S. 1219 is, therefore, essential. The bill provides, first, for protection of the Santa Barbara Channel by the immediate "termination" of drilling there on the federally owned Outer Continental Shelf (OCS) and the eventual "phasing out of oil production" after studies indicate how this can be done.

The second phase of the bill pertains to the Outer Continental Shelf elsewhere along the California coast where drilling would be suspended—in contradistinction to terminated—pending the study of methods of drilling, production, and transportation that remove the threat of environmental pollution.

We would like to suggest that the principles of S. 1219 should similarly apply to the State-owned tidelands of the channel and the California coast, and the Outer Continental Shelf and tideland waters of the Nation.

Such an extended application of S. 1219 has in a modified form been embodied in a series of marine sanctuaries study bills reviewed

in the 90th Congress at public hearings before the Committee on Merchant Marine and Fisheries and reintroduced this session. Submitted to Congress 8 months before the Santa Barbara Channel oil leases were sold, the sanctuary bills provide for studies over a 2-year period of the most feasible and desirable means of setting aside selected offshore areas, including the Santa Barbara Channel, as undersea wilderness areas comparable to the onshore reserves established by the historic Wilderness Act of 1964.

The legislation declares the policy of Congress to dedicate a national system of marine sanctuaries to preserve, protect, encourage balanced use, and where possible, restore and make accessible for the benefit of all the people those offshore areas valuable for sport and commercial fishing, wildlife conservation, outdoor recreation, scenic beauty, and marine ecological research.

During the 2-year study period, the Secretary of the Interior would not issue or renew any license or permit for industrial development for removal of minerals, including oil and gas, from any of the potential marine sanctuaries being reviewed. It should be noted that Secretary of the Interior Walter J. Hickel states in recent correspondence—April 21, 1969: "I would support legislation establishing a nationwide well-reasoned system to protect scenic shorelines in America, as you suggest."

Our suggestion specified the sanctuary system proposals now in Congress. Following is the correspondence in detail, as well as pertinent articles.

(The data referred to follow:)

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., April 21, 1969.

Mr. FRED EISSLER,
Director, Sierra Club,
Santa Barbara, Calif.

DEAR MR. EISSLER: Your recent telegram deploring resumption of drilling in the Santa Barbara Channel needs to be reviewed within the full perspective of the problem that faced me when I took office and actions I have taken since then. As the result of my visit to Santa Barbara on February 2, I became deeply impressed with the sincerity of the local people who were outspoken against leasing and drilling. Even if the blowout had not occurred, my own sentiments are on the side of those people who are speaking out for their right of self-determination against drilling. Quite bluntly, I would have made a different decision from my predecessor.

This problem was handed to me by the previous administration, but that does not mean I can ignore my responsibilities to the Nation now that I am Secretary of the Interior. I have done everything possible within my discretionary powers as Secretary to move in the direction beneficial to Santa Barbara. Let me list a few of these actions for you:

1. We shut down all drilling and production operations.
2. I directed my staff to come up with a more stringent code of drilling regulations. The views of knowledgeable people in industry and in the Government of the State of California have been and are being sought.
3. I ordered a massive scientific and engineering study of the Santa Barbara Channel by task forces of the Department.
4. We created a permanent Ecological Preserve and a larger buffer zone totaling 55,000 acres seaward from Santa Barbara.
5. I have pledged that the Department will not permit any other leasing in the Channel without soliciting public comment, and a thorough review by the concerned citizens of the area themselves.
6. We required all companies holding Federal leases in the Channel to submit company technical data to the Department for use in our intensive review along with our own information.

I want to emphasize that the blowout well at Platform A, six miles from Santa Barbara was shut down and now, except for remedial work to relieve pressure and collect oil seepage, no other activity is being permitted at Platform A. Knowledge gained here can be applied toward a program to eradicate the natural seeps that have been long known along the coast in the Channel area.

Oil and tar pollution is not new in this region. Many references to oil slicks appear in reports published even before drilling began on the Union Oil Company lease. Of course, the blowout and resulting oil spill that occurred during the ten-day period beginning January 28 was simply more than any sensible American should be expected to take. Further, I believe we are agreed that any future offshore operations anywhere on the Continental Shelf must be restricted under new drilling regulations which would make similar disasters in the future as unlikely as it is humanly possible to insure.

On April 1 production and drilling operations, interrupted by my earlier order, were permitted to resume for five leases at three sites—but only after a lease-by-lease review and investigation of drilling procedures and the geological and technological data for each site. This decision was necessary because I had gone as far as any Secretary could go up to this point. The factors compelling this action are:

1. The Federal lessees agreed to operate under the new drilling regulations, which are far more restrictive than before.

2. Geological and engineering analyses of the sites were completed and reports showed that more than 2,000 feet of protective geologic formations lie above the oil-bearing beds. Furthermore, the casing program and other safety devices satisfied our most rigid requirements for safety.

3. The five leases selected for resumed activity are at a substantial distance from Santa Barbara and the blowout locality. Two of them are in waters adjacent to Ventura County, two of them are more than 20 miles west of Santa Barbara, and the fifth lies about ten miles southeast of Santa Barbara. The geological conditions at these sites are different from that at the blowout locality.

4. More than 30 State leases are active east and west of Santa Barbara within the three-mile limit. This geological basin has been an oil and gas producer for more than 70 years and the natural resource is an integral part of the economy of southern California.

5. Finally, let me stress that the Federal leases issued in Santa Barbara Channel prior to my assumption of office constitute binding contracts with the United States and create property rights protected by the Constitution. For this reason, they cannot be arbitrarily cancelled by the Secretary of the Interior. I am certain that, even in the present circumstances, you would not suggest or condone any action on my part which would violate constitutional guarantees or otherwise fail to recognize the limitations on my authority under the governing provisions of law.

I would like you and members of the Sierra Club, the citizens of Santa Barbara, and all other concerned Americans, to know that we have endeavored to take responsible and constructive actions in this matter. In addition to the efforts we have made, I would support legislation establishing a nationwide, well-reasoned system to protect scenic shorelines in America, as you suggest.

Sincerely yours,

WALTER J. HICKEL,
Secretary of the Interior.

Enclosure.

SANTA BARBARA, CALIF., April 30, 1969.

Hon. WALTER J. HICKEL,
Secretary, Department of the Interior,
Washington, D.C.

DEAR SECRETARY HICKEL: Your April 21 letter in response to our telegram deploring resumption of oil drilling provides a basis for review of fundamental issues related to the continuing oil disaster. We would like to reaffirm our urgent request that you rescind your drilling permit and invoke a moratorium on channel oil operations pending the outcome of Interior Department public hearings in Santa Barbara on all aspects of the oil crisis.

The current Santa Barbara disaster is another phase of the severe national and world-wide pollution crisis created by the ill-considered impact of modern technology. The stakes are much too high in this technological crisis, with a liveable environment in the balance, to permit acceptance of the statement that "everything possible" has been done within the discretionary powers of the Secretary "to move in the direction beneficial to Santa Barbara".

Under the provisions of the Outer Continental Shelf Act, the Secretary of the Interior has the widest possible latitude to suspend completely and permanently any or all operations on federal lands in the channel. Interior Department action in the channel hardly represents an exercise of maximum discretionary power in this respect. Drilling and production operations were suspended on a short term basis, short term scientific studies were conducted by ad hoc committees, an ecological preserve was established representing only two percent of the total channel area deserving protection, and a pledge was granted that hearings would be scheduled on further leasing without provision for hearings on the critical issue of resumption of drilling. All these steps affirmed the principle that the Secretary has broad discretionary powers but to date has chosen to exercise these powers only on a partial, limited scale.

On April 1 production and drilling operations were resumed on five leases at three sites. The communities of Southern California that risk the disastrous consequences of another pollution incident had no voice in this decision. You listed five reasons "compelling this action." Fundamental questions can be raised about each of these reasons. Competent geologists, for example, believe the new drilling regulations, including the casing and safety programs are inadequate. Furthermore, the geologists are skeptical about the nature of the information on geological conditions at the three sites, especially since the logs for both Platform A and B, and wells on nearby state lands indicate there are no intervening structures, natural traps, or protective geological horizons at these sites. We urge that independent studies of the drill logs in question be scheduled with information revealed at public hearings—not an unfair request, especially in view of your commendable personal support of local citizens "who are speaking out for their right of self-determination against drilling."

As to the binding contract and constitutional guarantees of oil company private property, such guarantees apply as well to the local communities and, properly interpreted, we believe, to the protection of liveable environment. In a legal document on file before the United States Court of Claims (Pauley Petroleum Company, Inc. vs. U.S.), the charges are made that the new Interior Department regulations, providing for strict oil company liability in case of oil pollution disasters in the channel, work an undue financial hardship on the oil companies and are a violation of the original lease contracts, which the Pauley Company states were granted in the full knowledge by both the oil companies and the federal government that oil blow-out disasters could not be prevented in the channel.

The case reads in part: The Pauley Oil Company admits "that hazards beyond the control of the operator accompanied off-shore petroleum exploration and production;

... "that the Santa Barbara Channel area was characterized by deeper water, greater tectonic activity, greater density of sub-surface faults and fault zones, and more frequent and more intense earthquake and other seismic activity than most, if not all, other areas in which off-shore exploration for and production of oil and gas had heretofore been attempted, and that each of these conditions increased the likelihood of well blow-outs; and

... "that, with the sketchy and uncertain geologic knowledge of the Santa Barbara Channel "no operator could guarantee that, even with the greatest degree of care, its exploration and production in the area would be free of well blowouts or of other events which would give rise to the unintended discharge of oil into the surrounding waters."

Santa Barbara citizens and officials took precisely this position on the basis of sound, scientific advice, prior to the federal sale of leases in the channel a year ago last February and at that time received bland assurances from your predecessor that "no oil leases will be granted except under conditions that will protect your environment". You rightly dissociate yourself from the original February leasing decision of your predecessor, but we have every reason to fear that with your order to resume drilling, the current history of disaster threatens to repeat itself.

"... I would support legislation", you continue, "establishing a nationwide, well-reasoned system to protect scenic shorelines in America, as you suggest." We shall be happy to work with you to achieve this historic objective. Eminently reasonable would be the establishment of a Santa Barbara Channel Marine Sanctuary in which oil operations would be prohibited. Bills now in Congress would create such reserves. Our attorneys advise us that the authority resides in your office to initiate now all the studies, hearings, moratoriums and other provisions of this legislation prior to Congressional enactment.

It is our conviction that the most equitable way to share all viewpoints on the ramifications of the oil disaster is the scheduling locally of Interior Department

hearings during a moratorium on channel oil operations. We urge you to take this course.

Cordially yours,

FREDERICK EISSLER.

[From the Saturday Review, May 10, 1969]

FINDING LEMONADE IN SANTA BARBARA'S OIL

(By Garrett Hardin ¹)

To hardheaded men, economics cry louder than dying seabirds. Fortunately for naturalists, there is a hardheaded reply: "The central core of business dogma, the cost-benefit analysis, can be shown to support the aims of conservationists better than those of commercial exploiters."

"An opportunist," said Elbert Hubbard, "is a man who takes the lemons fate has handed him and opens up a lemonade stand." Hubbard was a folksy philosopher, and most of what he wrote is as irritating to the modern reader as Edgar A. Guest's poetry. But I've always been fond of Hubbard's remark about the lemons. Incurable optimists like myself find it a soothing support.

In Santa Barbara, we need such support now. Miles of beaches covered with filthy oil turning to tar, hundreds of seabirds dead and dying from the oil, the air along the coast sour with the smell—all this is the grim legacy of the oil spillage that began in the channel in late January. Yet, I am optimistic enough to believe that what has happened in Santa Barbara can bring ultimate benefits not only to our city but to the entire nation. But it will take a fight.

I don't think it will do much good to dwell on the fate of the poor seabirds and all they symbolize. As a member of the Sierra Club, I am moved by their plight—but I know I am in the minority. Indignation over the rape of the environment is an avocation of many people who are paid to do other things. Making money is the full-time occupation of the oil drillers. They can be patient. They can ride out a storm. Sooner or later, emotional fatigue overcomes the viewers-with-alarm. Even the worst news ultimately becomes a bore. Apathy and anomy set in, and the drillers take over.

To reach hardheaded men, hardheaded arguments are required. In economic theory, according to Gresham's Law, soft money drives out hard. Economic analysis is governed by an inverse law (which has no name): *hard concepts drive out soft*. Red ink in the ledger book moves more minds than the missing cries of loon and merganser.

Fortunately for those who love unspoiled nature, a completely unemotional, rational analysis can be extracted from the Santa Barbara experience. The central core of business dogma, the cost-benefit analysis, can be shown to support the aims of conservationists better than those of commercial exploiters. We need only to take a deep look at the exploitation problem, unfettered by what Kenneth Galbraith has called "the conventional wisdom."

To look deeply at this vital problem we must first clear away a miasma of sophistical terms. Of all the forms of pollution from which we suffer today, verbal pollution is perhaps the worst. Spokesmen for the oil interests tell us that the "resources" of the world must be "developed" to meet the "needs" of a growing population. The quotation marks are essential to sensitize us to the assumptions hidden in the words. As conclusions can be loaded into premises, so can reflex responses be incorporated into these words, the content of which is more than mere description. To speak of a "resource" is to imply it must be used up, destroyed. To "develop" something is to somehow help it realize the full potential for which it was predestined (as a fertilized ovum is predestined to develop into a human being). There are men who desecrate the landscape with hundreds of tacky-tacky houses and boastfully call themselves developers, but would never dream of living in their own developments. Natural resources that are destroyed are also said to be developed.

Possibly the trickiest word of all is "needs." Few men are so rich that they don't feel they "need" more. Informed that the population is growing—and accepting as gospel that such growth is inevitable—few people question the legitimacy of the "needs" of a growing population. Seldom is it asked: "Is this

¹ Garrett Hardin is a professor of biology at the University of California, Santa Barbara, and author of *Nature and Man's Fate*.

growth necessary?" How often is the question raised as to the possibility that what we really "need" is a smaller population?

Conventional wisdom should be challenged. This can best be done by investigating its hidden implications so that we may fully understand the practical, human consequences of accepting the conventional view.

A larger population, enjoying a high standard of living, can certainly use more oil. In a statistical sense, we can say that oil can be converted into people. With the generous U.S. standard of living, about 150,000 calories are required per person per day. Of these calories, only 3,000 are needed for food. The rest of the energy units are used for the many other purposes of our life: heating our houses, manufacturing and operating our automobiles, radios, televisions, washing machines, etc. Therefore, the average American requires about 55,000,000 calories per year.

A barrel of oil can furnish 1,000,000 calories. So, if a man obtained his energy from no other source, he would require fifty-five barrels a year. In his lifetime, he would require approximately 4,000 barrels. In this context, the energetic cost or value (they become synonymous) of an American life is 4,000 barrels of oil. This materialistic way of looking at the matter will prove useful in building a case for the preservation of the nonmaterial goods of life.

How much oil is there under the Santa Barbara channel? The oil companies, of course, play their cards close to their chests. The truth is not publicly known. Geologists have told me, however, that an educated guess would be that the channel reserve amounts to billions of barrels. Scuttlebutt has it that the reserve is apparently not as big as had been hoped in the beginning, so let's assume that it amounts to only a few billion barrels. To make the arithmetic easier, let's say there are four billion barrels of oil under the channel.

If the lifetime value of each American is 4,000 barrels of oil, four billion barrels would support 1,000,000 Americans for their lifetimes. This means—to develop the sort of argument favored by those who would exploit this reserve—that using the channel oil will make it possible for 1,000,000 more Americans to live—for just one lifetime (what happens to their descendants one is not supposed to ask).

The matter can be put another way: if the wells are closed down, the country foregoes the possibility of 1,000,000 additional Americans. Is that good or bad? An unprincipled protagonist can easily lead the public to believe that those who propose to shut down the wells are proposing to kill 1,000,000 Americans. No one is in favor of that, so the proposal to plug the wells is likely to be rejected.

But foregoing is not the same as killing. Lives never begun can never be ended. With modern medicine the average mother could have fifteen children instead of the present three; however, it would be ridiculous to say that a mother's selfish concern for her own comfort deprives the world of a dozen people. She does not murder twelve children by not having them.

To say that shutting down the Santa Barbara channel oil drilling will prevent the population from increasing by 1,000,000 people involves the hidden assumption that our population size is carefully (or at least accurately) determined by available income. This is a hard position to defend. On the contrary, it is possible that the number of babies born is independent of foreseeable income, and is determined by other factors which we need not specify. Taking this view, and assuming that the population in the years ahead will be uninfluenced by cutting down drilling operations in the channel, it would appear that the result of giving up this oil would result not in a diminution in population but rather a relative impoverishment of the population. If, for simplicity, we disregard the changing population base and assume a static population of the present 200 million, an increase of 1,000,000 without a concomitant increase in energy income would mean that everyone would figuratively have to "tighten his belt" by one-half of 1 per cent.

Suppose the process produces waste waters that are toxic to fish or other aquatic life? Suppose it produces smoke, which poisons nearby trees and makes the air foul for a considerable distance? Society is still in the process of making manufacturers internalize these externalities. A bitter battle is being waged; it is far from being won.

The media of the world are water, air, and ether (the medium of light and radio waves). Industrial poisons cast into the air or water, supersonic booms via the air waves, visual pollution of the landscape by billboards, audible pollution from radio and TV, all these and more corrupt the media. A man may own the land on which his smelter, tannery, or television station stands; he does not own the media that surround it. When the population was sparse, what a man did to the media could be safely ignored, but no more. Now it is time to say, "Let the

polluter pay the cost of pollution"; better still, let him be enjoined from polluting in the first place.

E. B. White has expressed the ecological ethic in his usual, succinct way. Reacting to a newspaper account that the Atomic Energy Commission had "authorized" the dumping of radioactive waste into the ocean, White remarked: "I sometimes wonder about these cool assumptions of authority in areas of sea and sky. The sea doesn't belong to the Atomic Energy Commission, it belongs to me. I am not ready to authorize dumping radioactive waste into it, and I suspect that a lot of other people to whom the sea belongs are not ready to authorize it, either."

The sea belongs neither to an agency of the Government nor to the oil well drillers. The cost of drilling an oil well in the Santa Barbara channel includes not only the cost of the drilling platforms, the labor costs, raw materials, and management overhead, but also the cost of any pollution that results therefrom. What the total cost of the recent pollution is, is anyone's guess. It should be noted that to date the lawsuits resulting from the spill total more than \$2 billion. For a yardstick, the value of the oil lost in the first twelve days of spillage was less than \$1 million.

For bargaining purposes the damages claimed in a lawsuit are almost always overstated. I doubt, however, if they have been in the present instance. We are only beginning to quantify damages to the media and the environment.

Dr. Robert R. Curry, a geologist at the University of California in Santa Barbara, has recently published a detailed study showing the measures that would have to be taken to make the tapping of the channel oil sufficiently safe in this earthquake-ridden area. Sixty-six earthquake epicenters have been identified in the channel by his geological colleague, Professor Arthur G. Sylvester. The five-mile-long pipelines required to bring the oil from the marine platforms to shore would need to have numerous automatic shutoff valves in them, for just two such lines (and there are already a dozen oil platforms in the channel) would contain more oil than has already spilled during the Santa Barbara catastrophe. Many other expensive safety features would be needed. It is doubtful the oil companies could afford to drill in the channel if they were forced to internalize the true costs.

Significantly, Dr. Curry's title is assistant professor of environment sciences. In the past, established professors of geology, as well as younger assistant professors, have not been notably courageous in laying down the law to the petroleum industry. Money talks. However, it is an encouraging sign of the awakening ecological conscience that there are a few faculty berths labeled "environmental sciences." In such a berth a man may be more independent of industry pressure than geology department members usually are.

The Santa Barbara crisis will be neither the last accident nor the last battle. The idea that there is an environment that professors and others should be concerned about is taking hold. The heresy that no one has a right to pollute the media of the world is changing to orthodoxy. Sooner or later the ecological ethic will prevail. Sooner or later industries will be forced to internalize so-called externalities.

The lemons of Santa Barbara may become part of the nation's lemonade stand.

[From the Santa Barbara News-Press, May 14, 1969]

OIL NEWS: PROTEST NUMBER FOUR

Why should the press and public be excluded from meetings of public bodies, such as the presidential scientific panel that considered Santa Barbara oil spill problems in Inglewood during the last two days?

The News-Press said this editorially on Feb. 1, four days after the spill began:

"With oil bubbling like festering boils into Santa Barbara's channel waters, a meeting of federal, state, county and local officials was convened yesterday afternoon in the County Administration Building. Purpose of the meeting was to review the oil drilling accident and to brief newly-arrived officials on latest developments. At least that is what the News-Press presumes the secret meeting was all about. The press was formally barred from the session."

We went on to say that "meetings bearing on the problem should be open to the press and the public interest it represents."

The editorial and supporting statements were forwarded to Washington by the California Freedom of Information Committee. So was protest number two, which

was made when the presidential scientific panel met in closed sessions at UCSB on Feb. 19. The response was not responsive.

On April 17, one of the President's top scientific advisers told the executive editor of the News-Press in Washington that the panel's report would not be made public. Whatever justification or pretext there might be for the scientists to conduct their deliberations in private, there seemed to be no defensible reason for keeping their conclusions secret—so that brought protest number three.

This editorial is protest number four, directed at the closed meetings of the presidential panel in Inglewood during the last two days.

This protest, like the others, is going to Herbert G. Klein, director of communications for the executive branch. Klein has made commendable progress in opening some of the hardened arteries through which information about the doings of government is channeled to the public. Now the News-Press is watching eagerly to see what success he has in opening the channels, now restricted, to news that deals with important aspects of the Santa Barbara oil disaster.

Mr. EISSLER. There is a distinct symbiotic relationship between S. 1219 and the sanctuary bills. Each could effectively borrow provisions from the other or the bills could be dovetailed as a single measure. To create a marine sanctuary in the Santa Barbara Channel where oil operations would be permanently prohibited, the leases on the federally owned OCS must be phased out as provided by S. 1219.

The sanctuary bills, on the other hand, authorize the Secretary of the Interior to encourage the State of California to engage in the studies necessary to determine ways of phasing oil operations out of the state-owned tidelands. Three other sections of the sanctuary bills worth incorporating in S. 1219 provide for cooperation and consultation with other interested State and Federal agencies, and public and private organizations; coordination of studies with all other applicable planning activities related to the coastal areas under consideration; and scheduling of public hearings in affected communities.

Since the only way to buffer marine sanctuaries from the threat of pollution originating outside their boundaries is to devise methods, in the case of oil, of drilling, production, and transportation that would remove the threat of pollution generally along the coast, the section 2(1) of S. 1219 seems to be a necessary addition to the sanctuary bills.

Studies under the sanctuaries bills apply, but would not be limited to, specified areas, such as the Santa Barbara Channel seaward to the Channel Islands; the Monterey, Santa Cruz, and San Luis Obispo coast in California; the Great Lakes; the Georges Bank area adjacent to lower Cape Cod, Massachusetts; and Plum Island off Hampshire. Twenty-three Congressmen and Senators with these areas in their districts submitted sanctuary bills. The broad existing and potential support for the sanctuary bills points up the need for careful evaluation of the advantages and disadvantages of broadening the geographic scope of S. 1219 with its current limitation to the OCS waters of California.

The Secretary of the Interior would be authorized to implement both S. 1219 and the sanctuary bills, an aspect of the bills that should be carefully evaluated. At sanctuary hearings last session, a leading congressional proponent of the bills warned:

"He [the Secretary] already has the enormous power, and he has been giving it to the oil companies . . ."

We have been advised that the Secretary is entitled under the Outer Continental Shelf Act to initiate sanctuary studies and to exercise the controls outlined in S. 1219. These powers already available to him have only been partially employed. But there is reason to

believe that authority more comprehensive than now inherent in the Secretary's office is required for management of large ecosystems.

For if the oil slick has demonstrated anything, it has shown that our environment is unified, that the Santa Barbara Channel and the total shoreline and offshore ecology of which it is a part is an interacting natural system. Half again the size of the State of Rhode Island, the tentacles of the 1,800-square-mile oil slick reached from the Federal OCS to the State tidelands; to international waters; to national park territory at Anacapa Island; to the shores of cities, counties, and districts; across Coast Guard, fish and game, Federal water pollution control lines of authority; to private land—only a sample of the jurisdictional boundaries it did not respect.

The Secretary of the Interior probably does not have the authority commensurate with the scope of the oil slick. Pollution cannot be prevented on a city-by-city, county-by-county, or agency-by-agency basis. Authority over the ecosystem, perhaps defined by the size of the oil slick itself, should be handled by a single, unified, coordinated commission or council of agencies.

River basin commissions are models of this approach. Consideration should be given to the structure of the San Francisco Bay Conservation and Development Commission (BCDC) formed by citizens and officials of communities and agencies with an interest in their region's single most important natural asset. Perhaps some type of area council on environmental quality, along the principles of S. 1075, could bring together what Senator Jackson terms the "extremely fractionated" agencies and separate policies on resource management in such regions as the Santa Barbara Channel. These divisions, he observes, reflect "our early national goals of resource exploitation, economic exploitation, economic development, and conquest."

Congressman Tunney has proposed the creation of a commission (H.R. 6296) to make a comprehensive oil study. Assemblyman Alan Serioty of the California Legislature proposes a type of BCDC commission for management coordination of the Southern California coastline. All of these proposals indicate a need for broad interjurisdictional ecological management of nature systems. In this conservation and balanced development of the human environment, the citizenry, the owners of the public land, those affected by the destruction of their environment, must have a paramount voice and representation on the governing agency.

The Santa Barbara oil spill is a disastrous example of the rush to exploit a new ocean frontier without regard for the consequences. Tyrannized by a rampant technological revolution with its wake of uncontrolled waste and pollution, more often more devastating than the spoilage on America's earlier frontiers, we cannot be satisfied with the same old defensive posture of reacting to disaster, the truly reactionary process of piecemeal, case-by-case attempts to cure catastrophes as they arise.

S. 1219, the bill before us, proposes the essential basis for the beginning of a resolution of the disaster problem in the Santa Barbara Channel and along the coast of California. We strongly endorse this measure especially as it dovetails with a comprehensive ecological strategy for the protection and balanced use of our Nation's coastal regions.

Senator Moss. Thank you, Mr. Eissler, for your very fine testimony and your concrete suggestion of how we ought to be moving, in your opinion, to protect areas, not only Santa Barbara, but areas of beauty along our coasts in many places. I am glad to have you talk about the sanctuary bills.

I am aware of bills that have been introduced on this subject and I agree this is one thing we ought to be giving attention to. Perhaps in this case there was not enough public information made available about the letting of the leases in the first place and about the drilling program, and we have difficulties in this area very frequently and when the welfare of a lot of people is involved, certainly they ought to be informed.

I would tend to cite to you in that way. I appreciate having you come to testify before us.

Senator Jordan, do you have any questions of Mr. Eissler?

Senator JORDAN. No question, Mr. Chairman, but I want to thank Mr. Eissler and all of the witnesses for giving us the benefit of their views on this very important matter.

Senator MOSS. Do you have any questions?

Senator CRANSTON. No questions.

Senator MOSS. I think Mr. Allen feels he may have misunderstood the question about the estimates on the amount of oil being released and might want to correct the record in that regard. If there was any misunderstanding, we certainly want the record corrected, so you may respond, Mr. Allen.

Mr. ALLEN. Thank you, Mr. Chairman.

The question I had anticipated so strongly, I heard, are my estimates much larger than those that were reported yesterday and, of course, my answer was "Yes." In fact, by a factor of 10, but I guess the question you asked was, Were they lower?

So I would like to make it clear that my estimates are at least a factor of 10 greater than previous estimates. In fact, this goes not only for the spill since March 4, but in fact ever since this spill began. It ironically turns out all other estimates have been consistently almost a factor of 10 less from what I have been coming up with.

Senator Moss. I believe I heard it that way before, but I am glad to have it made very clear in the record. We want the record to reflect what you had to say.

My very good friend, Mrs. Dick Carlson, of Santa Barbara, who has been here for 2 days and seems to be out of the room right now, sent me a very fine study on the oil activity in the Santa Barbara Channel, which was made by the Santa Barbara branch of the American Association of University Women. I want to have this placed in the record. I think it is very helpful. Without objection, it will be placed in the record at this point.

(The study referred to follows:)

STATEMENT OF THE SANTA BARBARA BRANCH, AMERICAN ASSOCIATION OF
UNIVERSITY WOMEN

The January 28, 1969, oil well blowout in the Santa Barbara Channel, California, set off a massive, uncontrolled oil eruption that caused major oil pollution in the channel and on the beaches, with accompanying destruction of shore birds and marine life.

The Santa Barbara Channel is an area so richly endowed with natural beauty and wonder that it warrants protection from economic exploitation and preservation for the enjoyment and appreciation of present and countless future generations.

The entire science of marine biology and marine biomedicine is opening vast new sources to our national health and well-being as our ever expanding population growth demands protection of the present and potential food resources of the sea.

Oil drilling is being allowed in areas where seismic records show complex faulting with resultant oil contamination and chemical invasion of the oceans and in spite of assurance from the Department of Interior and the oil industry that adequate safeguards would prevent pollution of the ocean, beaches and harbor, there has been major and disastrous oil spillage from the drilling operations on a lease in Federal waters.

The Santa Barbara branch of the AAUW respectfully recommends that the California State division take a firm stand against the hazard that exists to health, welfare, natural resources, and environment so long as drilling is permitted in the Santa Barbara Channel and petition the association to support permanent cessation of this oil drilling either by Executive order or by legislation to prohibit the leasing of submerged lands under the Santa Barbara Channel for exploration, development, and removal of minerals, and to rescind all such existing leases.

REPORT OF STUDY ON OIL ACTIVITY IN THE SANTA BARBARA CHANNEL

Mrs. Frank Rice, Mrs. William B. Drew, Mrs. A. F. Voegelé, Mrs. Martin Rypins, and Mrs. William Bryant; Legislative Program Chairman, Mrs. William Bryant; President, Santa Barbara Branch, Mrs. Martin Rypins.

The history of oil in the Santa Barbara Channel, California, dates back to the year of 1776 when the Spanish Franciscan fathers establishing missions reported oil seeps in the ocean and tar on the beaches. Seeps are an indication that oil is close to the surface and escapes through small fissures in the ocean floor. Spanish missionaries also reported devastating earthquakes and we have had them ever since.

In 1895 oil was discovered near the beach at Summerland, eight miles south of Santa Barbara, and was subsequently drilled from piers in the ocean. This was the first drilling in ocean waters.

In 1928 the Ellwood Field, eight miles north of Santa Barbara, was discovered. This was one of the richest in the West and drilling was done from piers in the water here also.

In 1938, because of the probability that additional fields might exist in the ocean, the State of California legalized awarding of oil leases out to the three mile limit. These wells were slant drilled from land.

In the early 1950's the State of California began granting permits for seismic exploration offshore in State waters. Fish kills occurred over wide areas.

In 1955 the Cunningham Shell Act was passed by the State Legislature creating a 16 mile long sanctuary 3 miles out from shore within which no drilling would be permitted unless it appeared to the State that its oil would be drained from adjacent areas. By this time the city and county had enacted zoning controls prohibiting oil drilling from shore along the 16 mile border of the sanctuary.

In 1958 the first offshore platform in State waters was installed by Standard Oil Company. Rich oil and gas deposits were struck five months later.

In 1959 the first onshore processing plant was approved at Carpenteria, and by 1966 all State tidelands between the Ventura County line—east—and Point Conception—west—had been leased except in the 16 mile sanctuary.

Early in 1966 word was received that the Federal Government planned to lease sometime soon and by December a single lease was granted to Phillips on the grounds that this area was being drained by the Standard lease on State land.

During the ensuing year, County officials and representative community leaders tried every possible avenue to stop the leasing. Conferences were held in Washington and in Santa Barbara with Assistant Secretary of Interior for Mineral Resources, J. Cordell Moore and his staff. Assistant Secretary of the Interior for Public Land Management, Harry R. Anderson, came to Santa Barbara and offered a two mile wide Zone to protect the Sanctuary—a buffer zone good only as long as the Department of Interior allows it. County officials asked for an extension of the buffer zone eastward to further protect the Sanctuary. If this request had been granted it would have prevented drilling of the well that caused the giant spill.

On February 6, 1968 the Federal Government received bids totaling 603 million dollars for 75 of the 110 lease blocks offered. These blocks are 3 miles square and contain about 5,700 acres each. The highest bid was from a combine of Gulf,

Texaco, Mobil and Union Oil Companies on Parcel 402 for \$61.4 million. It is on this parcel that the disaster occurred.

The short history of the January 28, 1969 spill in the Santa Barbara Channel, California, reads like a horror story to those who love this community and have worked to preserve its heritage. Trouble started at the fifth well drilled from the new Platform A around 11 a.m. on Tuesday, January 28, 1969. The Coast Guard, which has primary responsibility in case of a spill, was notified around 1 p.m. Local and County officials did not hear of it until 11 a.m. the next day as a result of anonymous phone calls to the news media. Gas was escaping from the well and it was out of control. With the gas was a massive upsurge of crude oil as an under-sea volcano broke loose. Secretary of the Interior declined to ban further drilling.

On February 2, 1969 Secretary of the Interior made a surprise visit to Santa Barbara and as a result requested the oil companies to suspend drilling and production voluntarily in Federal waters pending a review of their drilling operations. Companies complied that afternoon, but by the end of the next day all had been cleared to resume operations.

The spill was estimated at 500 barrels of oil a day in Coast Guard reports. Much higher estimates have been received from some of the scientists at research companies and at the University of California, Santa Barbara.

The spill remained through February 3 in an area generally to the east of Santa Barbara with fingers going towards land and hitting the beaches lightly in the Ventura area. It was extremely lucky that very minor onshore winds prevailed for short periods and offshore for longer periods.

By February 4 the spill was much larger to the east and south and was extending west towards Santa Barbara harbor. That night it hit the harbor and the beaches and residents and visitors alike watched in shock disbelief and anger as wave after wave of black, sticky crude oil despoiled the waterfront of one of the garden spots of the world.

Ten and a half days later the well was plugged top to bottom with cement and oil stopped flowing into the channel.

On February 12, 1969 the bottom of the ocean 190 feet under the surface broke open again and oil was seeping from several fissures in the bottom of the ocean. It was being forced up from pressurized oil sands just a few feet under the channel floor. Operation Sea Sweep pumped mud and cement down into the recently completely wells that were then reactivated to drain fluids off and relieve pressure from the shallow strata from which the oil was rising. As one well was being drilled for this purpose it opened up an avenue for oil from deeper levels to rise to the pressurized sands and thence to the ocean. This well was again ordered plugged from the 900 foot level to the bottom some 3,000 feet below.

From the beginning Union Oil assumed the responsibility for all aspects of controlling the spill at the platform, on the water and for cleanup on the beach. This was monitored by the Coast Guard and other Federal agencies. Chemicals sprayed on the surface were ineffective and added to the contamination. The Federal government banned chemical spraying, then approved it, then partially banned it again. Log, plastic and inflated booms were placed around the platform and across the harbor entrance. The oily water splashed over and under these. The Santa Barbara Harbor with more than 700 boats was heavily coated with crude oil. Thousands have worked trying to clean up the beaches. This has been done mainly by spreading straw on the sands in the hope it would absorb some of the oil . . . a primitive sight to see in this age of technological achievement.

The four Channel Islands all received contamination, particularly Santa Cruz, home for hundreds of varieties of seals.

The birds suffered most. Thousands of pelagic birds fell victim to the oil and the seashore for miles around was dotted with dead and dying waterfowl. Many thousands of oil-soaked birds were patiently cleaned and placed in pens to recuperate for several months. Experts say most of them will die for birds once polluted with petroleum are almost impossible to save. The few who have survived to this date bear out this fact.

While most marine biologists will not speculate on the long-range effect of the Channel pollution they have found that sand fleas, sand crabs, red worms and other forms of life in the oil-soaked beach sands of the intertidal areas are dead and that masses of dead or dying shellfish were found in some rocky areas.

The biggest oil pollution danger in the channel stems from increased tanker traffic and their increasing tonnage. The significance for the Santa Barbara Channel is that there are eight marine terminals in the area and that such transfer operations are prime candidates for major oil spills. Professor Paul G. Mikolaj of the Department of Chemical Engineering at UCSB said there is an increasing

danger of tanker collisions and other accidents in the small channel where shipping lanes are only one mile wide and are separated by a two-mile buffer zone. The shipping lanes come close to the Channel Islands and Point Conception.

One fact that gives sobering thought is that between June 26 and October 15 of last year 66 earthquakes jolted the Santa Barbara Channel. The epicenters of these earthquakes were located in a line across the Channel from the area of drilling platforms "B" and "A" to Santa Cruz Island. Experts, including Dr. Arthur G. Sylvester of the Geology Department of UCSB, have pointed out the danger of drilling wells in the Channel because of the faulted ocean bottom.

Today the oil continues to flow unabated into the channel waters at a constant rate that is officially estimated at something under 1,000 gallons a day. Alan A. Alien of General Research Corporation states that if crude oil continues erupting into the Santa Barbara Channel at its present rate until the end of April, a total of three million gallons will have contaminated the waters since the Union Oil Company well blew out last January 28. Experts are apparently without an answer as to how to stop it.

In testimony before State Senate Committees, a Vice-President of Union Oil testified that "no prudent engineer" would guarantee that another spill would not occur in the Santa Barbara Channel, regardless of any drilling changes or techniques. Donald Solanas, Regional Supervisor for the U.S. Geological Survey, in charge of Federal leases in the Santa Barbara channel, California, gave a similar statement and referred to the blow-out as one of the accidents that can occur in operations of this type. Mr. Solanas seemed to indicate that in his opinion Federal regulations were adequate and additional safeguards would not necessarily have prevented the accident.

As of April 27, 1969, the oil spill was in its 90th day. The channel has more than 60 miles of shoreline on the mainland alone, in addition to the beaches of the four channel islands. The oil has contaminated beaches far beyond the east and west limits of the channel. Signs posted on many Santa Barbara County beaches by the County Health Department read: "Warning: Beach and swimming area may be polluted with oil. A possible health hazard." Residents and visitors to this area read them and ask: When will it end?

RESOLUTION OF THE SANTA BARBARA BRANCH OF THE AMERICAN ASSOCIATION OF UNIVERSITY WOMEN

Whereas, the January 28, 1969 oil well blowout in the Santa Barbara Channel, California, set off a massive, uncontrolled oil eruption; and,

Whereas, this oil drilling in the Santa Barbara Channel has caused major oil pollution in the channel and on the beaches, with accompanying destruction of shore birds and marine life; and

Whereas, the entire science of marine biology is opening vast new sources to our national health and well-being; and

Whereas, our expanding population growth demands protection of the sea's present and potential food resources; and

Whereas, the Santa Barbara Channel is an area so richly endowed with natural beauty and wonder that it warrants protection from economic exploitation and preservation for the appreciation and enjoyment of present and countless future generations; and

Whereas, oil drilling is being allowed in areas where seismic records show complex faulting with resultant oil contamination and chemical invasion of the oceans, poisoning of marine organisms, and release of hydrocarbons; and

Whereas, in spite of assurance from the Department of Interior and the oil industry that adequate safeguards would prevent pollution of the ocean, beaches, and harbor, there has been major and disastrous oil spillage from the drilling operations on a lease in Federal waters: Therefore, be it

Resolved, That the Santa Barbara Branch of the American Association of University Women respectfully recommends that the California State division join in petitioning the association to take a firm stand against this hazard to health, welfare, and natural resources and endorse permanent cessation of drilling in the Santa Barbara Channel either by executive order or by legislation such as H.R. 7074, by Mr. Teague of California, that would prohibit the leasing of submerged lands under the Santa Barbara Channel for exploration, development and removal of minerals, and to rescind all such existing leases.

REASONS FOR (PRO) AND AGAINST (CON) THE RECOMMENDATION FOR A PERMANENT CESSATION OF OIL DRILLING IN THE SANTA BARBARA CHANNEL, CALIF.

I. EXPANDING POPULATION GROWTH DEMANDS PROTECTION OF FOOD RESOURCES

Pro: 1. Food is the most important resource of the sea in the world of today. It is rich in protein and highly nutritious. 2. Only a small portion of the sea's available food is being eaten today. Many specialists believe we can increase the catch ten times without hurting the stock.

II. A SOURCE OF MASS RECREATION THAT MUST BE PROTECTED

Pro: 1. Sportsmen, surfers, swimmers, sunbathers and sand castle builders all find relaxation in, on and along the ocean.

III. NEW SOURCES TO NATIONAL HEALTH AND WELL-BEING

Pro: 1. There is promise that we will discover many anti-biotics and other useful drugs in ocean organisms. 2. Literally thousands of marine animals and plants are known to contain biotoxic substances. Fewer than 1 percent of these have been tested for their pharmacological activity.

IV. CONTINUANCE OF DRILLING

Con: 1. A leading scientific adviser to President Nixon states that the best way to solve the offshore oil problem is to pump oil out as rapidly as possible and relieve the underground pressure.

Pro: 1. Drilling on the 71 federal leases in an earthquake zone is almost certain to result in new blowouts and pollution. There is complex faulting in the Channel.

V. STOPPING THE SPILL

Con: 1. Oil still pouring from the sea floor near Platform A can be stopped by pumping cement underground in hopes it will plug from below the fissures that are leaking.

Pro: 1. Efforts to cement the leak at the surface have failed thus far.

VI. SHORTAGE OF OIL

Con: 1. National Petroleum Council, oil and gas industry advisory body to the secretary of the interior, predicts that "petroleum, the leading source of energy, will be needed in increasing quantity far into the future." 2. Council urged U.S. to assert exclusive rights of ocean floor minerals all the way to the edge of its continental shelf. 3. In 1967, the Council states, some 9,000 of "near off-shore wells accounted for almost 12% of the nation's crude oil production and 10% of its natural gas.

Pro: 1. Dr. Walter Meade, department of economics, UCSB states "there is no shortage in world supply of oil. The scarcity referred to is artificially created. It makes no sense going offshore for \$3.50 a-barrel oil when it can be purchased in the world market, delivered in the U.S. for \$2.00."

VII. CLEANUP OF POLLUTED WATER

Con: 1. Offshore, Union Oil Co. continues to spray the oil slick with cement to coagulate the oil and make it simpler for the vacuum skimmer to suck oil off the surface of the water and into tanks.

Pro: 1. State Department of Fish and Game fears that cement powder may sink a substantial amount of oil rather than coagulate it on the surface. This would contaminate the ocean bottom. (On April 23, Union Oil abandoned, at least temporarily, the spraying of cement powder on the oil slick and will now experiment with other coagulants).

VIII. NATIONAL SECURITY

Con: 1. National security would be jeopardized by relying on foreign oil supply.

Pro: 1. Dr. Mead states that we have an eleven year supply of domestic crude oil without using offshore reserves. Most of our imported oil comes from Venezuela and not the Middle East.

IX. CONTINUED POLLUTION

Con: 1. Secretary Hickle announced that seep had stopped and pollution is ended.

Pro: 1. Reports are still received regularly of blobs of oil coming ashore. The pattern is not predictable and no beach is indefinitely immune to the tarry pollution. 2. Secretary Udall now states that he believes the granting of the leases was a tragic mistake.

RESOURCE LIST

- Allen, Alan A., General Research Corporation.
 Bickmore, David K., Santa Barbara County petroleum engineer, presentation before Senate Subcommittee on Air and Water Pollution, February 24, 1969.
 Clyde, George, Santa Barbara County supervisor, district I, presentation before, State senate natural resources and governmental efficiency committee, February 18, 1969. Presentation before U.S. Senate Subcommittee on Air and Water Pollution, February 24, 1969.
 MacDonald, Ross (Kenneth Millar) "Life With the Blob" Sports Illustrated, April 21, 1969.
 Mead, Dr. Walter, UCSB Department of Economics, study of economics of international oil market.
 Santa Barbara Museum of Natural History.
 Santa Barbara News-Press.
 Smith, Adm. Willard, Commandant, U.S. Coast Guard.
 Solanas, Donald, regional supervisor, U.S. Geological Survey.
 Stephens, William, director of education, Miami Seaquarium, south east editor of Oceans, "The Ocean's Riches" National Wildlife, April-May 1969.
 Sylvester, Dr. Arthur G., Geology Department, UCSB.
 U.S. Geological Survey, Department of Interior.
 Whitehead, Richard, S., County Planning Director, presentation before State senate committee on natural resources and governmental efficiency, February 18, 1969. State senate committee on oil and water pollution (subcommittee) February 5, 1969, and State department of fish and game.

Senator Moss. Let me reiterate the record will be open for 2 weeks' time for people who were witnesses or others who feel that they have something that they would like to submit for the record. We want it to be not only factual opinion, but pointed to the things that were brought out here in this hearing or things that we may have overlooked.

I express my appreciation to the witnesses who appeared and gave such very careful attention to the presentation of their testimony.

I might point out, also, that it will be possible to have a preliminary transcript that the witnesses may examine to make sure that the record reflects precisely what they said or intended to say before the record is put into print.

When we have completed the hearings, and the record is corrected, it will then be printed and it will be available, of course, and every witness will receive a copy and others will have access to the printed record, which at the time may inspire some other letters you may want to write to members of the committee expressing the point of view.

We are dealing here with a very difficult problem and we know it. We all feel that it was a great, great tragedy that this spill had to occur in the Santa Barbara Channel and to wreck damage on this most beautiful area and that that damage still continues to a large degree today, recognizing also the legal observation of the Government and the legal rights of those who were exploiting oil resources, and the importance of our petroleum resources. All of these things have to be balanced, one against the other, and that is a difficult job to do. We recognize it and we are going to address ourselves to it. We want to be informed as fully as possible when we do that.

I express my appreciation to Senator Cranston, who has been most active in seeking a solution, has the bill before us that we are con-

sidering now and has taken the time to be with this committee during all of our hearings, participating very actively with us, even though he does not happen to be a member of this committee.

We are pleased and honored that he would come and we appreciate very much his consideration with us and we know we will be consulting with him very regularly as we go into our deliberations.

Senator Cranston?

Senator CRANSTON. If I may say one word, I want to thank the witnesses and others who have been in attendance, but most of all I want to thank you, Mr. Chairman, and the members of this committee who have sat through so many hours of testimony on a matter that bears really little direct relationship to your own States.

I know it relates to your responsibilities in this committee, but many of you who have sat through these long hours come from States that do not have sea coasts and you could have been doing many, many other things and many, many people are grateful to you for the attention you have paid to this problem.

Senator Moss. Thank you for those kind words.

The members of the committee have received a truly large volume of communications on this bill and the related situation. In fact, so voluminous have been the communications that it is not feasible to publish all of them.

All of it is being held in our official files and is a part of the record of this hearing. All will be considered by the committee when it meets in executive session to consider action on the bill.

A number of statements directed specifically to the provisions of S. 1219 have been received, and they will appear in the record at this point.

The statements referred to follow:

U.S. SENATE.
Washington, D.C., May 9, 1969.

HON. HENRY JACKSON,
*U.S. Senate,
Washington, D.C.*

DEAR SCOOP: Recent oil spills from giant tankers and the blow-out of the drilling rig in the Santa Barbara Channel have focused our nation's attention on the importance of applying our conservation ethic to the resources of the sea as we have to the resources of the land. The exploitation and development of our oceans is still in its earliest stages, and we have an opportunity to assure continuing public access to these resources. We have a chance to avoid repeating the mistakes we have made with respect to so many of our resources and so much of our environment.

The Marine Sanctuaries Study Act of 1969, a bill which I plan to introduce in the Senate next week, would constitute an effective first step in planning the uses of the sea. This measure authorizes the Secretary of the Interior to recommend the best means of establishing portions of our tidelands, Outer Continental Shelf, Seaward areas, and the Great Lakes as marine sanctuaries. Through this mechanism we can preserve portions of these areas for the enjoyment of future generations.

A copy of the bill is enclosed. If you would like additional information concerning this measure or wish to have your name added as a co-sponsor, please have a member of your staff call Eliot Cutler (5344) in my office.

With all best wishes, I am,

Sincerely,

EDMUND S. MUSKIE, *U.S. Senator.*

STATEMENT OF HUMBLE OIL & REFINING CO.

Mr. Harry Pistole of Humble Oil & Refining Company, hereinafter referred to as "Humble" appeared with Mr. Harry Morrison, representing the Western Oil and Gas Association at the hearing of this Subcommittee held on May 20, 1969, at which time Mr. Morrison made a statement in behalf of that Association. Humble concurs in the Association's statement; therefore, that statement is adopted as our Company's position on S. 1219. However, because of Humble's substantial lease interests in the Santa Barbara Channel, we deem it desirable to present information particularly representative of Humble's position for your consideration. Accordingly, we appreciate the opportunity which your Subcommittee has offered to accept written statements from interested parties.

The investment and expenses required for exploring and developing offshore properties are of a much higher magnitude than those required for a more normal dry-land operation; however, they have been justified by our real need for providing additional hydrocarbon reserves needed by the United States, as well as our confidence of possessing the technical capability to operate safely and successfully in an offshore environment. Since 1948 Humble has been drilling and producing oil and gas from the offshore environment. During this twenty-one year period, Humble has conducted extensive research and has developed the technology which has permitted the successful drilling of 1647 wells located offshore of Louisiana, Texas and California. In addition our Company has drilled 97 core holes in the State and Federal waters offshore California, most of which are located in the Santa Barbara Channel area. Our Company continues to devote substantial money and manpower to continually improve our tools and techniques associated with operating offshore with particular emphasis on environmental conservation.

Humble's interest in the Santa Barbara Channel extends over many years prior to the 1968 Federal lease sale. During this time our Company expended millions of dollars evaluating prospective oil fields by drilling core holes, seismographing, and analyzing the geology. We have employed proven techniques of extrapolating known geological facts gained from operation in nearby onshore fields and on State of California offshore leases, together with exploratory information, to formulate our operating procedures. Based on the results of the information gained from this effort and the confidence that we possess the technology to permit safe operations in this area, Humble invested \$218 million last year for Federal leases in the Santa Barbara Channel. Since the sale we have supervised the safe drilling of twelve (12) wells on these leases, and our predictions as to drilling conditions have been repeatedly confirmed.

Our operating record of environmental conservation results from employing thorough planning to achieve this end by experienced management and technical personnel, the use of the drilling equipment and techniques designed to guard against pollution, and trained drilling crews who are constantly aware of pollution problems. With these factors we are confident of continued successful safe drilling and production operation.

To illustrate the cost of our offshore operations in the Santa Barbara Channel, Humble incurred a loss of \$1.7 million in operating expenses and \$2.1 million in interest on the \$218 million lease bonus during the recent 53-day shutdown period imposed as a result of incident on Tract 402. The U.S.G.S. experts have re-reviewed our drilling programs and all related geological matters have concurred with the safety of our plans. That the execution of these plans has been accomplished with the same degree of care has also been demonstrated by numerous inspections of our operations. Our interest together with those of our partners involve 41 of the 71 Federal Santa Barbara Channel leases. Our actual drilling operations have involved nine of the Federal leases in the Santa Barbara Channel. These wells extend from the East to the Western limits of the Santa Barbara Channel as do our pre-sale core holes which together provides a representative sampling of the Channel geological conditions. In none of our operations have we encountered subsurface formations that presented any unique problem in well control.

As a matter of information, we noted with pride that one of our competitors cited in the hearings Humble's operation at Avery Island in Southern Louisiana as an outstanding example where careful planning has demonstrated the compatibility of oil operations with one of the beautiful natural sanctuaries of the Nation. Similarly, we believe that the future will reflect a similar record for Humble's operations in the beautiful surroundings of the Santa Barbara Channel. Our planning and our operations are directed to achieve this goal.

In summary, we do not believe that the Santa Barbara Channel presents any unique subsurface problem that makes pollution-free drilling and production operations more difficult than other offshore Federal waters. In fact, many factors are more favorable than in other offshore areas. We feel that the current proposed legislation, which would penalize Humble for a very unfortunate incident that is not directly related to our operations, is unfair to Humble and other operators and we believe unwise from the standpoint of the National interest. Under these circumstances, we hope you will agree that the restrictive legislation proposed by S. 1219 is neither wise nor needed, and therefore, should not be approved.

STATEMENT OF THE LEAGUE OF WOMEN VOTERS OF THE UNITED STATES

The League of Women Voters of the United States supports passage of Section 2(1) of S. 1219. The League thinks it desirable that the Secretary of the Interior shall make "an investigation and study to determine methods of drilling for, producing, and transporting oil under leases issued pursuant to the Outer Continental Shelf Lands Act" in order to determine methods that "will remove the threat of pollution and other damage to the environment and ecological community."

We agree that results of such investigations and studies should be reported to the President and the Congress. We feel confident that such a report will receive serious consideration by both branches of government and that it will lead to arrangements for improvement in the quality and quantity of information available to the Department of the Interior when formulating environmental protection requirements in oil drilling leases on outer Continental Shelf lands.

The League of Women Voters of the United States, with 150,000 members organized in over 1,250 local Leagues in the 50 states, the Commonwealth of Puerto Rico, the Virgin Islands, and the District of Columbia, has been studying water resource management since 1956. The League seeks—as one of its goals—the improvement of water quality. Our members are concerned about the nation's coastal waters as well as its streams, rivers, and lakes.

In past testimony before congressional committees the League supported more stringent regulation of drilling, storing, and shipping oil. When local Leagues reported their thinking to the League's national board of directors two years ago, members clearly agreed that control of wastes was one of the costs of production.

League members are well aware that preventive measures to avoid oil spills will raise production costs, an increase ultimately paid by the consumer. Nevertheless, we think the studies proposed in Section 2 (1) of S. 1219 should be made. When ways of drilling, producing, and transporting oil without danger of oil pollution are known, their costs in high risk areas may be so great that exploitation of hazardous areas will be delayed until the nation's demand requires their yield.

The League of Women Voters of the United States neither supports nor opposes provisions of S. 1219 relating specifically to Santa Barbara Channel and the California coast. The League of Women Voters of California will make its own decision on whether all drilling under Outer Continental Shelf Act leases should be terminated in Santa Barbara Channel and suspended off the coast of California until the Secretary of the Interior has made the study proposed in Section 2 (1) and whether that study should deal with methods of phasing out oil production in the Santa Barbara Channel.

STATEMENT OF PETER J. HEARST, OXNARD, CALIF.

My name is Peter J. Hearst, my address is 673 Devonshire Drive, Oxnard, Ventura County, California. By profession I am a research chemist, and I received my doctorate degree at Stanford University. I attended the committee hearing, at which Chairman Moss invited any of those present to submit a statement. I therefore request that this statement be made part of the hearing record.

I submit this statement to supplement some of the arguments made at the hearing and to emphasize the fact that not only the citizens of Santa Barbara County but also those of Ventura County believe strongly that drilling should be stopped in the channel that lies along their beaches. Not all coastlines can be preserved as parklands, but it is important that our most unique shorelines and marine wilderness areas be saved from exploitation.

The Santa Barbara Channel is a special area of great scenic beauty, rare ecological value, and high recreational significance that should be preserved so far as

possible in its natural state. It has been proposed that a marine sanctuary be established in the Santa Barbara Channel. A number of bills to achieve this goal have been introduced in Congress. It has also been proposed that the islands forming the seaward boundary of the Channel be part of a national park. Several bills for the creation of a Channel Islands National Park have been introduced.

Man's nature has been to exploit his environment, and much of America's resources have been ravaged by uncontrolled development. Fortunately there is a rapidly increasing awareness of the value of an uncontaminated environment and of the importance—and of the right—of all citizens to enjoy clean air, clean water, and in this case clean beaches and freedom from threat of further disaster.

Citizens all over Southern California and all over the United States are urging that oil drilling be stopped in the Santa Barbara Channel, and that the values and risks of offshore drilling be reassessed in other tideland areas. A large portion of the news and opinion media are taking a similar position. Unfortunately, it was much too easy, by administrative action, and without sufficient investigation, to exploit the resources of the channel. It is not too late to at least partially reverse this action by passage of Senator Cranston's bill which is being considered by this committee.

The oil disaster has strongly aroused the citizens of Santa Barbara and Ventura Counties. During the first few days of the disaster, an offshore wind kept the oil from the beaches. The spill was chiefly a news event, as it still is to those who have not visited the area. But seven days later the thick oily mass hit the Santa Barbara beaches and sprayed over the breakwaters and up on the coastal bluffs. Citizens who prided themselves on their beautiful beaches were ready to take almost any action but did not know where to turn. Many tried to help constructively by rescuing dying birds along the beach, but such efforts were chiefly in vain. These dying birds were a symbol of the apparent disregard for anything but monetary values in the drilling operations.

Human concern grew as the oil spread to beaches in all areas of the Santa Barbara Channel and in Los Angeles County. People turned—as they are turning now—to their elected representatives for help. The disaster became a national issue. Advertising and misconception to the contrary, the disaster is continuing. The oil is still leaking.

Many people were gratified when Secretary Hickel finally stopped drilling operations. They were equally alarmed when he allowed resumption of drilling soon thereafter under new regulations. These regulations do not eliminate the risks of further oil spills and adequate methods of handling large spills are not available.

The risks of offshore operations are much too great to justify continuation of oil drilling in the Santa Barbara Channel. The geology of the channel, including the threat of earthquakes, makes further spills an ever-present possibility. This was brought out in recent claims by minor producers who said they could not be responsible for the effects of future pollution. Existing mechanical cleanup operations have been found to be useless when there is appreciable wave action. Chemical dispersants may prove more damaging than the oil itself, as was apparently the case in the Torrey Canyon disaster.

Many phases of the offshore drilling operations are being performed at the edge of our technological capabilities. If drilling operations are allowed to proliferate throughout the channel, the risks will increase proportionately. The hazards to navigation, and the possibility of collision of tankers will also greatly increase.

Small sanctuaries are not a solution to the preservation of scenic, recreational, or ecological values. The State of California has a three-mile wide sanctuary along the Santa Barbara coastline in front of the city of Santa Barbara. The federal government has added a two-mile ecological preserve and an additional buffer zone, in areas not already leased. But all these withdrawn areas comprise only about eight percent of the total channel area. Small sanctuaries will do little more than slightly diminish the visual impact of a potential sea of large unsightly platforms, visible from shore to shore. Floating oil does not recognize sanctuary boundaries. Extremely heavy pollution of beaches occurred in the sanctuary zone. State and County parklands also were polluted and continue to be polluted from the federally sanctioned operations. If the ecology or recreational value of any portion of the Santa Barbara Channel is to be preserved, a sanctuary encompassing the entire channel appears as a necessity.

In considering S. 1219 the Committee will have to reach value judgments that cannot be measured merely in dollars. Although revenues from tourism can be measured, the enjoyment of the scenic resources of our tidelands cannot be so measured. The recreational demands on our beaches are mounting as citizens

become more mobile and have more leisure—at the same time as the recreational value of many beaches is being damaged or destroyed! The oil in the Santa Barbara Channel and in other unique areas is not needed now. It will be available in the future if necessary. By that time its safe recovery may be technologically more feasible than at present. Its value will have increased with time.

It is important that legislation be enacted to survey all the tidelands and the outer continental shelves of the United States, to identify not only mineral values and areas of drilling work, but also biological, scenic, and social values that would be adversely affected by oil development—with a view toward zoning tidelands and continental shelves for various combinations of use, including the establishment of marine sanctuaries in the Santa Barbara Channel and elsewhere. This is the purpose of S. 1219.

It is also important that in the near future a Channel Islands National Park be created so that citizens can receive the maximum benefit of the scenic, recreational, ecological and scientific values to be found there. A sanctuary in the channel would greatly enhance the value of such a park. Continued drilling and further pollution would greatly detract from the value of a Channel Islands National Park, as well as from the recreational potential of the Santa Barbara Channel.

The people of Santa Barbara and Ventura Counties, and of all the United States, have a right to enjoy the environment of the Santa Barbara Channel (and other scenic shorelines)—unpolluted and unthreatened by further disaster.

THE RESOURCES AGENCY OF CALIFORNIA,
Sacramento Calif., June 10, 1969.

Hon. FRANK E. MOSS,
Chairman, Subcommittee on Minerals, Materials and Fuels, Senate Interior and Insular Affairs Committee, Washington, D.C.

DEAR SENATOR MOSS: This letter is written with regard to the appearance of Charles O'Brien, Chief Deputy Attorney General before your committee on Monday, May 19, 1969.

This is to advise that Mr. O'Brien was not authorized to speak as the official representative of the State of California and to make it clear that his testimony should not be interpreted as the official position by the State of California. At the appropriate time the State of California will present its comments.

Sincerely yours,

N. B. LIVERMORE, Jr.,
Secretary for Resources.

(See also additional letter on page 186.)

WEST COVINA, CALIF., May 3, 1969.

Hon. HENRY M. JACKSON,
Chairman, Senate Committee on Interior and Insular Affairs, Washington, D.C.

DEAR SIR: I am submitting my comments related to S. 1219, sponsored by Senator Alan Cranston. I respectfully request that my comments be included in the hearing record.

Recent occurrences of leakage from oil well operations in the Santa Barbara Channel off the coast of the State of California have well demonstrated that man is not now prepared to engage in mineral extraction in the ocean environment.

The result of mans unpreparedness has been to bring damage of great magnitude as yet specifically unassessed on the environment adjacent to the particular oil extraction operation.

Man has need for petroleum products in the present society but man has now and will have in the future a need for a livable environment. This livable environment is seriously threatened by multiple pollutants and if man is to endure the pollution of the environment must be curtailed.

The necessary actions in preserving a livable environment will likely necessitate that we not expose our environment to certain threats. It is not clear that opening up the Outer Continental Shelf lands is essential to the nations' economic welfare and recent events demonstrate that great harm to our environment can result.

I endorse all provisions of S. 1219 and encourage the inclusion of requirements to develop recommendations for a policy to assign liability and responsibility for full indemnification for and restoration of damaged or destroyed wildlife, wildlife

habitat, scenic and esthetic values, and property to the company, agent, or other entity performing operations or acts resulting in damage due to pollution.

Very truly yours,

LYLE A. TAYLOR.

SANTA BARBARA, CALIF., May 5, 1969.

HON. FRANK E. MOSS,
Chairman, Senate Subcommittee on Minerals, Materials, and Fuels, Senate Office Building, Washington, D.C.

DEAR SENATOR MOSS: Being concerned with the beauty and conservation of Santa Barbara and the State of California's ecology, and the wisest use of natural resources, the Garden Study Club of Santa Barbara, (member of Calif. Garden Clubs, and the National Council of State Garden Clubs) fully supports Sen. Alan Cranston's Bill S. 1219. Please let the transcripts of the records show our support.

We deplore the existing situation of oil flowing without cease into our channel, and continuing of drilling activities.

Thank you.

Mrs. BETTE (A. Daniel) ELIASON,
Chairman of Conservation and Civic Interests.

SANTA BARBARA, CALIF., May 7, 1969.

HON. HENRY M. JACKSON,
Chairman, Senate Committee on Interior and Insular Affairs, Washington, D.C.

DEAR SENATOR JACKSON: I heartily support the objective of S.B. 1219 (Senator Alan Cranston) to suspend all offshore oil-drilling in the Santa Barbara Channel and urge your committee to give it a "do-pass."

With vast supplies of new oil appearing world-wide, as well as within the confines of the United States there is no justification for tampering with our magnificent and limited California coast ecology and no monetary price can be put on it.

I would like my comment included in the hearing record.

Very truly,

ANNA LAURA MYERS.

SANTA BARBARA, CALIF., May 15, 1969.

HON. FRANK E. MOSS,
U.S. Senate, Washington, D.C.

DEAR SENATOR MOSS: Senator Alan Cranston's bill (S. 1219) is the best way of solving our ocean and beach pollution.

I urge your support of S. 1219 for the above reason.

Yours very truly,

GEORGE M. ROWLEY.

SANTA BARBARA, CALIF., May 14, 1969.

HON. FRANK E. MOSS,
Chairman, Subcommittee on Minerals, Materials and Fuels, Senate Interior Committee, Washington, D.C.

DEAR SENATOR MOSS: Earnestly request your support of Senator Cranston's bill to ban oil drilling permanently in the Santa Barbara Channel.

CHARLEEN MACKENZIE.

Senator Moss. The committee is now in recess.

(Whereupon, at 6:20 p.m., the subcommittee recessed, to reconvene at the call of the Chair.)

APPENDIX A

(The following news releases are of such importance to the consideration of legislation on oil drilling in the Santa Barbara Channel that they were ordered printed in the hearing record.)

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., June 2, 1969.

Dr. Lee A. DuBridge, Science Adviser to the President, today released a report which calls for the withdrawal of oil as rapidly as possible to reduce pressure and to "forever prevent future spillage" from the Repetto reservoirs off Santa Barbara, California.

The report and a memorandum to President Nixon were released by Dr. DuBridge at a Washington press conference. Dr. DuBridge was joined in the press conference by Dr. William Pecora, Director of the U.S. Geological Survey and Professor Hamilton M. Johnson, Chairman of Tulane University's Department of Geology. Dr. Johnson is a member of the special scientific panel formed to study the future of the Union Oil lease off Santa Barbara.

The study headed by Dr. John C. Calhoun, Vice President of Texas A & M University resulted from the oil blowout on January 29, which caused oil to spread widely over the Santa Barbara Channel and adjacent beaches.

Dr. DuBridge made the following statement:

"On April 7th the President, acting on the request of the Secretary of the Interior, Walter J. Hickel, directed me to assemble a special panel including suitable experts in geology, petroleum engineering and reservoir management to make recommendations to him about future steps that should be taken on the Union Oil lease. The President is deeply concerned over the necessity to preserve our national resources."

A panel of experts representing all phases of the problem was assembled and met in Los Angeles on May 12th and 13th. I instructed the Panel that:

"In evaluating the various plans highest priority must be given to the absolute need for the prevention of oil spillage resulting from drilling. Any plan must provide safety factors which will minimize hazards of further oil pollution.

"The Panel has completed its report and submitted it to me, copies are available. It is my conclusion that it has carefully considered the problem and I concur with its recommendations. I believe this plan is one which will reduce to the minimum present and future hazards of oil leakage. The report has been transmitted to the President and at his request I have transmitted it to the Secretary of the Interior for his consideration and implementation.

"I am aware that some have urged withdrawal from this oil bearing structure immediately. The Panel concludes that this would be hazardous at the present time, and would not provide a permanent end to the oil leak."

The Panel Report, a letter from Dr. DuBridge to the President forwarding the report and the list of Panel Members was made available at this time.

REPORT OF SPECIAL PANEL ON THE FUTURE OF THE UNION OIL LEASE

The Panel believes that it is less hazardous to proceed with development of the lease than to attempt to seal the structure with its oil content intact. In fact, the Panel is of the opinion that withdrawal of the oil from the Repetto zone is a necessary part of any plan to stop the oil seep and to insure against recurrence of oil seeps on the crest of the structure. The Panel concludes that it would be hazardous to withdraw from this lease at the present time.

It would be inappropriate for this Panel to recommend a detailed program to stop the seepage and reduce the formation pressures. It would be equally in-

appropriate to attempt to manage such a program from this Panel. Nevertheless, a definite order of priorities should be established. The Panel recommends the following order of priorities:

1. Contain and control present oil seepage through the use of underwater receptacles or other suitable methods.
2. Seal off, or reduce as much as possible, the flow from existing seeps through a program of shallow drilling (above the "C" marker), pumping and grouting.
3. Review the possible earthquake hazards and take necessary actions.
4. Attempt, through an oil withdrawal program, to determine the degree of interconnection between levels of the Repetto formation.
5. Reduce pressures throughout the reservoir to hydrostatic or less and maintain pressures with water injection, if needed, to minimize subsidence.
6. Deplete all Repetto reservoirs as efficiently and rapidly as possible consistent with safe practices.

It may be that the first four or five priority items can be pursued simultaneously, but the Panel wishes to emphasize the order of importance. The Panel recommends that the program be carried out under close supervision of the Department of the Interior. The Union Oil Company should be asked to supply additional detailed information as necessary.

To implement the recommendation for close supervision of the lease development the Panel recommends that a smaller group of consultants be made available to the Department of the Interior on a continuing basis to assist and advise as detailed questions arise in the course of the program. We recommend further that the Department of the Interior consider whether additional supervisory personnel from the U.S. Geological Survey may need to be assigned to this particular program.

The Panel notes that this oil structure underlies the adjoining Sun Oil Company lease as well as the Union Oil Company lease. Good conservation practices require that the development of these leases be considered together. The Panel strongly recommends that unitization be practiced. Consideration should be given to pressure reduction from operations at the western end of the Sun Oil lease.

The Panel wishes to thank the staff of the U.S. Geological Survey and the Union Oil Company and their partners for cooperation and for the large amount of data made available to the Panel for consideration.

JOHN C. CALHOUN, Jr., *Chairman.*

MEMBERS OF SPECIAL PANEL ON THE FUTURE OF THE UNION OIL LEASE

Chairman:

Dr. John C. Calhoun, Jr., Vice President, Texas A&M University.

Mr. Roy Bobo, Roy Bobo Engineering.

Mr. Lloyd S. Cluff, Woodward-Clyde and Associates.

Dr. John Craven, Chief Scientist, Special Projects Office, Navy Department.

Professor Murray E. Hawkins, Jr., Head, Department of Petroleum Engineering, Louisiana State University.

Professor Hamilton M. Johnson, Chairman, Department of Geology, Tulane University.

Mr. William R. Lorman, Naval Civil Engineering Laboratory.

Dr. Gordon MacDonald, Vice Chancellor for Research and Graduate Affairs, University of California Santa Barbara.

Mr. Ross McClintock, Fluor Corporation.

Dr. Henry W. Menard, Scripps Institution of Oceanography.

Dr. Carl H. Savit, Western Geophysical Company of America.

OST Staff: Dr. John S. Steinhart, Mr. Howard H. Eckles, Dr. David A. Adams (Marine Science Council).

MAY 27, 1969.

MEMORANDUM FOR THE PRESIDENT

Subject: Santa Barbara Oil Problem.

You will recall that, at the request of Secretary Hickel, you authorized me to establish an expert panel to examine into the current oil drill operations in the Santa Barbara Channel and to recommend such actions, particularly on the part of the Union Oil Company and its associated companies, which would:

- (a) reduce the present oil seepage, and
- (b) give maximum possibility of avoiding future oil spills.

Our panel consulted at length with petroleum engineers, with members of the U.S. Geological Survey and other experts in the field, and their report is transmitted herewith.

The panel recognized at the outset that there are a variety of different procedures that might be considered ranging from:

(a) immediate suspension of all oil drilling and pumping operations in the vicinity of the Union Oil platform, sealing up if possible existing leaks and abandoning the operation to:

(b) proceeding to pump the oil as rapidly as possible to remove the oil and reduce its pressure and thus forever prevent future spillage.

There are, of course, a variety of intermediate procedures that might be examined.

The panel has concluded that the maximum safety would be attained by proceeding approximately in accordance with alternative b. Specifically, they recommend that suitable structures be placed over existing leakage areas so the oil now leaking can be contained, and that removal of the oil from the various layers under the Santa Barbara Channel be expedited in order that pressures be reduced which force the oil upward into the ocean, with the eventual idea of removing the oil from the reservoir.

It is further recommended that all of these procedures be carried out under careful expert supervision by the Department of the Interior and especially the U.S. Geological Survey, together with such additional experts as are needed from nongovernmental sources.

I believe the OST panel has carefully considered the problem, and I concur with their recommendation and believe it is one which will reduce to a minimum current and future hazards of oil leakage.

This report is being transmitted to Secretary Hickel for his approval and implementation. I suggest also that the report be released by the Office of Science and Technology. The attached memorandum is for your approval.

LEE A. DUBRIDGE.

[News release]

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., June 2, 1969.

SECRETARY HICKEL AND TASK FORCE STUDYING SANTA BARBARA CHANNEL OIL RECOMMENDATIONS

Secretary of the Interior Walter J. Hickel said today that he and a Department task force are "studying and evaluating" the recommendations of a special panel reporting to the President's Office of Science and Technology on future disposition of the Union Oil Company drilling operations in the Santa Barbara Channel in California.

"Meanwhile, I have decided to move immediately on the first three of the recommendations, some of which have been under way since the 'blowout,'" Secretary Hickel said.

"In reaching this judgment I have placed maximum emphasis on a logical program that might stop the seepage in the vicinity of Union Oil's Platform 'A' that will minimize the pollution effects of the present seepage and that will allow additional remedial procedures with a maximum of safety."

"These first three recommendations, in order of priority, include (1) containing and collecting present oil seepage through use of underwater and surface receptacles; (2) reducing as much as possible any flow through a program of shallow drilling, pumping and grouting and (3) taking action against possible earthquake hazards.

"In the two-month period, April and May, more than 1,000 net barrels of oil have been recovered through eight underwater installations and surface skimming in the vicinity of Platform A. Additional underwater devices are being constructed and emplaced by the Company, and the industry has initiated a massive research and development program aimed at improving more effective containment and collection of sea spills.

"In response to an earlier recommendation of the same panel, the Department previously authorized a program of systematic pressure drawdown pumping utilizing the five development wells already drilled by the Company from Platform A.

"This program although properly executed, has not in fact stopped the seepage, although it has given us important scientific information. Therefore, I have authorized the Geological Survey to recommend to Union Oil an acceptable remedial program of shallow drilling and gravity injection of cement into shallow formations in accordance with this Panel's recommendations.

"It is clear to me that this distinguished Panel has concluded that it would be more hazardous to withdraw from this lease than to proceed with removal of all the oil in the reservoir to prevent oil leakage forever.

"In view of the importance of this decision to the citizens of Santa Barbara, we are studying and evaluating all of the recommendations with a view toward making a judgment in the best interests of the Nation."

[From the Federal Register, May 7, 1969]

PROPOSED RULE MAKING

OUTER CONTINENTAL SHELF—OIL AND GAS AND SULPHUR OPERATIONS

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by section 5 of the Outer Continental Shelf Lands Act of August 7, 1953 (67 Stat. 462, 464; 43 U.S.C. 1334) it is proposed to amend certain regulations in Part 250 of Title 30 as set forth below.

The purpose of the proposed amendments is to clarify and prescribe specific standards of compliance with the general operating regulations applicable to oil and gas and sulphur operations on all Outer Continental Shelf areas. Among other things, the proposed amendments (1) describe in greater detail the precautions to be taken by all lessees to maintain control of wells and (2) revise notice and reporting requirements so as to develop more timely and adequate information necessary to more effective supervision of operations.

It is the policy of the Department of the Interior, whenever practicable, to afford the public an opportunity to participate in the rule-making process. Accordingly, interested parties may submit written comments, suggestions, or objections with respect to the proposed amendments to the Director, U.S. Geological Survey, Washington, D.C. 20240, within 30 days of the date of publication of this notice in the Federal Register.

RUSSELL E. TRAIN,
Under Secretary of the Interior.

MAY 2, 1969.

Part 250 of Chapter II of Title 30 of the Code of Federal Regulations is amended as follows:

1. The last sentence of § 250.1 is revised. As amended, § 250.1 reads as follows:

§ 250.1 Purpose and authority.

The Outer Continental Shelf Lands Act enacted on August 7, 1953 (67 Stat. 462), referred to in this part as "the act," authorizes the Secretary of the Interior at any time to prescribe and amend such rules and regulations to be applicable to all operations conducted under a lease issued or maintained under the provisions of the act as he determines to be necessary and proper to provide for the prevention of waste and conservation of the natural resources of the Outer Continental Shelf, and the protection of correlative rights therein. Subject to the supervisory authority of the Secretary of the Interior, the regulations in this part shall be administered by the Director of the Geological Survey through the Chief, Conservation Division.

2. Section 250.2 paragraph (c) is revised and paragraph (j) is added to read as follows:

§ 250.2 Definitions.

* * * * *

(c) *Supervisor.* A representative of the Secretary, under administrative direction of the Director, through the Chief, Conservation Division, Geological Survey, authorized and empowered to regulate operations and to perform other duties prescribed in the regulations in this part, or any subordinate of such representative acting under his direction.

* * * * *

(j) *OCS Order.* A formal numbered order issued by the supervisor and available in his office, with the prior approval of the Chief, Conservation Division, Geological Survey, that amplifies the regulations in this part and applies to operations in a region or a major portion thereof.

3. Section 250.10 is revised to read as follows:

§ 250.10 Jurisdiction.

Subject to the supervisory authority of the Secretary and the Director, drilling and production operations, handling and measurement of production, determination and collection of rental and royalty, and, in general, all operations conducted on a lease by or on behalf of a lessee are subject to the regulations in this part, and are under the jurisdiction of the supervisor for any region as delineated by the Director.

4. Section 250.11 is revised to read as follows:

§ 250.11 General functions.

The supervisor is authorized and directed to act upon the requests, applications, and notices submitted under the regulations in this part and to require compliance with applicable laws, the lease terms, applicable regulations, and OCS orders to the end that all operations shall be conducted in a manner which will protect the natural resources of the Outer Continental Shelf and result in the maximum economic recovery of the mineral resources in a manner compatible with sound conservation practices. Subject to the approval of the Chief, Conservation Division, Geological Survey, the supervisor may issue OCS orders amplifying the requirements of the regulations of this part when such amplifications apply to an entire region or a major portion thereof. The supervisor may issue other orders and rules to govern the development and method of production of a pool, field, or area. Before permitting operations on the leased land, the supervisor may require evidence that a lease is in good standing, that the lessee is authorized to conduct operations, and that an acceptable bond has been filed.

5. Section 250.12 is revised to read as follows:

§ 250.12 Regulation of operations.

(a) *Duties of supervisor.* The supervisor in accordance with the regulations in this part shall inspect and regulate all operations and is authorized to issue OCS orders and other orders and rules necessary to provide effective supervision of operations and to prevent damage to or waste of any natural resource, or injury to life or property. The supervisor shall receive, and shall, when in his judgment it is necessary, consult with or solicit advice from field officials of interested Departments and agencies, including the Fish and Wildlife Service, Federal Water Pollution Control Administration, Bureau of Land Management, Coast Guard, Department of Defense, Corps of Engineers, and from representatives of State and local governments.

(b) *Modification of orders.* (1) The supervisor may prescribe or approve in writing minor departures from the requirements of OCS orders and other orders and rules issued pursuant to paragraph (a) of this section, when such modifications are necessary for the proper control of a well, conservation of natural resources, protection of aquatic life, protection of human health and safety, property, or the environment.

(2) All requests or recommendations for major departures from the requirements of OCS orders, whether on an individual well or field basis, shall be approved by the Chief, Conservation Division.

(c) *Emergency suspensions.* The supervisor is authorized either orally or in writing to suspend any operation which, in his judgment, threatens immediate, serious or irreparable harm or damage to life, including aquatic life, to property, to the leased deposits, to other valuable mineral deposits or to the environment. Such emergency suspension shall continue until in his judgment the threat or danger has terminated.

(d) *Other suspensions.* The supervisor is authorized by written notice to the lessee to suspend any operation for failure to comply with applicable laws, the lease terms, the regulations in this part, OCS orders, or any other written order or rule including orders for filing of reports and well records or logs within the time specified therein.

6. Section 250.17 is revised to read as follows:

§ 250.17 Well locations and spacing.

The supervisor is authorized to approve well locations and well spacing programs necessary for proper development giving consideration to such factors as the location of drilling platforms, the geological and reservoir characteristics of the field, the number of wells that can be economically drilled, the protection of correlative rights, and minimizing unreasonable interference with other uses of the Outer Continental Shelf area.

7. In § 250.18, paragraph (c) is revised and paragraph (d) is added to read as follows:

§ 250.18 Rights of use and easement.

* * * * *

(c) In addition to the rights and privileges granted to a Federal lessee under any lease issued or maintained under the act, the supervisor upon proper application may grant to a holder of a Federal lease or State lease issued by a State which extends the same rights to holders of Federal leases, subject to such conditions as the supervisor may prescribe, the right of use or an easement to construct and maintain pipelines on areas of the Outer Continental Shelf which are constructed, owned, and maintained by the lessee and used for purposes such as (1) moving production to a central point for gathering, treating, storing, or measuring; (2) delivery of production to a point of sale; (3) delivery of production to a pipeline operated by a transportation company, or (4) moving fluids in connection with lease operations, such as for injection purposes. The supervisor is authorized, among the conditions he may prescribe, to designate any reasonable offshore or onshore location as the central or delivery point. Rights of use or easement across areas covered by a mineral lease issued or maintained under the act shall be granted only after the lessee under such lease has been notified and afforded an opportunity to express its views with respect thereto, and any such rights shall be exercised only in a manner so as not to interfere unreasonably with operations of the lessee under such lease. The foregoing right of use and easement shall not apply to pipelines used for transporting oil, gas, or other production after custody has been transferred to a purchaser or carrier as provided for in section 5(c) of the Outer Continental Shelf Lands Act and regulations in 43 CFR 2234.5-3.

(d) Once a right of use or easement has been exercised by the erection of platforms, fixed structures, artificial islands, or pipelines, the right shall continue only so long as they are maintained and used for the purpose specified therein, as determined by the supervisor, even beyond the termination of any lease on which they may be situated, and the rights of all subsequent lessees shall be subject to such rights of use and easement by prior lessees. Upon termination by the supervisor of the right of use and easement, the lessee shall remove or otherwise dispose of all platforms, fixed structures, artificial islands, pipelines, and other facilities and restore the premises to the satisfaction of the supervisor.

§ § 250.20, 250.21 [Redesignated]

8. Sections 250.19 and 250.20 are redesignated §§ 250.20 and 250.21, respectively, and a new § 250.19 is added to read as follows:

§ 250.19 Platforms and pipelines.

(a) The supervisor is authorized to approve the design, other features and manner and means of installation of all platforms, fixed structures, and artificial islands as a condition of the granting of a right of use or easement under paragraph (a) or (b) of § 250.18 or authorized under any lease issued or maintained under the act.

(b) The supervisor is authorized to approve the design, other features, and installation of all pipelines or which a right of use or easement has been granted under paragraph (c) of § 250.18 or authorized under any lease issued or maintained under the act, included those portions of such lines which extend onto or traverse areas other than the Outer Continental Shelf.

9. Section 250.21 (as redesignated) is revised to read as follows:

§ 250.21 Relief from drilling and producing obligations.

The supervisor is authorized to approve applications for temporary relief from any requirement to drill or to produce under a lease, regulation, or order. Such approval shall not be construed as the granting of a suspension pursuant to paragraph (a) of 43 CFR 3383.5.

10. The first sentence of § 250.30 is revised. As amended, § 250.30 reads as follows:

§ 250.30 Lease terms, regulations, waste, damage, and safety.

The lessee shall comply with the terms of applicable laws and regulations, the lease terms, OCS orders and other written orders and rules of the supervisor, and with oral orders of the supervisor. The lessee shall take all precautions required by applicable laws and regulations, OCS orders, and orders of the super-

visor and such other additional precautions or plans as may be required to prevent damage to or waste of any natural resource or injury to life, or property, or the aquatic life of the seas.

11. Section 250.34 is revised to read as follows:

§ 250.34 Drilling and development programs.

(a) *Exploratory plan.* Prior to commencing exploratory programs on a lease, including the construction of platforms, the lessee shall submit a plan to the supervisor for approval. The plan shall include (1) a description of drilling vessels, platforms, or other structures showing the location, the design, and the major features thereof, including features pertaining to pollution prevention and control; (2) the general location of each well including surface and projected bottom hole location for directionally drilled wells; (3) structural interpretations based on available geological and geophysical data; and (4) such other pertinent data as the supervisor may prescribe.

(b) *Development plan.* Prior to commencing each development program on a lease, the lessee shall submit a plan to the supervisor for approval. The plan shall include all information specified in paragraph (a) of this section in detail.

(c) *Drilling applications.* Prior to commencing drilling operations either under an exploratory or development plan, the lessee shall submit an Application for Permit to Drill (Form 9-331C) to the supervisor for approval. The application shall include the integrated blowout prevention, mud, casing, and cementing program for the well, and shall meet the requirements specified in § 250.41(a), and contain the information specified in § 250.91(a) and shall conform with the approved exploratory or development plan.

(d) *Modifications.* The lessee shall submit: (1) All requests for modifications of an approved exploratory or development plan in writing to the supervisor for approval; and (2) all notices of changes to plans set forth in the approved Application for Permit to Drill on Sundry Notices and Reports on Wells (Form 9-331), except that these requirements shall not relieve the lessee from taking responsibility for appropriate action to prevent or abate damage, waste, or pollution of any natural resource or injury to life or property.

§§ 250.35-250.49 [Redesignated]

12. Sections 250.34a through 250.48 are redesignated §§ 250.35 through 25.49, respectively, and § 250.36 (as redesignated) is revised to read as follows:

§ 250.36 Subsequent well operations.

Prior to commencing deepening, plugging-back, repairing (other than work incidental to ordinary well operations), acidizing or stimulating production by other methods, perforating, sidetracking, squeezing with mud or cement, abandoning, and any similar operation which will alter the condition of a well, the lessee shall submit an application or notice as specified in §§ 250.91 and 250.92 to the supervisor for approval. This requirement shall not relieve the lessee from responsibility for taking appropriate action to prevent or abate damage or waste of any natural resource, or injury to life or property.

13. Section 250.38 (as redesignated) is revised to read as follows:

§ 250.38 Well records.

(a) The lessee shall keep for each well at his field headquarters or at other locations conveniently available to the supervisor, accurate and complete records of all well operations including production, drilling, logging, directional well surveys, casing, perforating, safety devices, re-drilling, deepening, repairing, cementing, alterations to casing, plugging, and abandoning. The records shall contain a description of any malfunction, unusual condition or problem; all the formations penetrated; the content and character of oil, gas, and other mineral deposits, and water in each formation; the kind, weight, size, grade, and setting depth of casing; and any other pertinent information.

(b) The lessee shall, within 15 days after the completion of each well operation specified in paragraph (a) of this section, transmit to the supervisor copies of records of such operation in triplicate on or attached to Form 9-331.

(c) The lessee shall, as soon as available but not later than 7 days after the completion of each logging operation, transmit to the supervisor duplicate copies (field or final prints of individual runs) of logs or charts of electrical, radioactive, sonic, and other well logging operations and directional well surveys. Composite logs of multiple runs shall be filed with the supervisor in duplicate as soon as available, but not later than 30 days after completion of all logging operations for each well.

(d) The lessee shall furnish copies of the daily drilling report, a plat showing the location, designation, and status of all wells on the leased lands, and other pertinent information when required and in the manner and form prescribed by the supervisor.

(e) The lessee shall require each service company to furnish legible, exact copies of reports on cementing, perforating, acidizing, analyses of cores, or other similar services when required and in the manner and form prescribed by the supervisor.

(f) The lessee shall submit any other reports and records of operations when required and in the manner and form prescribed by the supervisor.

14. Section 250.41 (as redesignated) is revised to read as follows:

§ 250.41 Control of wells.

(a) *Drilling wells.* The lessee shall keep all wells under control at all times, shall utilize only personnel trained and competent to drill and operate such wells, and shall utilize and maintain materials and high-pressure fittings and equipment necessary to insure the safety of operating conditions and procedures and shall conform to such higher standards as the supervisor may prescribe. The design of the integrated casing, cementing, drilling mud, and blowout prevention program shall be based upon sound engineering principles, and must take into account the depths at which various fluid or mineral-bearing formations are expected to be penetrated, and the formation fracture gradients and pressures expected to be encountered, and other pertinent geologic and engineering data and information about the area.

(1) *Well casing and cementing.* The lessee shall case and cement all wells with a sufficient number of strings of casing in a manner which will: (i) Prevent release of fluids from any stratum through the well bore (directly or indirectly) into the sea; (ii) prevent communication between separate fluid-bearing strata of oil, gas, or water; (iii) support unconsolidated sediments; and (iv) otherwise provide a means of control of the formation pressures and fluids. The lessee shall install casing adequate to withstand collapse, bursting, tensile, and other stresses and the casing shall be cemented in a manner which will anchor and support the casing. Safety factors in casing program design shall be of sufficient magnitude to provide optimum well control while drilling and to assure safe operations for the life of the well. When directed by the supervisor, the lessee shall install structural or drive casing to provide hole stability for the initial drilling operation. A conductor string of casing (the first string run other than any structural or drive casing) must be cemented with a volume of cement sufficient to circulate back to the sea floor, and all subsequent strings must be securely cemented.

(2) *Drilling mud.* The lessee shall maintain readily accessible for use quantities of mud sufficient to insure well control. The testing procedures, characteristics, and use of drilling mud and the conduct of related drilling procedures shall be such as will prevent blowouts. Mud testing equipment and mud volume measuring devices shall be maintained at all times, and mud tests shall be performed frequently and recorded on the driller's log as prescribed by the supervisor.

(3) *Blowout prevention equipment.* The lessee shall install, use, and test blowout preventers and related well-control equipment in a manner which will prevent blowouts. Such installation, use, and testing must meet the standards or requirements prescribed by the supervisor, provided, however, in no event shall the lessee conduct drilling below the conductor string of casing until the installation of at least one remotely controlled blowout preventer and equipment for circulating drilling fluid to the drilling structure or vessel. Blowout preventers and related well-control equipment shall be pressure tested when installed, after each string of casing is cemented, and at such other times as prescribed by the supervisor. Blowout preventers shall be activated frequently to test for proper functioning as prescribed by the supervisor. All blowout-preventer tests shall be recorded on the driller's log.

(b) *Completed wells.* The lessee shall conduct all its operations in a manner which will prevent blowouts and shall immediately take whatever action is required to bring under control any well over which control has been lost. The lessee shall: (1) In wells capable of flowing oil or gas, when required by the supervisor, install and maintain in operating condition storm chokes or similar subsurface safety devices; (2) for producing wells not capable of flowing oil or gas, install and maintain surface safety valves with automatic shutdown controls; and (3) periodically test or inspect such devices or equipment as prescribed by the supervisor.

15. Section 250.43 (as redesignated) is revised to read as follows:

§ 250.43 Pollution and waste disposal.

(a) The lessee shall not pollute land or water or damage the aquatic life of the sea or allow extraneous matter to enter and damage any mineral- or water-bearing formation. The lessee shall dispose of all liquid and nonliquid waste materials as prescribed by the supervisor. All spills or leakage of oil or waste materials shall be recorded by the lessee and reported to the supervisor. All spills or leakage of a size or quantity which cannot be immediately controlled shall also be reported by the lessee without delay to the supervisor and to the Coast Guard and the Federal Water Pollution Control Administration.

(b) If the waters of the sea are polluted by the drilling or production operations of the lessee, and such pollution damages or threatens to damage aquatic life, wildlife, or public or private property, the control and removal of the pollutant and the reparation of any damage, to whomsoever occurring, proximately resulting therefrom shall be at the expense of the lessee, and on failure of the lessee to control and remove the pollutant the supervisor, in cooperation with other appropriate agencies of the Federal, State, and local governments, or in cooperation with the lessee, or both, shall have the right to accomplish the control and removal of the pollutant in accordance with any established contingency plan for combatting oil spills or by other means at the cost of the lessee, but such action shall not relieve the lessee of responsibility for reparation of damages as provided herein.

16. Section 250.45 (as redesignated) is revised to read as follows:

§ 250.45 Accidents, fires, and malfunctions.

The lessee shall conduct all its operations in a manner which will prevent accidents and fires and shall immediately notify the supervisor of all lost-time accidents and all fires on the lease, and shall submit in writing a full report thereon within 10 days. The lessee shall notify the supervisor within 24 hours of any other unusual condition, problem, or malfunction.

17. Section 250.46 (as redesignated) is revised to read as follows:

§ 250.46 Workmanlike operations.

The lessee shall perform all operations in a safe and workmanlike manner unless a higher standard is required by applicable laws or regulations, Outer Continental Shelf or other orders, or industry practices, and shall maintain equipment for the protection of the lease, its improvements, for the health and safety of all persons, and for the preservation and conservation of the property and the environment. The lessee shall prevent or immediately remove any hazardous oil and gas accumulations or other health, safety or fire hazards.

18. Section 250.47 (as redesignated) is revised to read as follows:

§ 250.47 Sales contracts.

The lessee shall file with the supervisor within 30 days after the effective date thereof copies of all contracts for the disposal of lease products. Nothing in any such contract shall be construed or accepted as modifying any of the provisions of the lease, including provisions relating to gas waste, taking royalty in kind, and the method of computing royalties due as based on a minimum valuation and in accordance with the regulations applicable to the lands covered by the contract.

§ 250.48 [Amended]

19. In § 250.48 (as redesignated), the words "not less than 30 days" are changed to read "within 30 days".

§ 250.60 [Amended]

20. In the second sentence of § 250.60 (as redesignated), the words "positive copies" are changed to read "exact copies".

21. In § 250.65, paragraph (a) is revised to read as follows:

§ 250.65 Royalty on oil.

(a) The royalty on crude oil, including condensates separated from gas without the necessity of a manufacturing process, shall be the percentage of the value or amount of the crude oil produced from the leased lands established by law, regulation, or the provisions of the lease. No deduction shall be made for actual or theoretical transportation losses.

22. Section 250.67 is revised to read as follows:

§ 250.67 Royalty on processed gas and constituent products.

(a) If gas is processed for the recovery of constituent products, a royalty as provided in the lease will accrue on the value or amount of:

- (1) All residue gas remaining after processing; and
- (2) All natural gasoline, outane, propane, or other products extracted therefrom, subject to deduction of such portion thereof as the supervisor determines to be a reasonable allowance for the cost of processing based upon regional plant practices and costs and other pertinent factors: *Provided, however,* That such reasonable allowance shall not exceed two-thirds of the products extracted unless the Director determines that a greater allowance is in the interest of conservation.

(b) Under no circumstances shall the amount of royalty on the residue gas and extracted products be less than the amount which the supervisor determines would be payable if the gas had been sold without processing.

(c) In determining the value of natural gasoline, the volume of such gasoline shall be adjusted to a standard by a method approved by the supervisor when necessary to adjust volumetric differences between natural gasolines of various specifications.

(d) No allowance shall be made for boosting residue gas or other expenses incidental to marketing.

(e) The lessee, with the approval of the supervisor, may establish a gross value per unit of 1,000 cubic feet of gas on the lease or at the wellhead for the purpose of computing royalty on gas processed for the recovery of constituent products, provided that the royalty shall not be less than that which would accrue by computing royalties in accordance with the provisions of paragraphs (a) through (d) of this section.

§ 250.80 [Amended]

23. In § 250.80, the words "by registered letter" are changed to read "by registered or certified mail".

§ 250.96 [Revoked]

§§ 250.92, 250.95, 250.96 [Redesignated]

24. Section 250.96 is revoked; §§ 250.91, 250.92, and 250.95 are redesignated 250.92, 250.95, and 250.96, respectively; and a new § 250.91 has been added to read as follows:

§ 250.91 Application for permit to drill, deepen, or plug back.

Applications for permits to drill, deepen, or plug back must be filed in triplicate on Form 9-331C. Prior to commencing such operations approval in writing must be received from the supervisor.

(a) *Application for permit to drill.* (1) The application must give the surface location and projected bottom-hole location in feet from the lease boundaries; elevation of the derrick floor; water depth; depth to which the well is proposed to be drilled; estimated depths to the top of significant markers; depths at which water, oil, gas, and mineral deposits are expected; the proposed blowout prevention and casing program, including the size, weight, grade, and setting depth of casing, and the quantity of cement to be used, together with all other information specified on Form 9-331C. Information also shall be furnished relative to the proposed plan for drilling other wells from the same platform, for coring at specified depths, and for electrical and other logging, together with any other information required by the supervisor.

(2) At least two copies of the application shall be accompanied by: (i) A certified plat drawn to a scale of 2,000 feet to the inch, showing surface and subsurface location of the well to be drilled and all wells theretofore drilled in the vicinity for which information is available, and (ii) information specified in § 250.34 to the extent not included in the application or previously furnished (reference must be made thereto).

(b) *Application for permit to deepen or plug back.* The application must describe fully: (1) The present status of the well including the production string or last string of casing, well depth, present productive zones and productive capability and other pertinent matters; and (2) the details of the proposed work and the necessity therefor.

25. Section 250.92 (as redesignated) is revised to read as follows:

§ 250.92 Sundry notices and reports on wells.

All notices of intention to fracture treat, acidize, repair, multiple complete, abandon, change plans, and for other similar purposes, and all subsequent reports pertaining to such operations shall be submitted on Form 9-331 in triplicate. Prior to commencing such operations approval must be received from the supervisor in writing, and within 15 days after completing such operations a detailed report shall be filed with the supervisor.

(a) *Notice of intention to change the condition of a well.* Form 9-331 shall contain a detailed statement of the proposed work for repairing (other than work incidental to ordinary well operation), acidizing or stimulating production by other methods, perforating, sidetracking, squeezing with mud or cement, or commencing any operations that will materially change the approved program for drilling a well or alter the condition of a completed well other than those operations covered by § 250.91.

(b) *Subsequent report of changing the condition of a well.* Form 9-331 shall contain a detailed report of all work done and the results obtained. The report shall set forth the amount and rate of production of oil, gas, and water before and after the work was completed and shall include a complete statement of the dates on which the work was accomplished and the methods employed.

(c) *Notice of intention to abandon well.* Form 9-331 shall contain a detailed statement of the proposed work for abandonment of any well, including a drilling well, a depleted producing well, an injection well, or a dry hole. The statement as to a producible well shall set forth the reasons for abandonment and the amount and date of last production and, as to all wells, shall describe the proposed work, including kind, location, and length of plugs (by depths), and plans for mudding, cementing, shooting, testing, removing casing, and other pertinent information.

(d) *Subsequent report of abandonment.* Form 9-331 shall contain a detailed report of the manner in which the abandonment or plugging work was accomplished, including the nature and quantities of materials used in plugging and the location and extent (by depths) of casing left in the well; and the volume of mud fluid used. If an attempt was made to part any casing, a description of the methods used and results obtained must be included.

§ 250.94 [Amended]

26. In § 250.94 the words "in duplicate" are deleted.

27. Section 250.95 (as redesignated) is revised to read as follows:

§ 250.95 Well completion or recompletion report and log.

All reports and logs of well completions or recompletions shall be submitted not later than 15 days after the completion or recompletion of each well on Form 9-330 in duplicate. The form shall contain a complete and accurate log and report of all operations conducted on the well as specified on the form. Duplicate copies of logs that may have been compiled for geologic information from cores or formation samples shall be filed in addition to the regular log. Geologic markers and all important zones of porosity and contents thereof; cored intervals; and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries shall be shown as provided therefor on Form 9-330 or on attachments thereto. If not previously furnished, duplicate copies of composites of multiple runs of all well bore surveys, including electric, radioactive, sonic and other logs, temperature surveys, and directional surveys shall be attached. (Such copies are in addition to field prints filed pursuant to § 250.38(c).)

28. A new § 250.97 is added to read as follows:

§ 250.97 Public inspection of records.

Geological and geophysical interpretations, maps, and data required to be submitted under this part shall, upon request of the lessee, not be available for public inspection without the consent of the lessee so long as the lease remains in effect or until such time as it is administratively determined that release of such information is required and necessary for the proper development of the field or area or otherwise in the public interest.

APPENDIX B

(The following letters were received too late for inclusion in the body of the record but were deemed of such importance to the hearing they are included at this point:)

THE RESOURCES AGENCY OF CALIFORNIA,
Sacramento, Calif., July 14, 1969.

Hon. FRANK E. MOSS,
Chairman, Subcommittee on Minerals, Materials and Fuels, U.S. Senate, Washington, D.C.

DEAR SENATOR MOSS: Thank you for your letter of June 18 wherein you suggest that I convey to you the position of the State of California on Senator Cranston's bill, S 1219, which is now pending before your committee.

The State, through its Legislature, has the authority in its State Lands Commission to issue permits for drilling and production of oil and gas on state lands as the Commission deems necessary and desirable in the total public interest. I am advised that this same authority, with respect to federal lands and Outer Continental Shelf lands particularly, as currently being considered in S 1219, is vested in the Secretary of the Interior.

With Secretary Hickel's staff knowledge of the conditions that exist on the Outer Continental Shelf lands, including the Santa Barbara Channel, I am confident that the Secretary will make his decision based upon facts.

We share with Congressman Teague, Senator Cranston, and others their keen concern for preservation of the scenic and ecological environment of our California coast, but for the reasons stated in the enclosed copy of Governor Reagan's letter of July 11, 1969 to Senator Cranston, we are not in favor of S 1219.

We will keep you apprised as to any change in the State's position if and when any changes in the bill are offered. We understand that Senator Cranston is in the process of formulating such changes.

Thank you for this opportunity to comment on S 1219.

Sincerely,

N. B. LIVERMORE, Jr.

STATE OF CALIFORNIA,
Sacramento, July 11, 1969

Hon. ALAN CRANSTON,
U.S. Senate, Washington, D.C.

DEAR SENATOR: Thank you for your letter regarding the offshore drilling problems. We are, of course, sensitive to, and keenly aware of the need to protect the environment and to protect the resources in all parts of the state, including the Santa Barbara Channel. This Administration's record to date can leave no question about this.

For years this state prudently and properly worked in cooperation with the private sector to protect our interests while developing our tidelands resources. The record on this has been commendable, the benefits to the people of this state sizeable. It was not until former Secretary Udall issued the order to permit drilling on federal lands—without, in our opinion, due caution or proper regulations—that this problem arose. When Mr. Udall first indicated his inclination to permit drilling on those federal lands, the State of California requested that the federal regulations be made to conform with the regulations and restrictions enforced by the California State government. Mr. Udall did not act upon our suggestion.

It is apparent that protection of the environment is compatible with proper development of those resources for the benefit of all of our people. I would be inclined to oppose legislation which might threaten those revenues derived from properly regulated tidelands developments which have contributed substantial support to such programs as parks and recreation, education, and the California Water Project.

Sincerely,

RONALD REAGAN, Governor.

○