OCEAN DUMPING AND POLLUTION

HEARINGS

BEFORE THE

SUBCOMMITTEE ON OCEANOGRAPHY

AND THE

SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT

OF THE

COMMITTEE ON MERCHANT MARINE AND FISHERIES HOUSE OF REPRESENTATIVES

NINETY-FIFTH CONGRESS

ON

OCEAN DUMPING (H.R. 4715, H.R. 5282, H.R. 5851)

SEPTEMBER 20, 1977; FEBRUARY 1, 1978

OCEAN POLLUTION RESEARCH (S. 1617)

OCTOBER 3, 1977

NUCLEAR WASTE DISPOSAL

MAY 15, JULY 11, 1978

MARINE SANCTUARIES

JULY 24, 1978

Serial No. 95–42

Printed for the use of the Committee on Merchant Marine and Fisheries

U.S. GOVERNMENT PRINTING OFFICE

33-546 O WASHINGTON : 1978

H3561-26

COMMITTEE ON MERCHANT MARINE AND FISHERIES

JOHN M. MURPHY, New York, *Chairman*

THOMAS L. ASHLEY, Ohio
JOHN D. DINGELL, Michigan
PAUL G. ROGERS, Florida
WALTER B. JONES, North Carolina
ROBERT L. LEGGETT, California
MARIO BIAGGI, New York
GLENN M. ANDERSON, California
E. (KIKA) DE LA GARZA, Texas
RALPH H. METCALFE, Illinois
JOHN B. BREAUX, Louisiana
FRED B. ROONEY, Pennsylvania
BO GINN, Georgia
GERRY E. STUDDS, Massachusetts
DAVID R. BOWEN, Mississippi
JOSHUA EILBERG, Pennsylvania
RON DE LUGO, Virgin Islands
CARROLL HUBBARD, JR., Kentucky
DON BONKER, Washington
LES AUCOIN, Oregon
NORMAN E. D'AMOURS, New Hampshire
JERRY M. PATTERSON, California
LEO C. ZEFERETTI, New York
JAMES L. OBERSTAR, Minnesota
WILLIAM J. HUGHES, New Jersey
BARBARA A. MIKULSKI, Maryland
DAVID E. BONIOR, Michigan
DANIEL K. AKAKA, Hawaii

PHILIP E. RUPPE, Michigan
PAUL N. McCLOSKEY, JR., California
GENE SNYDER, Kentucky
EDWIN B. FORSYTHE, New Jersey
DAVID C. TREEN, Louisiana
JOEL PRITCHARD, Washington
DON YOUNG, Alaska
ROBERT E. BAUMAN, Maryland
NORMAN F. LENT, New York
DAVID F. EMERY, Maine
ROBERT K. DORNAN, California
THOMAS B. EVANS, JR., Delaware
PAUL S. TRIBBLE, Jr., Virginia

CARL L. PERIAN, *Chief of Staff*
ERNEST J. CORRADO, *Chief Counsel*
FRANCES STILL, *Chief Clerk*
W. PATRICK MORRIS, *Chief Minority Counsel*

SUBCOMMITTEE ON OCEANOGRAPHY

JOHN B. BREAUX, Louisiana, *Chairman*

PAUL G. ROGERS, Florida
LES AUCOIN, Oregon
NORMAN E. D'AMOURS, New Hampshire
WALTER B. JONES, North Carolina
RALPH H. METCALFE, Illinois
BO GINN, Georgia
LEO C. ZEFERETTI, New York
JAMES L. OBERSTAR, Minnesota
WILLIAM J. HUGHES, New Jersey
DANIEL K. AKAKA, Hawaii
BARBARA A. MIKULSKI, Maryland
JOHN D. DINGELL, Michigan
GLENN M. ANDERSON, California
GERRY E. STUDDS, Massachusetts
RON DE LUGO, Virgin Islands

JOEL PRITCHARD, Washington
PAUL N. McCLOSKEY, JR., California
EDWIN B. FORSYTHE, New Jersey
DAVID C. TREEN, Louisiana
ROBERT E. BAUMAN, Maryland
NORMAN F. LENT, New York
THOMAS B. EVANS, JR., Delaware

PHILIP E. RUPPE, Michigan (ex officio)

JOHN M. MURPHY, New York (ex officio)

G. WAYNE SMITH, *Professional Staff*
CURTIS L. MARSHALL, *Professional Staff, Minority*

SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT

ROBERT L. LEGGETT, California, *Chairman*

JOHN D. DINGELL, Michigan
FRED B. ROONEY, Pennsylvania
BO GINN, Georgia
DAVID R. BOWEN, Mississippi
CARROLL HUBBARD, JR., Kentucky
JAMES L. OBERSTAR, Minnesota
PAUL G. ROGERS, Florida
MARIO BIAGGI, New York
GLENN M. ANDERSON, California
E (KIKA) DE LA GARZA, Texas
JOHN B. BREAUX, Louisiana
GERRY E. STUDDS, Massachusetts
DON BONKER, Washington
LES AUCOIN, Oregon
WILLIAM J. HUGHES, New Jersey
DAVID E. BONIOR, Michigan
DANIEL K. AKAKA, Hawaii
JOHN M. MURPHY, New York (ex officio)

EDWIN B. FORSYTHE, New Jersey
PAUL N. McCLOSKEY, JR., California
DON YOUNG, Alaska
ROBERT E. BAUMAN, Maryland
DAVID F. EMERY, Maine
ROBERT K. DORNAN, California
THOMAS B. EVANS, JR., Delaware
PAUL S. TRIBLE, JR., Virginia

PHILIP E. RUPPE, Michigan (ex officio)

NED P. EVERETT, *Counsel*
ROBERT D. THORNTON, *Counsel*
GEORGE J. MANNINA, Jr., *Minority Professional Staff*

CONTENTS

OCEAN DUMPING

Hearings held— Page
- September 20, 1977 1
- February 1, 1978 65

Text of—
- H.R. 4715 2
- H.R. 5282 2
- H.R. 5851 2

Statement of—
- Biglane, Kenneth, Division Chief, Oil and Special Materials Division, Environmental Protection Agency 68
- Bleicher, Samuel N., Director of Ocean Management, NOAA, Department of Commerce 102
- Diamond, Henry, counsel, city of Philadelphia, Water Department 30
- Hess, Dr. Wilmot N., Acting Associate Administrator, National Oceanic, and Atmospheric Administration, U.S. Department of Commerce 102
- Johnson, Cmdr. Phil, NOAA Corps, Department of Commerce 102
- Jorling, Thomas, Assistant Administrator for Water and Hazardous Materials, Environmental Protection Agency 7, 68
- Kamlet, Kenneth S., on behalf of the National Wildlife Federation 55
  - Prepared statement 50
- Low, Robert A., administrator, New York City Environmental Protection Agency 30
- Milholland, John, NOAA General Counsel's Office, Department of Commerce 102
- Rhett, Jack, Deputy Assistant Administrator for Water Programs, Environmental Protection Agency 7, 68
- Rivlin, Martin, counsel, Division of Plant Operations, Division of Water Pollution Control and Chief, Enforcement and Compliance Unit, New York City Department of Environmental Protection 30
- Townsend, Steven, city of Philadelphia, Water Department, chief, sludge disposal section 30
- Wastler, T. A., Marine Protection Branch, Oil and Special Materials, Environmental Protection Agency 7, 68

Additional material supplied—
- EPA:
  - Answers to questions of Mr. Breaux 122
  - Dumping at the 106-mile site 86
  - Emergency, definition 30
  - Marine Protection, Research and Sanctuaries Act permit 75
  - New York and Philadelphia funding of research 16
  - Pending ocean dumping cases against EPA 96
  - Permit information and interim dates 74
  - Sec. 102(A)(5)(C) recommended language 83
- Evans, Hon. Thomas B.:
  - Article from Wilmington (Del.) News Journal, Sept. 19, 1977: "Editorial: Upstream Neighbor" 23
- Kamlet, Kenneth S.:
  - Article: "General Policy: Pollution Tax Supported by Union Carbide Executive" 56
  - "Noncompliance Fee" approach of S. 1952, 95th Cong., as recommended by EPA 58

Additional material supplied—Continued
Low, Robert A.:
Penalty fee as condition to interim permits for ocean dumping of sludge 49
NOAA:
Answers to Mr. Breaux's questions 125
Budget, fiscal years 1975-78, for designation and operation of Marine sanctuaries 112
Communications submitted—
Bleicher, Samuel A.: Letter of February 6, 1978, to Hon. John B. Breaux .. 111
Borghard, William G.: Letter of December 30, 1977, to Hon. John Breaux . 120
Breaux, Hon. John: Letter of October 18, 1977, to William G. Borghard 121
Hoffman, Charles E.: Letter of January 11, 1978, to Charles Samowitz 75
Jorling, Thomas C.: Letter of February 7, 1978, to Hon. John B. Breaux 119

OCEAN POLLUTION RESEARCH

Hearing held—October 3, 1977 127
Text of—S. 1617 128
Statement of—
Barth, Delbert S., DAA for Health and Ecological Effects, Office of Research and Development, Environmental Protection Agency 147
Brewer, William C., Jr., General Counsel, NOAA, Department of Commerce 178
Gage, Dr. Stephen J., Acting Assistant Administrator for Research and Development, U.S. Environmental Protection Agency 147
Hess, Dr. Wilmot N., Acting Associate Administrator, National Oceanic and Atmospheric Administration, Department of Commerce 178
Additional material supplied—
EPA:
Budget for research and development 174
Interagency coordination between NOAA and EPA 174
Marine and estuarine research of the EPA 150
Marine research public laws 173
NOAA:
EPA-NOAA Interagency Agreement concerning baseline surveys and evaluations of ocean disposal sites, Under Marine Protection, Research and Sanctuaries Act 180
Marine environmental research, fiscal year 1978 184
Marine research legislation 185
Research and development, NOAA—fiscal year 1978 183

NUCLEAR WASTE DISPOSAL

Hearings held—
May 15, 1978 191
July 11, 1978 301
Statement of—
Anderson, D. R., director, seabed disposal program, Sandia Laboratory 256
Bleicher, Samuel, Director, Office of Ocean Management, NOAA, Department of Commerce 302
Curtis, Clifton E., on behalf of the Environmental Defense Fund, Friends of the Earth, National Audubon Society, Sierra Club, Wilderness Society, National Wildlife Federation, the International Institute for Environment and Development, and the Environmental Policy Center 324
Prepared statement 318
Deese, David A., research fellow, programs for science and international affairs, Harvard University 256, 279
Deutch, Dr. John M., Director of Energy Research, Department of Energy 200
Prepared statement 193
Dyer, Robert S., Project Officer, Environmental Protection Agency 221, 245
Liverman, James L., Acting Assistant Secretary for Environment, U.S. Department of Energy 198
Long, Bill, Acting Deputy Assistant Secretary for International Environmental and Population Affairs, U.S. Department of State 245
Meyers, Sheldon, Director, Division of Fuel Cycle and Material Safety, U.S. Nuclear Regulatory Commission 210

Statement of—Continued Page
Pritchard, Hon. Joel, a Representative in Congress from the State of Washington ... 302
Rowe, Dr. William D., Deputy Assistant Administrator for Radiation Programs, Environmental Protection Agency ... 221
Sonenshein, Rear Adm. N., USN (Ret.), on behalf of Global Marine Development, Inc ... 337
Webster, Dr. Ferris, Assistant Administrator for Research and Development, National Oceanic and Atmospheric Administration, Department of Commerce ... 302
Prepared statement ... 303
Additional material supplied—
EPA:
Article of August 24, 1977: "EPA To Study Radioactivity Releases in Pacific Deepsea Dumpsite" ... 340
Article of October 14, 1977: "EPA To Use Manned Submersible To Study Pacific Deepsea Radioactive Waste Dumpsite" ... 341
Environmental surveys of two deepsea radioactive waste disposal sites using submersibles ... 374
Response to subcommittee questions ... 334
Table 1.—Primary U.S. radioactive waste dumpsites ... 240
Table 2.—NEA/OECD sea disposal operations ... 240
Energy Department:
Assessment of ocean bed emplacement ... 200
Table I.—U.S. Commercial waste ... 196
Table II.—U.S. Defense waste ... 196
Table III.—Projected spent fuel generation ... 197
Table IV.—Waste disposal research funding ... 197
Table V.—DOE nuclear energy research funding ... 197
Nuclear Regulatory Commission:
Low-level radioactive waste management program ... 344
Response to questions of subcommittee ... 336
Organization for Economic Cooperation and Development: Press release of July 22, 1977—"OECD Reinforces International Surveillance of Sea Dumping of Radioactive Waste" ... 339
State Department: Ratification of convention by Japan ... 256
Woods Hole Notes: Article of October 1976—"Alvin Participates in Retrieval of Radioactive Waste Container" ... 342

MARINE SANCTUARIES

Hearing held—July 24, 1978 ... 399
Statement of—
Bailey, George, vice chairman, board of directors, Comprehensive Planning Organization ... 430, 438
Prepared statement ... 439
Bleicher, Sam, Director, Office of Ocean Management, National Oceanic and Atmospheric Administration, Department of Commerce ... 400
Boyle, Stephen, President, Get Oil Out organization ... 430
Cassell, John K., senior geologist, Chevron U.S.A., Inc ... 415
Corwin, Dr. Ruthann, professor of environmental planning and ecology, University of California, Los Angeles, coprincipal of Resources Co ... 430, 485
Prepared statement ... 460
Lagomarsino, Hon. Robert J., a Representative in Congress for the State of California ... 408
Heffernan, Patrick, Natural Resource Management policy specialist, principal of resources, official representative of Santa Barbara County ... 430, 484
Prepared statement ... 460
Van Deerlin, Congressman Lionel, to public workshop on national marine sanctuaries program, Bahia Hotel, San Diego, April 18, 1978 ... 446
Additional material supplied—
Bailey, George:
Form notice of meeting on May 30, 1978, on establishment of a marine sanctuary ... 453
Resolution No. 78-81: "Nomination of Certain Offshore Waters of San Diego and Orange Counties" ... 448
Resolution No. 221102 ... 454

Additional material supplied—Continued

Resolution supporting the marine sanctuary nomination for a coastal area offshore of San Diego and Orange Counties 451
San Diego Coast Regional Commission, minutes of Friday, June 16, 1978 449
Boyle, Stephen:
Article from Los Angeles Times of June 26, 1978: "Oil Platforms Pose Hazard, Shippers Say; Proposal for Two Drilling Rigs at Entrance of L.A. Harbor Assailed" 437
Article from Zoo-Logic: "Funds Are Needed for the Oiled Birds" 438
Communications submitted—
Fowler, George: Letter of June 30, 1978, to Richard J. Huff 455
Thomas, R. E.: Letter of June 9, 1978, to Paul Graham 452
Watkins, Dal L.: Letter of June 8, 1978, to Richard Huff 457

OCEAN DUMPING

TUESDAY, SEPTEMBER 20, 1977

HOUSE OF REPRESENTATIVES, COMMITTEE ON MERCHANT MARINE AND FISHERIES, SUBCOMMITTEE ON OCEANOGRAPHY, AND SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT,

Washington, D.C.

The subcommittees met, pursuant to notice, at 2:05 p.m., room 1334, Longworth House Office Building, Hon. John B. Breaux, presiding.

Mr. BREAUX. The subcommittees will please come to order.

Today, the Subcommittees on Oceanography, and Fisheries and Wildlife Conservation and the Environment of the House Merchant Marine and Fisheries Committee convene hearings on H.R. 5851, a bill to amend the Marine Protection, Research and Sanctuaries Act of 1972.

If enacted, this bill would statutorily establish a deadline of December 31, 1981, after which all interim permit holders would have to stop ocean dumping. This deadline would apply to all persons dumping materials, such as sewage sludge and industrial wastes which do not comply with EPA's ocean dumping criteria. I might add that this policy is already articulated in EPA's ocean dumping rules and regulations issued on January 11 of this year.

In addition, H.R. 5851 would impose a mandatory penalty fee on all interim permit holders. The fee would amount to not less than the difference between the cost of ocean dumping and the cost of an acceptable land-based alternative. The proceeds from these fines would go into the U.S. Treasury. The bill gives EPA the option of waiving all or part of the penalty fee if, to the satisfaction of the Administrator, the interim permit holder will expend the equivalent amount of money waived on the research, development, demonstration, or implementation of land-based alternatives. The intent of this fee is twofold. First, it would remove any financial incentive to ocean dump. Second, it would encourage interim permit holders to expend money on the development and implementation of acceptable land-based alternatives.

H.R. 5851 contains a number of other amendments to the Ocean Dumping Act. Applicants for ocean dumping permits would be required to pay a processing fee in an amount commensurate with the administrative costs of processing the permit. The Corps of Engineers which administers the dredged material disposal program would be required to inform EPA of any interagency agreements they make with regard to the act. Lastly, responsibility over land-based alternative research programs would be transferred from the National Oceanic and Atmospheric Administration to

EPA which has developed a long standing expertise in such research through the programs established by the Federal Water Pollution Control Act.

[The bills follow:]

[H.R. 4715, H.R. 5282, and H.R 5851]

BILLS To amend the Marine Protection, Research, and Sanctuaries Act of 1972 regarding the issuance of interim permits for ocean dumping, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Ocean Dumping Amendments Act of 1977".

SEC. 2. Section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1412) is amended—

(1) by striking out all the matter in subsection (a) appearing immediately before "the Administrator" the first place it appears therein and inserting in lieu thereof the following:

"SEC. 102. (a)(1) No permit may be issued under this title with respect to any radiological, chemical, and biological warfare agent or any high-level radioactive waste.

"(2) No permit may be issued under this section with respect to any dredged material to which section 103 of this title applies.

"(3) Subject to paragraphs (4) and (5) of this subsection,";

(2) by adding at the end of subsection (a) the following new paragraphs:

"(4) Except as provided in paragraph (5) of this subsection, the Administrator may not issue any permit under this section on or after the date of the enactment of the Ocean Dumping Amendments Act of 1977 unless the material to be transported or dumped meets the criteria established under paragraph (3) of this subsection.

"(5)(A) Until December 31, 1981, the Administrator may issue interim permits for the transportation for the purpose of dumping into ocean waters material which does not meet the criteria established under paragraph (3) of this subsection; but any such permit—

"(i) may not be issued to other than a person who dumped material of the same type into ocean waters before the date of the enactment of this Act,

"(ii) shall apply only with respect to material of that type, and

"(iii) may only be issued if the Administrator finds that such person has no immediately available alternative for the disposal of such material other than dumping into ocean waters.

"(B) No interim permit issued under this paragraph, or any renewal of any such permit, may have an effective period exceeding one year after the date of issue.

"(C) In addition to such other provisions as may be imposed by the Administrator on permits issued under this paragraph, the Administrator shall require each person issued an interim permit to expend adequate funds, during the effective period of the permit, for research, in conjunction with the Administrator, into one or more methods for disposing, other than by ocean dumping, of the type of material covered by the permit. The Administrator shall specify for any permittee an alternative method of material disposal on which the permittee must so expend adequate funds, if the Administrator determines that alternative method is technologically and economically achievable (taking into account the relevant factors pertaining to the type of material concerned and to the region in which the facility of the permittee is located) and environmentally less harmful than ocean dumping. If the Administrator does not specify an alternative method for research under the preceding sentence for a permittee, the permittee must undertake research, in conjunction with the Administrator, on one or more alternative methods for the disposal of the material concerned in compliance with the criteria set forth in paragraph (3) of this subsection as soon as possible, but not later than December 31, 1981. For purposes of this subparagraph, the term 'adequate funds' means an amount determined by the Administrator to be necessary to carry out in a responsible manner, within the effective period of the permit, the research required under the permit; except that, in any case in which the Administrator specifies an alternative method for research, the amount may not be less than the difference, as estimated by the applicant and approved by the Administrator, between the cost of disposing of the material by ocean dumping for the effective period of the permit and the estimated cost of disposing of the material during such effective period by the alternative method.".

SEC. 3. Section 104(b) of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C 1414(b)) is amended to read as follows:

"(b) The Administrator or the Secretary, as the case may be—

"(1) shall prescribe, and collect from applicants for permits, a processing fee in an amount commensurate with the administrative costs directly incurred by the Administrator or the Secretary in processing the permits; and

"(2) may prescribe such reporting requirements with respect to actions taken by permittees pursuant to permits issued under this title as he deems appropriate.".

SEC. 4. Section 107(a) of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1417(a)) is amended by adding at the end thereof the following new sentence: "Whenever the Secretary enters into any agreement under this subsection, he shall immediately inform the Administrator of the details of such agreement.".

SEC. 5. Title I of such Act of 1972 is further amended by adding at the end thereof the following new section:

"SEC. 113. The Administrator shall—

"(1) conduct research, investigations, experiments, training, demonstrations, surveys, and studies for the purpose of determining means of minimizing or ending all dumping of materials into ocean waters and waters described in section 102(a)(1) of this title and developing disposal methods alternative to such dumping; and

"(2) encourage, cooperate with, promote the coordination of, and render financial and other assistance to appropriate public authorities, agencies, and institutions (whether Federal, State, interstate, or local) and appropriate private agencies, institutions, and individuals in the conduct of research and other activities described in paragraph (1).".

SEC. Title I of such Act of 1972 (33 U.S.C. 1441-1444) is amended—

(1) by striking out "possible alternatives to existing programs," in section 202(a); and

(2) by striking out section 203.

Mr. BREAUX. As chairman of the Subcommittee on Oceanography, I am committed to the elimination of all ocean dumping which is harmful to the marine environment as soon as possible. With regard to meeting the December 31, 1981, deadline, I have some serious doubts as to whether it can be accomplished if the current approach of EPA toward interim permit holders is allowed to continue.

The subcommittees were pleased to learn during the June 15 oversight hearings that Camden, N.J., was well on its way toward phasing out its ocean dumping by the end of this year. As far as the status of other interim permit holders, such as Philadelphia, New York City and several municipalities in the New York-New Jersey area, I am much less optimistic. There is a little more than 4 years remaining before the deadline will be upon us. At this point, neither New York City, Philadelphia, nor a number of other interim permitholders have selected the land-based alternative that will have to be implemented by December 31, 1981. I find a statement made by Mr. Robert Low, the head of New York City's Environmental Protection Administration to be most disturbing. In response to questions posed by the subcommittees, he stated:

We are making an all-out effort to meet the deadline. Under normal conditions, we would have expected that 1985 would have been a more reasonable deadline. We are engaging a knowledgeable consultant to provide us with answers as soon as humanly possible. There is a chance that we can meet the deadline. However, in the absence of a proven technology which is environmentally acceptable and is feasible under New York City conditions, it is quite possible that ocean dumping of sewage sludge beyond December 31, 1981, may have to be continued.

I do not want to find out as we are coming to the wire, that any interim permitholder will not be able to make the deadline. If there is any doubt as to the ability of anyone to comply with this deadline, the time to do something about it is now.

Today, I would like to have from the witnesses specific answers to the following questions:

One, how far along are Philadelphia, New York City, and other interim permitholders with respect to their implementation schedules; two, what circumstances exist, and what circumstances might arise between now and 1981 to upset these phaseout schedules; three, exactly what resources are being committed to phasing out ocean dumping authorized by interim permits; if there is a lack of funding, I would like to know. Finally, I want to be assured that the EPA is adequately assisting interim permitholders with the selection of land-based alternatives. I do not want to see materials, such as sewage sludge and industrial wastes, diverted from the oceans to some even more environmentally unacceptable alternative.

I would like to make a comment before recognizing anyone.

It seems like every time we have hearings on ocean dumping or sewage sludge we have either press releases from EPA or find out that EPA is doing something that makes the headlines the day before.

And I note that in the papers this morning EPA has granted a permit allowing the city of Philadelphia to continue to dump at the 35-mile site off the Maryland-Delaware coast of Cape May.

I would assume that this decision was made based primarily on the economics of the situation.

The bill before us today would remove economic incentives to choose ocean dumping over land-based disposal alternatives.

EPA, apparently, is very timely in granting a permit and I think we are very timely in having these hearings.

I would also like to say that I have introduced a bill along with the other cosponsors, particularly Mr. Forsythe. And in keeping with our democratic process, we are having hearings on this bill, although I am not certain at this time that H.R. 5851 offers the best approach to solving the problem.

I do think it is certainly serious enough and certainly deserves adequate investigation by the subcommittee to determine if this is, in fact, the best approach.

I do not want to come up with a bill that would penalize communities for ocean dumping, and at the same time create a financial hardship for those communities that makes it more difficult for them to meet the deadline established by the bill.

And, of course, that investigation is the purpose of the hearings today.

I would like to recognize the ranking minority member.

Mr. FORSYTHE. Thank you, Mr. Chairman.

I have just a short statement I would put in the record at this time.

Mr. Chairman, the purpose of these hearings is to consider the bill, H.R. 5851, which I introduced and which was cosponsored by 18 other members of this committee.

The intention in sponsoring the legislation is clear. We want to end harmful ocean dumping as quickly as possible and as responsibly as possible.

The bill bans ocean dumping of harmful material including sewage sludge after 1981, which is something this committee has supported in the past.

More importantly, this bill would include provisions which insure that the 1981 deadline can be met in a responsible and environmentally sound manner. Clearly, it is not enough for our committee to simply ban the ocean dumping of sewage sludge. It is imperative that we act on legislation that will insure sound land-based waste disposal methods available as alternatives to ocean dumping.

This bill has two key provisions involving the penalty fee on ocean dumping. First: The dumpers of harmful materials would be required to pay a fee based on the characteristics of the wastes they are dumping. This penalty fee would remove the economic advantages of ocean dumping. No longer would municipalities and industries drag their heels in meeting EPA's regulations simply to save themselves money.

Second: The penalty fee will be channeled back to the municipality or industry if it indicates that the money will be used to develop, demonstrate, or implement constructive land-based alternatives to ocean dumping. In the past, cities such as New York have spent next to nothing to end their ocean dumping practices—a trend which must be immediately reversed.

It is clear that without H.R. 5851, the 1981 deadline will not be met in any responsible environmentally sound manner.

Recently, New York City informed this committee that:

> Under normal conditions we would have expected that 1985 would have been a more reasonable deadline. Absent a proven technology which is environmentally acceptable and is feasible under New York City conditions, it is quite possible that ocean dumping of sewage sludge beyond December 31, 1981, may have to be continued.

Members of this committee will not tolerate ocean dumping of harmful sewage beyond 1981. Furthermore, we cannot be satisfied with simply banning dumping after 1981. Legislation must be enacted which will insure the harmful practice of ocean dumping is replaced with an environmentally beneficial alternative.

H.R. 5851 is such legislation and it is urgently needed.

I thank the chairman for agreeing to hold this hearing.

Thank you, Mr. Chairman.

Mr. BREAUX. Any other opening statement?

Mr. BAUMAN. Mr. Chairman, I want to observe that I think your hearing is timely but there are those of us who do not believe that the interim permit for Philadelphia was timely at all.

I will develop that point further when I get to my questioning.

Mr. BREAUX. The gentleman from New Jersey.

Mr. HUGHES. I don't have much of an opening statement, except to say that I am very happy the chairman has scheduled this particular hearing and I think it is timely.

Even though I am a cosponsor of H.R. 5851, I don't think it is a total answer. I think the chairman is correct that it has some very good ingredients in it, one of which would be to penalize those not making serious efforts to end ocean dumping.

My colleague from New Jersey put his finger on a major part of the problem. New York City and Philadelphia, but particularly New York, have done little to end ocean dumping.

All they expect to spend is $210,000 in trying to develop alternatives to ocean dumping because the old attitude of out of sight, out of mind, is still the cheapest way to dispose of waste material. It is this very attitude that started harmful dumping.

I frankly don't think the EPA has any legal authority to grant interim permits for harmful ocean dumping. I think the interim permits system is illegal and improper. It has made a dead sea of an area off the Middle Atlantic; it threatens to despoil the beaches of Maryland, Delaware, and New Jersey; it presents all kinds of risk to the health of the people as well as problems for the economy.

I am hopeful that this committee will come to grips with the problem.

I trust that today EPA will tell us that the 1981 deadline that I offered to the Ocean Dumping Act, which I understand still has not moved out of the rules committee, is acceptable to them.

We have not tried to secure a rule from that committee. Perhaps that particular authorization is not necessary—but I am very hopeful that EPA would reexamine their position on the 1981 deadline, so at least we can put an outside time on ocean dumping.

I understand that the EPA has taken another look at the 1981 deadline and will have something for us today.

We have to stop the harmful ocean dumping. And if it means that we don't address the problem in this committee, I think we are going to see increasing litigation to stop the kind of ocean dumping that is just destroying our area of the country.

Mr. Chairman, I thank you very much for your calling this timely meeting.

I am also hopeful that the EPA today will be able to tell us a lot more than I presently know about their policy in dealing with interim permits, and particularly the one just issued for Philadelphia.

Mr. BREAUX. Thank you.

I would like to comment on H.R. 4297, a bill to reauthorize the Ocean Dumping Act, to which Mr. Hughes offered an amendment. The amendment passed in full committee mark up and we are trying and have tried to get a rule. It has been pending in the Rules Committee for several months.

Any help Mr. Hughes can give in helping us get a rule, I am all for it, because I would like to get this acted upon as quickly as possible.

The Chair would also observe at the present time he is the only member not being dumped on as far as interim permits and ocean dumping are concerned. I welcome the participation of those who have direct problems.

We welcome back to the committee our friend from EPA, Thomas Jorling, Assistant Administrator for Water and Hazardous Materials, as our first witness. He may have anyone he wishes to accompany him.

Please identify them for the record.

STATEMENT OF THOMAS JORLING, ASSISTANT ADMINISTRATOR FOR WATER AND HAZARDOUS MATERIALS, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY JACK RHETT, DEPUTY ASSISTANT ADMINISTRATOR FOR WATER PROGRAMS; AND T. A. WASTLER, MARINE PROTECTION BRANCH, OIL AND SPECIAL MATERIALS

Mr. JORLING. Thank you, Mr. Chairman.

I would ask, if I could, that Jack Rhett, the Deputy Assistant Administrator for Water Programs and Al Wastler, the head of the Marine Protection Branch, Oil and Special Materials, be asked to be seated with me at the table.

Mr. BREAUX. We have a copy of your statement in the record. You may proceed as you see fit.

Mr. JORLING. Yes, Mr. Chairman.

It is a relatively short statement, so perhaps I could read it in its entirety.

Thank you for the opportunity to comment on the staff working draft of H.R. 5851, a bill to encourage municipalities to find land-based alternatives to ocean dumping.

As I have testified to this committee before, it is the policy of EPA to make sure that all municipal and industrial dumpers will be out of the oceans by 1981. We are convinced that land-based disposal methods, including the possibility of recycling into beneficial uses, provides the most environmentally acceptable solutions for the disposal of sewage sludge. Although the remaining sludge dumpers may not be able to inaugurate beneficial uses of sludge by 1981 they should all, at the very least, be able to landfill sludge by the cutoff date.

This proposed legislation will help us in meeting the 1981 deadline. It should encourage expeditious development of alternatives and will enable EPA to monitor and to work more closely with permittees to assure that acceptable alternatives to ocean dumping are found.

The provisions of this bill have our support. New subsection (5) would make our present regulatory scheme part of the law. Dumping in the period between the present and 1981 would be permitted only if the permittee had been previously dumping and if the Administrator determines that there is no alternative for the disposal of such material which can be immediately implemented and which is less harmful than ocean disposal. This is essentially our present regulations which we believe have a firm legal basis in section 102(a) of the present law. Based on the experience we have had and the continuing oversight of our subcommittee, we believe the proposed amendment would help clarify this position leaving no question as to the intent of Congress.

The only problem we see in this change is the possible unintentional limitation in section 4 which would prevent the agency from issuing research and emergency permits. Section 4 requires that all the criteria must be met for all new materials dumped after the enactment of this bill. Such incidents as the recent incineration of Herbicide Orange in the Pacific which required a dumping permit could not be tested under this new section since we did not know for sure, before the test burn, if the criteria would be satisfied. For

such purposes we believe research and emergency permits should be exempt from the section 4 requirements.

A major alteration to the Marine Protection, Research and Sanctuaries Act—MPRSA—would require a noncompliance fee for interim permit holders. As part of the Federal Water Pollution Control Act amendments we have offered for congressional consideration a noncompliance fee to take away the economic advantage of not complying with the effluent limitations for the small percentage of companies which have failed to meet the 1977 requirements. A noncompliance fee would also be an enforcement tool against those municipalities which have been guilty of bad faith in the building of publicly owned sewage treatment works. A delayed compliance penalty was incorporated into the Clean Air Act amendments that was signed into law last month. A similar fee, as suggested here for the handful of communities which have failed to find land-based alternatives for sludge disposal, seems equally appropriate.

Under the Federal Water Pollution Control Act, the proposed fee is based on the economic gain to the industry for not complying with the law. The fee has been successful in Connecticut to encourage compliance, and we believe it can be applied nationally with equal effect.

The analogy to the communities that are ocean dumping is not directly applicable. The basic noncompliance fee concept, with the modifications in the working draft, I believe, will work. Under the working draft, the penalty fee is determined by the Administrator based on the quantity of the material to be disposed and its characteristics including the materials' physical and chemical properties, the degree and persistence of toxicity, and the probable effects on the marine food chain. The fee, as proposed, cannot be less than the difference between the cost of ocean disposal and the estimated cost of land-based methods.

We believe we could establish a fee based on the quantities and characteristics of constituents dumped; however, they would be subject to the public rulemaking procedures and complicated litigation that could delay promulgation of the regulations for a substantial part of the period if the basis for the fee schedule becomes a matter of serious controversy. Therefore, we suggest the subcommittees consider only having the fee based on the difference between ocean dumping and the land-based alternative. Since toxicity and persistence is a factor in the possible land-based alternatives the characteristics of the sludge will still be a factor in establishing the fee. With this change, we could move from passage to full implementation in a much shorter time period.

The most positive aspect of the proposed noncompliance fee is that the Administrator would be allowed to remit all or part of the penalty fee if a permittee puts an equivalent amount of money into attempting to implement land-based alternatives. This provision would have the effect of encouraging expeditious development of alternatives since it would not require additional funds beyond what would be required anyway to meet the 1981 date.

This proposal is not a revenue collection measure or a case of retribution. It is an honest attempt to encourage the municipalities to use the funds they are saving due to ocean dumping to imple-

ment land-based alternatives as quickly as possible. We understand the historical reasons why these municipalities have dumped, and we are available to provide any assistance, financial or otherwise, within our resources and authority to expedite the transition. Working together we will meet the 1981 deadline.

Other amendments offered in the working draft would make the agency primarily responsible for research, investigations, experiments and training in finding alternatives to ocean dumping. Land-based sludge disposal research has been financed and carried out by EPA since it began the sewage treatment program. No sludge land disposal research has ever been financed out of the MPRSA but under FWPCA. The amendment to section 104(b) and section 113 in the working draft will clarify the matter of research into alternatives by giving the lead to the agency which has the necessary expertise on the effects of sludge in the other media.

Mr. Chairman, this concludes my prepared statement. I will now be happy to answer any questions you or members of the subcommittees may have.

Mr. BREAUX. Thank you very much, Mr. Jorling, for your statement.

On the question of EPA's region 3 office granting the permit to Philadelphia to continue the dumping at the Cape May site as opposed to the 106 site further offshore, is that basically an economic decision or are there other factors that went into making that decision?

Mr. JORLING. The decision which was made and was the subject of the article in the Washington Post this morning was the issuance of another interim period permit to the city of Philadelphia. That was because the original permit expired in June, and a new permit was necessary to be issued by region 3 to continue any activity on ocean dumping by the city of Philadelphia. It in no way prejudges or prejudices the outcome of the exercise that we are conducting under the court order, which has come to be known as the Toms River hearing. The hearing examiner in that case, my predecessor, Dr. Briedenbach, has not issued his recommendation to the Administrator on the question of whether Philadelphia should be moved from the near Cape May site to the further 106 site, so that that matter still is outstanding.

If, in fact, the Administrator makes a determination based upon the hearing examiner's recommendation to go to the 106-mile site, the region 3 permit will be immediately amended to incorporate the Administrator's determination.

The present issuance of this permit was simply because the present Philadelphia permit expired and new permit had to be issued.

Mr. BREAUX. I guess what you are saying is that the regional administrator did not have the authority to move the dumpsite but only rather to reissue a permit to dump at that particular dumpsite; is that correct?

Mr. JORLING. The determination was the region 3 administrator's and he made the determination to continue to dump at the Cape May site.

Mr. BREAUX. Didn't he have the legal authority to say: "We are not going to give you an interim permit to continue to dump at the

33-546 O - 78 - 2

Cape May site and we are going to require you to dump at site 106"?

Mr. JORLING. He has the authority to issue permits for designated dumpsites, but the questions remaining are whether or not the necessary preceding steps for site designation have been taken; namely, determining the amount of pollution at the 106 site and completing the NEPA process that must accompany the designation of a disposal site. And I am not quite clear whether or not those necessary preceding steps have been taken.

Mr. BREAUX. Let me ask you this and see if it is correct because I believe the article is incorrect about this.

Your EPA regional administrator for the Philadelphia area is Jack J. Schramm. The article says that hearing examiner George Pence explained yesterday that Schramm has no authority to order a change in the dumping site. Only EPA's National Administrator, Doug Costle, can do that.

Is that legislative authority; is that correct?

Mr. JORLING. No; it is not new legislative authority.

It is simply that the authority to make the determination required under the court order is reserved to the Administrator. So that is, I think, the reference that the new regional administrator was defining or describing in that statement.

There is one other qualification that I should add so that the record is perfectly clear: That the region 3 authority extends only to the extent of region 3. And it is my understanding that the 106-mile site is, in fact, geographically, at least the way we define things, within region 2.

Mr. BREAUX. When that decision reaches the Administrator's level, he could negate the granting of the interim permit or he could change the site to a different site, such as 106, if he thought that was the best arrangement.

Mr. JORLING. That is correct.

The one thing in support of the region 3 position is that we are determined, as you know, to cease the dumping into the oceans by 1981, including the Philadelphia dumping activities.

And as the article accurately describes, we have in Philadelphia a phased-down permit sequence so that the permit that was issued on Friday, Mr. Chairman, calls for less ocean dumping than the permit which Philadelphia has previously been operating under. And there is a stage that we can monitor continually, down to elimination of the dumping by 1981.

Mr. BREAUX. According to that article it also points out that there would be 10 million gallons of sludge dumped in the final year, which ends in January 1981.

Now, the law requires us to end by December 31, 1981.

So, actually, if this statement is correct, you would be requiring Philadelphia to stop all ocean dumping 1 year before the deadline.

Mr. JORLING. That is correct.

We believe that is possible and that is what we should require.

Mr. BREAUX. Two other quick points.

On page 2 of your statement you talk about needing authority or you would like to have authority to continue issuing research and emergency permits and that your authority to do this should be exempt from the section 4 requirement.

Now, that tends to bother me, because aren't all of these permits you are granting now, Mr. Jorling, emergency permits?

Mr. JORLING. There is a distinction between what we consider emergency permits and these interim permits, and we did not include the interim permit practices we follow, Mr. Chairman, to be anyway included in that.

Mr. BREAUX. What type of permit did Camden, N.J., get?

Mr. JORLING. I would have to ask staff.

Mr. RHETT. I believe the Camden permit was a straight interim permit. An example of the emergency permit would be the hull of the *Argo Merchant.*

That was an emergency; in other words, something to be done that has to be done right away; a unique.

Mr. BREAUX. How does that differ from what happened in Camden?

They said the sludge was piling up and they had to get rid of it so the court ordered EPA to grant them a permit. It sounds like an emergency permit.

Mr. JORLING. The permit you are referring to is a court-ordered permit, and not an EPA permit. We would be very happy to have you confine the definition of emergency to those things that any reasonable men, if such can be assembled, would agree is an emergency. Perhaps tied to the protection of life would be an additional qualification.

Mr. BREAUX. That would certainly have to be looked into.

My only other question is on page 3—I have some other thoughts I will submit—on page 3, the first paragraph you state, "A similar fee, as suggested here, to the handful of communities which have failed to finance land-based alternatives."

It is a lot more than a handful, isn't it?

Mr. JORLING. It is a handful relative to the national program and is generally confined to EPA's regions 2 and 3.

Mr. BREAUX. How many communities are we talking about?

Mr. JORLING. In the Metropolitan New York City area—including the New Jersey communities—there is something on the order of 37 separate jurisdictions.

Mr. BREAUX. Any idea how much they dump?

Mr. JORLING. Yes; we have relatively good data.

I hope my memory serves me accurately; there are 2.2 million tons coming out of New York City annually.

There are 1.7 million additional tons coming out of the surrounding New Jersey communities and surrounding Long Island communities. There are approximately 450,000 tons presently coming from the city of Philadelphia. Those are the bulk of the remaining cities.

Most other cities around the coastal regions of the United States, with the exception of some we are now prosecuting in enforcement actions, have abated dumping of sludge.

It is a handful of areas, to be more precise.

Mr. BREAUX. I just didn't want to give a misleading impression.

We are talking about an awful lot of sewage sludge being dumped, even though it might not come from so many areas.

Mr. JORLING. That is correct.

And I should also point out that both areas I mentioned, the Philadelphia area and the New York area, are presently putting on

line over the next several years very large major new sewage treatment plants which will generate new greater amounts of sludge.

Mr. BREAUX. The draft bill before us is unclear as to whether Federal grants or Federal funds that are going to communities for implementing alternative land-based disposal sites would be considered as part of the money expended by the local communities in this offsetting penalty procedure.

Would your recommendation be to consider Federal grants or not consider them?

Mr. JORLING. In other words, a determination of whether or not the penalty will be based only on the local share or whether it would be on the total share?

And I believe, and I am subject to correction here because I am not sure whether or not there is any proposed statutory language which would answer that, but it would apply to the entire amount.

Mr. BREAUX. I am really asking you for a recommendation because we have to clear it up in the draft. It is kind of open for argument right now. It is not clear.

I am just asking for a recommendation.

Mr. JORLING. Our feeling is that the communities we are talking about not only need an inducement to find the alternative, but they need an inducement to move expeditiously.

And that the calculation of the fee based on only the local share, Mr. Chairman, would not provide that incentive to move quickly: That the difference between the cost of ocean dumping and the cost of land treatment alternatives should be the entire cost. And then they will then move to seek the proper position on the State priority list that is necessary for the Federal money to be made available.

Mr. BREAUX. So we should consider Federal funds as well as local community funds?

Mr. JORLING. That is my recommendation.

Mr. BREAUX. I recognize Mr. Hughes.

Mr. HUGHES. Thank you, Mr. Chairman.

If I understand your testimony correctly, EPA now favors a legislative deadline of December 31, 1981. In other words, EPA in the past has used the December 31, 1981, deadline merely as a target. EPA in essence made a determination that municipalities dumping could feasibly abate the other dumping by that date.

But the last time EPA was before us, EPA took the position that they didn't favor putting the 1981 deadline in legislation form.

So your testimony today really is a reversible of that previous testimony?

Mr. JORLING. Mr. Hughes, we went around on this issue the last time I was here and I attempted to articulate what the administration's position is and hopefully will continue to be.

The 1981 date first appeared in EPA regulations, and that is a statement with the full force and effect of law. The question that surrounds the statutory date is one with respect to possible noncompliance and the circumstances surrounding that possible noncompliance. We have, for instance, in the Water Pollution Control Act, statutory deadlines for compliance. Some of those have passed.

The question arises: What happens? Do you immediately put a plug in the pipe or do you provide an enforcement action with penalties and what have you?

Our statement of support for the 1981 date is firm. We believe it can be done——

Mr. HUGHES. That wasn't my question.

Mr. JORLING. We believe that our regulatory effort will get there. What we are suggesting is, that in the event of noncompliance in 1981 for whatever reason, and some perhaps outside the control of the communities that are affected, that there must be some recognition that enforcement actions will then take place.

And those enforcement actions will probably be penalties plus a new schedule of compliance that is very tight—but to accommodate that fact—rather than immediately suspending the dumping. We are concerned a greater environmental harm could occur unless we have that enforcement possibility.

Mr. HUGHES. I accept your explanation.

I just want to applaud what I consider to be certainly a correct modification of EPA's position—whether it is a reversible or not. It certainly is a giant step in the right direction. It will serve notice on those that are dumping that we mean what we say; and that 1981 is the deadline.

Let me ask you this: Philadelphia will be testifying a little later. And they indicate they can be out of the ocean dumping by 1980. Why was the interim permit that was just granted, granted to 1981, if, in fact, they can be out of the ocean by 1980?

Mr. JORLING. You have introduced a new fact, if it is indeed a fact, that Philadelphia has indicated they are prepared to be out by 1980.

Mr. HUGHES. I don't want to steal Philadelphia's show because they will be next, but let me just read to you from the statement that was presented by Mr. Guarino, who is the commissioner of the water department. He indicates: "I would like to indicate for the record that Philadelphia expects to be out of ocean dumping one full year in advance of the December 31, 1981, deadline."

Mr. JORLING. They are referring to the proposed statutory time and not our permit time.

Our permit time for Philadelphia to end ocean dumping advanced one date, Mr. Hughes, is 1980.

Mr. HUGHES. I see.

I would also like to know what progress EPA is making in assessing the impact of dumping off the Shelf at the 106 site?

Mr. JORLING. These evaluations have been occurring in two forms: One is the standard EIS review of that designation; and the second is part of the hearing examiner's review of the matter and part of the court order.

On both cases I don't want to prejudge the issue. The hearing examiner should be momentarily issuing his recommendation to the administrator. And the EIS timetable calls for completion of the draft by January.

And then it goes out into the public process.

Mr. HUGHES. When does that start?

When does the EIS start?

Mr. JORLING. The EIS?

Mr. HUGHES. Yes.

Mr. JORLING. The surveys, the baseline data surveys, began approximately 2 years ago. The formal EIS preparation began in April of this year.

Mr. HUGHES. Why is it that EPA has taken so long when it was rather clear in the legislation, adopted in 1972, that in designating the recommended sites, the Congress indicated the administrator should utilize wherever feasible locations that are beyond the edge of the Continental Shelf.

And given that as a legislation pronouncement, why did it take EPA so long to take a look at the impact of dumping beyond the edge of the Continental Shelf?

Mr. JORLING. I think the fair answer, sir, is that EPA is an agency with limited resources. And our basic orientation is to cease ocean dumping so that the resources we have been giving higher priority and attention to are the resources necessary to develop acceptable land-based alternatives.

Mr. HUGHES. EPA found the resources to look at the impact on other areas. EPA was studying the possibility of opening up a dumping site some 70 miles off of our beaches. It seems that they have resources for that.

Why didn't you have resources to take a look at what the impact would be 106 miles out?

Mr. JORLING. Those resources have been applied, but I am still making the point that we feel that the protection of the ocean is going to be satisfied and served by developing land-based alternatives rather than simply trying to designate disposal sites around the shores of the United States.

Mr. HUGHES. But it seems to me that Congress was pretty clear in its language in the legislation in 1972; that is that it would be preferable in selecting sites for dumping, to dump beyond the edge of the Continental Shelf.

Now, here we are some 5 years later, and we still really haven't taken a good look at what the impact would be at the 106-mile site. We still have dumping taking place at the Cape May site. Up until recently the EPA was looking at the possibility of opening up new areas some 70 miles off the mid-Atlantic region.

It seems to me that EPA hasn't really complied with the mandate of Congress to take a serious look and to give preference where feasible to the sites beyond the Outer Continental Shelf.

Mr. JORLING. OK, again we are conducting the review of the 106-mile site.

Mr. HUGHES. What is the status of the potential 70-mile site?

Mr. JORLING. I will have to ask staff to give you that.

Mr. HUGHES. I hope it is a dead issue.

Mr. JORLING. The review of the 70-mile site is included within the final EIS activity on the New York Bight.

So that those two were made conjunctive.

Mr. HUGHES. Is EPA still considerating the opening up of a new site, a pristine site off the mid-Atlantic, some 70 miles off our coast?

Mr. JORLING. No. The answer to that is no.

Mr. HUGHES. That's progress. The last time EPA was in before us you indicated there was some uncertainty as to the specific authority to grant interim permits to begin with.

Has EPA looked into the authority question since your last appearance, Mr. Jorling? Where in the legislation does EPA have any authority to grant interim permits to any municipality for harmful ocean dumping?

Mr. JORLING. After a review of that question, we continued to believe that there is a firm legal foundation for the mechanism that we have developed. We were confronted with a statutory objective of protecting the biological and chemical and physical integrity of the oceans, and given that overall direction, we thought it appropriate that the Congress intended that to be the overall objective of the regulatory program.

And rather than simply tailor the criteria downward and make them less stringent, our best judgment would indicate it is necessary to protect the oceans—which we think is the overriding congressional objective—and we then conclude that there was inherent in that objective the ability to phase down these requirements, Mr. Hughes, based on the authority that we received. And among the considerations that we had to make were alternatives in feasibility.

Mr. HUGHES. What section of the Marine Protection Act does EPA rely upon for that specific authority?

Mr. JORLING. I believe that the basic statement of criteria for evaluating permit applications, Mr. Hughes, that refers to alternatives that impact on other environmental parameters is contained in the various objectives of 102(a).

Mr. BREAUX. The time has expired.

Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman.

First, in your statement on pages 3 and 4, you discussed this penalty fee and you come to the point of saying that you really believe that a fee basis dealing totally with the difference between ocean dumping and land-based alternatives would be the right way to do it.

You state it might prevent litigation and extended rulemaking and so forth. And I just would remind you that in our last discussion on this in response to a written question, I think you suggested exactly what is now in the working draft of the legislation.

Mr. JORLING. That is right.

Mr. FORSYTHE. So you now support our initial bill and retract your earlier recommendations.

I would like to have you expand that a little further.

Mr. JORLING. Yes, sir.

The question of delay, cease, penalties, what have you, has been the subject of intense congressional scrutiny over the last 8 or so months. And I think a lot of people have been studying these matters very carefully with some intensity. And as more analysis is performed, the concepts are continually refined. And I think you have pointed out the fact that we have now changed our position.

And let me just describe the two basic reasons, if I can, for that change.

The first change or the first judgment is that the measure of the difference between the ocean-dumping cost and the cost to do a

land-based alternative is a sufficient driving mechanism to provide the incentive for these communities to develop the system.

That is the major factor. And that compares, I think, almost identically, recognizing a different situation, with the concept of the Clean Air Act and the concept that the administration proposed and the Senate adopted, with some change, in the Water Pollution Control Act that is now pending in a companion committee, the House Public Works Committee.

The second aspect is that incentives work most effectively when they are relatively precise. And we think that by including questions concerning what in effect are cause-effect relationships—the cause of the ocean dumping and the effect on the ocean environment—is something upon which scientists disagree and certainly lawyers disagree. And that adding that dimension would remove that provision, would remove that expeditious aspect of the delay compliance penalty and would provide endless opportunity for delay.

So we think that the combination of a sufficient measure being provided by the difference in cost with the relatively fewer litigable issues raised by the other measures, Mr. Forsythe, indicates that we should change our position.

Mr. FORSYTHE. Then you would now support the language in the original draft bill rather than what we put in the working draft? I think the language in the original draft is now where you are. I just want to make sure.

Mr. JORLING. Yes, that is our position.

Mr. FORSYTHE. Now, how much money have New York and Philadelphia, if you can remember, spent in recent years on implementation of alternatives?

Mr. JORLING. If I might ask permission to supply that information for the record.

Mr. FORSYTHE. We would appreciate that.

[The following was received for the record:]

NEW YORK AND PHILADELPHIA FUNDING OF RESEARCH

The municipalities in the New York-New Jersey Metropolitan area were told by EPA and the States that alternatives would be studied and funded by the Federal Government and the States, and that they were required by permit condition to participate fully in the Interstate Sanitation Commission/Ocean County Study by furnishing all data upon request. It was the considered opinion of EPA and the States that separate studies by almost 100 facilities would not be cost effective. It is understood, however, that New York City funded approximately $150,000 of independent research. The Interstate Sanitation Commission/Ocean County Study was funded at $930,000.

For Philadelphia, the City reports that $500,000 was spent in fiscal 1976 and $1 million was spent in fiscal 1977.

Mr. FORSYTHE. Well, I know Mr. Hughes referred to that matter.

Mr. JORLING. I might add, sir, that no one has the impression that New York City is the only corporate in that Hudson-New York Harbor area.

Mr. FORSYTHE. I recognize that.

And I believe that in some ways—at least in terms of getting secondary treatment—New York City is moving far faster than some of my New Jersey communities on the other side of the river.

And the real basic problem of raw sewage is one that I have to compliment New York's progress. They have done a commendable

job. As you refer and as we well know it's true that as they move in that direction, the problem of ocean dumping then becomes even more severe.

So many things just add up to where we are and where we are going.

Mr. JORLING. What are the things that EPA really acknowledges—and I am not seeking it—is that they are given credit for some things, and I think it is our forceful posture with New York City that has led it to their performance.

Mr. FORSYTHE. And we are just trying to help.

Do you anticipate administrative problems in implementing the bill, Mr. Jorling, considering that we go back to language which would not give a sophisticated fee determination, as we now have in this bill?

Mr. JORLING. I don't want to suggest that there wouldn't be some administrative problems. But with that change we think that the calculations that are required are relatively simple and straightforward; that the cost data on the alternatives is quite good.

So we think that we could make those determinations and that given the fact that the problem is confined to two regions primarily. in the national perspective, that we can administer it well.

Mr. FORSYTHE. The basic intent of the bill as now drafted, of course, is that the money will get back to those very cities and municipalities to implement alternatives, rather than just be a fine or a penalty that takes away the very possibility of the city moving.

Under what conditions would you anticipate that the penalty fee would not be waived?

Mr. JORLING. I think those kinds of judgments are something the agency has developed considerable expertise in as it has moved in the enforcement areas in other statutues.

And the question is asked: What constitutes good faith, bonafide efforts to perform?

And the agency is developing that, I think, quite satisfactorily. And it would be those same kinds of measures which would determine whether or not the money was, in effect, transferred from an incentive to in fact a penalty.

But I do think that that is an essential feature in this provision. I know full well, as most of you do, too, that basically public institutions are strapped for funds, especially municipalities. And I know that we should not adopt a posture that would take these very scarce resources and apply them either to somebody else's treasury or at least not to their own, so that feature of this bill, I think, makes it very important and very attractive.

Mr. FORSYTHE. Thank you. I have nothing further.

Mr. BREAUX. Mr. Bauman?

Mr. BAUMAN. Mr. Chairman, I want to compliment the EPA for coming around to this committee's viewpoint on curtailing ocean dumping.

Mr. JORLING. I would say, Mr. Bauman, that that is a function of change in administrations.

Mr. BAUMAN. If that is the only thing that the current administration has done which is good, I will swallow Burt Lance along with it. [Laughter.]

But I am pleased to see this change in viewpoint. I am constrained to ask some questions about some things that don't seem consistent with your support of this legislation. You mentioned that the recently issued permit for Philadelphia was issued before any site was agreed upon: That the question of the 106 site is still open and amendments could be reached.

Wasn't Judge Hansworth's direction in the litigation now in the circuit court over which he still retains jurisdiction, Mr. Jorling, that a determination of the 106 site—well, wasn't that to be made before the permit was to be issued?

Mr. JORLING. I suspect that I should be somewhat careful in responding to this question.

As you point out, it is a matter still within the jurisdiction of the court.

With that response, and with my counsel behind me, I do have a prepared answer in effect, Mr. Bauman, that I think is in response to that question.

Mr. BAUMAN. You anticipated it?

Mr. JORLING. I would hope that the staffs were communicating well. The fourth circuit did not in its opinion order Philadelphia to be removed from the Philadelphia site and moved to the 106 site. And in fact, could not, because Philadelphia was not a party to that suit.

Nor did it order EPA to do so. Nor did the court require EPA to make a definitive decision on site selection before reissuing Philadelphia's interim permit.

The court ordered only that EPA make full inquiry into the question of whether the Philadelphia site should be considered for dumping of sewage sludge.

I think what the court was asking us to do was to perform as careful and as complete a review as could be done into the dimensions of ocean dumping. The ocean is a much more complicated system than anything we deal with in fresh water.

So this ability to make judgments about the value of going to one site versus another is something which everyone is on thin ice. And that overall knowledge and understanding leads us to believe that the best way to protect the oceans and the shorelines adjacent to them is to end the dumping practices.

So that we have undertaken this inquiry. The hearing examiner is the principal focal point for it. He is to issue his recommendation to the Administration shortly.

We have a situation I think where the region was under some compulsion to act because of the expiring Philadelphia permit, Mr. Bauman, before the overall decision was made in compliance with the court order. As I did point out earlier, should the Administrator determine that the shift to the 106 site is scientifically and public policywise a better choice, then the region 3 permit is immediately amended to accommodate that decision.

Mr. BAUMAN. Well, it was my understanding that in the district court the judge ruled that historic usage of a site could be the basis for a continuance. And that, of course, would have supported the use of the Cape May site to which the gentleman from New Jersey and I, along with others, object to strongly.

But on appeal, Judge Hansworth made it very clear that EPA was not following the requirements of section 102 that set up certain criteria for ocean dumping sites.

And yet you have gone ahead, despite the judge's ruling, at the appellate level, and continued to use—apparently for historic reasons—you have been using it. So we keep using it. And you have not met the requirements of section 102 in either evaluating the present site or the new site, and yet you go ahead and issue almost a year's permit to continue dumping when apparently you are in a violation of the law.

Mr. JORLING. There are two judgments that, in effect, have to be made. One is the designation of site and the second one is whether a proposed dump at that site will result in unreasonable degradation.

I think it is safe to say that our determination is that dumping at the 40-mile site, as in effect the interim permit suggests or concludes, is an unreasonable dump, and therefore is one that we are eliminating.

We also know enough now to make the same judgment with respect to any designation at the 106 site; that is, if Philadelphia were moved there, it would still be an unacceptable dump.

Do you follow what I mean?

It would be one not subject to a normal permit; it would be subject to an interim permit. It would still be an unacceptable dump.

Mr. BAUMAN. I agree with you that the Delmarva site is an unacceptable dump.

We would like to eliminate as soon as possible all ocean dumping. The reason I particularly have such a concern is that within a matter of weeks the Department of Commerce is going to apparently issue regulations on an emergency basis which will control at least for the next 3 or 4 months whatever their authority is for emergency action: The taking of soft clams or surf clams, the control of the amount that can be taken, the number of boats, in fact, eliminates any new boats from going into this industry.

One of the reasons, of course, is overfishing, but another reason and a very serious reason is the total degradation of the sites that have already been closed by reason of the pollution of Philadelphia and Camden.

They have just destroyed whole areas of the ocean. And now we are getting to the point where a whole industry is coming under Federal regulation because there are not enough clams left.

And I raise this question because at least the Outer Continental Shelf site is a little bit farther away from the historic shellfish beds, but yet the EPA doesn't have any urgency in moving on this, which is what I thought the circuit court order was clear about.

Mr. JORLING. You are correct.

The very reasons that you point out are reasons that support the policy to end the dumping. We are faced with some Hobson's choices in many respects.

And I would add that among the problems are not just ocean dumps. As you know, off the coast of New Jersey last summer there was an episode which affected the shellfish population through very extensive regions of the Atlantic shore.

The study that was made indicated that the ocean dumping was the least important of the problems but it was probably much more a function of some of the other causes of pollution.

We are confronting and developing an overall coherent policy to protect the quality of the ocean. We have several mechanisms by which the oceans are degraded by the activities of man, and not the least of which is ocean dumping.

However, we have ocean outfall pipes up and down the eastern shore; we have the disposal of dredge spill or dredge spoil; we have the huge amounts of materials that continue to be, in effect, discharged into the oceans of the United States from the rivers of the continental United States.

We have to address all of these if we are to protect in fact the quality of the adjacent ocean.

We are undertaking an effort to achieve that.

We are faced with short-term Hobson's choices, though.

Is it better to continue a dump at an already degraded site for 2 or 3 more years rather than take an area 106 miles out to sea where we know less, where we know there are stronger currents that carry the materials farther, where we know that the fish that inhabit those areas are higher in the food chain—we know all of those things.

And those are the kinds of choices that we are making.

And we will be acting upon at least the recommendations of the hearing examiner in making the determination on the 106-mile site; knowing full well that another side of the question is that to go 106 miles—and Philadelphia with its 450,000 tons of material annually as in contrast to the 4.5 million that comes out of the New York area, the 4.5 million tons annually—would increase the cost to Philadelphia.

Our fear is, that would take resources away that would be used to develop that land-based alternative.

Mr. BAUMAN. Except that other people, that the resources—in this case the shellfishing industry—are being destroyed at enormous cost to the people involved. And you ought to, some day, sit down and explain, as I do, to those individual boatowners who are going to lose their livelihood, based on these new regulations, what is going on.

I am not going to develop it further. I recognize the elegance of the overall problem, but it is not quite as elegant a solution.

Let me ask you this question. I hope that in making these decisions at EPA you observe the procedural requirements, not just legally, but also ethically. It is my information that prior to the issuance of this interim Philadelphia permit, that a delegation of representatives from the city of Philadelphia—sponsored by their congressional delegation—met with Mr. Costle. The State of Maryland, who is a party to this suit, as your agency is, was not informed of this and was not given any occasion to present their view.

After that Mr. Costle, as you indicated, who is a representative of the new administration, made the decision in favor of this interim permit.

Was such a meeting held and was any notice given to the other parties?

Mr. JORLING. I have received a copy of the letter to Judge Hansworth filed by the attorney general of the State of Maryland. And that particular paragraph describing that meeting is one that I feel very sensitive to because of the fact we have been trying to be as open and as fully communicative to all parties and on all of our problems as possible. And I was at that meeting.

And let me describe it for you. And I hope you will direct some of these questions to the city of Philadelphia representatives who will be appearing before you later on to see if whether or not they confirm my own understanding of how that meeting came about.

But, in any event, it was requested by the congressional delegation adjacent to the city of Philadelphia, and at that time it was styled as an opportunity in the offices of the Capitol, which is where the meeting was held, to provide the city of Philadelphia officials with an opportunity to describe in the presence of both the Members of Congress and the members of the administration what Philadelphia was doing in its overall waste treatment program.

That was a congressional request and we try, under all congressional requests, to honor them.

I can say that during the course of that meeting there were no discussions, no negotiations, no substantive—in fact, I tried to refresh my memory in discussions with several other people from EPA who were there. And the question of the ocean dumping permit was only mentioned in passing by the city of Philadelphia representative, and only as one of the permits that they must receive as part of their ongoing program.

There were no discussions of the ocean dumping activity. There were no negotiations regarding it.

The administrator made no determinations. The administration made no commitment.

It was strictly what I would characterize as a standard meeting between Members of Congress and their constituents. It was not in anything like an enforcement context or a permit issuing context. And if we have meetings with Philadelphia of that nature, it would be my hope that the region 3 people would so operate as I think is appropriate.

But this particular meeting was not at all subject to the kind of criticism that the attorney general had described in his letter to Judge Hansworth.

Mr. BAUMAN. I think you can understand the reasoning of the Maryland officials. However, I am not aware that Philadelphia has any other problems other than ocean-dumping, any other problems with EPA.

Mr. JORLING. Oh, no, sir.

It is in violation of the July 1, 1977, date, and we have many matters with which we are discussing with Philadelphia.

As you may know, we have been considering a request from the city of Philadelphia that they be granted an——

Mr. BAUMAN. You seem to characterize the meetings as totally divorced from the ocean dumping problems and I don't see how they could be.

Mr. JORLING. In effect, they are related. The systems are all single systems. And if we are successful and if Philadelphia is successful in complying with the law, a great deal more sludge will

be generated than is presently generated. And we hope we will have a land alternative before that need arises.

Mr. BREAUX. Mr. Evans.

Mr. EVANS. Thank you, Mr. Chairman.

You said at the outset you were not personally affected by this because you don't have that problem with the beaches that we do in Delaware and New Jersey and Maryland.

I would like to hope that someday you will be able to enjoy them. And I think that is what we are here for today.

Mr. Jorling, I appreciate your attitude very much. It is a very positive attitude. I think the trend is in the right direction.

Philadelphia is asking for an interim permit, for example, for 95 million pounds of sludge. You know, we speak in millions of dollars and billions of dollars around here. But I think it is important to reduce that to something people can understand. This new interim permit translates into 173 pounds of sludge for every man, woman, and child in my State, and I am concerned about it.

I am concerned about the track record of Philadelphia and others. I think it is one thing to have these noble objectives of ending ocean dumping, as you say, for Philadelphia by 1980, but I think their track record has been deplorable.

We are being interim permitted to death.

For example, in 1976 when the last permit was granted to Philadelphia, what conditions did you impose on Philadelphia at that time?

And have you done anything to collect the $225,000 in fines levied on the city of Philadelphia?

I understand they said they couldn't afford to pay.

Mr. JORLING. Let me respond by suggesting that these are sensitive matters regarding enforcement activities and I would prefer not to comment specifically, as these discussions are underway. So that if I can defer on the latter part of your question, with respect to your first comment, sir, it is important to transfer some of these things into reality.

And when Philadelphia—and this is really a horseback guess but I suspect it is within a very close margin of error—that when Philadelphia has achieved compliance with the July 1, 1977, level of performance for effluent control coupled with compliance with sewage sludge problems that we are addressing here, the cost to the city of Philadelphia and the Federal taxpayer, since the State of Pennsylvania does not contribute anything to municipalities in the State of Pennsylvania—it is entirely locally borne, and is 25 percent—is in excess of one-half billion.

So, it is a considerable chunk of resources that we are talking about to bring us into compliance.

Mr. EVANS. It certainly is, but their attitude in the past, their record in the past, doesn't give me a whole lot of confidence that they will actually comply.

I think we should take a look at that and look at history, particularly recent history of 1976.

I was very concerned with Mr. Guarino's statement that they just couldn't come up with $225,000 in financing.

But let me move on to something else.

I just think that it is important to know, as Mr. Forsythe asked you, what Philadelphia is planning to spend in fiscal year 1978 on alternatives to ocean dumping. Whether it is 106 miles offshore, whether it is 70 miles offshore, whether it is 35 miles offshore, I think it is harmful.

I am concerned that we have any ocean dumping at all. I think their track record certainly underscores the importance of placing into law a requirement that no ocean dumping will occur beyond December 1981.

Mr. Chairman, do you have any ideas as to when that bill, the ocean-dumping amendment, will reach the House floor?

Mr. BREAUX. I think I indicated at the outset that we have requested a rule from the Rules Committee.

We requested that approximately 7 weeks ago. Hopefully we will be getting a response shortly. We made the request. We wrote the letter. Any additional assistance the gentleman can give us will be certainly helpful. I have written three letters over there. It is in the process.

Mr. EVANS. Thank you, Mr. Chairman.

I would like to include, if I could, an editorial that appeared in the News Journal paper in Delaware yesterday afternoon, discussing ocean dumping and the City of Brotherly Love, and the attitude of Philadelphia.

In fact, Philadelphia's nickname might well be changed to the "City of Brotherly Sludge." [Laughter.]

Mr. BREAUX. Without objection, that will be made a part of the record.

[The following was received for the record:]

[From the Wilmington (Del.) News Journal, Sept. 19, 1977]

EDITORIAL: UPSTREAM NEIGHBOR

Philadelphia, the city with a penchant for sharing its wastes with neighbors who don't want it and shouldn't have to put up with it, has turned from simple defiance of the orders of the federal Environmental Protection Agency to total disregard.

The encouraging sign is that EPA has not yet backed down on its order to get Philadelphia out of the ocean dumping business by 1981. EPA just last week gave the city another routine extension of the privilege of dumping 35 miles off our coast and the coast of Ocean City, Md. In granting the extension, EPA decreased the quantity to 95 million pounds of solids. While we would argue that this is still 95 million pounds too many, the decrease is a step in the right direction.

Unfortunately, the performance record of Philadelphia in cleaning up the environment is such that we'll believe that city will meet the 1981 deadline when 1981 comes along and the city is no longer fouling our ocean.

Congressmen, primarily those of coastal states including the Delaware delegation, want to put an ocean dumping deadline into law. EPA opposed that earlier this year because cessation of the dumping by Philadelphia, New York and Camden, N.J. "may not be economically feasible." That raises suspicion about EPA's intent in all this, and provides Philadelphia with just the excuse it needs four years from now.

This is the city that cavalierly announced in June that it didn't intend to pay a proposed $225,000 in fines for failing to file required reports with FEA on ocean dumping.

"We're in the process of firing 10,000 teachers, and EPA wants up to pay $225,000 or paperwork violations? We just can't afford it," said Carmen F. Guarino, Philadelphia water commissioner, before the U.S. House Committee considering abolishing all ocean dumping by Dec. 31, 1981.

What a fantasy. Wouldn't the average citizen who drew a fine for some violation love to step before the bench saying, "We just can't afford it." And, what about Delaware prison officials in federal court saying, "We just can't afford it."

A scant month later, EPA's response was to combine the ocean dumping problem with a deal for more time for the city to clean up the waste water its sewage plants flush into the Delaware River. Delaware gets the benefit of that too.

Philadelphia just couldn't seem to meet the national July 1 deadline for installing the best practicable equipment for treating its sewage. EPA gave the city three more years to meet the deadline at two treatment plants and 18 months for the third.

Philadelphia proved it knows how to graciously accept a break. Instead of signing a court-enforceable document waiving the $225,000 in fines—which it could care less about anyway—and promising to clean up its act by 1980, the city took advantage of legal manuevers to delay final EPA action.

Ah, yes, Philadelphia—that city of brotherly sludge—has done it again and again and again. Will someone please put that 1981 ocean dumping deadline into law?

Mr. BREAUX. I have two other points that I think we need to get out.

Has EPA made any estimate of how much the penalty fee under this particular legislation would be for the cities of New York and Philadelphia or any other areas?

Mr. JORLING. An analysis has been made based on the difference between composting and landfill and ocean dumping.

The number would be for New York City approximately $7 million annually. For Philadelphia it would be $2.5 million annually.

Mr. BREAUX. $7 million for New York City?

They would not be penalized if they——

Mr. JORLING. If they spent that amount of money going to the land-based alternatives.

Mr. BREAUX. The problem I see is, suppose they don't need to spend that much money?

Mr. JORLING. I think, then, the question will become a matter of negotiation between the city to demonstrate that that amount was not required. That is an estimate based on our analysis of what it would take in New York City to go to a land-based alternative.

If New York could come in and demonstrate that a lesser amount was all that was needed, then certainly the fee could be adjusted accordingly.

Mr. BREAUX. The problem is, I think, the way the bill is presently structured, if a dumper could show that they could get a good study going and an alternative underway for, say, $5 million, the difference between dumping and landfilling would be $7 million, so they would still be assessed $7 million.

You don't have that option under the current legislation.

Mr. JORLING. I think that is something we would like to review and assist the staff in analyzing.

Mr. BREAUX. That is a key point because I don't want to have a dumper go out and spend $7 million if it is not necessary.

I think the legislation says that right now.

So we need to correct it.

Another thing I noticed from Ocean Dumping in the United States, 1977, the fifth annual report, and this is from EPA, on page 61 it says the amount of funding for fiscal year 1976 was $3,328,000 for major projects that the EPA has funded for municipal sludge removal.

In fiscal year 1977 it is $2,945,000, which is a decrease from the previous year.

Now, is it decreased because of the appropriations process or is it decreased because EPA has requested less funding?

It is disturbing to me and I am sure the other members that we are now spending less in 1977 than in 1976 when the problems seemed to be much greater.

Mr. JORLING. Page?

Mr. BREAUX. Page 61, the bottom.

Mr. JORLING. I think there are a couple of reasons for the reduction.

One is that this is an R. & D. budget and we basically feel that not a great deal more of R. & D. is necessary for these types of projects: That the composting and landfill alternatives do not need a whole lot of more research and development dollars.

We feel they need implementation dollars.

I am going to ask Mr. Rhett if he might further elaborate.

Mr. RHETT. That is one addition.

The bulk of our money with the R. & D., as Mr. Jorling was saying, the bulk of the money being spent for sludge alternatives today are construction grants, taking this technology and building for the first time on a large scale, so there are other moneys beside the straight research and development money. It is more what you could call a technical transfer type of thing. And the level of funding is not going down.

Mr. BREAUX. Well, I realize that there are funds other than just research and development, but I want to make sure you are being adequately funded as far as research and development is concerned, and not being slighted in that area because I think it is very, very critical.

Any other points?

Mr. HUGHES. Mr. Chairman, as we talked about the noncompliance fee, it seems to me we have left out something which I think is very important.

Mr. Bauman just touched upon it somewhat.

This clam and shellfish industry is just one aspect. We have potential for a great loss along the resorts. And where is that loss going to be absorbed?

You know, we are going to be taking the noncompliance fees and under the legislation we are going to use it as an inducement and refund it to the people who are dumping—that is, if in fact, they are trying to develop land-based alternatives.

But what do you think of possibly using a portion of those funds, such as we do with the oil pollution fund, to try to make whole some of the communities that suffer the losses because of the dumping. They are the ones that are suffering.

Why should it go to the Federal Government or the dumpers?

Mr. JORLING. In the event that the penalty fee was not remitted to the community, in order to get the job done with the land-based alternative, I think that it would be appropriate to explore putting that money into a fund which would be accessible to remedy individuals who are damaged by these actions and through no fault of their own.

I am very aware of the fact that most of the damage that has been done to the environment by all parties—industrial, nonpoint source, municipal, Federal Government—are borne by people who are least able to compensate; namely, either directly the kinds of

33-546 O - 78 - 3

industries you suggest—namely, the commercial fishing and resort areas—but by the taxpayer.

We are bailing out everybody with these programs for these activities and I am very sensitive to the point you make, and I think to the extent that moneys are recovered from a community and a determination is made that they should not receive that money back, I would certainly think an appropriate use of it would be to compensate the third parties that are damaged.

Mr. HUGHES. I would invite EPA to look at legislation that I have introduced which would, in fact, do just that. Impose a fee of so much a ton for the sludge.

And that would be used to build up a fund to remedy any damage.

Let me ask you another question. You indicated that both the Cape May site, which I think is the 40-mile site and the 106-mile site is unacceptable. Cape May is the 40-mile site, isn't it?

Mr. JORLING. Yes, on the order of it.

Mr. HUGHES. I believe you stated that dumping by Philadelphia and New York or anyone else really is unacceptable at those locations. All are unacceptable dump sites, even beyond 1981.

Further, that they would not be acceptable dump sites for the type of dumping that those communities are dumping. As I understand it, Camden found itself in the position of not receiving an interim permit with EPA, and Camden ended up in the Federal district court. The Federal district court ordered EPA to grant an interim permit, which EPA did grant, but at the 106 site.

Is that summary correct?

Mr. RHETT. Yes, sir.

There were a couple of extra points in this and one of them is that it was a very small quantity and was checked before it was suggested by NOAA and——

Mr. HUGHES. The reason I asked the point is, I am trying to find out this: Now both sites, including the Camden and the 106 sites, are unacceptable for dumping. Apparently the Cape May site is less acceptable than the 106 site—at least for certain purposes.

Would that be so?

Mr. JORLING. I don't want to prejudge what the outcome of the hearing examiner's report is going to be.

Mr. HUGHES. I know, but you are not prejudging anything. Obviously, you made a value judgment when you decided that as long as you are going to be forced into granting an interim permit by the Federal district court, that Camden should dump it at least disruptive site—and that apparently was the 106 site.

Now, the point I am trying to make, is if that is the case, then what besides economic reasons are dictating the continued dumping at the Cape May site?

Mr. JORLING. I cannot speak with any knowledge of the actual decisionmaking that went on with the Federal district court because I just was not privy to that and I have not been informed of it in the interim.

Perhaps I should be. My feeling is that our concern with Camden was to get them out, which they will be out after that 9-month interim permit expires at the end of this calendar year.

With respect to why we acquiesced—and maybe that is an inappropriate characterization—in the 106-mile site, I cannot give you any answer. I don't believe it was based upon the kind of analysis that you suggested: And that is, that if it were done at the Cape May site, it would have caused greater impact than if it was dumped at the 106 site.

Mr. HUGHES. I am trying to find out the logic of requiring Camden to dump at 106 but permitting Philadelphia to continue to dump at the Cape May site.

It is basically the same type of sludge. There may be some difference, but I would think that the difference really is insignificant.

And, of course, the volume coming from Philadelphia is much, much greater than what is coming from Camden.

Camden had phased it down to the point where the sludge was insignificant compared to the Philadelphia dumping.

Mr. JORLING. The basic answer that I can give you, and I will try to get more if there is more, is that NOAA concurred in this in a manner tht they would not occur—at least at that time—on the 106-mile site for Philadelphia, Mr. Hughes, based on the short time and the small quantity of the sewerage sludge.

Mr. BREAUX. The time of the gentleman has expired.

I would like to recognize the chairman of our other subcommittee, Mr. Leggett.

Mr. LEGGETT. Thank you very much, Mr. Chairman.

I would just like to ask a couple of questions.

First, do you thing the fee schedule set forth in my colleague's bill is prohibitive or is it capable of being handled by the various entities involved?

Mr. JORLING. We think that the measure of the difference between the cost is feasible, Mr. Leggett, with the caveat that in the event that the community does do the work, that that fee not be extracted from them but be applied to doing the work.

But if it were just a penalty and required them to spend an equivalent amount of money out of another pocket of theirs, then it probably would be prohibitive.

Mr. LEGGETT. OK.

Now, in the bill the fee schedule is in the form of a penalty, is that correct?

Mr. JORLING. I believe the phraseology is a penalty.

Mr. LEGGETT. OK.

Now, what you are stating is that the money derived should be used to carry out the work at a land site disposal, is that correct?

Mr. JORLING. That is right.

Mr. LEGGETT. OK. I recognize that many times cities, counties, and other entities want to comply with the direction of the Federal law but, unfortunately, because of situations with politics and taxes, they are unable to do so completely. So if we were to impose a penalty like this and actually allow it to go to a fund that could be drawn on by the area to accomplish the work in question and achieve the desired result from this legislation, it would be, in fact, helping areas to achieve the objectives of the bill.

Mr. JORLING. I believe, if I understand the thrust of your question, that one of the things that influences feasibility, oftentimes

more than economics, is clarity of resolve. And if the EPA and the Congress are clear in their statement that this is what is to be done and no equivocation about it, feasibility then accommodates that resolve.

The overall program that we administer, the construction grant program, and the projects that are constructed with it provide that once we have provided Federal assistance for these projects, that the O. & M. is built into the system through user charges.

So that once we are over the hump of getting the capital expended and getting the system underway, it should be a part of the ongoing system—at least the financing should be a part of the ongoing system. It is that initial kick that is necessary to get the program underway.

Mr. LEGGETT. I understand that, Mr. Jorling.

However, in a lot of areas, including my home State of California, they have just been unable to develop the local match to move ahead with various sludge disposal and sewer disposal programs.

So this would allow for an added kick to the local areas to provide the match.

Mr. JORLING. We do have four hard-pressed communities that demonstrated an inability to borrow in a loan guaranteed program administered by EPA. So we do have a mechanism. The communities that we are referring to here, we believe, have the local resources to put up the local share.

Philadelphia is in a little bit more difficult situation than some of the New York communities because the Commonwealth of Pennsylvania does not contribute as does California and as does New York, Mr. Leggett, to the local share. So that Philadelphia is required to pick up 25 percent of any construction project. In New York, I believe, it is only 12½ percent. In California, I believe, it is only 10 percent. So there are differences in a community's ability to finance. And Philadelphia, because of the nonparticipation of the State in the program, is harder pressed than some other cities.

Mr. LEGGETT. Now, are you saying that the compliance with the direction of H.R. 5851 can be resolved at this point with only 10 or 12 percent local effort and an 87-percent Federal effort?

Mr. JORLING. No. In the case of Philadelphia, the available Federal moneys are limited to 75 percent. In Pennsylvania, the local community has to put up the remaining 25-percent share. In California, the Federal Government still only provides 75 percent; but the State of California contributes 15 percent and that leaves the local share at only 10 percent.

Mr. LEGGETT. Thank you, Mr. Jorling.

Mr. BREAUX. All right.

Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman.

Just at the point that you were speaking of, Mr. Leggett, New York City clearly comes down to 12½ percent. And I think New Jersey is the same. The State picks up the other half of the local share. So that we are talking about only Philadelphia. And in the context of this bill, Philadelphia would have a somewhat larger burden.

But in another respect, happily, Philadelphia is further down the road than most of New Jersey with these problems and New York. So I think the impact is a fair one.

But I would just like to go back to discussions between Mr. Bauman and Mr. Hughes on this question of 106.

As I am sure you are well aware, I took a rather vigorous part in that. And the fact that information, for instance, as to the whole problem of 106 versus the 12 miles in New York really hasn't gotten the kind of scientific backing that is now available—and really only as a result of about a year's work in that area. So it is to the point where—well, for instance, when we were having the oxygen problems in the New York Bight area this year, the fact that we were able to monitor these on an almost daily basis showed that that very New York 12-mile bight site had the best oxygen anywhere in that particular region; that the sludge dump in and of itself was not the important problem, vis-a-vis the beaches, the fish kill, the claims kill, and all of these things.

And so we have to be truly very careful when we start moving these things around.

And I am very happy that EPA is looking very carefully at moving to 106, because we may just be creating many more problems than we have—even at the Camden site. And I think we have to look very closely at the total impact of what is happening. And it deals far more with other areas than it does with sludge dump.

So I commend EPA in being very careful about practices of just jumping off one site to another for the sake of thinking they are going to solve the problem; because I think the evidence is very clear there are other things that are far more important than sludge dumping alone. I know it is the thing you can point to, but the evidence is certainly coming out in a significantly different direction.

Thank you, Mr. Chairman.

Mr. BREAUX. Any comments?

Mr. BAUMAN. I just wanted to ask for one clarification.

In your statement you amended the lack of flexibility in section 4 and asked for some sort of amendment that would allow emergency permits to be issued.

My concern is an "emergency" will become a synonym for "interim" as in fact a way of getting around the intent of the law.

What would you define "emergency" as if we get to the end of 1981 and Philadelphia still has not met the necessary requirements? Now, would that be an emergency?

Mr JORLING. No. That is not the intention of our recommendation there. It is basically to provide for situations where loss of human life is imminent; for those kinds of situations. And I would be pleased to provide to your staff what we think are some of the parameters around that definition so that it is clear that it does not mean the circumstances of an interim permit. It should be very tightly worded. And we will provide you with what we think.

Mr. BREAUX. We would like to formally make that request, that you do submit a suggested definition of what an "emergency permit" refers to.

[The following was received for the record:]

"EMERGENCY," DEFINITION

Emergency permits may be issued for the dumping of materials not environmentally acceptable for ocean disposal when there is demonstrated to exist an emergency requiring the dumping of such materials, which poses an unacceptable risk relating to human health and admits of no other feasible solution. As used herein, "emergency" refers to situations requiring action with a marked degree of urgency, but is not limited in its application to circumstances requiring immediate action.

Mr. BAUMAN. I have one last request. And that is that on July 22, 1977, the Acting Governor of Maryland, Mr. Blair Lee, addressed a letter to Mr. Costle, asking for certain information regarding the enforcement actions of EPA against the city of Philadelphia.

Now, 2 months later, he still hasn't received a reply. I would like to publicly request that you communicate with Governor Lee. He is Acting Governor and one of your brothers.

Mr. JORLING. We will comply with that request.

Mr. BREAUX. The committe would like to thank you, and your colleagues, for being with us. We hope to look forward to working with you on this legislation in the future.

We would call as our next witness. Mr. Robert Low, administrator, New York City Envirinmental Protection Agency, city of New York.

Mr. Carmen F. Guarino, commissioner, water department, city of Philadelphia, is not here, but is represented by counsel for the city of Philadelphia.

We would like to ask the attorneys representing the commissioner and the city of Philadelphia to please take your places at the witness table. We will try to do this quickly. And if you would, as you are seated, please identify yourselves for the record.

STATEMENT OF ROBERT A. LOW, ADMINISTRATOR, NEW YORK CITY ENVIRONMENTAL PROTECTION AGENCY, CITY OF NEW YORK, ACCOMPANIED BY MARTIN RIVLIN, COUNSEL, DIVISION OF PLANT OPERATIONS, DIVISION OF WATER POLLUTION CONTROL AND CHIEF, ENFORCEMENT AND COMPLIANCE UNIT; AND HENRY DIAMOND, COUNSEL, CITY OF PHILADELPHIA WATER DEPARTMENT, ACCOMPANIED BY STEVEN TOWNSEND, CITY OF PHILADELPHIA, WATER DEPARTMENT, CHIEF, SLUDGE DISPOSAL SECTION

Mr. LOW. Mr. Chairman, my name is Robert Low, commissioner, New York City Department of Environmental Protection; and with me is Mr. Martin Rivlin, on my left, counsel, Division of Plant Operations in the Division of Water Pollution Control and chief of the Enforcement and Compliance Unit.

Mr. DIAMOND. Mr. Chairman, my name is Henry Diamond and I am counsel to the city of Philadelphia Water Department.

Commissioner Guarino is in a capital budget meeting, a major concern of which is sludge disposal funds. So I did not come here lightly. I have been involved with the city of Philadelphia for some 2 years. I am former commissioner of the New York State Department of Environmental Conservation.

With me is Mr. Steve Townsend of the city of Philadelphia Water Department, who is the chief of their sludge disposal section.

Mr. BREAUX. Mr. Low, why don't you proceed.

Mr. LOW. Thank you, Mr. Chairman.

I might say also that Mr. Costle, the Federal EPA Administrator, is in New York today visiting the treatment facilities in the city, along with some of our professional people. Based on my brief conversation with him this morning before coming down, I think he is impressed with the dedication of our people to get on with the job and to get out of the ocean at the earliest possible time.

I have a brief statement, which I will read, which does not address itself to the question of ending ocean disposal, but to the penalty fee.

At the outset, I would like to repeat what I said before with respect to getting out of the ocean by December 31, 1981. And that is this:

It seems to me that, to be acceptable, a land-based alternative must be environmentally preferable to the existing ocean disposal. If a land-based alternative is not environmentally preferable, it would be counterproductive simply to make a move for the sake of making a move.

We suggested at that time that the Federal EPA Administrator be given some flexibility, some discretion, to permit ocean dumping if the land-based alternative is not preferable from an environmental point of view.

We are willing to put our interests in the hands of a third party such as the Federal EPA Administrator because he has the technical expertise at his hands to evaluate continued ocean dumping as well as alternative land-based approaches. And we think that is very important.

If you don't permit some discretion here, we are just going to go hell-bent into programs for land-based disposal which may be less environmentally sound than what is now going on.

The Federal EPA has indicated, through Mr. Jorling, that it is faced with hobson's choices. You may have a hobson's choice in the early 1980's—1980, 1981—and someone with expertise will have to balance out the pluses and the minuses and then make a determination.

If you look at the current amendment in terms of that approach, I would suggest that you might want to consider some change in the language, particularly with respect to the penalty and the cost. The present language reads:

> The difference between the cost of disposing of all materials dumped under interim permits and the cost as estimated by the Administrator of disposing of these materials during the affected period of the permits by land-based methods deemed appropriate by the Administrator.

It seems to me that those land-based methods should only be "environmentally preferable" methods. I urge that "environmentally preferable land-based methods" be inserted after the words "* * * period of the permits by." If that is acceptable to the committee, other changes in the language may be necessary for conformity throughout the amendment. I emphasize that again because the city of New York disposes of such a huge volume of sludge that the solutions of other coastal cities may not be precedents which we can follow.

I noticed that Mr. Jorling disposed rather casually of the question of what land-based disposal methods are available. The single sentence in his statement on that subject read:

> We are convinced that land-based disposal methods, including the possibility of recycling into beneficial uses, provide the most environmentally acceptable solutions for the disposal of sewage sludge.

That was his only reference to land-based alternatives.

We say in all good faith that we sympathize with the frustration of the committee members—particularly from the Coastal States of New Jersey, Delaware, and the other States represented—about ending ocean disposal. But we first must have the technology to do it. It is not enough to simply point to Mobile, Ala., or to other coastal cities and suggest that New York and Philadelphia should proceed in the same manner.

We are one of the most heavily populated areas on the face of the globe. We don't have at our disposal land where we can dispose of solid or liquid wastes to the degree that land is available to other coastal cities and other areas of the country.

It is no accident that Philadelphia and New York find themselves somewhat in the same position with respect to the problem.

I have heard Mr. Forsythe's evaluation of the character of the sludge dumping grounds, and I am happy that his statement was introduced into the record. The committee should know that New York City accounts for only about 40 percent of the volume of sewage sludge dumped in the New York Bight. There are several other sewage authorities, from New Jersey, which would be subject to the penalty under consideration by the committee, and I think it would be well to know what their attitude would be toward this penalty.

These include the Passaic Valley Sewage Authority, the Middlesex County Sewage Authority, Bergen County Sewage Authority, Linden-Roselle Sewage Authority, and the Elizabeth Joint Meeting Sewage Authority. The State of New Jersey agencies use the same disposal site as New York City.

If those authorities, which are funded by bonds, are required to pay penalties, it is the taxpayer who is going to end up paying them. The penalty is not going to come out of the air. We have to bear that in mind that a penalty may be counterproductive.

A penalty for tardy completion of work has value in some areas, such as construction contracts, where it has long been used. But applied to the municipalities and authorities which now dispose of sludge into the coastal waters, it would be patently unfair. It would work a severe hardship on them, especially the city of New York with its current financial difficulties.

For the city of New York, the money would simply have to come out of the general fund, and make it that much more difficult for the city to live up to its responsibility to repay the loans that this Congress has approved to keep the city from going into bankruptcy.

If the penalty was paid and was applied to the development of land-based alternatives, a crash program would ensue. Like all crash programs, it would surely be wasteful. The best approach from a technological standpoint probably would not be selected, because we don't know all the answers yet. There is no proven practical means of disposing of the city's huge quantity of sludge—

105,000 dry tons per year and increasing—on land. Alternatives must be developed carefully, in accordance with good engineering practice.

The Interstate Sanitation Commission, with pollution control jurisdiction over the waterways in the New York, New Jersey, Connecticut area, under a Federal grant of $1.2 million, contracted with a consultant to investigate land disposal techniques. The resulting report proposed "alternatives" which would cost from 2½ to 5 times more than ocean disposal now does. Furthermore, none of the recommendations can be applied today to New York City's sludge, despite claims to the contrary.

In my last statement here I mentioned the problem of metals in sludge, which would have to be removed if the sludge was to be used as a compost material for agricultural purposes. I failed to mention the fact that there is a very substantial problem of dewatering the sludge, which would be a prerequisite for land disposal.

The city of Detroit, which operates one of the country's largest sewage treatment plants, has incinerated the primary sludge produced at this plant for years. However, ever since the plant was upgraded and much of its sludge now is derived from secondary treatment processes, have found it virtually impossible to dewater the sludge in preparation for incineration. All of New York City's sludge results from secondary treatment, thus we are forewarned by the Detroit experience that careful research must precede decisions, with regard to dewatering and all other sludge treatment processes.

Under the proposed amendment the city would be fined millions of dollars each year for disposing of sludge in the ocean, beginning from the date of enactment of the amendment.

The cost of the city today of ocean disposal is approximately $2.5 million per year. The Interstate Sanitation Commission estimated the cost of composting at $6.15 million per year. If composting were feasible, which would mean that scientists could lick the problems of dewatering and the removal of heavy metals, then the city would be obligated to pay a penalty of $3.65 million per year, or a total of $14.6 million over a 4-year period. If pyrolysis were to be the preferred alternative, the cost to the city, according to the Interstate Sanitation Commission, would be about $12.5 million per year, or a penalty of $10 million per year, with a 4-year total of $40 million.

The city's alternative to the payment of these horrendous penalties would be to embark upon a crash design and construction program of land-based facilities through the use of Federal funding under Public Law 92-500. The result would be that we probably would buy expensive facilities that are capital intensive, such as pyrolysis, which are the furthest from being proven out technologically, because the city wouldn't have the money to come up with composting facilities, which could not be funded from the Public Law 92-500 moneys.

But even this approach would not automatically entitle the city to a waiver, because under the language of the amendment it is the permittee—the city or any one of these sewage authorities—that must then make the expenditure equal to the difference between present disposal and land-based disposal.

So that the city itself, from its general funds, would have to come up with the money for these expensive capital-intensive facilities.

To qualify for the waiver under the amendment, the city would have to spend at least $3.6 million on a land-based alternative. This would have to be done in the first year and in succeeding years, employing only city funds and in a manner acceptable to the Federal EPA. These requirements would necessitate a crash program on land-based alternatives of questionable worth, and at great cost to the city.

The city already is embarked on a $2.8 million sludge alternative study, approved and funded to the extent of 75 percent by the Federal EPA. It is doubtful that the EPA would continue its financial support of the programs because of the poor planning which such crash programs inevitably produce.

In addition, EPA regulations require environmental assessments, public hearings, and so forth, which would make it absolutely impossible to achieve any land-based alternative within a 1-year period. Our experience is that the Federal EPA, when it comes to spending Federal money, will insist on orderly planning, which this kind of crash program certainly would not produce.

A crash program is unwarranted, not because we are unwilling to end ocean disposal, but because we don't need this type of club over our heads today. The city is undergoing enormous financial difficulties which may well be accentuated in the 1979 fiscal year, which ends June 30, 1979.

It seems to me the imposition of both the penalty and the waiver will be counterproductive. Money which we sorely need for essential services will be taken out of the city's general fund for the payment of a penalty which will not hasten by 1 day the ending of ocean disposal. Furthermore, it will have a serious effect on the city's operation of its treatment plants, which already has been hit by an action of the State. New York State this year seriously reduced the amount of operation and maintenance financial support it has given to all communities for the past 10 years. Last year New York City received $10 million under this program; this year the amount has been reduced to about $7 million, and the program is scheduled to end in May 1978. That will mean a loss of $10 million to the city.

We are going to need every last penny in order to keep our plants operating. It will not serve the goals of this committee to hold a club over the city's head and say we are going to take money out of your pocket if you don't do as we demand that you do.

We are determined to end ocean disposal, but we want to do it in an environmentally acceptable fashion. We are proceeding with the study that I have referred to, and we hope that our solution will satisfy both the members of the committee and the Federal EPA.

Thank you.

Mr. BREAUX. Thank you.

Mr. DIAMOND. Thank you, Mr. Chairman.

We have a statement we filed with the committee by Commissioner Guarino, which is responsive to your letter of September 1 which asked four questions about the specific amendments.

You also asked four questions at the beginning of this hearing that I think are very germane. We would like to have an opportunity to respond to those in writing.

If I may, however, I would just like to highlight one or two points of the statement.

We concur very strongly that fines or penalty provisions along levels of government don't work very well. The fact is that it may work in industries—and I have had some experience in administering them and I think they are a good thing—but when one level of government seeks to impose a penalty or fine on another, it brings about, I think, a harsh negotiation, litigation, and bad feelings.

And also the political process and local government simply does not respond the way that industry might respond to fines. They either tend to get their backs up and fight it and use political means to avoid it or whatever. And it simply is not politically sound. And I use that word in the sense of public administration.

To give you some numbers of the impact on Philadelphia, it would have no impact. Currently, the city of Philadelphia is spending $1.8 million to ocean dump. We are already spending $2.5 million for land disposal methods, plus another $5 million in capital costs. So the numbers work the other way as far as the city of Philadelphia is concerned. And I suspect it will be that way across the country.

If you insist on the penalty provision, I hope you would have a bonus provision where you could allow the EPA to pay the city an additional grant for the difference for land disposal. That would be something of an incentive.

Another adverse impact which one might not see at the beginning is if EPA has fines pending over a city, as it does in the city of Philadelphia, then when the city of Philadelphia goes to the bond market to issue bonds to build sewage treatment plants, the bond companies—and particularly after the New York City experience—they really ask: Do you have any surprise financial commitments that might hit you? And one of them are pending fines.

And we have had trouble with bond counsel's issuing water pollution control bonds to build sewage treatment plants because of possible pending fines from EPA. That I suggest to you is an absolutely silly result.

On the matter of a statutory deadline, again the city of Philadelphia will not be affected. We have voluntarily agreed to getting out, as it was directed, before this committee, by the end of 1980. We did not fight that date. We agreed to it in negotiations with EPA. And we are going to do it. So the statutory deadline, I think, has no effect on the city of Philadelphia.

I suggest to you again that as a matter of public administration I understand this goading effect, but it may not be the best way to get municipalities out. The deadlines in 92-500 which we just passed July 1, 1977—with perhaps 60 percent of the municipalities out of performance—suggest that that might not be the best way.

Finally, the transfer from NOAA to EPA of research responsibilities, we feel, is probably a little late. The city of Philadelphia is working with NOAA. We have a major grant to seek land-based alternatives. It is working very well. The program is winding down because we are getting out of the ocean.

So we suggest that a transfer is perhaps not in the best interests—again only on a sound administration point—because we are already using the grant program under the current program administered by NOAA.

In conclusion, Mr. Chairman, EPA has been working with the city of Philadelphia. They have been moving to get us out of the ocean, but is is again the city that must perform. And we suggest that arbitrary fines and particularly fines with a heavy discretionary element in it—such as is in this current draft—tends to chew up time in negotiation and litigation and not get the job done.

Thank you very much, sir.

Mr. BREAUX. Thank you very much, gentlemen.

Mr. Diamond, thank you for your testimony on behalf of the city.

Mr. Low, on page 3 of your statement, I get the impression that you are not following what the bill, H.R. 5851 would do when you talk about the cost in terms of a penalty that New York City would be assessed.

You point out that ocean disposal is costing you approximately $2.5 million per year. You have an estimate from the Interstate Sanitation Commission that the cost of composting would be $6.15 million per year. So you are saying that the city would then, under those figures, be obligated to pay a penalty of $3.65 million per year.

Then you make the same distinction between the cost of ocean and pyrolysis, which you estimate would be $12.5 million a year; therefore, a penalty of $10 million a year.

You understand that the penalty would just go to the cost of implementing and developing alternatives to ocean dumping? In other words, if New York City could show that they were spending that $3.65 million on a composing program, then the penalty would be waived.

If New York City could show they were spending the $10 million per year on pyrolysis, then there would be no penalty; it would just be under the pyrolysis program.

Do you understand that?

Mr. LOW. Yes, sir.

I think my statement was ineptly drawn. If the Federal EPA Administrator decided that composting was feasible and the cost was $7 million, then the city would be required to pay the difference. Or if the land-based alternative was pyrolysis, then we would have to pay the difference between what EPA estimated the cost of pyrolysis would be and the current cost of disposal at sea. The paragraph was poorly drafted. As I read it, I recognized that it might throw you off. I think I understand what is intended.

Mr. BREAUX. We are intending not so much to penalize, as I think the authors of the bill can probably agree with me, and then to stick it in the U.S. Treasury. I am the first to agree with you that we are not helping anybody and we are just going to harm New York City by assessing fines. But the idea is to say, all right, if you can implement an acceptable alternative with an additional $5 million, then you will be assessed $5 million unless you put the $5 million into that type of a program.

I recognize further the program that we talked about with Mr. Jorling; that if you say you can do your pyrolysis for $5 million and

the computed penalty fee is $7 million, then I don't want to assess the penalty of $7 million if you can in fact get the same thing done for $5 million.

I guess the simplest statement would be that the city would have the penalty waived and that they would use that amount waived to develop alternatives to ocean dumping. I think your statement is a little unclear. I hope I corrected the record on that point.

Mr. FORSYTHE. Mr. Chairman, would you yield on that point?

Mr. BREAUX. I would be glad to yield.

Mr. FORSYTHE. I think it should also be pointed out—and this may take an amendment to clarify it—that the Federal funds would be included in that fund to be expended; so that of the $3.6 million, only 12½ percent would be city funds as compared to the total of $6.5 million. This certainly is what is intended. And I think if we need clarification, that will be made.

Mr. BREAUX. That was also the recommendation of the EPA when I asked them that question.

Go ahead, Mr. Low.

Mr. LOW. Our reading of the bill did not indicate that the penalty funds would be applied to any land-based alternative. It seemed to us it was a fine or penalty and would go into the general Treasury of the United States.

Mr. BREAUX. And it can be waived if the city shows they are using those funds for an effective alternative land-based operation.

Mr. LOW. And that determination is to be made by the Federal EPA. That is the difficulty.

He has told us today that land-based alternatives are available. Well, I have been around the United States to try to find them. I have been to South Charleston, W. Va., to look at pyrolysis; it is not doing well down there. I intended to visit Baltimore while I was here, but the Monsanto plant is closed, so there is no point in going there. That plant has been a failure as well.

Mr. BREAUX. I really think New York has some particular problems because of the size of the city and the amount of sewage sludge that you are dealing with; but yet your colleague next to you, the city of Philadelphia, has said they will have no problem with phasing out ocean dumping by January 1980, a year ahead of schedule. So I think that the fact that there are other cities around the country that are looking at alternatives and are in fact using alternatives is important.

Mr. LOW. I would point out, Mr. Chairman, that we are surrounded by population. We don't have open space. There is somewhat more open space available to Philadelphia, although not as much as in other coastal cities, such as in your area of the country.

But New York City is totally surrounded by people. Not even the Federal EPA proposes that we can use sludge for composting in agriculture. I doubt whether the potato farmers of Long Island would be in a position to use our compost.

The Federal EPA says that we could ship compost up the Hudson River. That sounds like a good scheme, but there is some question whether the capital investment required for composting could be achieved through Public Law 92-500. That is something that the committee would possibly want to address itself to; because if funding is not available for composting, which might be the best direc-

tion for us, at least in the short term, then we might simply pick up the Federal dollars and invest in pyrolysis, a process whose technology is not yet proven. But that would be very wasteful.

We are hesitant about embarking on a crash program founded on untried processes. Mr. Jorling or one of his associates indicated that EPA was going ahead with other communities with capital investment in facilities. No mayor can expect reelection if he invests huge sums of city and Federal money in a plant only to have it shut down. I don't know the political situation in Baltimore, but I would think it would be a great embarrassment to a city administration for it to invest its own and Federal money into a plant and then finding it won't work. We cannot afford that in New York City today. We want to get into the bond market and be able to borrow that 12½ percent so we can get on with the job. But if we build facilities that become white elephants, we are going to have more and more difficulty in putting our city on a good financial basis. That has to be kept in mind here.

Mr. BREAUX. On that point, Mr. Low, in previous hearings held before these subcommittees on June 15, 1977, Mr. Hansler, who was then Regional Administrator for EPA, stated there were thousands of acres in New York that could be used for composting. And I think that was a pretty important statement. So we asked EPA here in Washington if they would list the locations and the size of each site in New York City. And the answer that EPA gave us—and I would like you comment on it—and this is included in the hearing record on that date—said that:

> Under an EPA contract, the Interstate Sanitation Commission prepared a report in June 1976 entitled "Report of Technical Investigation of Alternatives with New York, New Jersey, Metropolitan Area Sewage Sludge Disposal Management Program."

This report listed proposed sites or locations for use of sludge treatment sites by municipalities located in the New York and New Jersey metropolitan area. Most of these sites are large enough for the construction of composting facilities.

Since publication of the above-mentioned reports, the city has informed EPA that there also exists sufficient acreage at several abandoned landfill sites, at Fresh Kill landfill sites on Staten Island to be used as a composting facility site.

The result of the study indicated that composting material could be used within the metropolitan area on highway median strips, parklands, as landfill cover, as nursery cover.

The study indicates there are thousands of acres within New York City, the New York City area, which could be used to receive composting materials.

Mr. LOW. I hadn't seen that evaluation.

However, another branch of the Federal——

Mr. BREAUX. Wait.

You haven't seen that?

Mr. LOW. About the acreage?

No, sir.

Mr. BREAUX. I mean, that is a key thing that we are talking about.

Mr. LOW. I haven't seen the EPA coming in and telling us we have places to dump sludge in New York City.

Mr. BREAUX. No; the Interstate Sanitation Commission of New York.

Mr. LOW. Well, I have been quoting from this and——

Mr. BREAUX. Let me finish my question.

Mr. LOW. I have been quoting from this and that—indicating——

Mr. BREAUX. Let me finish my question.

The Interstate Sanitation Commission, which is your State Sanitation Commission, and which covers New York and New Jersey, did report to the EPA about this. And that is the kind of a key question we are talking about.

Mr. LOW. I understood that the comment about the median strips and parklands, et cetera, had come from an EPA evaluation.

Mr. BREAUX. The EPA provided us the answer that they had a contract with the Interstate Sanitation Commission to do the investigation. It was the Interstate Sanitation Commission's findings on New York City.

Mr. LOW. Yes.

And what happened is this:

You have the initial report, which is "Phase II Report of Technical Investigation," prepared for the Interstate Sanitation Commission by its consultant.

The commission, which is a public body with representation from New York, New Jersey, and Connecticut, issued its summary of October 1976. I am not going to take the committee's time, but I can refer you to page after page in the report questioning the viability of composting for New York City.

It was the consultants who gave the opinion you quoted, but when the commission members wrote their report, by no means did they tell us we had plenty of room in New York City to dispose of compost.

I would like to mention the Fresh Kills landfill, because another branch of the Federal EPA is hounding us to close down our incinerators. We have six incinerators and some landfill areas. About 60 to 70 percent of our solid waste is disposed of on landfills. Now, you have landfills in your communities. I imagine you conceive of them as depressions, as holes, as valleys.

In New York City our landfills are mountains, and we are being told every day that we must close them down. We could dispose of some sludge on our landfills, but not for long.

We have a giant landfill in Staten Island—Fresh Kills—which will be phased out eventually. There is another in the East Bronx, a mountain several hundred feet high. There is one in Brooklyn near Kennedy Airport, which is another mountain. We are under pressure right now by the solid waste disposal unit of the Federal EPA to shut them down. It is a little surprising to hear people concerned about liquid waste disposal telling us to keep building them up higher and higher.

Mr. BREAUX. Well, let me follow up on my question.

I quoted from the EPA contract with your Interstate Sanitation Commission. And I quoted what Mr. Jorling said. And maybe he is not correct. I want your comment on it. He says——

Mr. LOW. I think——

Mr. BREAUX. Let me finish.

Mr. LOW. I think the distinction——

Mr. BREAUX. Let me finish. You will get a chance to respond. It is my turn now.

Mr. LOW. Mr. Chairman, I apologize. I thought you had asked a question.

Mr. BREAUX. Mr. Jorling says:

> Since publication from the above-mentioned report, the city has informed EPA—that is your city—that there also exists such acreage in several abandoned landfill sites and at the Fresh Kills landfill site on Staten Island for use as a composting facility.

Is that not the position of the city of New York? Because EPA is incorrect if that is not true. And he says the city is telling him that.

Mr. LOW. We indicated, when we were here before, that in order to make the 1981 deadline if there were no viable land-based alternatives, then what we would have to do would be to use our vessels to pump the sludge onto existing landfills. That would be an interim measure, a short-term measure in order to comply with the 1981 deadline. In that connection we referred to the Fresh Kills landfill.

I must add that if we have to go in that direction—and this current study will tell us whether or not that is the only thing we can do—then we would have to dewater the sludge. We are concerned about the problem of leachate, which would not be eliminated by dewatering.

I believe that the response of the city was in connection with what we have referred to as a two-phrased approach.

The only way we could meet the 1981 deadline would be by adopting some kind of interim approach like that, which is far short of the solution that the committee and the city are looking for. That would not be composting. It would be simply using the vessels to transport the sludge to a central dewatering facility, and then pumping the thickened sludge onto existing landfills.

If the Congress says get out of the ocean and onto the land, that is the only thing we shall be able to do between now and December 31, 1981 in order to comply with the statute. But it is not a long-term solution by any means. It was in that context that the committee was supplied with that data.

Mr. BREAUX. Can you tell me how much money—money raised from the city of New York—was spent on research, development, or implementation of any land-based alternatives in the last 5 years?

Mr. LOW. Approximately $280,000.

Mr. BREAUX. In 5 years?

Mr. LOW. The study by the Interstate Sanitation Commission was funded in total by the Federal EPA. The present step I study that I referred to, of $2.8 million, will require the city to spend 12½ percent; it is to those funds, in terms of several hundred thousands, that I am referring.

Mr. BREAUX. Do you have a round number, an estimate of how much the city spends on sewage disposal; not on alternates, but on sewage itself?

Mr. LOW. We spend approximately $30 million a year to operate our plants, of which up to $10 million has been reimbursed by the State in the past. This year it will be something like $7,500,000,

because the State reimbursement was cut to 25 percent and, as I indicated before, that program is designed to be phased out in May 1978.

So, as things now stand, next year the city will be short about $7.5 million in the operation of our sewage treatment plants.

The plants, I should point out, include the four ocean-going vessels that take the sludge, the residue, out to the dumpsite.

Mr. BREAUX. Mr. Hughes?

Mr. Hughes. Thank you, Mr. Chairman.

If I understood your response correctly, Mr. Low, to the question of how much a year is spent on land-based alternatives and sludge dumping, most of the funds you refer to are part and parcel of the study that is underway now, where 87½ percent is furnished by the EPA and 12½ percent by the city. That is where the sum of $280,000——

Mr. LOW. Yes. It is $250,000.

Mr. HUGHES. That is an ongoing study?

Mr. LOW. That is ongoing

Mr. HUGES. That was a study that was just undertaken.

Mr. LOW. That is starting up now.

This study that the chairman referred to was concluded in October 1976, and it was determined that the study did not point the way sufficiently for the city to undertake an alternative course.

Mr. HUGHES. Is it correct, then, to say that New York City, aside from the study performed by EPA for the Interstate Sanitation Commission and the study that is under way now that is ongoing at a cost of $2.8 million, New York City has spent no other funds looking at land-based alternatives?

Mr. LOW. I think that is correct.

Mr. HUGHES. I just find that appalling. I realize that this committee has no direct jurisdiction over landfill projects and solid waste recycling; but when you describe to me the mountains of landfill, I find that beyond comprehension when there are technologies available to recycle resources such as solid waste. I am sure you are familiar with, the resourse recovery techniques that are available, even though New York City may have more mammoth problems. I frankly can say your statement concerns me. I know that your administration is having great trouble in trying to find dollars to do the things that you want to do. But I find that there is not really the feeling of urgency in getting out of the ocean. That is why the coastal States are so very concerned, not about just New York City, but some of the north Jersey communities that dump in the ocean. Let me tell you, the same things go for the communities that you mentioned in north Jersey or any others in north Jersey that are dumping in the ocean—it is absolutely wrong and it is our intent to bring ocean dumping to a halt.

You indicated in your testimony that you were traveling today or looking at some facilities today. There is all kinds of technology available.

Are you familiar with the Bowing project, for instance, one of the dewatering techniques that I am familar with?

Mr. LOW. Let me respond in respect to solid waste disposal.

We are pursuing a number of innovative approaches. I think the primary emphasis today is on cooperation with the local public

33-546 O - 78 - 4

power utility to use solid waste for generating steam. We are not oblivious to the other experimental projects, particularly the one in north Boston. We have a good program under way, but I have pointed out our lack of space which is dramatized by the fact that when it comes to solid waste, where we are behind the eight ball, too, we are building mountains. We do not have a lot of space upon which we could simply distribute the sludge that is now being disposed of at sea.

Mr. HUGHES. Philadelphia does not have a lot of space. They have some of the same political problems that you describe. The city of Boston does not have a lot of space. Los Angeles and San Francisco do not have a lot of space; but these communities have managed within the constraints that you have described, to better address their sludge and solid waste problems. I do not want to get into any particular project or particular technology dealing with the water content at any great length. I know it is one of the big problems. Resources Conservaton Co. has a program where they go into communities, apparently for a charge of something like $25,000 to bring their facility in and actually prove to the community that they can not only do water, the sludge, but make it a useful product. They can tell you what your kind of sludge is best for. Whether it is usable as a fertilizer or best for composting.

Are you familiar with their particular program?

Mr. LOW. I am not.

Mr. Rivlin tells me he is not.

However, I would say to you that our sludge after secondary treatment is about 3 percent solids, and dewatering would be a giant problem.

Mr. HUGHES. I am not saying that the Resources Conservation Co. technique is the answer. There are many other approaches.

Mr. LOW. We would be happy to look at it, Mr. Congressman.

Mr. HUGHES. R.C.C. is not the only one, but it is one of the ones that I am familiar with, and they are actually promoting it to the point where they will go into a community for a certain amount and prove to the community that they can come out with an end product that is marketable in some fashion. In fact, some of the areas in the Far West, apparently, that have a lot of pulp manufacturing have now found that some technologies will not only dispose of their waste material but in fact create another profitable end product.

I know that there are a lot of other technologies around and I just get the impression in listening to you describe what New York has done that you really have not done very much of anything.

Mr. LOW. Well, we have made the attempt; and I think the only response I could make to you is twofold:

No. 1: New York, too, is a coastal State. I do not know whether our coast line is as long or longer than that of New Jersey, but the counties of Nassau and Suffolk, with their recreational facilities and beaches are concerned, as you are in your area. We are equally desirous about ending ocean dumping.

The study that was made with Federal funds is so replete with conditions, questions, and equivocations that the city simply could not go forward with anything based on this study. Therefore, we had to undertake a new study, and that is the problem.

I think that Resources Conservation Co. has something; we certainly want to look at it, and maybe some of the people in our R. & D. unit are familiar with it. Mr. Rivlin and I may not be the last word on the city's knowledge of the subject.

Mr. HUGHES. I want you to look at all of the technologies and see which is best for New York City. I have no connection with them; I asked Resources Conservation Co. to come in to tell me a little bit more about their program because I am very interested in learning more about land-based alternatives to sludge dumping.

You cannot talk about ending ocean dumping unless you have some practical alternative. I do not agree with your assessment when you say at present there are no proven practical means of disposing of the city's huge quantities—105,000 tons of dry sewage on land.

I do not believe that there are not practical alternatives when we have metropolitan areas around this country that have the very same problem New York has, maybe not on the same scale; but they manage to address those problems. I just have a feeling that New York City has not yet decided that EPA really means 1981.

Mr. LOW. Let me say this, sir.

We are now in a consent decree with the Federal EPA under which we have agreed to end ocean disposal by 1981. If I may take exception, the professional people in our organization are really determined to meet the deadline. Public officials do not relish being sued and held in contempt, fined, and so on, and they, too, are eager to obey.

We do not need a penalty on top of it, which will be counterproductive to the interests of the city right now. I can point out to you, sir, that the department which I head has lost 20 percent of its personnel in 3½ years, yet we are obligated not only to run the treatment plants and to dispose of the sludge, but to maintain the water supply system and the hydrants out in the streets. We are down there on the firing line with life-support services and, despite that, we are giving this matter very high priority.

Mr. HUGHES. Well, first, let me say to you—and my time is up, I know—but I know that New York has a myriad of problems aside from the sludge problem. That has been rather obvious, particularly in the last several years; and I know that sometimes the problems seem to be beyond solution; but I do not see in the expenditures of only $280,000 the kind of commitment that assures me that New York really is doing all it can to get out of the ocean.

Thank you, Mr. Chairman.

Mr. BREAUX. Thank you, Mr. Hughes.

Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman.

First, thank you for being here. Let me go to one of your points that you have made in your testimony about the "practical and environmentally less harmful" criteria that is in the bill on page 3 of the committee print. A permit may only be issued if the administrator finds that such a person has no alternative to dispose of such material which can be immediately implemented and which is environmentally less harmful by dumping it in the ocean.

So that is there and it was your recommendation that put it there. So we do try to react responsibly to our witnesses. I would

like to definitely clear up the record on this $3.6 million which, again, appears on page 3 of your statement. You say the minimum penalty would be involved, would you not receive 87½ percent Federal funds against that, so that we are talking about $450,000 of city funds in that kind of a situation?

Mr. LOW. The question of which are operating funds and which are capital funds was really not dealt with in my brief statement, but the meaning of the language of the amendment would seem to include funds from whatever source; that is, that they would have to be spent by the city, whether it is for construction or operation. I did not really address myself to that.

During the first year, we would have to be building the facility and, as I indicated, even as a short-term alternative, if we wanted to dispose of the sludge on a landfill, we would have to construct several facilities. We would have to build a dewatering plant and also docking and pumping facilities, to get the sludge from our vessel to the landfill. So we would need capital funds.

Mr. FORSYTHE. Those are the very funds that you would be most able to get from reimbursement from capital funds in this area.

Mr. LOW. The question I raise, Mr. Congressman, is whether under Public Law 92-500 funds would be available for this method of disposal. It is something that we certainly ought to be sure about, because it may be that this alternative would be preferable to, let us say, pyrolysis.

Mr. FORSYTHE. I really want to avoid getting into that discussion, as to preferable, but I am sure that they are available. As a matter of fact, in composting, for instance, I know the city of Camden received Federal funds to construct their composting operation and the one that is going to be in operation before the end of 1977; granted, to compare the problems of Camden with New York is a very ridiculous comparison, but it is not in the mechanics that are involved or in the types of funding that are involved, and really I hope none of us are talking about pumping sludge on the landfills because that I think is not an environmentally better solution than composting, or pyrolysis; and I share your concerns because I looked into this and I am equally as concerned as the rest of the members on this committee to be talking about viable alternatives, not wild goose chases or crash programs that are going to embarrass us.

So we are looking at those areas.

Mr. LOW. On that point, Mr. Rivlin reminds me, of course, that in that first year we would be spending primarily on design, but there is no way that such huge sums could be spent entirely on design contracts.

Mr. FORSYTHE. I would concede that this is an area we ought to be looking at, because I agree with the chairman that we should not be making a penalty that actually is not spendable funds in the area; but I think the intent does tie those two together.

Now, whether the legislation is clear on that or not is something that we are anxious to look at; because we are not just trying to—again, to fund it. We are trying to give you better reasons to go to your taxpayers to fund what you say you want to do and what you know we must do. I think that is where we come down on this thing; and I know that the discussion as to whether this is viable,

that is, using this process between levels of government has been brought out; but here we are 5 years down the road in this legislation and these numbers are confusing, but I understand actually city expenditures in the 5 years prior to this study that you are now just getting underway were $210,000 over 5 years on studies dealing with alternatives.

Your answer was, I think, there were none until you started to contribute to this new study.

I do not think New York has been active—when I say New York, I include the New Jersey operations.

I think Philadelphia has.

They point out that their current operation would not be affected by this legislation because they are already spending adequate funds.

So in a sense, I think we are really talking about New York's metropolitan area.

Mr. LOW. On the question of cost, Mr. Forsythe, of land-based alternatives, there was a question whether funds would be available for the acquisition of the land. Composting, for example, is land intensive, at least in the experiments that I saw at Beltsville.

We would be hard-pressed to purchase the sites for composting. We would like to think that Federal moneys would be available for composting in the same way that they would be available, let us say, for pyrolysis plants.

Mr. FORSYTHE. I think there could be debate as to the question of how land intensive, or how much land it takes for the composting operation per se. The disposal of the compost is another matter; the concept, of course, is that it goes into the parklands and other places where it is not a problem.

Dr. Epstein of the Department of Agriculture points out, his understanding is the New York metropolitan area could use all of its composted sludge on parks, highways, and landfill areas, for several years. It takes two acres to compost all of Camden's sewage. You are not talking about big areas. But it disturbs me that you come here today and do not have more familiarity with some of these things that we have found are already being done; what Philadelphia is doing; what other cities are doing and, granted, the scale of New York is massive as compared to many of the others; but I do not think that the city of New York has looked outside maybe as much as it should.

Mr. LOW. I think, Mr. Congressman, you will find that these other cities did have access to or had available substantial tracts of land where sludge could be disposed of in one way or another.

The Beltsville project, as I understand it, required 5 acres of vacant land to develop 11 tons of compost. That is what I meant by a land-intensive process.

That is why I suggested that this funding would be important for congested areas like New York City.

Mr. FORSYTHE. Thank you.

Mr. BREAUX. Mr. Evans?

Mr. EVANS. Thank you, Mr. Chairman.

Commissioner Low, I thank you for the concern that you have shown this committee and the express concern to some of us who live in coastal States such as Delaware. I realize full well that the

taxpayers in New York and Philadephia and throughout the country are overburdened, and I realize it is a difficult problem. I have great empathy for them.

But we are also suffering a penalty and suffering a burden as a result of what someone is doing upstream from us, so to speak.

You are killing an ocean that puts people out of work in Delaware. We have a tourist-related industry in the southern part of the country that is dependent upon a clean ocean. We have a beach that a number of people, even from Washington, enjoy, and we would like to see them continue enjoying it.

The problem I have is that based on the fact that you have a financial problem in New York City, you say you want to do everything possible to develop on-land disposal sites and yet those are good intentions; but how can we rely on the fact that because you have a financial problem that you will place that as your top priority?

I recognize that the cities have problems in education, and crime, and housing, and police protection. But when you are doing something to someone else, I think it is incumbent upon the Congress to say to you, you must place that as your top priority.

Mr. Low. Mr. Evans, Mr. Forsythe, I believe, earlier today discussed the impact of our dumpsite on the New York Bight, and he indicated that it was not related to some of the problems that have existed, either on the beaches or in connection with the lack of oxygen or the red tide problem. I think we should put this New York dumpsite into perspective. It has been used since the mid-twenties; there is no question that that part of the ocean floor does not sustain marine life.

On the other hand, I have been out there on the sludge vessels, and it is amazing, but lobster pots are all around that dumpsite, and those lobsters are eaten and sold in the New York metropolitan area.

I am not saying that I condone the use of the site indefinitely. I think we ought to get out there, but I really think we have to look at it in perspective. Sludge is an inert substance. When it is dumped from our vessels, the sea gulls, which are, I think, described as scavengers, pay no attention to that sludge. It gets to the bottom; it does not drift to our beaches.

You know, New York City has beaches that are used by 1 million people on Sunday, in the Rockaways and then down Long Beach, Fire Island, and so forth. We have no evidence that sludge is the culprit. We have to take some responsibility because there is still raw sewage coming out of the New York Bight, both from New Jersey and from New York City, and some of that unquestionably got up onto beaches.

But we have not had any good scientific evidence that it is the sludge at the dumpsite that has been the culprit for either the red tide or the problems on our beaches.

I reiterate, I am not saying that we should stay there, but I think we have to keep that in perspective. We would like to get this to a high priority in the city.

Our city budgets now are subjected to a State body called the emergency finance and control board. If we were assessed with a penalty, they would have to come up with the money, but those

moneys would be taken form some other vital service. That is why it is a question of relative priorities.

I can tell you it is of high priority, but I cannot tell you that it has a higher priority than providing the city of New York with potable water or collecting the garbage or providing police protection, and so forth.

We have a question of priorities here, but I doubt that the city of New York is impacting on the State of Delaware.

Your people and our people work out water releases from the Delaware River, and I think it is workable. We try to be good neighbors, but I do not think the New York dumpsite, which is used by New Jersey, Nassau, and Westchester, is a problem connected with your fishing interests in the Delaware Bay, for the reason that it has not been connected with problems in the Rockaways, which are only 11 miles from the site.

This thing must be placed in perspective.

Mr. HUGHES. Would the gentleman yield for just a minute?

Mr. EVANS. I yield to my colleague from New Jersey.

Mr. HUGHES. Have you seen the General Accounting Office assessment of the damage that has been done in the New York Bight areas as well as other areas from the dumping of sludge, particularly the mercury and the cadmium levels?

Mr. LOW. Yes.

We think those are much higher priorities to stop, stop now.

Mr. HUGHES. The point is that the sludge is creating that?

Mr. LOW. No.

Mr. HUGHES. I beg to differ with you. It was directly related to the sludge; and, in fact, the prior site just off of Cape May some 3 years after abandonment had cadmium and mercury levels many times above the acceptable levels set by EPA. And the New York Bight was 100 times that level.

Mr. LOW. I agree, sir. The dump sites for those toxic substances deserve a higher priority, by far, than the elimination of the sludge dump site.

Now, that does not mean to say, and I continue to repeat, that we do not want to end ocean disposal; we do. But these other sites that have been authorized by Federal agencies, it seems to me, ought to be terminated a lot sooner than maybe is now envisioned, because they are creating problems.

No one considers those problems in its studies as well as does the Federal EPA, but it has not been the sludge dump site that has been associated with those problems.

Mr. EVANS. I might just say that it depends on who is examining the evidence as to what harm is being done, and what cumulative impact is done.

Have you had any help from the State of New York?

If you do not have the land in the city, have you discussed this with the State?

Mr. LOW. We have had ongoing talks with some people in Columbia County, which is due north of the city, between the Hudson and the Connecticut line, maybe the Massachusetts line.

We find, however, that when programs like these become known, where New York City is going to export its residue, whether solid waste or sludge, that there comes a time when political opposition

arises, and it becomes very difficult. We are looking into several possibilities for exporting sludge, but I do not know if any will be successful.

You know, a lot of our solid wastes are disposed of in New Jersey, in the Meadowlands, by private cargo, and there was an effort to terminate that. That created quite a problem, because then we had no place to go with our solid waste.

I have said, Mr. Chairman, before other committees of this Congress, that this problem of waste, whether it is solid or liquid, requires an investment on the part of the Nation far beyond the discussions of the sums of money that we are talking about here.

The metropolitan areas of this country are suffocating in their waste. We should be able to recycle them, to look upon these wastes as precious resources that can be used, but the technology is not always there, and we really need help. It is a national problem that requires a national solution, whether it is solid waste problems or the problem of disposing of our sewage sludge. The problem today is nothing like what it is going to be, as you said, when the quantity of sludge in the New York-New Jersey area is doubled within the next 20 or 25 years.

Mr. EVANS. Commissioner, you know the city of Camden is complying as of November of this year, and I would suggest that perhaps some of the same problems that you have in New York exist in the city of Camden as far as the availability of land.

I am not going to say here that you must do it today, because we are trying to be reasonable and we are trying to be fair. But I think that complying by 1981 gives you a little more than 4 years and I do not think that that is unreasonable.

One question, if I might, Mr. Chairman.

Mr. BREAUX. We have another witness.

Mr. EVANS. Could I ask Mr. Diamond a question and I recognize that you are acting as counsel for the city of Philadelphia and you suggest that your bond rating would be affected.

I suggest to you that our bond rate in Delaware is not very good when you continue to dump off our shores.

Are you going to pay the $225,000 fine that was levied?

Mr. DIAMOND. The $225,000 fine, Mr. Evans, has been recommended by adjudicatory hearing officer to the regional administrator of EPA.

The regional administrator has not levied a fine, so we have not gotten a piece of paper saying you are fined $225,000.

I might correct one statement.

I may have misled the chairman by my perhaps cavalier characterization of the city's effort. We are not getting out easy by 1980. It is an enormous effort but it can be done. I misled you if I said it is easy.

Mr. EVANS. We recognize that.

Mr. BREAUX. I want to thank both panels, all four of you gentlemen, for being with us. You provided some very helpful information in your testimony this afternoon.

Thank you very much.

Mr. LOW. Mr. Chairman, if I may, I am going to submit to you a revised paragraph with respect to those penalties so that it is certainly clear for the consideration of the committee.

I believe my language was poorly drafted.

Mr. BREAUX. That will be made a matter of the record.

[The following was received for the record:]

PENALTY FEE AS CONDITION TO INTERIM PERMITS FOR OCEAN DUMPING OF SLUDGE

The principal object of this hearing is the effect the penalty fee of H.R. 5851 will have on municipalities' efforts to meet the 1981 deadline to terminate the use of the off shore ocean waters for sewage sludge disposal.

On its face, a large penalty fee might be expected to spur activity towards a desired end. This device works well in such areas as construction contracts. We believe, however, that if applied to the municipalities presently disposing of sewage sludge in the coastal waters, it would be patently unfair and work a severe economic hardship on the municipalities, especially the City of New York with its current financial difficulties. If the penalty fee were to be applied to the development of land-based alternatives, pursuant to the waiver provision, a crash program might ensue, and as with all crash programs, it would surely be wasteful.

The City now spends about 2.5 million dollars per year disposing of its sewage sludge at sea. At present, there are no proven practical means of disposing of the City's huge quantities (105,000 dry tons per year) of sewage sludge on land. Alternatives must be developed carefully, in accordance with good engineering practices.

The Interstate Sanitation Commission, with pollution control jurisdiction over the waterways in the New York, New Jersey, Connecticut area, under a Federal grant of 1.2 million dollars contracted with a consultant to investigate land disposal techniques. The costs of the proposals ranged from 2½ to 5 times more than ocean dumping, and none of the recommendations can be applied today to New York City's sludge despite the claims to the contrary which are based upon very limited small scale operations. Dewatering is a prerequisite to land disposal, whether composting, incinerating, or by pyrolysis.

The City of Detroit, which operates one of the world's largest sewage treatment plants, has incinerated the primary sludge generated at this plant for years. Now that the plant is being upgraded and more of its sludge is derived from secondary treatment processes, they find it virtually impossible to dewater this sludge in preparation for incineration. All of New York City's sludge results from secondary treatment and we are forewarned from the Detroit experience that only decisions based upon careful research must be made with regard to the dewatering of our sludge.

This proposed amendment would mean that the City will be fined millions of dollars each year for disposing of sludge in the ocean from the date of enactment of the amendment.

As pointed out above, the cost to the City today of ocean disposal is approximately $2.5 million per year. The Interstate Sanitation Commission estimated the cost of composting at $6.15 million per year. If the Federal EPA determined that composting were to be feasible, which would mean that the problem of removal of heavy metals and dewatering had been solved, then the City would be obligated to pay a penalty of $3.65 million per year or a total of $14.6 million over a four year period. The Interstate Sanitation Commission estimated the cost of pyrolysis to be about $12.5 million per year. If the Federal EPA determined pryolysis to be a feasible land-base alternative, the penalty would be $10. per year or a total of $40 million over a four-year period.

The City's option to the payment of these horrendous penalties would be to embark upon a crash design and construction program of land-based facilities through the use of federal funding under Public Law 92-500. But even this approach would not automatically entitle the City to a waiver because under the language of the amendment it is the permittee—the City—that must make the expenditure equal to the difference between present disposal and land-based disposal.

To qualify for the waiver under the amendment, the City would have to spend a minimum of $3.6 m. on a land-based alternative within the first year ("effective period of the permit") and succeeding years, employing only City funds ("the permittee will expend") in a manner acceptable to federal E.P.A. ("to the satisfaction of the Administrator").

These requirements would necessitate a crash program on land-based alternatives of questionable worth and at great cost to the City.

The City is embarked on a $2.8 m. sludge alternative study, approved and funded (87½) by the Federal E.P.A. It is doubtful that the Federal E.P.A. would continue its

financial share of the program because of the inherently bad planning which such a crash program inevitably produces.

Further, there is no need for a crash program. As I mentioned in my last appearance before this committee, sewage sludge disposal in the ocean comprises but 10 percent of the total pollutant load to the New York Bight. These is, therefore, no emergency need, we believe to eliminate the ocean dumping of sludge before the end of 1981.

The imposition of the penalty or waiver provision will be counter productive. The loss of these funds and the Federal funding can only have negative effects upon the treatment of sewage in the City while scarcely enhancing the progress of the land-based disposal of sludge.

Mr. BREAUX. Our next witness is Mr. Kenneth Kamlet, on behalf of the National Wildlife Federation.

We welcome you again.

We have a detailed copy of your statement. It will appear in the record and, if you will, we would encourage you to summarize it so that we can get in some questions.

[The following was received for the record:]

STATEMENT OF KENNETH S. KAMLET ON BEHALF OF THE NATIONAL WILDLIFE FEDERATION

Thank you, Messrs. Chairmen and Subcommittee members, for the invitation to appear once again before this panel on the subject of ocean dumping. My name is Kenneth S. Kamlet and I am here on behalf of the country's largest private conservation organization—and the one which has taken a conspicuous leadership role in keeping tabs on the Federal Government's ocean dumping regulatory activities—the National Wildlife Federation ("NWF").

The purpose of this hearing is primarily to consider H.R. 5851 (H.R. 4715), a bill to amend the Marine Protection, Research, and Sanctuaries Act of 1972 regarding the issuance of interim permits for ocean dumping, and for other purposes. The Committee's invitation letter specified four issues as to which the Federation's comments were particularly desired. These issues are:

1. The effect of the bill's penalty fee on municipalities' efforts to meet the 1981 phase-out deadline;
2. The pros and cons of transferring responsibility for research into land-based alternatives from NOAA to EPA;
3. Our further views regarding the December 31, 1981 deadline; and
4. Additional comments and suggestions concerning amendments to the 1972 Act.

Having carefully reviewed the proposed Committee Print of H.R. 5851, I will address each of these issues in turn.

THE PENALTY FEE PROVISIONS OF H.R. 5851

Section 2 of H.R. 5851 would add several new paragraphs dealing with penalty fees to Section 102(a) of the Marine Protection, Research, and Sanctuaries Act ("MPRSA"). Paragraph (5)(A)(v) would condition the issuance of "interim" ocean dumping permits for wastes which do not meet the ocean dumping criteria on the permittee's payment of a "penalty fee." Paragraph (5)(C)(i) would specify that the amount of the penalty fee is to be based upon five factors: "the characteristics of the material to be dumped, the dumping location, the physical, chemical, and toxicological properties of the material, and the probable effect of the disposal on the marine food chain." Paragraph (5)(C)(i) would also require that any penalty fee be no less than the cost savings realized by the permittee from the use of ocean dumping rather than appropriate land-based methods. Finally, Paragraph (5)(C)(ii) would allow the Administrator to waive all or part of any penalty fee if the permittee will expend an equivalent amount "on the development, demonstration, or implementation of a land-based disposal method . . . ."

The objective of these penalty fee provisions seems clearly to be to eliminate the economic incentive which most ocean dumpers now have to continue ocean dumping as long as possible, and to stimulate those dumpers who cannot meet EPA's ocean dumping criteria to phaseout their ocean dumping as rapidly as possible. This is an objective which NWF can and does support whole-heartedly.

The fact is that the vast majority of sewage sludge and industrial waste ocean-dumped since the MPRSA's effective date in 1973 has been dumped under so-called

"interim" permits, in violation of the numerical limits of EPA's ocean dumping criteria. For example, a recent General Accounting Office report, *problems and Progress in Regulating Ocean Dumping of Sewage Sludge and Industrial Wastes* (Jan. 21, 1977), found that "[a]ll sewage sludge dumped in the ocean exceeded the EPA-established safety levels for cadmium and mercury" (at 15), that "[t]he 26 municipal permit holders in the New York-northern New Jersey area were dumping sewage sludge containing either cadmium or mercury that exceeded by more than 100 times the established safety levels" (id.), and that "[a]lmost all sewage sludge and industrial wastes are being discharged into the ocean at too rapid a rate [as determined by bioassay testing], which may be causing harm to the environment" (at 17).

The penalty fee provision of H.R. 5851, together with the bill's prohibition against issuing interim permits beyond 1981 (and a third provision encouraging the use of alternatives, which we recommend for addition to the bill; *see below*), should adequately assure the rapid phase-out of unnecessary and environmentally destructive sewage sludge and industrial waste ocean dumping.

In this regard, we would call to the Committee's attention the similar approach recommended by the EPA Administrator in the context of the Federal Water Pollution Control Act, in the form of a so-called "noncompliance fee." The noncompliance fee approach, as incorporated in Section 45 of S. 1952 (a Senate-passed bill to amend the 1972 Water Act amendments), has several features worthy of special note:

(1) It requires discharges as to which the Administrator intends to impose a noncompliance fee to furnish upon request "a detailed description of the control technology or system" proposed to achieve compliance with applicable regulatory requirements, including "capital costs, debt service costs, the estimated schedule of expenditures to comply with such (requirements), and the estimated annual costs of operation and maintenance of any technology or system required to maintain such compliance," together with information on "the economic value which a delay in compliance * * * may have for the owner or operator * * *" of the discharge source. (*See*, proposed Section 319 (b)(1); *see also*, proposed Section 319 (C)(2)(B)). This approach has the significant virtue of putting the burden on the discharger to estimate the cost of compliance with regulatory requirements, thereby indirectly defining the amount of the noncompliance fee. It is likely to yield fairly reliable information given the competing thrusts of a discharger's normal tendency to exaggerate the costs of regulatory compliance and the knowledge that the higher the estimate provided, the higher will be the noncompliance fee which the discharger must pay. It also has the virtue of making clear what factors must be included in estimates of the "cost" of legal compliance (or, in the ocean dumping case, of implementing land-based alternatives).

(2) It authorizes the Administrator to retain a contractor to assist in determining the fee assessment where the owner or operator of a discharge source fails to submit a calculation of the fee assessment, in which case the cost of carrying out such a contract may be added to the penalty assessed. (*See*, proposed Section 319(b)(2)). This provision is desirable in providing an alternative means of setting the noncompliance fee without burdening EPA with the costs (in money and manpower) of compiling and reviewing large amounts of economic data.

(3) Where a penalty fee is assessed and paid and the discharge source ultimately achieves full legal compliance, it provides for reimbursement with interest for any overpayment (i.e., where the estimated cost of compliance exceeds the actual cost), and for the assessment and collection of an additional payment with interest for any underpayment (i.e., where the estimated cost of compliance was less than the actual cost). (*See*, proposed Section 319(i)). Such a provision is desirable as a means of correcting any error in the estimate of the penalty fee based upon actual costs. It provides an additional deterrent to a discharger's intentional underestimation of the costs of bringing its discharge into compliance.

(4) It establishes procedures for expedited judicial review of a discharger's challenge to a noncompliance fee set by the Administrator. Specifically, it limits such review to thirty days from the establishment of the penalty fee (i.e., if the discharger doesn't challenge the assessment quickly, he may not do so at all); and it precludes a judicial stay of the operation of the penalty fee pending the outcome of review, except under certain circumstances where the noncompliance was "due to reasons entirely beyond the control of the owner or operator," in which case a bond or surety must be posed in an amount equal to the potential liability during the period of the stay. (*See*, proposed Section 319(e)). Procedures of this kind would be especially valuable in the context of H.R. 5851, since court challenges to proposed

penalty fees could conceivably delay their imposition until the end of 1981, with the result that they might be avoided altogether.

(5) It makes the failure to make required payments or to submit required information a violation of the Act, which subjects the owner or operator of the offending source to all penalties under the Act, "in addition to liability for such payments." It also makes clear that payment of assessed penalty fees is "in addition to any other permits, orders, payments, sanctions, or other requirements" established under the Act, and "in no way [a]ffect[s] any civil or criminal enforcement proceedings" brought under the Act. (*See,* proposed Section 319 (g) and (h)). These provisions are necessary to make clear that a discharger's penalty fee obligations are legally enforceable, and that the mere payment of a penalty fee does not excuse a discharger from the need to comply with otherwise applicable permit conditions and regulatory requirements.

We would urge the Committee to consider expanding Section 2 of H.R. 5851 to incorporate language paralleling the proposed noncompliance fee approach in the five indicated respects. If the Committee wishes, we would be happy to work with Committee counsel on specific legislative language to meet the intent of the Committee's bill.

We would recommend, in addition, several minor language changes in the penalty fee provisions to avoid unintended side effects:

(1) *Problems.*—Paragraph (5)(B) as written, in limiting to one year the effective period of "renewals" of interim permits (as well as interim permits), impliedly sanctions the "renewal" as opposed to the "reissuance" mechanism for maintaining interim permits in effect for successive one-year periods. This is inappropriate since a permit "renewal" is conceptually easier to obtain than the issuance of a supplemental permit. The proposed amendments should not leave open to question the obligation of an interim permittee to meet all application and review requirements applicable to an initial permit request each and every time a new interim permit is desired.

Recommended solution.—Delete the words: "or any renewal of any such permit," from proposed paragraph (5)(B). Implied would be the fact that if a new permit were sought after the expiration of a 1-year interim permit, a new interim permit would have to be applied for.

(2) *Problem.*—Paragraph (C)(i) in its present form makes the size of a penalty fee dependent, at least in part, on the adverse effects associated with the penalized dumping. Thus, among the factors to be considered are "the degree and persistence of toxicity * * *, and the *probable* effect of the disposal on the marine food chain * * *." (Emphasis added). Given severe state-of-the art limitations on the ability of marine scientists to measure the fate and effects of marine pollutants (except where the effects reach catastrophic levels), it seems unlikely that it will often be possible to quantify dumping effects sufficiently to aid in the calculation of an appropriate penalty fee. This is especially the case if it is necessary (as the present language would appear to dictate) to demonstrate that a given effect is "proable."

Recommended solution.—Delete the word "probable," with or without the substitution of the word "potential." Since the penalty fee is, at minimum, required to equal the "value" of noncompliance to the dumper, difficulties in quantifying dumping effects need not stand in the way of assessing a penalty. However, it should not be made any more difficult than necessary to include "effects" information in the penalty fee calculation.

(3) *Problem.*—Paragraph (C)(i) in its present form allows consideration only of "physical and chemical" properties in determining a waste's "toxicity." This would prevent consideration from being given to a waste's microbiological properties (i.e., presence in sewage sludge of disease-producing bacteria, viruses, and protozoa). We doubt that it is the Committee's intent to exclude consideration of such properties.

Recommended solution.—Change "toxicity" to "hazard potential" (to include disease) and change "physical and chemical properties" either to "properties" or to "physical, chemical, and biological properties."

(4) *Problem.*—Paragraph (C)(i) speaks of alternatives to ocean dumping in terms of appropriate land-based methods of "disposing" of waste materials. Section 102(a)(G) of the MPRSA is, of course, presently somewhat broader in requiring consideration not only of alternative disposal methods, but also alternative methods and locations of "recycling." In the case of sewage sludge, this could include controlled land application (not "disposal") of the sludge to strip-mined land as a soil conditioner to aid in returning the land to its natural state. Paragraph (C)(i), by referrring exclusively to "disposal" alternatives, may give rise to the inference that investments in waste recycling may not be used to offset an otherwise applicable penalty fee assessment. This would be unfortunate and counter-productive.

Recommended solution.—Change "cost * * * of disposing * * * by land-based methods," to "cost * * * of disposal or recycling * * * by land-based methods and at locations * * *." The same problem and remedy apply to Paragraph (C)(ii).

(5) *Problem.*—Paragraph (C)(ii) provides for the waiver of the penalty fee where the permittee will expend "an amount equal to the amount so waived" on purusing acceptable alternatives. Obviously, this should not be taken as precluding the expenditure of *greater* amounts on acceptable alternatives. The language of the paragraph should be modified to reflect this.

Recommended solution.—Change "an amount equal to * * *," to "an amount equal to or greater than * * *."

(6) *Problem.*—The bill, although it requires nonconforming ocean dumping to be terminated by the end of 1981, and requires interim permittees to pay penalty fees in the meantime, really does not prod interim permittees to end their dumping as quickly as possible between now and the end of 1981. Such a prod would be present only if the penalty fee exceeded the value to the dumper of delaying a phase-out of its dumping, a situation that is likely to be rare given the great difficulty in quantifying the adverse impacts associated with individual acts of dumping. Something further is, therefore, necessary.

Recommended solution.—Add a new paragraph to the bill (perhaps to take the place of proposed Paragraph (5)(A)(iv)) modeled after the approach of Section 4(f) of the Department of Transportation Act (described more fully in paragraph (c) of the final section of this testimony), precluding ocean dumping except where there are no "prudent and feasible" alternatives and all possible steps have been taken to minimize harm. This would have the added advantage of applying to dredged material (as to which there is no "interim" permit system), as well as to sewage sludge and industrial wastes.

Conclusions.—In the NWF view, the proposed penalty fee provision of H.R. 5851, particularly if modified in the indicated respects, has a worthy and desirable objective and will, if enacted, contribute constructively to the expeditious phasing out of the ocean dumping of sewage sludge and other (non-dredged) wastes.

LEAD AGENCY ON LAND-BASED ALTERNATIVES

Section 203 of the MPRSA currently vests in NOAA (via the Secretary of Commerce) the responsibility to: "conduct and encourage, cooperate with, and render financial and other assistance to appropriate public * * * authorities, agencies, and institutions, private agencies and institutions, and individuals in the conduct of, and to promote the coordination of, research, investigations, experiments, training, demonstrations, surveys, and studies for the purpose of determining means of minimizing or ending all dumping of materials within five years of the effective date of this Act."

Section 5 of H.R. 5851 would strike out Section 203 and transfer the contained responsibility over land-based alternatives to EPA as part of a new Section 113.

Given the reality of the limited manpower and resources available to NOAA in connection with ocean dumping, and the lack of a large body of expertise and experience with respect to land-based waste treatment technology, NWF cannot quarrel with the desirability of vesting responsibility for the conduct of alternatives research in EPA where the capability to do so presently resides. So we would support this aspect of Section 5 (as contained in proposed Section 113(1)).

On the other hand, given the fact that research on alternatives relevant to the phase-out of ocean dumping is taking place and will continue to do so in many quarters, within the government and outside (e.g., the Corps of Engineers and EPA are both directly involved in the exploration of ocean dumping alternatives; similarly, the Agricultural Research Service of the Department of Agriculture is heavily involved in sludge treatment research which may be extremely relevant to the termination of sewage sludge ocean dumping), there is something to be said for having an agency such as NOAA—which has a primary concern with preserving and managing the ocean environment—play a coordinating role to ensure that available expertise, wherever it may reside is brought to bear on the problem of bringing ocean dumping to an expeditious halt. Accordingly, we would favor retention within Section 203 of a residual role for NOAA, which might be articulated as follows:

"SEC. 203. The Secretary of Commerce, in consultation with the Secretary of the Army and the Administrator, shall encourage, cooperate with, and promote the coordination of research and other activities described in Section 113(1)."

Not only would this approach help ensure that existing research results are most effectively applied to facilitating the termination of ocean dumping, but it would help coordinate and enhance the efficiency of research efforts made and supported

by other federal agencies. Duplication of effort and underutilization of valuable research results could both be minimized in this way.

In addition, we would recommend the following further changes:

(1) Revise proposed Section 113(1) to require the determination of means of "expeditiously" minimizing or ending all dumping. This is necessary to convey a sense of urgency, especially since the proposed amendment would delete the "five year" time limit presently contained in Section 203.

(2) Revise proposed Section 113(2) to read as follows: "render financial and other assistance to appropriate public authorities * * * [etc.]." The encourage, cooperate and promote language would be deleted, since this function would be retained by NOAA under Section 203.

(3) Add a new Paragraph (f) to Section 103 of the present MPRSA, incorporating (as sub-paragraphs (1) and (2) the substance of proposed Section 113 (as modified in accordance with the above) in connection with the regulation of dredged material ocean dumping by the Secretary of the Army. In other words, the Army Secretary, like the EPA Administrator (in the case of non-dredged wastes) should be encouraged to conduct research aimed at finding land-based alternatives to the ocean dumping or dredged material.

THE DECEMBER 31, 1981 DEADLINE

Proposed Paragraph (5)(A)(i) of H.R. 5851 prohibits the issuance of interim permits (for the ocean dumping of material which violates the ocean dumping criteria) after December 31, 1981.

We note that this language is more succinct straightforward than its counterpart in H.R. 4715 and we believe, therefore, less subject to misinterpretation. We fully support this change in language, as well as endorsing the objective and effect of Paragraph (5)A)(i) of H.R. 5851. The Committee may wish, however, to express its intent that no further dumping may occur beyond 1981, even if "authorized" prior to the end of the year.

OTHER COMMENTS AND SUGGESTIONS

We offer the following further comments and suggestions concerning amendments to the MPRSA:

(1) Paragraph (5)(A)(ii) should be revised to make clear that waste transporters (who are often the recipients of EPA ocean dumping permits) which are now ocean dumping sewage sludge from municipality A are not, by virtue of this provision, eligible to begin ocean dumping for the first time of sewage sludge from municipality B. We'd suggest the following change, in line with § 220.3(d) of the current dumping criteria (42 *Fed. Reg.* 2470): "may not be issued *for the dumping of waste from a facility which has not previously dumped wastes in the ocean, from a new facility, or for the dumping of an increased amount of waste from the expansion or modification of an existing facility* as of the date of this Act." (Additions denoted by italic).

(2) Section 3 of H.R. 5851 should be amended to specify that the proceeds derived from the collection of authorized processing fees may be applied by the Administrator or the Secretary to defray the expenses of program administration or for any other appropriate program purpose. Absent such a provision, the proceeds would revert to the U.S. Treasury and would be unavailable for program purposes.

(3) Proposed Paragraph (5)(A)(iv), allowing the issuance of interim permits only if there is no acceptable alternative which can be immediately implemented, should be revised to coincide with the approach of Section 4(f) of the Department of Transportation Act (49 U.S.C. § 1653(f); *see also,* 23 U.S.C. § 138). Section 4(f) specifies that:

"The Secretary [of Transportation] shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area. or wildlife and waterfowl refuge of national, State, or local significance * * * or any land from an historic site of national, State, or local significance * * * unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use * * *."

Ocean dumping and highway construction are analogous in the sense that the ocean, like public parks, is not protected by marketplace forces (i.e., it is not under private ownership). In both cases, there would be the temptation to dump in the ocean or build a road through a park as the path of least cost least resistance, absent the intervention of Congress to protect these "common areas" for the benefit of this and future generations. Paragraph (5)(A)(iv) could accommodate this approach as follows:

"(iv) may not be issued unless (a) there is no feasible and prudent alternative to the issuance of such permit, and (b) such dumping is predicated on all possible planning to minimize harm to the marine environment and human health."

(4) We reiterate our view, expressed in previous testimony before this Committee, that the MPRSA should be amended to close the loophole which allows the U.S. Navy to ocean dump aviation fuel and other materials without the need for a permit and without regard to any of the requirements of the MPRSA. If the Committee wishes, we would be happy to pursue specific legislative language to accomplish this change with Committee counsel.

(5) We believe it would be desirable to amend the MPRSA to prohibit the issuance, under any circumstances, of ocean dumping permits with durations of greater than three years (subject to reapplication and reissuance). We are prepared to support this position in detail and would be pleased to do so if the Committee wishes to pursue this issue.

(6) We believe it would be desirable to amend the MPRSA to make the toxic substances limitations established by EPA pursuant to Section 307 of the Federal Water Pollution Control Act Amendments (Public Law 92-500) applicable to ocean dumping under the MPRSA. Again, we'd be glad to pursue this matter further with the Committee staff.

We very much appreciate the opportunity to present these views.

STATEMENT OF KENNETH S. KAMLET, ON BEHALF OF THE NATIONAL WILDLIFE FEDERATION

Mr. KAMLET. Thank you, Mr. Chairman.

I will just hit the highlights of my testimony.

I would like to note first that the penalty provisions of the bill are designed to eliminate the economic incentives which most ocean dumpers now have to continue their ocean dumping as long as they possibly can and also to stimulate those dumpers who cannot meet EPA's dumping criteria to phase out their dumping as rapidly as possible, in no case later than 1981.

The National Wildlife Federation fully supports this objective of the bill and we believe that the penalty provisions provided in the bill represent an appropriate and effective means of promoting the desired result, although in view of what has been said, perhaps a different term than "penalty fee" might be preferable, such as an "alternatives incentive fee," or perhaps a "delayed compliance fee." There are some adverse connotations that the term "penalty fee" has, which are perhaps inappropriate.

Most existing municipal and industrial ocean dumpers are dumping under the terms of so-called interim ocean dumping permits. As pointed out by a General Accounting Office report, issued last January, this means that these dumpers are pouring their wastes into the ocean at rates and at levels often greatly exceeding safety levels set by the Environmental Protection Agency to safeguard human health and the marine environment; and that does include mercury and cadmium, which are presentin the sludges of all the cities that we are talking about in whopping big doses.

By the terms of the permits issued in support of such dumping, and in accordance with revised ocean dumping regulation promulgrated last January, the continued authorization of dumping in violation of criteria requirements will end by the end of 1981.

Even so, EPA's widespread use of interim permits for a period of nearly nine years, from mid-1973 through the end of 1981, to authorize the ocean dumping of wastes clearly in violation of the ocean dumping criteria has been a practice of highly dubious legal validity under the ocean dumping law.

H.R. 5851 would validate this practice where shown to be necessary, but would deprive interim permittees for the first time of the rewards flowing to them from their protracted noncompliance with the requirements of the criteria, while speeding them toward an expeditious rendezvous with more acceptable waste management practices.

Such a "pollution tax" approach has in other contexts received the enthusiastic support of industry as well as of environmentalists. I have with me—and if the Chair wishes, I would be glad to submit it for the record—a 2-page summary, which appears in the June 24 issue of Environment Reporter, describing the recent National Environmental Policy Conference, sponsored by Executive Enterprise, Inc. Mr. Jackson B. Browing, corporate director of health, safety and environment affairs for Union Carbide, is quoted as telling the conference that his company favors pollution taxes as a means of eliminating uncertainty in the regulatory process and of enhancing the creativity and effectiveness of industrial cleanup efforts, by providing an incentive system tied closely to free market economics.

I would be glad to offer that for the record.

Mr. BREAUX. Without objection, it will be made a matter of the record.

[The following was received for the record:]

[From Environmental Reporter, "Current Developments," Vol. 8, No. 8, June 24, 1977, pp. 321-2]

GENERAL POLICY: POLLUTION TAX SUPPORTED BY UNION CARBIDE EXECUTIVE

Members of industry and the Sierra Club found themselves agreeing June 21 that a pollution tax might be a better way to clean up the environment than government regulation.

The idea was presented by Jackson B. Browning of Union Carbide Corporation, one of several industry and environmentalist speakers at the National Environmental Policy Conference sponsored by Executive Enterprises, Inc. June 20-21 in Washington, D.C. (See related story, p. 318).

Browning, who is corporate director for health, safety and environmental affairs for Union Carbide, said his support of the pollution tax concept surprised even himself at first.

"It may seem strange—it may even seem treasonable—to find a headline reading 'Businessman Urges Consideration of More Taxes," he said. "The hope is, of course, to get a trade-off—taxes for regulations, and eventually, lower taxes."

Browning's paper defending the pollution tax approach appeared to be well received by the approximately 65 people at the conference. Most of those attending are environmental directors for companies or corporations.

One members of the audience said the pollution tax could buy time for his company to resolve some technological problems that are causing it to fall slightly short of complying with the Clean Air Act.

ENVIRONMENTALISTS ENDORSE CONCEPT

President Willian Futrell of the Sierra Club said later in the program that environmentalists strongly support the pollution tax. He said in response to a question that environmentalists don't regard it as a 'license to pollute.' "I would pray devoutly for a pollution tax," he said. "We have lobbied for it. Why hasn't it been done?"

BASED ON INCENTIVES

The pollution tax envisioned by Browning is based on the assumption that industry will be more creative and effective in its environmental cleanup efforts under an incentive system tied closely to free market economics.

"Government and business are engaged in a slow dance of death on the regulatory ground and neither side seems to be able to find a way out," he said. "And the worst of it is that the more regulation fails, the more regulation we get."

Specifically, Browning's pollution tax would be levied per unit of effluent discharged, with those pollutants deemed to have greater adverse effects carrying higher charges.

Browning said in response to a question that highly toxic substances such as Kepone and PCBs should not be discharged under any circumstances.

"Toxic substances in air or water are a class apart and have to be handled differently," he said. "You don't regulate them. You just say no."

EXPENSIVE SYSTEM

The present regulatory system, aside from being cumbersome and less effective than an economic solution, is very expensive, Browning contended.

"We now spend between $50 and $60 billion (annually) on environmental regulations alone," he said. "If we should attempt to meet the demands of the 1970 Clean Air Amendments and the 1972 Water Pollution Control Act Amendments, by the early 1980s one conservative estimate holds that the cost would run on the order of $500 billion, or about 10 percent of the growth in per capita national income."

FLEXIBILITY IS KEY

Flexibility is the key to effective pollution control, Browning argued. The pollution tax, he said, "would provide flexibility both to industry, which could adjust its processes for maximum economic and budgetary advantage; and to government, which could adjust its tax schedules to impact specific pollutants as environmental needs dictated."

He cited the 1983 water pollution requirement for best available technology (BAT) as an example of regulatory inflexibility.

"The 1983 requirement for BAT doesn't take into account the fact that the goal of the Water Act is 'fishable, swimmable water,' he said. "If we can achieve that goal without applying BAT, we should be encouraged to do so—not prohibited from doing so.

"When you lock industry into using the best technology available at a given date, and you set environmental standards accordingly, you deprive industry of any incentive to seek its own long-term solutions, to seek constant improvement in technologies and, moreover, you foreclose on constant improvement in environmental quality," he said. "If we can reach 'fishable, swimmable water' before 1983 without BAT, let us get on with it. The flexibility required to do that doesn't now exist."

PRODUCTS REFLECT TAX

A pollution tax, because it is predictable and measureable, would eliminate the uncertainty which Browning contends is inherent in the regulatory process.

"Today, uncertainty provides an incentive to evade the law," he said. "The ability of some to evade or delay complying with the law while others obey it creates an inequity."

A pollution tax, on the other hand, would allow industries to base their marketing decisions on predictable environmental obligations, he said. Goods with the least adverse environmental impact would have a competitive advantage, Browning said.

"A pollution tax would uniformly reflect the environmental cost of doing business and would share those costs clearly and directly with the consumer. A product which created a great deal of pollution would increase commensurately in cost," he said.

EUROPEAN COUNTRIES CITED

Browning said several European countries, including West Germany, France, the Netherlands, Czechoslovakia, and Great Britain, either have adopted or are moving toward the pollution tax concept.

In the U.S., he said, the idea has been advanced by Charles Schultze, the head of President Carter's Council of Economic Advisors, who co-authored with Allen V. Kneese a stay on pollution taxes and regional control strategies (Current Developments, December 24, 1976, p. 1227)

NO CONGRESSIONAL ACTION

Browning noted that the idea of a pollution tax has been before the U.S. Congress before but "So far nothing has come of it."

The arguments against the pollution tax approach were summarized by Senator Edmund Muskie (D-Maine), chairman of the Environmental Pollution Subcommittee, who was questioned on the subject later in the program. Muskie, who helped

33-546 O - 78 - 5

write key environmental legislation, said the regulatory approach is working and should continue.

"I've always been rather negative toward that answer," Muskie said of the pollution tax. "It does not really eliminate the complexity of an overwhelming bureaucracy. I doubt whether it would be any easier to implement than now."

But Muskie expressed some interest in testing the pollution tax on a specific pollutant to determine its effectiveness, as proposed by Senator Gary Hart (D-Colo).

"I've never heard that proposed before and I'd be interested to examine it," Muskie said.

Mr. KAMLET. The Environmental Protection Agency has, similarly, proposed the use of a so-called "noncompliance fee" to assist it in carrying out its pollution control responsibilities under the Federal Water Pollution Control Act.

Again, if the Chair wishes, I would be pleased to submit for the record the legislative language of the EPA sponsored noncompliance fee approach, as adopted by the Senate as section 45 of S. 1952.

Again, if the Chair wishes, I would submit that.

Mr. BREAUX. Without objection, it will be made a matter of the record.

[The following was received for the record:]

"NONCOMPLIANCE FEE" APPROACH OF S. 1952, 95TH CONG., 1ST SESS., AS RECOMMENDED BY EPA

NONCOMPLIANCE FEE

SEC. 45. Title III of the Federal Water Pollution Control Act is amended by adding a new section as follows:

NONCOMPLIANCE FEE

"SEC. 319. (a) A noncompliance fee established pursuant to this section shall be imposed automatically and payable to the Administrator or a State with an approved program under section 403, as appropriate, either quarterly or monthly, for any point source (other than a publicly owned treatment works) which is not in compliance on or after (1) July 1, 1979, with any effluent limitation or standard under section 301(b) (1), 306, 307, or 316 of this Act, or (2) January 1, 1984, with any effluent limitation or standard under section 301(b) (2), 302, or 307 of this Act. Any permit issued under section 402 of this Act for such source shall be amended to incorporate such fee requirements.

"(b)(1) The owner or operator of any such point source for which the Administrator or a State with an approved program under section 402 intends to impose a noncompliance fee under this section shall upon request by the Administrator or the State furnish to the Administrator or the State (with a copy to the Administrator) information containing a detailed description of the control technology or system proposed to achieve compliance with such effluent limitation or standard and the estimated cost of compliance, including capital costs, debt service costs, the estimated schedule of expenditures to comply with such limitation or standard, and the estimated annual costs of operation and maintenance of any technology or system required in order to maintain such compliance, together with such information as the State (or the Administrator) may require on the economic value which a delay in compliance beyond July 1, 1979, or January 1, 1984, as the case may be, may have for the owner or operator of such source.

"(2) The Administrator or the State shall issue specific notice to the owner or operator of a point source subject to this section requiring the information described in this subsection. If the owner or operator of any source subject to this section fails to submit a calculation of the fee assessment, a schedule for payment, and the information necessary for independent verification thereof, the State (or the Administrator, as the case may be) may enter into a contract with any person who has no financial interest in the owner or operator of the source (or in any person controlling, controlled by, or under common control with such source) to assist in determining the amount of the fee assessment or payment schedule with respect to such source. The cost of carrying out such contract may be added to the penalty to be assessed against the owner or operator of such source. In addition, the State or the

Administrator, as appropriate, may use cost information developed under section 304(b) of this Act.

"(c)(1) A notice of receipt of information pursuant to subsection (b) of this section shall be published in the newspapers in general circulation in such State, and such notice shall set forth where copies of the information are available for inspection and, for a reasonable charge, copying.

"(2)(A) Within thirty days following the date of publication of the notice issued under paragraph (1) of this subsection, or at any time the Administrator or a State with an approved program under section 402 proposes to establish a noncompliance fee under this section, there shall be published in the newspapers in general circulation in such State (and, as appropriate, the Federal Register or any publication required as part of any rulemaking activity in such State) the proposed noncompliance fee applicable to the source with an announcement of an opportunity for a public hearing on such action.

"(B) A proposed noncompliance fee under this section, determined in accordance with guidelines published by the Administrator, shall be a monthly or quarterly payment in an amount no less than the monthly or quarterly equivalent of the economic value of noncompliance, including, but not limited to, planning costs, design costs, supply costs, capital costs and costs of capital over a normal amortization period not to exceed ten years, start-up costs, operation and maintenance costs, and such other factors deemed appropriate by the Administrator relating to the economic value which a delay in compliance beyond July 1, 1977, or January 1, 1984, as the case may be, or such other date required for compliance, or any other noncompliance, may have for the owner or operator of such source.

"(C) The Administrator or the State shall take final action establishing such noncompliance fee within ninety days after the date of publication of the proposed fee under subparagraph (A) of this paragraph.

"(d)(1) A noncompliance fee established by a State under this section shall apply unless the Administrator, within sixty days after the date of publication of the proposed fee under subsection (c)(2)(A) of this section, objects in writing to the amount of the fee as less than would be required to comply with guidelines established by the Administrator.

"(2) If the Administrator objects under this subsection, he shall simultaneously establish a substitute noncompliance fee applicable to such source in accordance with the requirements of subsection (c) of this section.

"(e)(1) In the event an owner or operator contests the noncompliance fee established under this section, the owner or operator may within thirty days seek review of such penalty in the appropriate United States district court.

"(2)(A) Except as provided in subparagraph (B) of this paragraph, in no event shall any challenge or review taken under this subsection operate to stay or otherwise delay the obligation of a source to commence monthly payment of the noncompliance fee as determined by the Administrator or the State on the date established to begin such payment, pending the outcome of any such review.

"(B) In any challenge of the imposition of the fee based on an allegation that the failure to comply by such date was due to reasons entirely beyond the control of the owner or operator and there is a substantial likelihood that the owner or operator will prevail on the merits, the obligation to commence monthly payment of the noncompliance fee may be stayed pending the outcome of such challenge: *Provided*, That as a condition of such stay, the owner or operator of such source shall post a bond or other surety in an amount equal to the potential liability for such fee during the period of the stay.

"(3) If an owner or operator is successful in any challenge or review proceedings under this subsection, the court may award such relief as necessary, including cancellation of the bond, rebate of any payments, or adjustment of the amount of payments required by the order.

"(f) In any case where a State does not have sufficient authority to issue a noncompliance fee, the Administrator after thirty days' notice to the State shall establish, implement, and enforce such fee.

"(g) Failure to make any payment required under this section or to submit information required under this section shall constitute a violation of this section and section 301 and shall, in addition to liability for such payments, subject the owner or operator of a source to all penalties under section 309 of this Act.

"(h) Any payments or other requirements under this section shall be in addition to any other permits, orders, payments, sanctions, or other requirements established under this Act, and shall in no way affect any civil or criminal enforcement proceedings brought under any provision of this Act or State or local law.

"(i) Upon making a determination that a source with respect to which a fee has been paid under this section is in compliance and is maintaining compliance with the applicable requirement, the State (or the Administrator as the case may be) shall review the actual expenditures made by the owner or operator of such source for the purpose of attaining and maintaining compliance, and shall within one hundred and eighty days after such source comes into compliance—

"(A) provide reimbursement with interest (to be paid by the State or Secretary of the Treasury, as the case may be) at appropriate prevailing rates (as determined by the Secretary of the Treasury) for any overpayment by such person, or

"(B) assess and collect an additional payment with interest at appropriate prevailing rates (as determined by the Secretary of the Treasury) for any underpayment by such person.".

Mr. KAMLET. In short, the penalty fee approach of H.R. 5851 has much to recommend it and has been recognized as a useful device in other contexts.

If the committee would indulge me for another minute or two on this subject, we would like to recommend several changes in the bill which we feel would strengthen the penalty fee approach and facilitate its application.

The bill, in proposed paragraph (C)(i), leaves it up to EPA, in determining the amount of the penalty fee to assess on a dumper, to itself estimate not only the monetary value of any harm caused by the dumping to the marine environment, but also the monetary savings to the dumper by being able to continue ocean dumping rather than having to employ a more costly land-based alternative.

We would recommend that the bill be modified to place the onus of estimating the cost of alternative technologies on the dumper rather than on EPA, since this information is most directly accessible to the dumper and given EPA manpower limitations. It would also avoid the delay inherent in rulemaking to cover groups of dumpers—which is the only way EPA could assume this responsibility itself.

The likelihood that a dumper would intentionally underestimate his phase-out costs in order to minimize applicable penalty fees, is somewhat offset by a polluter's natural tendency to exaggerate, rather than understate, the costs of satisfying environmental requirements.

The possibility of understatement can further be reduced by providing for an after-the-fact accounting, which compares the actual cost of compliance with the original projections and requires the dumper or EPA to reimburse any discrepancy.

This approach is the one proposed in the context of a noncompliance fee under the Water Act. We feel it has merit in the ocean dumping area, as well.

The bill says nothing about enforcement or judicial review, and we believe the bill should make clear that the mere payment of a penalty fee does not thereby excuse a dumper from the need to comply with otherwise applicable permit conditions and regulatory requirements.

Similarly, the bill should specify that the failure to make required payments or to submit required information constitutes a violation of the act, making the offender subject to all civil and criminal penalties under the act, in addition to liability for payment of the penalty fee.

Furthermore, we believe the bill should provide for expedited judicial review on a dumper's challenge to a penalty fee assessment, to avoid delaying the assessment of a fee until 1981 has passed and the fee no longer has meaning.

Specifically, recourse to judicial review should be limited to 30 days from the establishment of the penalty fee; a judicial stay of the operation of the penalty fee pending the outcome of review should be prohibited, except where the noncompliance is due to reasons entirely beyond the control of the dumper; and even in such cases the dumper should be required to post the amount of the penalty fee as a bond, so that if he loses in court, he will still have to forfeit the full amount of the penalty fee. Again, these recommendations are modeled after the approach of the noncompliance fee proposed under the Water Act.

Perhaps a comparable approach would handle the problem raised by Mr. Low earlier, of what you do in the early years of implementation, where you are involved in design work and planning, that does not cost the full amount of what a fee would be. It might be appropriate to consider including in the bill a provision for placing these funds in an escrow account for use in later years when construction commences and the more expensive phases of implementation come into play—so the full opportunity for an offset remains available and yet the dumper does not get off scot-free in the interim.

Finally, on pages 7 through 10 of our prepared statement, we recommend half a dozen minor, clarifying changes to the language of the penalty fee provisions of the bill.

These changes would in no way alter the effect or intent of the present provisions. Their purpose would be solely to preserve the integrity of the overall statutory and regulatory scheme and avoid unintended inferences and misconstructions. We hope the committee will review these recommendations carefully.

One of these recommendations deserves special emphasis.

Proposed paragraph (5)(A)(iv), as it appears in section 2 of the bill, would condition the issuance of an interim permit by the Administrator on a finding that the dumper "has no alternative * * * which can be immediately implemented and which is environmentally less harmful" than ocean dumping. While we endorse the intent of this provision, we believe it should be broadened in its reach and expanded in its coverage.

Specifically, we recommend the adoption of the two-pronged approach of section 4(f) of the Department of Transportation Act, which requires not only that the project proponent fully exhaust all "feasible and prudent" alternatives, but also that the project, if it proceeds, must include "all possible planning to minimize harm."

We also recommend, although this may not be apparent from our prepared statement, broadening the applicability of this requirement to give preference to land-based alternatives to encompass ocean dumping under section 103, as well as under section 102 of the ocean dumping law.

The full text of section 4(f) of the DOT act appears on page 14 of our prepared statement.

A revised version of this language could appropriately be embodied in the ocean dumping law either as an addition to section 104, or as additions to both section 102 and section 103.

We believe the rationale behind the section 4(f) approach, designed to minimize the destruction of public parklands at the hands of highway projects, applies directly and logically to protecting the ocean from damage resulting from waste disposal. In both cases, the resource being protected is owned by no one and everyone. In both cases, only the Congress can protect these resources for the benefit of this and future generations.

The second issue we were asked to address concerns the proposed transfer of the responsibility for developing land-based alternatives to ocean dumping from NOAA, where section 203 currently places it, to EPA, under a proposed new section 113.

Our views on this question are spelled out on pages 10 through 13 of our prepared statement. Although the approach proposed by the bill is one we could live with, we would prefer to see it modified in three major respects:

First: The bill should require the determination of means of "expeditiously" minimizing or ending all dumping, and not simply minimization or termination as vague goals.

Second: The duty to search out such alternatives, proposed for section 113 in the context of EPA should be extended to include the Corps of Engineers through a comparable provision in section 103.

And third, we believe it would be appropriate and desirable to retain in NOAA, as part of a truncated Section 203, residual authority and responsibility to "encourage, cooperate with, and promote the coordination of" alternatives research, while transferring to EPA and the Corps responsibility over the direct conduct of and grant support for such research.

We make this suggestion based on our view that some outside supervision is necessary to ensure that research results relevant to finding ocean dumping alternatives are recognized and applied as such.

Outside coordination, of the sort which NOAA could provide, would also assist in minimizing duplication of efforts by and among other Federal agencies.

In making this recommendation, we do not mean to impugn the competence of EPA or the Corps of Engineers. Rather, it reflects the fact that EPA, for example, is organized along specific functional lines. It has offices concerned with grants administration, research and development, effluent standards, and so forth. It is quite easy within such a context for one office concerned with ocean dumping to be totally unaware of what any other of a dozen separate offices may be doing which may bear on finding alternatives to ocean dumping. We recommend a coordination role for NOAA only because clarity and perspective can sometimes only be gained from a distance.

The third issue we were asked to address concerns the 1981 phaseout deadline contained in the bill as proposed in paragraph (5)(A)(i). Our comment is brief: We fully support this provision.

Finally, we were invited to offer further comments and suggestions concerning amendments to the ocean dumping law. Rather

than belaboring these now, I would simply invite the committee's attention to pages 13 through 15 of our prepared statement. If the committee wishes to explore any of these recommendations further, I would be happy to pursue them with the committee staff or during the question period.

That concludes my statement.

We thank the committee for the opportunity to present it and hope it has been responsive to the committee's needs.

Mr. BREAUX. Mr. Kamlet, we thank you once again for your detailed statement.

Mr. BREAUX. Mr. Hughes?

Mr. HUGHES. I have no questions.

Mr. BREAUX. Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman.

I also want to thank you very much for a very detailed job but, again, we are under pressure of time. If we have any further questions, we will submit them to you.

Again, we appreciate it very much.

Mr. KAMLET. Thank you.

Mr. BREAUX. Thank you.

With that, we will conclude today's hearings and the Subcommittee on Oceanography and the Fish and Wildlife Conservation and the Environment will stand adjourned until further call of the Chair.

[Whereupon, at 5:07 p.,m., the subcommittees adjourned.]

OCEAN DUMPING

WEDNESDAY, FEBRUARY 1, 1978

HOUSE OF REPRESENTATIVES, COMMITTEE ON MERCHANT MARINE AND FISHERIES, SUBCOMMITTEE ON OCEANOGRAPHY, AND SUBCOMMITTEE ON FISHERIES AND WILDLIFE CONSERVATION AND THE ENVIRONMENT,

Washington, D.C.

The subcommittees met at 10:07 a.m., in room 1334, Longworth House Office Building, Hon. John. Breaux (chairman of the Subcommittee on Oceanography) presiding.

Present: Representatives Breaux, Leggett, Hughes, Forsythe, Pritchard, Emery, and Evans.

Staff present: Ernest J. Corrado, chief counsel; Ned P. Everett, counsel; Richard D. Thornton, counsel; Judy A. Townsend, professional staff; Grant Wayne Smith, professional staff; Donna Kay Firkin, subcommittee clerk; Curtis L. Marshall, professional staff, minority; and Gregory Batey, research assistant.

Mr. BREAUX. The subcommittees will please come to order.

Today, the Subcommittees on Oceanography, and Fisheries and Wildlife Conservation and the Environment convene hearings to consider the authorization of funds to be appropriated to the Marine Protection, Research and Sanctuaries Act of 1972. The act, commonly known as the Ocean Dumping Act, is divided into three parts:

Title I establishes the ocean dumping permit program to be administered by the Environmental Protection Agency. Both U.S. Corps of Engineers and the U.S. Coast Guard are mandated responsibilities under this title. The corps is given general responsibility over the dumping of dredged material, and the Coast Guard is required to provide monitoring and surveillance support to the program.

Title II directs the Department of Commerce, through the National Oceanic and Atmospheric Administration, to provide research and monitoring support for the ocean dumping program. In addition, section 202 gives NOAA the authority to conduct research pertaining to the long-term effects of pollution and other man-induced changes to the marine environment.

Last, title III establishes with NOAA a marine sanctuary program which provides for the protection and regulation of activities in specified areas of the ocean.

Today the subcommittees will be considering the level of funds that will be required to effectively carry out the program mandated under the three titles of the act for fiscal years 1979 and 1980.

Before we start with the testimony, I would like to make some observations.

For the most part, since it became law in 1972, the Marine Protection, Research and Sanctuaries Act has suffered from a lack of interest on the part of the administration. While the ocean dumping permit program has been considerably more successful in obtaining funds relative to the other titles under the act, it is questionable whether the intended purpose of the program, as established by Congress, has been adequately carried out. The express purpose of the act is to strictly prohibit or limit the dumping of materials which are harmful to the marine environment. In response to this congressional directive the EPA promulgated regulations which have attempted to define what is environmentally acceptable to dump into the ocean.

At the same time, that agency also established various permit categories for materials being ocean dumped. One such category, interim permits, has been a special concern of these subcommittees because these permits allow the dumping of materials which do not comply with the EPA environmental criteria. All of the industrial wastes and municipal sewage sludge currently being dumped into the ocean is allowed under interim permits. EPA's justification for the use of such permits is based on the fact that no acceptable alternative disposal methods are available which would permit the termination of the dumping of these substances into the marine environment.

The subcommittees have looked long and hard into this problem. We have held many days of hearings and have heard testimony from the cities engaged in ocean dumping, technical experts familiar with alternative disposal methods, the EPA, and other agencies responsible for carrying out the intent of the act. Our findings have been somewhat disturbing.

Most of these cities have not yet selected a disposal alternative to ocean dumping. The EPA has assured Congress that all dumping authorized by interim permits can be eliminated by December 31, 1981. EPA has codified this termination date in its revised regulations published on January 11, 1977.

Last session, these subcommittees, concerned that the cities were not taking the intent of the act nor the EPA deadline seriously, adopted an amendment which would require the cessation, by the end of 1981, of all sewage sludge dumping which does not comply with the EPA environmental criteria. This amendment was signed into law by the President last October.

We do not intend to stop here. I personally have my doubts that this deadline will be met. The plight of Camden, N.J. only substantiates my fears. In hearings before these subcommittees last session, the Honorable Angelo Errichetti, Mayor of Camden, claimed that his city would terminate its ocean dumping by the end of 1977. Camden is still dumping its sewage sludge into the Atlantic Ocean.

With the approach of the 1981 deadline, the need for the Marine Protection, Research and Sanctuaries Act will not diminish. In this session, and in the future, we will be directing our efforts to what currently accounts for over 90 percent of all materials which are being ocean dumped—dredge spoil. According to studies conducted by NOAA's marine ecosystems analysis project, dredge spoil compared to all other pollution sources, accounts for over 50 percent of the suspended solids; 30 percent of the lead; 20 percent of the

organic carbon; and 45 percent of the phosphorous going into the New York Bight.

NOAA will have a major role to play in the study of the effects of dredged material and other substances on the marine environment. NOAA is currently in the process of drafting an interagency agreement with the Corps of Engineers and, in fiscal year 1978, will begin a pilot dredged material study in the Mississippi Delta area. I am pleased to see that after more than 4 years of having no funds appropriated, NOAA is finally able to fulfill its responsibilities mandated under title II.

The lion's share of the blame for the slow start of title II programs rests on NOAA itself. In past years, for some reason NOAA decisionmakers determined that, relative to other NOAA programs, its title II responsibilities were relatively unimportant. This is illustrated by the fact that NOAA did not even request funds for title II until fiscal year 1976. By the time NOAA did request funds, the other decisionmakers in the budget process had been convinced that title II programs did not merit funds, and again in fiscal year 1976 no funds were appropriated.

For the first time now, it seems that this unfortunate and unjustified perception has been reversed. For fiscal year 1979, OMB has approved $3.35 million and $2.56 million to sections 201 and 202 respectively under title II.

My last observation pertains to title III of the act—the marine sanctuaries program. This program, which has yet to be appropriated any funds, is just now getting its feet on the ground. To date, only two marine sanctuaries have been designated, the Monitor and Key Largo sites.

Last year, the President's environmental message emphasized the importance of the marine sanctuaries program. Since that time, over 170 potential sanctuary sites have been identified. In response to this increased interest and the need to effectively manage other uses of the ocean, NOAA formed the Office of Ocean Management. The marine sanctuaries program is a major component of this new office. I hope the result of these new changes will be a long-awaited realization of congressional intent—an effective marine sanctuary program.

I would like to call on our ranking minority member, Mr. Forsythe, and ask if he has any comments he would like to make.

Mr. FORSYTHE. Thank you, Mr. Chairman.

I do have a few comments that I would like to make as we open this hearing.

We are now in our sixth year of a national ocean dumping program established when Congress enacted the Marine Protection, Research, and Sanctuaries Act of 1972. Among other tasks, this act authorizes "research, investigations, experiments, training, demonstrations, surveys, and studies, for the purpose of determining means of minimizing or ending all dumping materials within 5 years of the effective date of this act." That 5-year deadline was passed last October.

Today, 5½ years later, dumping is continuing and no immediate end is in sight. EPA and Congress have set December 31, 1981, as a deadline for the ocean dumping of harmful wastes, but major dumpers, in particular New York City, do not believe the deadline

can be met. An all-out effort, drawing upon resources from the private and public sector, will be required in order to prevent yet another deadline from sliding by.

One obstacle to an effective ocean dumping program has been the structure of the Marine Protection, Research and Sanctuaries Act. NOAA, an agency specializing in oceanographic research, has been given responsibility in the act for researching land-based alternatives to ocean dumping. Tnis responsibility ought to belong to EPA. H.R. 5851, a bill which I introduced and which has been cosponsored by 18 members of our committee, would make this change. I hope this provision can be incorporated into the authorization bill that we are considering today.

Finally, I would like to address EPA and NOAA. This committee plans to take a very close look at your ocean dumping programs. We consider it imperative that ocean dumping be ended by 1981, and we plan to give the involved agencies a very substantial authorization for these programs. In addition to authorized funding, this committee is prepared to act on legislative proposals—such as H.R. 5851—to insure that the 1981 deadline is met. Constructive, environmentally sound alternatives must replace the disgraceful practice of ocean dumping.

I thank you, Mr. Chairman.

Mr. BREAUX. Thank you.

I would like to call our first witness, the Honorable Thomas C. Jorling, Assistant Administrator for Water and Hazardous Materials.

Tom, the subcommittees welcome you. If you have anyone that you would like to accompany you, please identify them for the record.

STATEMENT OF HON. THOMAS C. JORLING, ASSISTANT ADMINISTRATOR FOR WATER AND HAZARDOUS MATERIALS, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY JOHN T. RHETT, DEPUTY ASSISTANT ADMINISTRATOR FOR WATER PROGRAMS OPERATION; AL WASTLER, CHIEF, OCEAN DISPOSAL BRANCH; AND KENNETH BIGLANE, DIVISION CHIEF, OIL AND SPECIAL MATERIALS DIVISION

Mr. JORLING. Thank you.

If the committee would allow, I would like to ask Jack Rhett, Deputy Assistant Administrator for Water Program Operations; Kenneth Biglane, Division Director, Oil and Special Materials Control Division; and Al Wastler, of the Marine Protection Plan, if they would accompany me to the table.

Thank you, Mr. Chairman and members of the committee. I welcome the opportunity to testify today to provide the support of EPA and the administration for continued authorization of the Marine Protection, Research and Sanctuaries Act—MPRSA.

In 1972, while the landmark Water Pollution Control Act amendments was moving toward enactment, it became clear that one byproduct of the regulation of discharges of pollutants from industrial and municipal sources would be significant increases in the volume of sludge.

The Marine Protection, Research and Sanctuaries Act was passed 8 days after the FWPCA to eliminate the option of disposing of harmful sewage sludge in the ocean environment.

Since that time, EPA has brought all sewage, industrial and dredge ocean disposal under regulatory control. Today, with the added thrust of the 1977 Clear Water Act amendments, the end of dumping harmful industrial and sewage sludge is in sight.

I would like to describe the actions now being taken by EPA to insure that the remaining sewage sludge dumpers will be able to stop ocean dumping by the end of 1981 in conformance with Public Law 95-153.

We have just completed the process of issuing new interim permits to municipal sludge dumpers in the New York-New Jersey area. The major sludge dumpers in New York State requested and were granted extensions for the development and submission of facility plans. These plans are now due between May and July of this year. Major New Jersey sludge generators have submitted draft facility plans which are now being reviewed by the region II staff. Public hearings on these plans will begin the third week in February.

The new permits generally incorporate explicitly more enforceable milestones than were included in previous permits. For example, the New York City schedule now contains 28 interim dates leading to the cessation of ocean dumping by the end of 1981. Similarly, in the case of Westchester County, there are 13 interim dates. Other permits also include numbers of interim dates appropriate to each situation.

This has been done so that EPA can monitor progress more closely than before and can take appropriate enforcement action before major slippages occur. We believe this approach has built into these permits an early warning system which will improve our ability to keep the dumpers on schedule. All dumpers have been advised of our intent to monitor compliance with all permit conditions very closely and to take immediate enforcement action when permit conditions are violated.

In the case of the city of Philadelphia, EPA brought a successful action for violation of an ocean dumping permit. The administrative law judge recommended the assessment of a fine of $225,000 against the city. Unless Philadelphia agrees voluntarily by entering into a court-ordered consent decree as a result of negotiation now ongoing in the region, further enforcement action is contemplated to insure Philadelphia meets its permit requirements and ends ocean dumping on schedule. EPA has already referred the case to the Department of Justice for possible judicial enforcement. EPA will do whatever is necessary to get Philadelphia out of the ocean no later than 1981.

During the past year, serious consideration has also been given to relocating the New York-New Jersey metropolitan areas and Philadelphia sewage sludge dumping sites. A hearing on these matters was held last spring at Toms River, N.J., to solicit information on the issues involved. Given the importance we attach to this problem and the tremendous range and complexity of issues and evidence involved, I am doing a detailed review of the record of

that informational hearing. I anticipate that a decision will be announced during the next several weeks.

I regret to report to you that Camden, N.J., has not yet stopped ocean dumping. In justice to the city, however, I would like to state that this is not due to lack of good faith effort on their part. There were some difficulties in receiving bids on construction of part of the composting plant which delayed some construction into bad winter weather. We do expect at this time that the composting facility will be operational by the end of March and that ocean dumping of sewage sludge will stop at that time.

The schedules for implementation for all remaining sludge generators are indeed tight and have little allowance for slippage. In addition, the enforcement posture of the agency has been enhanced with last session's amendment. We believe that our careful monitoring of each permittee's activities will afford the highest probability of forestalling any occurrences that will result in any permittees being unable to dump harmful sewage sludge by December 31, 1981.

Of course, ending sludge dumping requires more environmentally acceptable alternatives for sludge disposal. EPA, continuing the work of its predecessor agencies, has been working on methods for the disposal and management of municipal sludge since the enactment of the first Federal water pollution control laws. The study of these alternatives to ocean dumping of municipal sludge normally has been funded, not through the ocean dumping program, but rather through the Federal Water Pollution Control Act—FWPCA—since municipal sludge is a byproduct of the sewage treatment process.

The current research and demonstration program emphasis has shifted toward development of improved technology for returning sludge to the environment in an ecologically acceptable manner. In fiscal year 1976, nearly $3 million was allocated on such programs, including secondary health and ecological effects of the alternatives to ocean disposal. The emphasis of these projects was on beneficial utilization, that is, land application for soil enhancement, crop production and reclamation of disturbed lands, the production of energy, and resource recovery.

I would like, Mr. Chairman, to submit for the record copies of some of the documents that the agency has produced pursuant to this research and development activity, all dealing with municipal sludges, the most recent being the technical bulletin on municipal sludge, which does deal with the alternatives and criteria measuring the acceptability of those practices.

Mr. BREAUX. Without objection, they will be received for consideration by the subcommittee.

Mr. JORLING. New technologies are being examined to determine if there are cost-effective methods for producing or recovering marketable products in the processing of sludge. These products include metals recovery, organic acids, fertilizer bases, soil conditioners, methane, and the recovery of process heat. The program will also provide guidance for controlling unacceptable land disposal practices under the Resource Conservation and Recovery Act of 1976.

In addition to research and demonstration programs, EPA is undertaking pilot studies for the design of new and innovative technologies for sludge as well as studies of regional solutions to sludge issues. Presently over $17 million has either been obligated or is in the process of being committed for such studies. These funds have been targeted to those communities that have been ocean dumping. This work is being done and supported under the Clear Water Act.

It is our understanding that consideration is being given to transferring the research and demonstration authority of section 203 of the Ocean Dumping Act from NOAA to EPA. If this is done, we would regard the demonstration of the practicality of land-based alternatives for the disposal of sewage sludge as the first priority. Land-based sludge disposal research has been financed and carried out by EPA since the beginning of the sewage treatment program. I should point out that no sludge land disposal research has been financed under the authority of the MPRSA. We also believe that attention should be given to the development of innovative technology particularly as it applies to the disposal of dredged material.

Major problems in utilizing some land-based alternatives for these types of wastes are related to the demonstration of the practicality of techniques already developed through ongoing research. Pyrolysis and composting are examples of such techniques. More effort needs to be devoted to implementing such alternatives on a demonstration basis, as has been done in the case of Camden, N.J., so that the hesitation of some communities about using an unproven technique can be overcome.

The act gives EPA the authority to designate ocean dumping sites for dredged material, as well as for sewage sludge and industrial wastes. EPA is required to prepare Environmental Impact Statements—EIS's—in support of each site designated for use on a continuing basis.

Carrying out this responsibility requires the collection of environmental data on the dumpsites and adjacent areas, and continuing measurement and assessment of conditions at each site. We have an interagency agreement with NOAA which includes provision for NOAA to collect baseline information on some ocean disposal sites as part of their research activities under title II.

The thrust of the NOAA activities under title II is, however, directed toward understanding the complex processes occurring in the ocean through long-range research activities, and not toward obtaining the types of site specific data required for us to designate and manage sites in a timely manner. Thus, while we have obtained valuable information from NOAA on the New York Bight and on the 108-mile site, and we expect to receive additional information in the future, we are unable to rely on other agencies' commitment of resources so that timely inputs can be made to meet our site designation responsibilities which have regulatory impact.

During the past year we have negotiated a contract for preparing EIS's on all sites which are not being phased out prior to January 1980. This contract includes a provision for additional baseline surveys to supplement information presently available or expected to be developed through the research efforts of NOAA under title

II of the Ocean Dumping Act. EIS's on a few dredged material sites will be included in this contract, but the funds presently available will not permit us to prepare EIS's on all dredged material sites. We are, therefore, directing our efforts toward those sites which we anticipate are having the most severe impact on marine ecosystems. We are working closely with the Corps of Engineers in this activity and are negotiating an interagency agreement which will delineate the respective roles of the two agencies in this area. Review of Corps of Engineers permits issued for dredging activities is done by EPA regional offices on a routine basis, and no formal agreement has been needed to clarify relationships in this part of the program.

Over the past 3 years, EPA has supported the development of new technology for monitoring the impacts of ocean dumping. We have developed by contract sensitive biological monitoring devices and techniques designed to detect changes in the enzyme balances of marine organisms due to the presence of certain specific pollutants long before any toxic effects occur. These devices, known as Biotal Ocean Monitors [BOM's], have been thoroughly tested in the Gulf of Mexico and at the Philadelphia sludge dumping site. This summer they will be used as an operational monitoring tool in the New York Bight.

The Coast Guard is responsible for normal surveillance of dumping operations. Coast Guard districts are provided with a copy of each permit, and dumpers are required to give the Coast Guard advance notice of their dumping schedules. This system has worked quite well in practice and no formal agreement has been necessary between EPA and the Coast Guard. During calendar year 1977, the Coast Guard performed a total of 1,291 surveillance missions. This represents surveillance of 72 percent of all toxic chemical dumps and 22 percent of all other dumps done on a spot-check basis so the monitoring is more effective.

We have also been deeply involved in incineration at sea as an alternate means of disposal especially of some combustible toxic organics when traditional methods would create an unacceptable risk. EPA has taken the lead in establishing operating guidelines for incineration at sea and in exploring the potential of this new technology as an acceptable means of disposal for certain types of wastes. International guidelines for incineration at sea are being developed under the International Ocean Dumping Convention, and much of the information being used was developed by EPA during research and operational burns over the past several years.

During 1977, the U.S. Air Force incinerated 2,300,000 gallons of Herbicide Orange aboard the M/T *Vulcanus* in the Pacific Ocean under EPA permit. Much valuable information was collected during this operation, and the data collected will be used to develop criteria under which incineration at sea can be done safely.

The disposal of dredged material is a matter of continuing concern, particularly when massive harbor deepening projects are being considered. The Corps of Engineers dredged material research program has made great contributions in pointing out how dredged material can be used in beneficial ways. Some of these approaches should be explored in more detail in terms of how dredged material can be used to enhance, rather than degrade, the

marine environment. The building of artificial islands and estuarine habitats are approaches that could make dredged material a beneficial resource rather than a waste. We feel that large-scale demonstrations of such approaches are needed.

The administration's fiscal year 1979 budget request for title I of the MPRSA calls for $1.4 million. The 1980 budget request is now in preparation. Continued funding will be required, particularly to increase our studies of dredged material sites and to designate acceptable sites at an early date. The 1979 budget request does maintain support for the ocean dumping program and conforms to the administration's budgetary limitations.

The funding of title II of the Water Act, however, with its 75 percent funding of sludge facility construction costs will be critical in reaching the 1981 deadline.

Mr. Chairman, this concludes my prepared statement. I will now be happy to answer questions you or members of these subcommittees may have.

Mr. BREAUX. Thank you very much for your statement, Mr. Jorling.

On page 2 you mention the 1981 deadline that is included in both the regulations that your Agency has promulgated and the law Congress passed last year making it an absolute deadline. One thing that disturbs me immediately is the fact that in the next paragraph you explain that the State of New York has been granted an additional time extension for the submission of their facility plans.

Do you think this in any way will hamper their ability to reach the 1981 deadline?

It is disturbing to see that this was done. I could tolerate it if I could be assured that it would not affect compliance with the 1981 deadline.

Mr. JORLING. The facility planning extension was granted in order to broaden the scope of the planning process itself, to include broader reach of the metropolitan area sludge dumpers, rather than have a facility plan for each separate facility, or each separate project, which is generating sludge.

We, and the city of New York, and now the metropolitan area communities agree that we should look at this program from a more comprehensive view to determine the feasible alternatives to the ocean dumping. That extension should have no effect on the 1981 date, except to accelerate compliance, rather than to delay it.

We think by including a broader reach of these communities, the economics of scale, and what have you, should come into play to enable the actual implementation of the alternatives by the required date.

Mr. BREAUX. Does your Agency really believe that New York City and other communities in New York and New Jersey will be able to meet the 1981 deadline?

Mr. JORLING. Yes, we believe that they can.

Mr. BREAUX. I notice that you have set up in their latest interim permit, a schedule that has something like 28 interim dates leading to the cessation of all ocean dumping by 1981 for New York City. What happens if they do not meet each one of these interim dates?

33-546 O - 78 - 6

Is there a penalty clause, or are these just target dates that the city is supposed to have something done by?

Mr. JORLING. Each interim date in each schedule mentioned is an enforceable requirement. As these dates come, judgment can be made as to whether compliance has been made, or enforcement actions of one or another sort should be taken to bring the schedule back on track.

One of the problems we have had in the past has been we have had final dates, but we have sort of left these communities alone up until that final date. We have not had the ongoing surveillance and monitoring, or the opportunity to provide technical assistance or financial assistance at appropriate times to keep an overall program on track.

The inclusion of these interim dates in the region II permits, we think, will enable us to work with the communities, train with them, and in fact, reach the final date objectives that are set forth.

Mr. BREAUX. According to these schedules, where are they now? Have these communities met all of the conditions and interim dates included in their respective permits so far?

Mr. JORLING. These permits were issued, I believe, on January 10, effective February 15. I think we can supply a schedule of dates for the record, which gives you the benchmark, or the milestones that are set forth.

Mr. BREAUX. I think that would be helpful. Are you saying that what has recently been set up is just a new schedule of 28 interim dates?

Mr. JORLING. That is correct.

Mr. BREAUX. Do you remember when the first interim deadline was? I would like to know. Can you supply it for the record? Do you know how far apart these milestones are, approximately?

Mr. JORLING. I am informed that the first interim date is within 30 days after the permit has been issued, but unless I look specifically here——

Mr. BREAUX. Would you supply the interim dates for the record? We would like to be able to monitor this matter.

[The following was received for the record:]

PERMIT INFORMATION AND INTERIM DATES

Attached for the record are the following:

1. A complete copy of the New York City ocean dumping permit with the forwarding letter addressed to Charles Samowitz. The permit shows the interim dates in Special Condition No. 7 beginning on page 11.

2. Excerpts from the rest of the municipal ocean dumping permits issued by Region II (New York) which show: (a) the name of the applicant, waste generator, and waste transporter; and (b) Special Condition No. 7, the Implementation Plan, Schedule, or Alternative, for each permittee.

In Region II's municipal ocean dumping permits, all General Conditions are the same. Variations in special Conditions are listed below:

Special Condition Number:

1. All the same unless the phase-out date is this year.
2. The wording is the same, but the volumes change by permit.
3. All the same.
4. Only the names of the barges change.
5. In some cases the waste generator does the analyses, in others the transporter. Otherwise, the language is the same.
6. The same holds true for the monitoring.
7. Included for the record.
8, 9, 10. Language is the same.

11. Language is the same, but it depends on the individual responsibilities of the generator and the transporter.

U.S. ENVIRONMENTAL PROTECTION AGENCY,
New York, N.Y., January 11, 1978.

Re Ocean dumping permit NY 009.

Mr. CHARLES SAMOWITZ, P.E.,
Commisioner, Department of Water Resources,
NYC EPA, New York, N.Y.

DEAR MR. SAMOWITZ: Enclosed you will find the ocean dumping permit referenced above which has been issued by the Regional Administrator of the United States Environmental Protection Agency, Region II, pursuant to authority granted in § 1412 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. §§ 1401-1444).

I urge you to read your permit carefully and to become thoroughly familiar with those provisions for which you are liable, either solely or jointly and severally with another person or entity, in the event of any noncompliance. It is the policy and practice of this Regional Office to enforce these permits strictly and to seek substantial penalties for their violation.

I would like to point the particular importance of complying with this year's permit. Under 40 C.F.R. § 220.3(d), no permits may be issued after April 23, 1978 unless the Regional Administrator determines that the permittee has an implementation schedule adequate to allow phasing out of ocean dumping by December 31, 1981 at the latest and that the applicant has demonstrated that he has exercised his best efforts to comply with all provisions of the previously issued permits. As indicated in the Preamble to the Regulations, 42 Fed. Reg. 2463, January 11, 1977, the EPA has not retained discretion to issue further interim permits to applicants who do not comply with the requirements of § 220.3(d) including the deadlines set therein.

Thank you for your cooperation in the application and permit issuance procedures. Should you have any questions on any aspect of your ocean dumping permit, do not hesitate to refer them to either Peter Anderson, Chief of the Marine Protection Programs, or to the undersigned.

Sincerely yours,

CHARLES E. HOFFMAN,
Attorney, Water Enforcement Branch,
Enforcement Division.

Enclosures.

U.S. ENVIRONMENTAL PROTECTION AGENCY—MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT (OCEAN DUMPING) PERMIT

Permit No. and type: II-NY 009-Interim.
Effective date: February 15, 1978.
Expiration date: January 9, 1979.
Reapplication date: July 10, 1978.
Applicant: Charles Samowitz, P. E., Commissioner, Dept. of Water Resources, NYC EPA, Municipal Building, New York, N.Y. 10007.
Waste generator(s): Same as applicant.
Waste generated at: See Table I.
Port of departure: New York, N.Y.
Waste transporter(s): NYC, Envir. Protection Adminis., DWR, Municipal Bldg., New York, N.Y. 10007; and any person owning or operating a towing vessel employed for the purpose authorized herein.

This permit authorizes the transportation and dumping into ocean waters of certain material pursuant to the Marine Protection, Research, and Sanctuaries Act of 1972, 33 U.S.C. 1401-1444 (hereinafter referred to as "the Act"), regulations promulgated thereunder, and the terms and conditions set forth below.

General conditions

1. All transportation and dumping authorized herein shall at all times be undertaken in a manner consistent with the terms and conditions of this permit. The applicant, waste generator(s) and waste transporter(s) designated above shall be the permittees liable for compliance with such terms and conditions. The liability of each is set forth in the Special Conditions. Compliance by any permittee with one or more but less than all of the conditions with which such permittee must comply will

not constitute a ground or grounds of defense in any proceeding against that permittee for violation of the provisions of this permit.

2. Any person who violates any provision of the Act, the Final Regulations issued thereunder, or any term or condition of this permit shall be liable for a civil penalty of not more than $50,000 for each violation. Additionally, any knowing violation of the Act, Final Regulations, or permit may result in a criminal action being brought with penalties of not more than $50,000 or one year in prison, or both.

3. (a) Transportation to, and dumping at any location other than that authorized by this permit shall constitute a violation of the Act and of the terms and conditions of this permit.

(b) Transportation and dumping of any material not identified in or significantly in excess of that identified in the application for this permit, unless specifically authorized by a written modification hereto, shall constitute a violation of the Act and of the terms and conditions of this permit.

4. Nothing contained herein shall be deemed to authorize, in any way, the transportation from the United States for the purpose of dumping into the ocean waters, into the territorial sea, or into the contiguous zone, of the following material:

(a) High-level radioactive wastes.

(b) Materials, in whatever form, produced for radiological, chemical or biological warfare.

(c) Persistent synthetic or natural materials which may float or remain in suspension in the ocean.

5. The applicant may not apply for, nor any permittee simultaneously hold, a permit from another EPA Regional Office for any of the material to which this permit is applicable, nor may the applicant or any permittee transfer material from one EPA Region to another if a permit for the transportation or dumping of such material has been denied by one EPA Region.

6. After notice and opportunity for a hearing, this permit may be modified or revoked, in whole or in part, during its term for cause including, but not limited to, the following:

(a) Violation of any term or condition of the permit;

(b) Misrepresentation, inaccuracy, or failure by the applicant to disclose all relevant facts in the permit application;

(c) A change in any condition or material fact upon which this permit is based that requires either a temporary or permanent reduction or elimination of the authorized transportation or dumping including, but not limited to, changes in conditions at the designated dump site, and newly discovered scientific data relative to the granting of this permit.

(d) Failure to keep records, to engage in monitoring activities, or to notify appropriate officials in a timely manner of transportation and dumping activities as specified in any condition of this permit.

7. This permit shall be subject to suspension by the Regional Administrator or his delegate if he determines that the permitted dumping has resulted, or is resulting, in imminent and substantial harm to human health or welfare or the marine environment. Such suspension shall be effective subject only to the provisions of 40 CFR 223.2(c).

8. The authority conferred by this permit may, at the discretion of the Regional Administrator or his delegate, be transferred to a waste transporter other than that (those) named herein, provided that a request for such a transfer be made, in writing, by the applicant at least 10 days prior to the requested transfer date.

9. If material which is regulated by this permit is discharged due to an emergency to safeguard life at sea in locations or in a manner not in accordance with the terms of this permit, one of the permittees shall make a full report, in accordance with the provisions of 18 U.S.C. 1001, within 10 days to the Regional Administrator detailing the conditions of this emergency and the actions taken.

10. Unless otherwise provided for herein, all terms used in this permit shall have the meanings assigned to them by the Act or the Final Regulations issued thereunder.

11. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to property or any invasion of rights, nor any infringement of Federal, State or local laws or regulations, nor does it obviate the necessity of obtaining State or local assent required by applicable law for the activity authorized.

12. This permit does not authorize or approve the construction of any onshore physical structures or facilities or, except as authorized by this permit, the undertaking of any work in any navigable water.

13. Each permittee shall at all times maintain in good working order and operate as efficiently as possible all facilities, including vessels, used by such permittee in achieving compliance with the terms and conditions of this permit.

14. This permit, or a true copy thereof, shall be placed in a conspicuous place on the vessel which will be used for the transportation and dumping authorized by this permit. If the dumping vessel is an unmanned barge, the permit or true copy of the permit shall be transferred to the towing vessel or an additional true copy shall be available on board the towing vessel.

15. Every scow or boat engaged in the transportation of wastes for ocean disposal shall have its name and number painted in letters and numbers at least fourteen inches high on both sides of the scow or boat. The name and number shall be kept distinctly legible at all times, and no scow or boat not so marked shall be used to transport or dump any such material.

16. The permittee(s) shall allow the EPA Regional Administrator, the Commander, Third U.S. Coast Guard District, and/or their authorized representatives:

(a) To enter into, upon, or through the permittee's premises, vessels, or other premises or vessels under the control of the permittee, where, or in which, a source of material to be dumped is located or in which any records are required to be kept under the terms and conditions of this permit or the Act;

(b) To have access to and copy any records required to be kept under the terms and conditions of this permit or the Act;

(c) To inspect any monitoring equipment or monitoring method required in this permit;

(d) To sample or require that a sample be drawn under EPA/CG supervision of any materials discharged or to be discharged; and

(e) To inspect any dumping and navigation equipment installed on board any towing vessel, barge, or self-propelled vessel utilized in ocean dumping activities authorized under this permit.

17. The waste transporter shall cause to be installed, maintained, and operated on board any towing vessel or self-propelled vessel departing port for ocean dumping activities under this permit, a commercially available LORAN-C automatic tracking and recording device, acceptable to the U.S. Coast Guard for this purpose. Such equipment may be portable. Such equipment shall be employed no later than six months after notification of the requirement, but not before the transporter has been afforded the opportunity for a public hearing by the Commander Third Coast Guard District concerning any such requirement. Such equipment shall be operated in accordance with procedures provided by the Coast Guard. No such towing or self-propelled vessel shall depart on a dumping mission six months after such notification with such equipment not installed or not operational without first obtaining written authorization from the Coast Guard.

Special conditions

1. Permit Term: This permit shall expire at midnight on January 9, 1979. This permit is nonrenewable. Application for a new permit must be submitted to EPA at least 180 days prior to expiration of this permit.

2. Description of Material: During the term of this permit, the type and quantity of material permitted for transportation for the purpose of ocean dumping shall be in accordance with the following: 3,965,000 wet tons annually of digested sewage sludge generated by the facilities listed in Table I.

Waste volumes ocean dumped must comply not only with the total volume limit noted above, but also to the individual volume limit set for each waste treatment plant listed in Table I.

The waste generator shall submit quarterly reports (on a calendar basis) of volumes removed from its facilities by the waste transporter under this permit, and the waste transporter shall submit similar reports of volumes transported by it to the dump site specified in Special Condition No. 3. Such volumes shall be expressed in the following units—gallons, cubic yards, wet tons, and dry tons. Such reports shall be submitted within 20 days of the end of the reporting period.

3. Disposal Site: Transportation for the purpose of ocean dumping shall terminate at, and waste disposal shall be confined to, the area described below:

Latitude: 40°22'30" N to 40°25'0" N
Longitude: 73°41'30" W to 73°45'0" W

Table I

Sewage treatment plant/port of departure:	*Wet-tons per year*
Bowery Bay	483,840
Coney Island	126,720

Hunts Point	422,400
Jamaica	422,400
Newtown Creek	768,000
Oakwood Beach	0
Owls Head	287,700
Port Richmond	230,150
Rockaway	57,600
Tallman Island	253,440
Wards Island	698,880
26th Ward	211,200

4. *Method of Disposal.*—a. The waste transporter shall use only the following vessel(s)/barge(s) for transportation and dumping of wastes authorized under this permit:

NEWTOWN CREEK, BOWERY BAY, NORTH RIVER, OWLS HEAD

b. The waste transporter shall comply with the following restrictive conditions:

(1) The master of the ocean dumping vessel shall prepare at the time of occurrence a navigational overlay of the dumping vessel's trackline during the dumping operation, indicating the times and positions at critical points (e.g. entry and exit from the dump site; beginning and end of dump). The overlay shall be signed and dated by the master and forwarded within 72 hours after completion of the trip to:

Captain of the Port, U.S. Coast Guard, New York Station, Governors Island, New York, N.Y.

(2) The master shall also submit to Captain of the Port, New York, in the manner outlined above, a statement signed and dated, indicating whether or not the conditions of the permit were met.

(3) The waste transporter shall provide telephone confirmation to Captain of the Port, New York of the following information within 15 minutes of the time of departure of a dumping vessel for the dump site:

(a) COTP Reference Number,

(b) Name of dumping vessel, and

(c) Actual time of departure.

(4) The master shall notify Coast Guard Group Sandy Hook via VHF-FM within ten (10) minutes of occurrence of the actual time that a dumping operation begins. The master will contact Group Sandy Hook on Channel 16 and then shift and transmit on Channel 12 (or other agreeable frequency) the following information:

(a) COTP Reference Number,

(b) Name of dumping vessel, and

(c) Actual time dumping operation started.

(5) The waste transporter shall install and utilize during the course of each nighttime dumping operation a spotlight, which shall be of sufficient intensity to illuminate the discharge immediately astern of the dumping vessel. The spotlight shall be sufficiently elevated so as to give ample coverage to the wake of the vessel, while at the same time maintaining the direction of the light beam vertically into the water column. The spotlight shall be fixed firmly into position and shall be installed on the vessel so as not to interfere with or to be confused with any other required navigational lights.

These restrictive conditions apply only when Coast Guard shiprider surveillance is not conducted.

(c) Waste materials are to be discharged at a uniform rate while moving at a speed of not more than 5 knots over a distance of at least five (5) nautical miles within the dump site designated in Special Condition No. 3. If two or more vessels/barges are discharging simultaneously, a safe separation distance must be maintained.

5. *Analysis of Authorized Wastes:* (a) Analyses shall be conducted quarterly for each treatment facility listed on Table I by the waste generator on a representative sample of a vessel/barge load for the following parameters:

Bioassay (mg/1, TL 50, 96 hrs.) using the organisms *Skeletonema costatum, Menidia menidia,* and/or any substitute organism designed to be more appropriate by EPA, Region II.

Mercury (mg/kg), liquid and solid phase.

Cadmium (mg/kg), liquid and solid phase.

Specific gravity at 20°C

Oil and grease (mg/1), using liquid-liquid extraction with trichlorotrifluoroethane.

Petroleum hydrocarbon (oil in mg/1), using tentaive IR procedure.

Fecal coliform (MPN/100 ml).

Total coliform (MPN/100 ml).

Arsenic (mg/1).
Chromium (mg/1).
Copper (mg/1).
Lead (mg/1).
Nickel (mg/1).
Vanadium (mg/1).
Zinc (mg/1).
COD (mg/1).
Total solids (mg/1).
Suspended solids (mg/1).

(b) Analytical data shall be submitted to EPA no later than 30 days after sampling.

(c) All analyses will be conducted according to one of the following:

(1) Specific analytical procedures distributed by EPA, Region II;

(2) Approved test procedures contained in "Guidelines Establishing Test Procedures for Analysis of Pollutants", 40 CFR 136; or

(3) Test procedures selected by the waste generator and approved by EPA, Region II.

(d) Within 20 days of effective date, the name and address of the designated laboratory and a description of all analytical test procedures being used shall be provided to the EPA. Any variation or change in the designated laboratory or procedures shall be reported to EPA, in writing, immediately.

(e) Any laboratory employed for purposes of performing the analyses specified in Special Condition No. 5(a) shall maintain a viable analytical quality control program. This program will include:

(1) Use of EPA-approved analytical test procedures as listed in Special Condition No. 5(c).

(2) Use of sample preservation techniques and the holding time specified in analytical method employed or in EPA manual entitled "Methods for Chemical Analysis of Water and Wastes".

(3) Routine use and documentation of intra-laboratory quality control practices as recommended in the EPA manual "Handbook for Analytical Quality Control in Water and Wasterwater Laboratories". These practices will include use and documentation of internal quality control samples.

(f) The laboratory facilities, data, records, and quality control records are subject to periodic inspection by EPA Personnel.

(g) EPA may require analysis of quality control samples by any laboratory employed for purposes of compliance with Special Condition No. 5(a). Upon request, the waste generator shall provide EPA with the analytical results from such samples.

6. Monitoring: The waste generator is required to continue to implement its EPA approved monitoring program as a means of determining the short-term environmental impacts of ocean dumping of its waste.

7. Implementation Plan, Schedule, or Alternative: a. In accordance with 40 CFR 227.16, the waste generator shall be responsible for the selection and implementation of one or more land-based sludge-management alternatives, determined by EPA and the responsible State to be environmentally acceptable, technically feasible, and economically reasonable. The alternative(s) selected shall be implemented in accord with 40 CFR 220.3(d) on or before December 31, 1981.

The waste generator may utilize any source of funding available to it for implementation of the alternative(s) selected. Whether the waste generator is awarded an EPA Construction Grant, or whether it chooses, or has, to spend its own money, it is obligated to comply with the schedule set forth below:

(1) Apply for a "Step 1" Construction Grant for a facility plan, including an environmental assessment and a detailed "heavy meatal source determination study" report, detailing the origins of the heavy metals found in its ocean-dumped sludge, and describing the steps to be taken to reduce or eliminate controllable heavy metal sources, for implementation of the alternative(s) selected:	Oct. 1, 1976.
Submit an approvable contract for review by City officials, NYSDEC, and EPA.	Nov. 23, 1977.
Receive necessary contracts approval from City officials, NYSDEC, and EPA.	Dec. 7, 1977.
Request BOE resolution	Do.
Receive necessary BOE approval	Dec. 15, 1977.
Request consultant to proceed with contract	Do.
Submit contract to EFCB for review	Dec. 17, 1977.
Execute contract and submit to EFCB	Dec. 22, 1977.
Register contract	Dec. 29, 1977.
Issue order for consultant to proceed along two-track approach (i.e., short-term and long-term solution).	Jan. 1, 1978.
Commence short-term facility plan, environmental assessment, and heavy metal report.	Do.
Advertise public hearing date	May 21, 1978.
Complete draft EAS and preliminary facility plan	June 15, 1978.
Submit draft EAS and preliminary facility plan to NYSDEC and EPA.	Do.
Conduct public hearing	June 21, 1978.
Complete EAS facility plan, and heavy metals report	July 15, 1978.
Submit approvable facility plan, EAS, and heavy metal report to NYSDEC and EPA.	Aug. 1, 1978.
(2) Decide number of consultants needed to accomplish "Step 2"	June 15, 1978.
Conduct pre-proposal meeting with consultants	June 18, 1978.
Receive proposals for "Step 2"	July 10, 1978.
Rank and nominate consultants to selection board	July 21, 1978.
Apply for a "Step 2" Construction Grant or independently fund the preparation of plans and specifications for the alternative(s) selected.	Aug. 1, 1978.
Select consultants	Do.
Submit approvable contract to City officials, NYSDEC, and EPA for approval.	Aug. 21, 1978.
Receive necessary contract approval from City officials, NYSDEC, and EPA.	Sept. 7, 1978.
Request BOE resolution	Do.
Receive BOE approval	Sept. 14, 1978.
Submit contract to EFCB for review	Sept. 17, 1978.
Execute contract	Sept. 21, 1978.
Register contract	Sept. 28, 1978.
Issue order for consultant to proceed	Oct. 1, 1978.
Initiate the preparation of plans and specifications	Do.
Complete approvable plans and specifications	June 1, 1979.
Submit approvable plans and specifications to NYSDEC and EPA.	Do.
Receive NYSDEC and EPA approval	July 10, 1979.
(3) Apply for "Step 3" Construction Grant or independently fund the construction of facilities for the alternative(s) selected:	July 15, 1978.
Commence construction of such facilities	Feb. 15, 1980.
Complete construction of such facilities and cease the ocean dumping of its wastes.	Dec. 31, 1981.
(4) Commence preparation of facility plans and environmental assessment for long-term sludge disposal.	Nov. 1, 1978.

(b) The waste generator shall submit monthly progress reports on compliance with the implementation plan and on progress to reduce to a minimum controllable heavy metal sources beginning February 1, 1978. The waste generator shall inform EPA within 10 days of noncompliance with any phase of the aforementioned implementation schedule, and shall notify EPA immediately of its failure to obtain necessary approvals from appropriate regulatory agencies.

8. Digester Cleanout: a. The waste generator may contract authorized waste transporters, who in turn may dispose of "digester cleanout" wastes generated by facilities listed in Special Condition No. 2 at the 106-mile chemical wastes dump site (Latitude 38°40'N to 39°0'N, Longitude 72°0'W to 72°30'W. The following vessel(s)/barge(s) are authorized under this permit for transportation and dumping of "digester cleanout" wastes: Ocean Disposall No. 1; Lisa; Raritan; Forest; Susan Frank; Rebecca K

With respect to the disposal of "digester cleanout" wastes, the method of disposal shall be in accord with Special Condition No. 4(c).

b. A representative sample of the "digester cleanout" material shall be collected and analyzed by the waste transporter on each vessel/barge load for the following parameters: Mercury, liquid and solid phase (mg/kg); Cadmium, liquid and solid phase (mg/kg); Petroleum hydrocarbon (mg/kg), using IR procedure; Total solids (mg/kg); Total volatile solids (mg/kg); and Specific gravity at 20°C.

Analyses shall be conducted in accordance with Special Condition No. 5(c) and submitted to EPA no later than 30 days following the discharge.

9. Notice to Regulatory Agencies: (a) The waste transporter shall provide telephone notificaton of sailing to Captain of the Port (COTP), New York at 212-264-8753 during working hours (8;00 a.m. to 4:30 p.m. Monday through Friday) and at 212-264-8770 during the nonworking hours, weekends, and holidays not later than two (2) hours prior to the estimated time of departure for the dump site designated in Special Condition No. 3 or not later than twenty-four (24) hours prior to the estimated time of departure for the dump site designated in Special Condition No. 8. The waste transporter shall immediately notify the COTP upon any changes in the estimated time of departure greater than one (1) hour.

Surveillance of use of the dump site designated in Special Condition No. 8, will generally be accomplished by a Coast Guard shiprider who will be on board the towing conveyance for the entire voyage. Within two (2) hours after receipt of the initial notification the waste transporter will be advised as to whether or not a Coast Guard shiprider will be assigned to the voyage. His quarters and subsistence while on board shall be provided by and shall be at the expense of the waste transporter. He shall be treated courteously and afforded free and immediate access to all navigational capabilities on the vessel which can provide information on position, course speed, depth of water, bearings, etc.

(b) The following information shall be provided in the notification of sailing:

(1) Permit number.
(2) Name of the towing vessel and barge or tank vessel.
(3) Name of the transporter.
(4) Description of the vessel's contents including volume
(5) Place of departure.
(6) Location of the dump site.
(7) The time of departure.
(8) Estimated time of arrival at the dump site.
(9) Estimated time of departure from the dump site.
(10) Estimated time of return to port.

(c) The waste transporter shall maintain and submit to EPA on a monthly basis the following information with regard to Special Condition Nos. 9 (a) and (b):

(1) Permit number; (2) Name of Person contacted; (3) Time of contact; (4) Confirmation code; and (5) Other pertinent information.

(d) The waste transporter shall maintain and submit Coast Guard Form CCGD 3-278, Monthly Transportation and Dumping Log, to COTP, USCG, c/o New York Station, Governors Island, New York, N.Y. 10004. Waste transporter shall enter on this form under the column entitled "Dump Site" the latitude and longitude at which the actual dumping occurred. These forms are to be mailed to both the Coast Guard and EPA during the first week of the succeeding month for which they were prepared. If additional forms are required, they may be obtained by forwarding a written request to Commander (mep), Third Coast Guard District, Governors Island, New York, N.Y. 10004.

10. Reports and Correspondence: All reports and related correspondence required by Special Condition Nos. 2, 4, 5, 6, 7, 8, and 9 shall be submitted to the following

address: U.S. Environmental Protection Agency, Region II, Surveillance and Analysis Division, Edison, N.J., Attn: Marine Protection Program.

All other material, including applications, shall be submitted to the following address: U.S. Environmental Protection Agency, Region II, Enforcement Division, 26 Federal Plaza, New York, New York, Attn: Status of Compliance Branch.

11. Liability: (a) The waste generator and waste transporter shall be jointly and severally liable for compliance with Special Condition Nos. 2 and 10, as well as all applicable General Conditions.

(b) Any person owning or operating a towing vessel employed for purposes of the activities authorized by this permit shall be, for purposes of each discharge, a joint permittee herein who shall be jointly and severally liable together with the waste transporter for compliance with Special Condition Nos. 3, 4(b), 4(c), and 8, as well as all applicable General Conditions.

(c) The waste transporter shall be solely liable for compliance with Special Condition Nos. 4(a) and

(d) The waste generator shall be solely liable for compliance with Special Condition Nos. 1, 5, 6, and 7.

By authority of Eckardt C. Beck, Regional Administrator, United States Environmental Protection Agency:

Signed this 10th day of January 1978.

MEYER SCOLNICK,
Director, Enforcement Division.

Mr. BREAUX. Will the $225,000 fine, levied by an administrative law judge against the city of Philadelphia actually ever collected?

Mr. JORLING. The actual assessment of the fine, or collection of the fine has been an issue in the negotiation with the city of Philadelphia. The city of Philadelphia not only has a sludge dumping problem, but it has problems with other enforceable requirements of the Clean Water Act, namely compliance with the July 1, 1977, date for the installation of treatment. Negotiations are underway in Philadelphia with respect to all violations of the law which are presently being experienced.

So there is an effort to negotiate a consent decress with the city of Philadelphia which will not only include the sludge practices, the sludge dumping practices in the ocean, but the overall waste treatment system in the city of Philadelphia.

Mr. BREAUX. If they are required to pay the quarter of a million dollars, which does the money go? Does it go into the General Treasury?

Mr. JORLING. It goes into the General Treasury.

Mr. BREAUX. Is there any possibility of earmarking that money for additional sewage disposal research, or for a disposal plant in Philadelphia? I would rather have them spend the money on correcting the ocean dumping problem in Philadelphia than send it to the United States Treasury to be used for some other purpose. The latter arrangement would only make it more difficult for them to reach the deadline.

Mr. JORLING. There is that implication in the collection of fines, but without a change in statutory authority, such as that which Mr. Forsythe had recommended at the last session, we are unable to divert these funds in the legal process to those users. They are automatically referred to the Treasury.

We would need a change in authority in the collection of fines to allow us to divert them into a fund of one sort of another, earmarked for a purpose specific.

Mr. BREAUX. I think that the legislation offered last session by Mr. Forsythe directly addresses this point. But I would like to ask

you to have your staff submit language that would allow your Agency to accomplish that purpose.

Perhaps it might be the same thing as that which Mr. Forsythe has submitted.

Mr. JORLING. We will be happy to do so.

[The following was received for the record.]

SEC. 102(a)(5)(C) RECOMMENDED LANGUAGE

"(C) The Administrator shall require as a condition of issuing an interim permit that each person issued the interim permit pay a fee upon issuance of the permit not more than the difference, as estimated by the Administrator, between the cost of disposing of the material by ocean dumping for the effective period of the permit and the estimated cost as determined by the permittee of disposing of the material for the effective period of the permit by the most economical and environmentally sound alternative land-based method. The Administrator may in his discretion waive all or part of the fee under this paragraph if the permittee will expend such funds to implement the compliance schedule in the interim permit authorized under this subsection."

Mr. BREAUX. What about the consideration to move the sewage sludge dump sites? You mentioned that there was a hearing at Toms River, N.J.

It is my understanding that a decision was due on this issue quite a while back. What is the problem? What is holding back the decision?

Mr. JORLING. The problem is one of complexity, and also transition.

Mr. BREAUX. All problems are complex.

Mr. JORLING. All problems are complex. We have involved here all of the discharges at the dump sites, and the decisions that are to be made relate to whether any or all should be relocated from their present site to alternative sites.

The problem of transition has been that my predecessor conducted the hearing, and has submitted a draft report to me. Because of my desire to make sure that the decisions that we make now go from this, with the enforcement requirements of these permits, and with the overall objective to get these communities out by 1981, I have delayed issuing, or recommending to the Administrator any decision until I am satisfied that I have that pretty well under control.

The one issue that did concern me was the performance of Camden, N.J. in this equation. We now have good evidence that the end of March will show that they will be out of the ocean.

But there are several issues that I have not been confortable with.

I should mention that my delay in this action has not in any way altered or slowed down our efforts to achieve the ultimate objective.

The issuance of the new permits in region II, for instance, is independent of this decision, and has not been, in any way, slowed down by it.

Similarly, the Philadelphia enforcement actions have in no way been slowed down by the failure to issue a determination based on that hearing. So that all of those actions toward the objective of the removal by 1981 are on track.

The failure of making the decision does not operate to slow those down.

Mr. BREAUX. I think you understand the concern of these subcommittees that the decision be expedited. In one respect, no matter which way you come down on it, the decision is not going to make everyone happy. It is one that you are going to be criticized for. Yet, the decision is one that you still have to go forward with.

I have been concerned that a decision to move these dump sites would result in a lot of additional cost to the communities, and quite possibly require different types of equipment to transport the material further offshore, et cetera. Such a decision might consequently be defeating our purpose to phase out harmful ocean dumping by the end of 1981. By moving the dump sites further offshore, the communities could end up spending more money on ocean dumping and less on efforts to phase it out. This is something that I know you are aware of.

Let me ask one other point, and I will let the other members get into this.

We have a suggested amendment which would transfer portions of NOAA's program under title II—for research on land-based alternatives to ocean dumping—to the Environmental Protection Agency.

I would like to ask you for your comment on that.

Mr. JORLING. Mr. Chairman, it is our understanding that no funds have been expended under the section 203 authority, that the research on alternatives to ocean dumping of sludge has been primarily conducted by the Environmental Protection Agency, and as reflected in those documents that I have made available for the record.

We think that the integration of these various authorities on sludge alternative research would be a good judgment. We would identify certain things, too, as high priority, and have established some estimates of the cost that we would attach, for instance, we have identified—should the 203 authority be transferred—$500,000 for sludge alternative demonstrations, $200,000 for at sea alternatives, and $300,000 for alternatives for dredged materials.

So we have looked at that possibility, and made that judgment, as to the priorities we would use in implementing it should we receive the authority. It would allow us to keep the various pieces that we have within EPA, doing this kind of research together.

We have authority under the Resources Conservation Act to do sludge research and under the Federal Water Pollution Control Act to do research. Under the Safe Water Drinking Act we are required to do a lot in the area of pits and lagoons, which are used for industrial sludges.

Mr. BREAUX. If the amendment is adopted, I would hope that EPA would exhibit a very aggressive attitude in trying to proceed further with the research that really in fact your Agency is doing under a different mandate at the present time, instead of having NOAA do it.

Mr. JORLING. I think we can give you that assurance.

Mr. BREAUX. Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman.

You have covered a good many of the things that I was concerned with in this whole area. But there are a couple of areas into which I'd like to inquire further.

On page 8, where you were discussing the EIS dredge site, and so forth, where are you concentrating this activity, in the east coast, in New York Bight, or all around the coast?

Mr. JORLING. The present contract, which is generating these EIS's, calls for the production of 13 of them. I will read through that list very, very quickly, and then come back and qualify it.

The first is the acid dump site in the New York Bight. The second is the 106-mile site. The third is the Philadelphia sewage sludge site. The fourth is the Galveston industrial sludge site. The fifth is the Puerto Rican industrial site, the sixth is the Mississippi River site, and the seventh is the celler dirt in New York Bight. That is basically demolition-related dumping.

Eight, alternative sludge dumping site in the New York Bight, and the last five are potential incineration sites on all three coasts.

Now, there is now a judgment being made that the Galveston, Puerto Rico, and Mississippi River industrial sites are being terminated, so we are shifting by contract that emphasis to three dredge sites, and those three dredge sites will be the New York Bight, Galveston, and the Columbia River.

Those three which we have identified are related to stress, marine ecosystems, and where major deepening of harbors are involved.

Mr. FORSYTHE. Is this environmental impact statement work on 106 involved in the delay in the decision as a result of a Toms River hearing?

Mr. JORLING. No.

Mr. FORSYTHE. That is independent?

Mr. JORLING. If the decision resulted in a recommendation that any or all of the communities be shifted to the 106-mile site, it would have to go through a rulemaking process, which would bring the final shift by permit, coincident with what we expect to be the EIS for the 106-mile site which is September of this year.

Mr. FORSYTHE. Of course, my comment would be harsh. As you well know, my position on the 106 situation coincides with that of the Chairman, who indicated that investing anything in that situation, drains from the potential of getting out of the ocean. Almost any way you look at it now, particularly when it comes to other environmental problems in that situation in addition to the substantial money factor, dumping at the 106 site should not occur. Money spent to survey the 106 site certainly should be going in to getting the onshore game underway, where we are finding so many delays.

In reference to Camden, are those contracts now actually signed?

Mr. JORLING. Work is being performed.

Mr. FORSYTHE. Work has actually started under the contract?

Mr. JORLING. The interesting point about Camden, it is a demonstration project. We need more Camdens, we need more examples of where success has been reached, so that when we get closer to 1981, communities will be able to point to success stories, and this is why the Camden thing, while it has gone on 3 months longer than we had projected, has that kind of an explanation, it is a key

demonstration project, it is a first time through it for a community, once we have it to point to we will be able to move other communities more expeditiously.

Mr. FORSYTHE. But there is no risk of further delays beyond weather for that March operational date?

Mr. JORLING. We feel very comfortable now with the March 31 date.

Mr. FORSYTHE. Do you have any information on Camden's record of its 106 dumping—what it has done in costs, what weather has done in terms of the ability to even get to 106, have you monitored that in any way?

Mr. JORLING. Mr. Forsythe, I cannot give you that information. If my staff cannot, we will certainly provide that for the record.

Mr. FORSYTHE. It seems to me that is significant as we look at 106 any further. Recognizing that Camden' sewage is a very minimal delivery in terms of what would be contemplated from New York or Philadelphia, nevertheless there certainly is an experience there that I think would be significant to have as a part of our interest in this whole problem.

Mr. JORLING. I agree.

[The following was received for the record.]

DUMPING AT THE 106-MILE SITE

Since Camden began dumping at the 106-mile site in January 1977, they have been able to adjust their dumping schedule to any weather problems that have arisen. There have not been any emergency dumps due to adverse weather conditions. They make approximately one trip per month. It costs the city $14,000 more per trip than when they were dumping at the Philadelphia site.

Mr. FORSYTHE. You have said here this morning that New York can meet the 1981 deadline. I fully agree. I think the technology is available to do this.

The big question, I think, involves the will to perform, to make a commitment in terms of a city and State, the Federal money, I am sure, is not a question, any question there, or is it?

That would be important?

Mr. JORLING. Well, annual appropriations are always a question. We have now a 5-year authorization as a result of amendments to the Clean Water Act for the title II construction program.

However, the fiscal 1978 moneys are presently in a supplemental which is pending, and perhaps is to be voted on today in the Senate, and will come back to the House for final action.

We are trying to explore with the respective Budget Committees and Appropriations Committees, full mulityear funding to give the predictability, the planning assurance of these funds, so that there is still some uncertainty, but the administration has very squarely committed to 10 years of that program.

I do not think there is any hesitation in Congress. It is simply a matter of timing. That is one side of that issue.

Another side is to work with region II and the States of New York and New Jersey to make sure that these projects which are necessary, to in fact reach the end of ocean dumping by 1981, stay high on the priority list for funding in those States.

And, in fact, the construction grant program is managed to make the money available at the appropriate time. The one uncertainty

that remains, and the one where cajolery is first tried, if not enforcement, is the generation of the local matching share to that 75 percent. That is less within our control directly, but I can assure you that the Agency has developed a policy that the ocean dumping date dictates priority for us in the management of our construction grant funds so that they are available at the appropriate times to enable these communities to go the alternative route.

Mr. FORSYTHE. I should have really included New Jersey when I say New York. It generally is, and I know that while it may not be the majority of the problem, it plays a big part.

So far as New Jersey is concerned, what is your view of this State and local commitment to the matching funding program?

Mr. JORLING. The State of New Jersey, I think, has come publicly on record as supporting the application of construction grant moneys to this objective. The local communities, I think, have given some assurances that they will also endeavor to do their best.

Mr. FORSYTHE. To drop another, perhaps the biggest bomb of all, in this whole discussion, I think New York is one of the most outstanding examples, but again only because of the question of size.

Is there any work going on, or any trying to look at this problem of a dual system, storm draining, which really puts treatment plants out of business any time you get any heavy runoff? In everything that we are doing today in terms of treatment, systems of this size can run into that situation any time you have a heavy runoff situation, that the whole treatment plant is bypassed. There is nothing really that I know that seems to be getting at that major problem.

Now, if we are talking about the cost of doing the job that we are talking about here, I realize that this is a monster. But it seems to me that we also ought to be at least trying to begin to think about that problem down the road somewhere.

Mr. JORLING. You are correct. It is one of the more perplexing problems in the waste treatment area. The treatment facilities in some sewer areas, which include the Northeast, have the effect of causing, for some number of days per year, basically passthrough. It is both used in the context of ocean dumping, as well as into fresh water discharges.

The approach that we are taking is that in the 208 planning process, the areawide planning process, and in the 201 planning process, these issues will be looked at, and cost-effective solutions will be generated for remedies to these situations. They are very intensive cost producers.

Some communities can address them more easily than others, others have almost intractable problems. It is something that the program anticipates, but the Federal dollars, or the State-Federal dollars, may not be sufficient.

Mr. FORSYTHE. The one other area in this complex matter, of course, is the handling of industrial toxics and chemicals before they enter the system. Because, as I understand it, once you have them in you have a major problem. Is that being looked at?

Mr. JORLING. Yes, sir, we will be promulgating, hopefully, by February 15, but I suspect our own deadlines will lapse a day or

two, or a week or two, a pretreatment program which will be required for each publicly owned treatment system.

That pretreatment program is to assure the application by each discharger into that system of a toxic substance of the best available technology. It is the first step in that effort.

A second step that the Agency is commencing is to review, to look at, to learn what the nature of their discharge is, then working back through that, to learn how these materials enter the waste stream.

Previously, and by and large, all conventional descriptions of publicly owned treatment systems are in terms of BOD's, solids, pH, and we never looked at, specifically, the toxic materials in the waste stream. So we are proceeding down those two roads in parallel—beginning with this promulgation in February.

I should also add that we have issued the first major set of pretreatment requirements applicable to an industry category, with the electric plating industry, and those are appearing in the Federal Register this week.

Mr. FORSYTHE. Good, just one more question, Mr. Chairman, if I may.

How are we keeping up with the outfall situation. We are not letting this bypass the rest of our work.

Mr. JORLING. You are correct in identifying outfalls as a larger source of pollutants into the ocean. We cannot proceed down one path without addressing the other.

We have the requirements that all municipal outfalls, and industrial outfalls, must be progressively increasing in their stringency, technological requirements, the secondary treatment requirements in 1977, and the best practical requirements in 1984.

There was an inclusion in the Clean Water Act amendments of a provision for communities to claim that they qualified for a deep ocean outfall exemption. That provision had its genesis primarily in west coast communities, but may have some application to the east coast.

We are not entirely sure of that now. But it could have the effect of slowing down the control of the discharge of pollutants into the marine environment. That is something that we are concerned about.

Mr. FORSYTHE. I would agree.

I think that I have used my time. If we have time, I will get back.

Thank you, Mr. Chairman.

Mr. BREAUX. Mr. Pritchard?

Mr. PRITCHARD. Thank you.

I want to get back to a problem, as you know, which we have on the west coast, particularly in the Puget Sound area where we are currently using primary treatment of sewage. Then it goes out into the ocean. Some of the proposed regulations for discharge levels that we view in the future are not very practical, and the costs are horrendous.

You said something, and I did not catch it. Do you want to tell me again what your policy is in this area?

Mr. JORLING. The policy is still being developed, pursuant to the amendments signed in December. There is a provision that will

provide that a community, by September 24, 1979, can come to the Agency and apply for a modification of the secondary treatment requirement with respect to three pollutants.

The Agency is given a set of criteria upon which to make a judgment as to whether a modification should be issued. The criteria, on their face, direct the Agency to pay particular attention to the discharge of toxic materials, to be assured that the pretreatment requirements are in place, so that those toxic materials do not come through.

We are having a public meeting in California on February 22, to discuss the implementation of this provision. I notice it went to the Federal Register on Monday, I hope it will be printed today or tomorrow, announcing the meeting, and identifying some of the issues upon which the Agency is seeking public response.

We do have the obligation to get the regulations out as soon as possible, so that the communities will have as much time between that time and the September 24 date as possible.

Mr. PRITCHARD. Fine, I will be very interested in what you do in this area.

As you know, we would like to apply the few local dollars that we have on the most serious problems, and in any metropolitan community you have a lot of different problems in the area of water quality. Currently, get areas in Puget Sound are investing heavily to get away from the storm drainage and sewage combination problems, and we would like to apply our few dollars that we have on that problem. If we have to invest heavily in secondary treatment for sewage outfalls which currently flow into Puget Sound with very little severe impact due to the characteristics of Puget Sound, we do not think that this would achieve as efforts directed toward the storm sewer problem, the same benefit ratio.

One other thing. Do you have any policy, or any thoughts on applying somewhere down the road a tax on either the sludge that is going into the ocean, if it is going into areas that are very harmful to the environment, and allowing that as an incentive to curb harmful ocean dumping?

I know there has been discussions of this, and also taking the same application of such an effluent charge as far as dumping garbage itself.

Mr. JORLING. The agency is generally reviewing as many of the types of techniques or mechanisms that are available to induce compliance. Right now we are generally restricted to traditional enforcement, penalty assessment.

With respect to publicly owned systems, these are often less than adequate mechanisms. It is perhaps true that taxing or fees would also be less than adequate mechanisms, because of the limited resource base that public institutions have.

With respect to industrial sources, they may have more efficacy. But these are under consideration as part of the regulatory reform studies that are going on in the agency. Some might be applicable to sludges. But right now we have limited the use of other than conventional enforcement to one of depriving noncompliers of the economic advantage that they have by virtue of the noncompliance, and the application of that in both the clean water area and the air pollution area.

33-546 O - 78 - 7

Mr. PRITCHARD. Thank you, Mr. Chairman.

Mr. BREAUX. Mr. Evans?

Mr. EVANS. Thank you, Mr. Chairman.

Mr. Jorling, I believe you are a very sincere man, and frankly, I am glad to see you in this position. I think you may recall my asking you a question last year on the then proposed amendment to ban ocean dumping of harmful sewage sludge by December 31, 1981. The question was whether or not you would vote for it, even though I knew at the time that the administration might not be wholeheartedly in favor. You said you would, and I appreciated that very much.

However, with all that sincerity going for you, do you need any more in terms of resources to develop on land alternatives to ocean dumping?

Mr. JORLING. I do not think the Federal Government needs any more resources. If we manage, along with the States, the construction grant dollars, and that is $4.5 billion in fiscal 1978, and $5 billion in fiscal 1979, if we manage those properly there is sufficient Federal support, and then I might add, in the fiscal 1981-82 period, sufficient Federal support for these communities.

The concern that I have is whether or not these communities will be—and States, some States do contribute—whether the communities and the States will be able to come up with the 25-percent obligation that they have. That is the tougher issue. It is less subject to control. But that is where I think the big uncertainty is.

But if we manage our program properly, if the States manage their programs properly, from our standpoint, there are sufficient resources in the system. It is the local communities that have the difficulty in generating resources.

Mr. EVANS. We now have 3 years and 11 months to achieve the goal of no harmful ocean dumping, as required by the legislation signed into law last November.

However, I am still concerned that perhaps we may not meet that deadline. The implementation is extremely important. The chairman of our subcommittee, distinguished chairman from Louisiana, asked about Philadelphia's penalty. As I understand, a penalty of $225,000 was levied on Philadelphia for not meeting interim standards; yet with very good lawyers, it seems that they can extend the time for meeting that penalty for any number of months through the judicial system and through the administrative morass of redtape.

How exactly do you stand on that $225,000 fine that was levied against Philadelphia?

Mr. JORLING. I mentioned, before you came in, that the collection of the fine is involved in the overall negotiation, the enforcement negotiation with the city of Philadelphia. Their problem is not just the dumping of sludge, but includes their overall waste treatment system, and all of those issues are in a single negotiation being conducted at the present time.

In fact, several issues have been referred to the Justice Department for prosecution. The obligation is serious, to manage our programs, to achieve that objective, which is now a statutory objective.

In looking at the kinds of tools we have to assure that—we have obviously our management tools, the expenditure of Federal moneys, making available technical assistance, and the like, but when push comes to shove, and more is needed, you raised sort of a question of, is the enforcement mechanism an Achilles heel.

I have asked the staff to consider such things, as asking the Federal court to appoint trustees, so that they would assume the management responsibilities for the local communities of these obligations, to assure their performance.

In one sense I am a little bit hesitant to ask the Federal judiciary to assume management control of these systems, but there needs to be some better set of tools available to us to achieve compliance with these objectives.

Mr. Forsythe's amendment, diverting, through court order, funds not to the Federal Treasury, but to the objective, is another one that we had supported last session, and the chairman has asked us to expand upon that, refine it and make another recommendation.

But that is difficult—enforcement actions against public institutions to arrive at an enforcement technique.

Mr. EVANS. I certainly support the new approach to issuing permits, and you said you included more enforceable milestones than were previously included. I am particularly glad you have an early warning system incorporated in those interim permits. But, you report back to our subcommittee once a year, when we talk about these goals, and how well they have been achieved. We heard last year that Camden was going to stop the harmful ocean dumping as of November 1977, and now we hear that it is going to be in March 1978. I understand that there can be unforeseen circumstances, such as bad weather, that does develop, but I think it might be appropriate for EPA to perhaps report to the committee, Mr. Chairman, on a quarterly or semiannual basis regarding the meeting of these interim milestones.

Mr. BREAUX. I will make the observation that this marks about the fifth time within the last 12 months that EPA has appeared before these subcommittees.

Mr. JORLING. The question is, is the message getting any better.

Mr. EVANS. I would like to see the track record of the cities audited very closely, because I think we need to know at once if there is any slippage in the effort to meet the interim milestones set by EPA.

Mr. Errichetti, the mayor of Camden, came in here and said he supported an ocean dumping objective. He said you need to tell the city something as of a certain date, and I agree, and those objectives are very noble, but yet Camden still has not complied. That is what concerns me. Even though we have codified the law, I want to make certain that the penalties are severe enough to get the city's attention, and if we need something beyond incentives, then perhaps we ought to go in that direction.

Mr. FORSYTHE. Will the gentleman yield for a moment, and maybe with the chairman's concurrence, if we could ask that, not hearings, but that on a routine basis, any slippages of these target dates be reported to the committee, they would be available through the committee staff to pick up.

Mr. BREAUX. Let me make the observation that I have asked Mr. Jorling to submit the interim deadlines contained in the interim permits issued by EPA. EPA has the deadlines that the city of New York has to meet. They will submit those deadlines to us, and give us a progress report on that. It will be helpful.

Mr. EVANS. Thank you, Mr. Chairman. And thank you, Mr. Jorling.

Mr. BREAUX. Mr. Emery?

Mr. EMERY. Thank you very much, Mr. Chairman.

I wonder whether any consideration has been given to technology of utilizing wastes that might otherwise be dumped in the ocean?

It seems to me that most of the time we spend our efforts in discussing what we were going to do with it, and where we were going to throw it, and not much discussion has been on recovery of heavy metals, recycling, or purifying water.

It seems to me that if we are talking about a complete package of eliminating ocean dumping, and waste disposal in other areas as well, we really ought to be discussing the feasibility of utilizing that waste for some useful purpose.

Some parts of the country have water shortages, and tremendous amounts of water could be separated from waste. Heavy metals become a continuing problem when they are mixed with the ocean sludge, or when they are mixed with landfill on land. Heavy metals are useful in industry, and for defense purposes, if they can be separated through various chemicals, electrical means. Possibly the sale, or resale could cut down on the ultimate cost of waste production.

Through various techniques, direct combustions, and gas processes, most organic material can be used to provide a variety of fuels, such as methanol or other fuels, which can be used to produce energy, and ultimately cut down the cost of waste disposal.

I guess my question to you is, considering those potential uses for waste, what effort is EPA—or what efforts are other agencies actively involved in that would move us towards a more complete technology, not merely disposing of the waste, but utilizing those components of it that we can recycle for our own benefit?

Mr. JORLING. I think the first answer is that one of the first steps that the new administration of EPA took was to issue policy statements, both with respect to municipal effluents, and with respect to sludges, that our focus should be on the utilization of those materials. We have done that, and we are now trying to have that policy reflected in our implementing actions.

We are spending approximately $3 million in each of the next 3 years, including this fiscal year; approximately $3 million into research and demonstration of those kinds of systems that you have mentioned, and we could add others, the composting, pyrolysis, and land spreading especially. The choice of the alternatives is often based on the composition of the sludge.

Mr. EMERY. Indeed.

Mr. JORLING. And we have tried, we are attempting, over time, to integrate our regulatory policy so that we apply pretreatment to remove the heavy metals so that the sludge can be used in land spreading, or land reclamation. I think one of the things that I

have been very concerned about is developing techniques which relieve, and if we cannot relieve the burden entirely, at least reduce the obligation of the taxpayer, the community taxpayer. That we should be fostering low cost alternatives that utilize these materials, rather than high cost technological systems that require huge O&M and what have you.

So we are moving in those directions. We have to move faster in the sense of demonstrating them in actual circumstances, like Camden, for composting; or perhaps some coincineration, or pyrolysis in other communities, so that local officials can have some assurance that they are not committing their constituents to failure. That is our difficulty.

Mr. EMERY. Obviously, some forward looking brave communities, working with EPA, and other governmental agencies, are going to have to take some kind of risk, because we are talking about technology that is feasible in a laboratory, and in some cases have been done in real life. But in limited cases, has it been done where a municipality was able to make money from waste, or recycle to the break even point?

Several cities, and I think the gentleman from Seattle was involved at least in the planning stage, tried it at one point. San Diego, Milwaukee, and several other municipalities have had varying successes. Unfortunately, there have been more failures than successes, however.

In Congress several years ago, when I was in the Science and Technology Committee, much legislation was introduced to introduce this. What I am looking for is leadership in your Agency to come up with a workable program that will provide technological assistance to those municipalities and States that wish to experiment with modest programs, that will demonstrate it, so that we can move ahead and make more of an impact than we have been.

I would look forward to an aggressive program from your Agency to make these goals a reality sometime in the future.

Mr. JORLING. I think, as the chairman knows, Congress has given us that explicit direction. There is an amendment in the construction grants program that provides for an increase in the share from 75 percent to 85 percent for those communities that do use an innovative or alternative technology, and this would include sludge management and disposal.

There is another provision that says that unless the failure of that system is due to negligence, the Federal Government will pay 100 percent of the alternative. If it fails, and needs replacement, the Federal Government will pick up 100 percent to take away some of that risk factor. We do have that authority now under the Clean Water Act.

Mr. EMERY. Thank you very much.

Mr. BREAUX. Mr. Hughes?

Mr. HUGHES. Thank you, Mr. Chairman.

I am sorry I missed your statement. My absence during your presentation is not an indication of my lack of support for what you are doing. I am encouraged by what I hear.

Just following up on my colleague Mr. Emery's statements, I am interested in the total picture. If all we do is just react to one crisis after another, not looking at the overall picture, and I am aware of

what is occurring, for instance, in Middlesex County, then we are not doing the job. Their efforts to try to not only recycle their sludge, but also solve their solid waste problem is forward looking. They are looking at proposals now that would recycle their solid waste, using the heat to dewater the sludge, and otherwise dispose of both of these twin evils and end up with something useful.

Is there any type of an interface between these two goals in EPA at the present time?

Mr. JORLING. I will say yes, and give some evidence, but also acknowledge at the same time how difficult translating the efforts in integration and changes in the landscape.

One of the steps that was taken last summer, after I came into the Agency, was to shift the solid waste program, which implements the Resources Recovery Act from the air pollution control program into the water pollution control program, into my jurisdiction. This was done for many of the reasons that you have just advanced, because of the obvious overlap in these programs, and the obvious need to bring them together so that we achieve common environmental objectives rather than solve one problem, and thereby create another, and keep adjusting to each new crisis of the day. It is difficult; however, we are attempting to do it at the planning level so that we are integrating the water pollution planning, and I might add the Safe Drinking Water Act as well.

It is not only what comes through the treatment system, but under the Safe Drinking Water Act there is authority, and the only Federal authority, to protect ground water supply. Many of these wastes can leach into ground waters so that also has to be brought into the system. But the planning level, the regulatory level, and the assistance level, all of these, should be brought together to the extent that we can, and we are attempting to do that.

On the other side, I think it is going to be some time before we are successful at the Agency, in headquarters and at the regional offices. To bring these same type of attitudes to the State officials, and then to the local officials.

It is the direction that we clearly have to go, but it is going to take time for it to produce nationwide results.

Mr. HUGHES. That leads me into another question. One of the complaints I received from industry is that even though they feel that they made some advancements in recycling technology and resource recovery, it is very difficult to communicate that information to those who have the needs.

I just wonder, is EPA doing anything at the present time to try to look at some of the technologies that do exist around the world, not just with our domestic firms, in order to provide that kind of leadership to communities that do not really know how to meet their needs?

Mr. JORLING. The Agency has several technical assistance functions, and carries those out. The most directly affecting local communities is under the Resources Recovery Act, and if I recall the way that operates, 20 percent of the abatement and control budgets are for such purposes. I believe in fiscal year 1979 this will translate out to something on the order of $4 million.

This includes a program of supporting what are called technical assistance panels. These are panels authorized in each region of

EPA to include outside of Government people, such as industry officials and other municipal officials where a system has worked. The panel goes to a community that needs a system, and brings to it the benefits of the stored knowledge of Government, industry and other municipalities. This program is authorized on a nationwide scale.

The support for the first year, as I mentioned—that will be fiscal 1979—I believe, is approximately $4 million. But $4 million should go a long way, because this is supporting people, rather than supporting hardware, and you can send an awful lot of expertise around the country for $4 million.

Mr. HUGHES. Let me get down to some specifics, if I may.

I believe that you testified earlier that in fact you are doing some point source analysis for industry in trying to develop industrywide standards, trying to rid us of toxics, and other problem components that blend into the water.

Are you developing anything for the community?

Mr. JORLING. For the publicly owned treatment systems?

Mr. HUGHES. That is right.?

Mr. JORLING. We are initiating an effort, and let me put this in context.

Under the Water Pollution Control Act we write guidelines for the discharge of effluents for each industry subcategory. This is done by regulation, and we look at 129 pollutants in that exercise. We have not done the same kind of analysis for publicly owned systems, so what we initiated is to treat publicly owned treatment systems as if they were an industry category, and make the same kind of analysis.

That is going to take 18 months to 2 years to produce fruit. But we want to look at these other discharge components.

Mr. HUGHES. Would they be guidelines, or will they be absolute rules that the industry must follow?

Mr. JORLING. Under the industrial side they are requirements that are incorporated into permits that they must adhere to.

Mr. HUGHES. Let me ask you about industrial dumpers. How many industrial dumpers currently hold interim permits?

Mr. JORLING. In 1977, the number will come down to 19 from 37 in calendar year 1976. There will be 19 industrial waste permits issued.

Mr. HUGHES. Do you anticipate any problems in phasing out these particular dumpers by the 1981 deadline?

Mr. JORLING. I think the answer is "No." We have had greater success with industrial sources than with municipal sources.

Mr. HUGHES. I understand you already testified that the Camden interim permit has been extended from December 31, 1977, to March 1978 because of contractual problems.

Do you anticipate any problems in phasing out the Camden dump site by March of this year?

Mr. JORLING. No, they are the only active user of that site for sludge and when they are out, that site should be inactive for other than industrial wastes.

Mr. HUGHES. So far as the Philadelphia interim permit, as I recall, that is to be phased out by 1980. Is that being set up in stages that are being followed very closely by EPA at this posture

to make certain that the phaseout in fact does take place between now and 1980?

Mr. JORLING. There are interim requirements in the present permit that Philadelphia is currently discharging, or dumping its waste under. The overall schedule is also involved in the negotiation, in an effort that will lead to tighter timetables, such as the region II.

Mr. HUGHES. Has the EPA considered making the phase out of that permit a part of the court order in those particular proceedings?

Mr. JORLING. Yes.

Mr. HUGHES. Is that now part of the proceedings?

Mr. JORLING. It is involved in the negotiation.

Mr. HUGHES. To be part of the order?

Mr. JORLING. That is the issue in which the performance of their overall waste treatment system and the collection of the $225,000 is involved, yes.

Mr. HUGHES. So your answer is that it is EPA's intent, as part of the court order in the Philadelphia-EPA proceedings, to place as part of the requirements, a schedule or steps for the phaseout in stages?

Mr. JORLING. It is to incorporate the ocean-dumping requirements, as well as the NPDES, the water pollution control requirements.

Mr. HUGHES. Let me say, I do not share the feeling of my colleagues insofar as the fine is concerned. I think it is important that EPA have all the tools. I do not think that Philadelphia, or any other community should benefit by any violations, or any infractions of the law, particularly when they were considered to be willful violations of the law. So that even though I am sympathetic to legislation that would provide additional resources for communities to develop land-based alternatives, I do not share the belief that that fine should go back to Philadelphia to develop land-based alternatives.

I think it becomes counterproductive.

Are there other court suits pending in which EPA is involved, dealing with interim permits?

Mr. JORLING. We are the defendant in a couple of actions, but we have not been the plaintiff in any actions.

Mr. HUGHES. Can you tell me what actions are pending, and what municipalities are involved?

Mr. JORLING. I think it would be helpful if we give you a detailed annotated response, but these all involve the New York Bight area. There are three lawsuits involving the American Littoral Society, the National Sea Clammers Association, and the Township of Longbeach, respectively. We will give you an annotated description of each of these actions.

[The following was received for the record.]

PENDING OCEAN DUMPING CASES AGAINST EPA

Township of Longbeach v. *City of New York, et al.*, No. 76-1930 (D. New Jersey, complaint filed October 8, 1976) action to enjoin sewage sludge dumping in the New York Bight.

National Sea Clammers Association v. *City of New York, et al.*, No. 77-126 (D. New Jersey, complaint filed January 14, 1977, service on the United States perfect-

ed in December, 1977) action to enjoin dumping of sewage sludge and dredged material in the New York Bight and to recover damages resulting from dumping against municipal and Federal defendants.

America Littoral Society et al. v. *Costle et al.*, No. 77-1073 (D. New Jersey, complaint filed June 2, 1977) action to enjoin sewage sludge dumping in the New York Bight, and to require the designation of an off-the-Shelf site for the ocean disposal of sewage sludge.

Mr. HUGHES. Has the EPA considered, particularly in the New York area, where we have the larger number of problems, the possibility of doing the same thing that you are doing in Philadelphia, i.e. incorporating into litigation the phaseout requirements for that particular interim permit?

Mr. JORLING. What we have done with the New York Metropolitan-New Jersey sludge generators is that we have issued new permits which have a more elaborate sequence of interim milestone dates which are enforceable. I think it is safe to say that we are prepared that if we see a pattern of these dates being lapsed, to enter the permits in effect into a court order so that they would be enforceable through the contempt powers of the court as well as through permit conditions, fines and what have you.

Mr. HUGHES. Looking at the 1981 deadline, do you feel that the goals that are set forth in the legislation can be achieved in the New York Bight?

Mr. JORLING. Yes.

Mr. HUGHES. Is there enough lead time?

Mr. JORLING. We think they can be achieved. It is going to take the application of the resources of Government at all levels to, in fact, bring them about. But the Agency is committed to managing the program to that objective.

Mr. HUGHES. Do you feel that there is enough money in the authorization that we are considering to enable you to carry out your responsibilities under the law?

Mr. JORLING. Yes. The big dollar item that is necessary to bring this about is construction grant assistance. And in the fiscal years that we are concerned with here, 1978 through 1980, there is sufficient money in the program, $5 billion a year, and as I had mentioned earlier, the greater uncertainty is not the availability of Federal dollars but the availability of State and local matching shares.

Mr. HUGHES. There is one additional thing.

The chairman did inquire about the Toms River report. Do I understand correctly that within the next 2 weeks to 1 month, we can expect some decision on that?

Mr. JORLING. My credibility is at stake if I say another 2 weeks, because that was sort of the message the last time I was here. I will personally report to you if it is not out by March 1. I will come to the committee and the chairman and tell you it is either out by March 1 or reasons why it would not be.

Mr. HUGHES. I know it takes time, but I think it is extremely important to expedite it because the enabling legislation made it clear that preference should be given to the 106-mile site. And frankly I think it is important that we have a session on that at the earliest possible time.

Let me just question you once again. It was suggested at one time that there was a potential 30-mile site, a new site off of New Jersey in an altogether pristine area being considered for dumping. Is that definitely now out of consideration?

Mr. JORLING. I think I can give you assurance that the context of the decision will be confined to existing sites plus 106.

Mr. HUGHES. Thank you, Mr. Chairman.

Mr. BREAUX. I recognize the chairman of our other subcommittee which has jurisdiction in this area, Mr. Leggett.

Mr. LEGGETT. Thank you, Mr. Chairman. You have done an excellent job.

I have listened to the questions of Mr. Hughes. Since this is an Atlantic coast problem and not a California problem, and since the gulf has been so creative in solving some of their problems in this area, it is only fitting that the Atlantic Congressmen resolve their problem.

Mr. Jorling, your statement indicates that you have these 28 target dates and you are going to alert this committee in the event that those targets are not met. But if the targets are met, the dumping should stop in 1981. You apparently have funding of something like $15 billion for the next 3 years, $5 billion a year, under the Federal Water Pollution Control Act, to assist in resolving New York, Camden, and Philadelphia's problems in this area. Is that correct?

Mr. JORLING. That is correct.

Mr. LEGGETT. Under title I you asked for about $5 million last year and you got about $1.5 million, and this year you asked for about $5 million and you got about $1.5 million. NOAA asked for about $5 million last year under title II and they got about half of that, this year they asked for about $10 million and they got about half of that.

The concluding sentence of your statement mentions the funding of title II of the Water Act, I assume by that you mean the Federal Water Pollution Control Act?

Mr. JORLING. That is the construction grants and assistance program.

Mr. LEGGETT. So you are saying that that money is critical to resolve this problem and that is being funded.

Now, the question is, what is the effect of the failure to meet both your budget requirements and the budget requirements of NOAA under title I or title II of the act we are considering here?

Mr. JORLING. I think we are a very resource-constrained agency. And in allotting those resources among the many statutory requirements that we have—we implement 13 separate statutes in EPA—we try to identify those things which have the most immediate effect. In this particular program we are talking about the phaseout of dumping of sludges into the ocean. We think we have the amount of money available in fiscal 1979 to keep that program on track and hopefully meet the promises that we made.

The areas that will suffer by what we will say is short funding, deal with the conduct of EIS's, for designation of other dumpsites, particularly in the area of dredged material from harbor deepening and what have you. So those are the areas that, in effect, did not

get the full implementation that we would give it if we receive more money.

In an effort to overcome that, we are working with the Corps of Engineers to work out an agreement so that their project funding—when they receive authorization and appropriation for a project to deepen a harbor, channels, what have you—includes a sufficient amount of money to do the environmental assessment that we are required to do. Then they would transfer it to us so we could capture an additional set of resources to enable us to do our job adequately. That is the area where we suffer as a result of these short funds.

Mr. LEGGETT. How much do you think you would require to do that environmental assessment incident to the public works budget?

Mr. JORLING. I think some order of magnitude figures would be helpful. The EIS contract calls for the investigation of 13 sites. It is just slightly under $2 million. There are presently 73 dredged material dumpsites being used around the country. If we look at the amount of money per site that is in the first contract, it would take a considerable amount of money.

We think, however, in the case of dredged material, there are more comparable features to it than, say, some municipal sludges so that if we do EIS's around a representative set of areas, we can accomplish the overall objective. But I would think that the amount of resources that we need is basically the difference between what we are getting and what we are authorized to get.

Mr. LEGGETT. So what you are saying is that if you can get $3.4 million in the public works budget, that that will assist you in making the assessments that are not being made, is that right?

Mr. JORLING. That is correct.

Mr. LEGGETT. Now, are you working very carefully with the corps?

Mr. JORLING. Yes. In fact, there is a meeting tomorrow to see if we can wrap this agreement up.

Mr. LEGGETT. How much are they spending down there?

Mr. JORLING. I could not give you that because we would have to pull it out of their overall—Jack, you may have some recollection of that—but it is a lot of money.

Mr. LEGGETT. Are you going to be able to come to some conclusions with them as a result of the Vicksburg studies?

Mr. JORLING. Yes, I think we will.

Mr. LEGGETT. Now, let me ask you this. You indicate that the 28 target programs for New York are apparently on schedule. Generally, how do you plan to solve the New York problem—just in a couple of paragraphs?

Mr. JORLING. Well, the first step is the grant which has been made under title II of the Water Pollution Control Act, which is, in the terms of art under that statute, a facility's plan. That facility's plan is required to analyze all of the alternatives or combination of alternatives that could be put into place in that situation. The facility's plan is then submitted to us and approved. The facility's plan identifies one or more alternatives—and I am sure in the New York-New Jersey metropolitan area, it is going to be a series of

alternatives. It is not going to be all land spreading or all land pyrolysis. It is going to be a mix of alternatives.

That leaves then a grant for the design of that system. Then, following the grant for the design, which is usually a 10- to 12-month period, the step 3 grant is awarded, which is to implement, actually construct, the necessary facility. And our schedule calls for all three of those steps to be completed by 1981.

Mr. LEGGETT. Now, construction time would generally approximate how long?

Mr. JORLING. It depends on the project. If it is a conventional waste treatment plant and it is the size of some of the New York facilities, it can be 8 to 10 years.

Mr. LEGGETT. Eight to ten years?

Mr. JORLING. I am talking about the entire waste treatment system, a Blue Plains, for instance.

But for the sludge management alternatives, the time spans are generally much shorter for construction. A composting facility can be constructed in less than 6 months. Pyrolysis, which is larger, could be longer, up to 2 years. So that there is a range in sludge management but they are all doable within the time frame that we have available.

Mr. LEGGETT. Well, how long is it going to take you to come up with your management plan?

Mr. JORLING. The facility's plan date has been extended in the New York metropolitan area to June of this year, and following that there will be determination made of which alternatives will be chosen. Then the design will commence shortly thereafter.

Mr. LEGGETT. At what point do you anticipate that the design will be awarded?

Mr. JORLING. I think we will have to give you the schedule that would lay these things out because while we say New York, we are actually talking about 26 different jurisdictions. So that it is a whole matrix of different situations.

Mr. LEGGETT. That is what makes your dates fuzzy. When you refer to that design, when does that 12 months start? That is what I am asking you.

Mr. JORLING. I think, as a general matter, that 12 months will start about July 1 or August 1 of this year.

Mr. LEGGETT. You just said that you are going to give an extension of time.

Mr. JORLING. That was just an extension to get the facility's plan into us which now calls for it to be in to us in May or June.

Mr. LEGGETT. All right.

Mr. JORLING. Some of the communities' facility plans are already in, and we will have public hearings on them in February.

Mr. LEGGETT. I think that is all, Mr. Chairman.

Mr. BREAUX. Thank you.

I have one final point, and I think Mr. Evans has another question.

I will note for the members of the subcommittees that we will continue after EPA with NOAA's testimony and go right on through.

Tom, I am really concerned about the coordination between your shop and NOAA as far as research is concerned.

Can you tell me something about this? Do you have any kind of interagency agreement with NOAA as far as research is concerned? If so, how is it working? Have you and NOAA been having meetings about the research mandated to NOAA under this statute?

Mr. JORLING. Yes, I think the relationship will be a good one.

Mr. BREAUX. I am not asking if it will be. There should have been coordination in the past several years. Unfortunately, I do not think there has been.

Mr. JORLING. I think that is probably accurate. I think in this administration it will be a good one.

We have already transmitted to NOAA several requests in areas unrelated to this. For instance, the discussion that we had earlier on the modification of secondary treatment. We are asking them to help us in that process; that kind of effort will continue. We do have a memorandum between the two agencies, memoranda of agreement between agencies need more than just paper to bear fruit. They need interaction between the staff as well as the policymakers. And I think that will——

Mr. BREAUX. How many meetings has your shop had with NOAA in policy matters? How is this going to be handled?

Mr. JORLING. I have not yet met with the Administrator in his new capacity at NOAA. He, Dick Frank, happens to be a close friend so I expect we will have a good relationship. But there have been meetings at the level of DAA's, the next level down, on a relatively frequent basis. I cannot give you a number on that but there have been those types of meetings.

Mr. BREAUX. I think as far as these subcommittees are concerned, this has been an area that has been notably lacking.

Mr. Evans.

Mr. EVANS. Mr. Jorling, you have been asked several times if you had enough funds in terms of resources to meet the 1981 deadline. Your answer to my colleague and friends from New Jersey was, yes, in terms of Federal funds. But both times you stated that perhaps the only question was the matching funds required from the States, 25 percent.

Is the 75-25 split a proper split? I am sure you looked at it very closely, but it concerns me that perhaps 25 cities involved, 25 may be in compliance, 23 may put up the matching funds. The two major culprits who dump the most harmful sludge might not have the funds available.

Would you consider 80 or 85 or 90 percent, or should you?

Mr. JORLING. We have no authority to increase the amount of grants except under the determination that what is chosen as an innovative system, and that may, in fact, be the cause in some of these situations, but the 75-25 split is a statutory requirement. The split is also influenced by the willingness of States to participate.

For instance, some States put this up to 15 percent. I think that is the highest State contribution of any State in the Union. Some States do not put in any level, the entire 25 percent burden is on the local community. Both of the States, New York and New Jersey, do contribute. I think New York contributes 12½ percent, leaving the New York metropolitan communities to come up with the remaining 12½ percent.

Mr. EVANS. My question would be in your estimation would we achieve these objectives in a better manner if there were a different split?

Mr. JORLING. I think honesty compels me to say if it was 100 percent Federal grant, we could probably assure success earlier. But, by the same token, having the communities take financial interest in it has had the effect of choosing alternatives which are more cost-effective than if somebody else is paying the tab. And that has an important effect on the overall O&M burden of the life of the project.

So there is values to be gained by keeping a local share.

Mr. EVANS. Thank you, Mr. Chairman.

Mr. BREAUX. Tom, Mr. Rhett and gentlemen thank you very much.

We will have some additional questions that we will submit to you in writing for response. We also made some requests today that we hope you will be able to supply for the record as soon as possible.

I would like to call the next two witnesses, Dr. Wilmot N. Hess, Acting Associate Administrator, NOAA, and Samuel N. Bleicher, Director of Ocean Management, NOAA.

STATEMENT OF DR. WILMOT N. HESS, ACTING ASSOCIATE ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE, ACCOMPANIED BY: SAMUEL N. BLEICHER, DIRECTOR OF OCEAN MANAGEMENT; COMMANDER PHIL JOHNSON, NOAA CORPS; AND JOHN MILHOLLAND, NOAA GENERAL COUNSEL'S OFFICE

Dr. HESS. Thank you, Mr. Chairman.

Mr. BREAUX. Do you have any particular order?

Dr. Hess, we have you listed first. If you would go ahead and start.

Dr. HESS. Mr. Chairman and members of the subcommittee, I appreciate this opportunity to appear before your subcommittees to discuss funding authority for NOAA's programs under title II of the Marine Protection, Research and Sanctuaries Act of 1972.

Section 204 of the act authorizes funds to be appropriated to support research activities carried out pursuant to title II, sections 201, 202, and 203, of the act. These sections provide for: 201, initiation of a program of monitoring and research regarding the effects of dumping of waste materials into ocean waters; 202, research into the long-range effects of pollution, overfishing, and other man-induced changes to ocean ecosystems; and 203, promotion of programs of research on alternatives to ocean dumping. Funding under section 204 is authorized through fiscal year 1978 in the amount of $6,500,000, while the amount actually appropriated is $1,870,000.

Funding will be required in fiscal year 1978 and fiscal year 1980 to support NOAA activities in response to sections 201 and 292. No funds are being requested for section 203 research because it is more appropriately an EPA function.

In fiscal year 1979, the total appropriation for title II research will increase substantially, provided the Congress acts favorably on the President's budget request. For that fiscal year the administra-

tion is asking for an increase of $4,035,000 which, if approved, would make the total fiscal year 1979 appropriation $5,905,000. This is indeed a significant change in the funding picture for ocean pollution research. We consider it as proof of the administration's commitment to protection of the oceans.

I can assure you, Mr. Chairman, that NOAA management will be watching this program closely and will work hard to see that NOAA meets these additional responsibilities.

I should now like to summarize our plans regarding title II research in fiscal year 1979.

SECTION 201

The base funding for our current ocean dumping research program is $1,870,000. With no increase in fiscal year 1979, this amount would be used to continue investigations at deepwater dump site 106, and at the Puerto Rico dumpsite. The administration is requesting an additional $1,475,000 to strengthen the ocean dumping research program in fiscal year 1979. Of that amount, $800,000 will be allocated to the study of two dredged material dumpsites in the Gulf of Mexico. Another $250,000 would provide additional ship support to the ocean dumping research program. The remaining $425,000 will enable us to begin a complementary research program—one not necessarily related to specific dumpsites, but designed to consider basic questions, such as the mechanisms of contaminant assimilation by marine organisms. For the first year we plan to initiate studies on characteristics of metals in waste-seawater mixtures, and effects of various waste types on planktonic organisms and fish. We plan to make special efforts to insure that this research on dumped materials will be complementary to and not overlap with any similar work being done by the regulatory agencies.

With the requested increase, the NOAA ocean dumping research program would have a total funding of $3,345,000 in fiscal year 1979.

SECTION 202

Section 202 of the act requires the Secretary of Commerce to initiate a comprehensive and continuing program of research on the possible long-range effects of marine pollution. Our agency's research effort in this area totals approximately $5 million. However, these studies are carried out in response to legislation predating the Marine Protection, Research and Sanctuaries Act. Through fiscal year 1978 no funds have been approved for implementation of section 202. The President's request of $2,560,000 for this section will allow us to coordinate the section 202 research efforts in accordance with the intent of the act.

Of this sum, $400,000 would be used to establish a group within NOAA responsible for coordinating all NOAA research programs on long-term effects. We also plan to set up a computer-based management information system which would list all relevant research in this area so that we might identify gaps and duplication and determine priorities. With the cooperation of the other Federal agencies engaged in long-term effects research, we believe that it

will be possible to get a handle on this research and to make the total Federal effort more cost-effective.

Another $1½ million would be allocated to support long-term effects research. We are mindful of the legislative history of section 202 in that its scope includes all federally sponsored research and that sums appropriated for section 202 would be available to any Federal agency or private research institution if such support would strengthen the overall national effort.

As for specific research needs in this area, it is possible to establish some immediate needs without going through systematic analysis. The general categories we plan to address during fiscal year 1979 include: (a) Sources and volume of pollutants introduced into the ocean, approximately 50 percent; (b) distribution, fate, and effects of pollutants, approximately 30 percent; (c) long-term exposure studies, approximately 10 percent; and (d) development of early warning system, approximately 10 percent.

As our planning for the first year's program moves along, we will keep your staff informed regarding specific research tasks to be carried out and the agencies or private research organizations to be supported.

The President's budget request includes $660,000 for a new research initiative involving long-term effects studies in the Gulf of Mexico. This project is directed at understanding and predicting environmental threats, such as industrial pollution and oxygen depletion in the waters of the Gulf of Mexico. The objectives of the program are: (1) To determine the significant processes that affect the sources, routes, and eventual sinks of pollutants entering the gulf; (2) to provide the basic knowledge of the present state of the marine environment; (3) to provide the understanding required to assist in predicting environmental threats such as red tides, anoxic conditions, offshore industrial development, ocean dumping, et cetera. First-year funds will be used to develop the program development plan, $150,000; establish the project office, $240,000; analyze historical data, $100,000; and initiate field studies, $170,00.

This concludes my summary of our planned fiscal year 1979 activities in response to title II of the act. We look forward to carrying out the expanded program. Furthermore, we wish to assure the subcommittees that the amounts requested are reasonable and within our capability to allocate in a cost-effective manner.

With respect to fiscal year 1980, our planning has just begun and we are unable to provide an estimate of our requirements at this time. Our decisions for fiscal year 1980 will depend, of course, on the outcome of the President's fiscal year 1979 budget request and we recommend an authorization for fiscal year 1980 of such sums as may be necessary.

Mr. Chairman, this completes my statement. I would be pleased to respond to any questions you might wish to ask.

Mr. BREAUX. Mr. Bleicher, we will go ahead and get your statement on the record.

Mr. BLEICHER. Thank you, Mr. Chairman.

I have today with me Comdr. Phillip Johnson, a member of the NOAA Corps, and Mr. John Milholland, who is from the NOAA general counsel's office.

My name is Sam Bleicher, and I am the Director of NOAA's Office of Ocean Management. As you are aware, the Marine Protection, Research and Sanctuaries Act of 1972 authorized the Secretary of Commerce to designate and operate areas of the ocean both within and beyond the territorial sea as to preserve or restore these areas for conservation, recreational, ecological, or esthetic purposes. While authorizations for funding title III of the act have existed for the past 7 years, President Carter's fiscal year budget recently submitted to Congress, contains the initial funding request for the marine sanctuaries program, $500,000.

Since the enactment of this legislation to sanctuaries have been designated—the area surrounding the U.S.S. *Monitor* site off North Carolina and 100 square miles of coral reef off Key Largo, Fla. In 1975, the wreck of the U.S.S. *Monitor* off Cape Hatteras, N.C., was designated the Nation's first marine sanctuary.

The *Monitor* was a forerunner of modern Naval vessels and is part of the history of our country. NOAA has expended considerable effort to establish proper procedures for review and issuance of permits to conduct research on this historic site. Research will continue over the next several years, and plans must be made after 1980 to consider the salvage and reconstruction of this historic artifact.

The Key Largo Coral Reef Sanctuary was also designated in December 1975 in an effort to combat destruction of living coral, and to make this unique habitat off of our coast a living national monument. The sanctuary regulations also guarantee a portion of the reef will be available for scientific study.

The sanctuary and its adjacent State park are a major attraction that receives over 400,000 visitors a year. The Key Largo Marine Sanctuary is actually managed on site by the Florida Department of Natural Resources under a written agreement with NOAA. The enforcement and surveillance responsibilities are carried out by the U.S. Coast Guard under contract.

In 1977, two major actions were taken that underscore the relevance of title III and the purposes for which it was enacted. First, President Carter in his May 1977 environmental message instructed the Secretary of Commerce to identify sanctuaries in areas where development appears imminent.

Second, NOAA Administrator Richard Frank established a major reorganization of the National Oceanic and Atmospheric Administration including the establishment of a new Office of Ocean Management that incorporates the responsibilities for title III within a broader concept of ocean resource management.

Let me speak a moment to the overall perspective of the Office of Management and how the designation and operation of marine sanctuaries contributes to this program. The goal of the Office of Ocean Management is to see that ocean resources are used for the maximum public benefit with minimum environmental damage or conflict among resource uses.

The office will be evaluating and developing new techniques for the evaluation of existing and projected ocean resource use demands in terms of ocean resource use levels, resource availability, and potential impacts. When conflicts are identified between conservation and resource use, or among resource uses, the office will

33-546 O - 78 - 8

seek to develop a management strategy that will resolve these conflicts, whether through the use of NOAA's statutory powers, or through authorities vested in other Federal or State agencies.

The Office of Ocean Management is designed to be a focal point and a catalyst for NOAA's involvement in ocean decisions. Through the designation and operation of marine sanctuaries, and through selective participation in the decisions of other Federal agencies, the Office hopes eventually to transform Federal ocean management decisions from relatively uninformed and parochial decisionmaking processes into informed coordinated Federal actions that respond to the broadest concepts of social benefit as expressed in national policies made by Congress and the President.

I consider the marine sanctuaries one of the basic tools that NOAA has to accomplish these objectives. Our Office currently estimates that there are 25 to 35 good marine sanctuary candidates that could be pursued over the next 5 years to implement the letter and the spirit of title III.

We have an ambitious program for 1978. In the summer of 1977 NOAA solicited recommendations for possible marine sanctuary sites from private industry, environmental groups, Federal and State agencies, and the public in general. Over 170 recommendations were received, mostly from States and other Federal agencies, and recommendations continue to arrive at the rate of about 1 each week, or 50 per year.

We hope to designate 5 marine sanctuaries during calendar year 1978, and dispose of about 30 other recommendations in addition to excuting our management responsibilities for the two existing sites.

Your invitation asked that I review the procedure leading to a marine sanctuary. The formal process of sanctuary designation begins with the nomination of an area as a marine sanctuary and by any interested party. The marine sanctuary regulations identify the basic types of sanctuaries—habitat, species, research, recreation, esthetic, and unique areas—and provide general criteria to be used in determining the appropriateness of sanctuary designation.

Once the nomination is submitted, a preliminary review of its feasibility is conducted by the Office of Ocean Management, in conjunction with the affected State or States, and other involved Federal agencies. The feasibility will be determined on the basis of the rare or unique characteristics of the area, the nature of development activities within the area, its vulnerability, and the ecological, recreational, scientific, and esthetic value of the proposed site.

If, measured against these benchmarks, the nomination is judged feasible, a profile of the proposed marine sanctuary will be drawn, incorporating detailed analyses of the marine life and geological features, the effects of existing Federal and State laws, and the relative impacts of development activities on an unprotected site, as well as potential sanctuary restrictions on future use. This document is circulated to interested groups and institutions for comments and suggestions.

This information is then incorporated in draft and final environmental impact statements, in compliance with the National Environmental Policy Act of 1969. The completed draft is published in the Federal Register, seeking comments on proposed regulations governing the nominated marine sanctuary.

Public participation plays a vital role. Interested Federal, State, and private groups and individuals are consulted throughout the designation process. Press releases are issued by NOAA when the initial feasibility is determined, and when the regulatory proposals are published, and public hearings are held in the coastal communities most affected by the nomination.

If the results of this effort indicate that positive action is appropriate, Presidential approval is sought for the designation of a sanctuary.

In cases where a proposed marine sanctuary lies within the territorial jurisdiction of any State, for example, 3-mile limit, the Governor has veto power over any action.

A similar process of proposal, public hearings, and when appropriate, an environmental impact statement, will also be used to consider any revisions to established marine sanctuary regulations.

Let me now review our plans for 1979. First of all, in fiscal year 1979, marine sanctuaries—including the two that were designated in 1975, and any additional, up to five, that may be designated in 1978—will require management. The five most probable candidates sites are Looe Key in Florida, the Flower Garden Banks off Texas, two California sites, and an Alaskan site.

Looe Key is a small coral reef in danger of destruction by recreation boaters and pollution. Flower Garden Banks in Texas is a unique reef ecosystem threatened by anchor damage and oil pollution. The two California sites are being considered to protect esthetic values, and the Alaskan site is being considered to provide some measure of environmental protection from increasing levels of development.

We have a number of ongoing responsibilities that come with the designation of new sanctuaries. These include management, surveillance and enforcement, and assessment.

The Office of Ocean Management will develop individualized sanctuary management plans, selecting and negotiating agreements with onsite management agents—typically the adjacent State, but other groups are possible—and oversee the activities involved in sanctuary operations.

Management performed by the contractor for any particular sanctuary includes permit processing, ongoing evaluations of the sanctuary regulations, public relations, and insuring that the sanctuary purpose remains meaningful and reflective of environmental benefit.

Surveillance and enforcement is currently being done under contract by the U.S. Coast Guard for Key Largo. Even though there is no contract, the U.S. Coast Guard is performing these same services for the *Monitor*.

Assessment involves both baseline and monitoring environmental studies to determine the benefits and costs of sanctuary designation and the impact of activities in and near the sanctuary on its viability. These studies, which are essential to an effective sanctuaries program, will be contracted to local universities, private research groups, or Government agencies. They will provide environmental information, and help to refine regulations and to better respond to sanctuary needs.

Second, in 1979 we will be evaluating and designating new sanctuaries. Under current funding levels during fiscal year 1979, we hope to evaluate some of the 30 recommended or nominated marine sanctuary sites, and to select several for designation. Until thorough analyses are completed, we cannot specify just what areas will be designated.

The designation of a new sanctuary involves an intensive process of analysis and review to identify critical resources or amenities that require protection, preparation of preliminary issue papers on potential sanctuaries, and draft and final regulations.

It also requires extensive travel to coastal States in the vicinity of candidate sites to meet with State, local, and private groups that nominated and support, or sometimes oppose the nominations. In addition, formal hearings and consultations on sanctuary regulations and mangement and enforcement arrangements are required.

The designation of a marine sanctuary is considered s significant Federal action under the National Environmental Policy Act, and an EIS will be prepared under contract for each sanctuary site, a review of alternative regulatory schemes, and an evaluation of potential socioeconomic and environmental impacts.

We plan to continue the marine sanctuaries program in fiscal year 1980 evaluating and designating sanctuaries sites. Because this is a time consuming job, and costly process, we want to use our fiscal year 1978 experience to guide us in the development of our budget needs for fiscal year 1980. Consequently, at this time we believe the most appropriate step for the Congress to take would be to authorize such sums as may be necessary for fiscal year 1980.

I am personally excited about the opportunity to take on the challenge of creating and managing a system of marine sanctuaries. I consider title III a vital element of our Nation's ocean programs, and I look forward to working closely with this committee on the implementation of its mandate.

This concludes my prepared statement. I will be happy to answer any questions you may have.

Thank you.

Mr. BREAUX. Thank you very much, gentlemen.

Doctor Hess, on page 2 of your testimony, you point out that no funds have ever been requested for the section 203 research program because it was more appropriately an EPA function. Well, I happen to agree with that.

We have an amendment to transfer section 203 research responsibilities to EPA. If the amendment is not passed, the current law leaves it as an NOAA function. I hope the amendment passes, but if it does not, it is still in your shop, and that gives me some concern.

It really is a congressional decision to determine whose shop it should be in. So it gives me some concern that you have said that it is more appropriately an EPA function.

Until the law is changed, it remains NOAA's function.

Dr. HESS. I understand that, Mr. Chairman. The administration's position is that they would like to see it in EPA's area. If the amendment is not passed, we would do what we could in that area.

Mr. BREAUX. I would hope that in the future this program will be more successful than it has been in the past. Up to now it has been

practically nil. That is one of the reasons why we are moving to transfer the authority to conduct this type of research to EPA.

I agree with your statement. Hopefully we will get the amendment passed, and give section 203 to EPA, but it is not there now.

One of the budget requests that gives me additional concern is the fact that NOAA's request for fiscal year 1979 and fiscal year 1980 indicates an accelerated survey effort on the dump sites. In fiscal year 1979, under section 201, NOAA is requesting $4.9 million. In fiscal year 1980 you are requesting—is that $8.1 million?

The reason for my concern is that section 201 requires NOAA to monitor, and do research regarding the effects of dumping in ocean waters. But we have a termination date of 1981 which covers most, if not all, of the nondredged material being dumped into the ocean.

I am concerned that we are going to be researching and monitoring effects that are soon to be phased out. I am wondering what is the justification for it.

Dr. HESS. Mr. Chairman, we do not have requests in for fiscal year 1980. The President's budget has not yet been put together.

Mr. BREAUX. How about an unofficial NOAA request?

Dr. HESS. The NOAA program is not formulated. We are going to a retreat tomorrow, to try to put together a program.

Mr. BREAUX. A retreat from this amount?

Dr. HESS. No, sir.

Mr. BREAUX. Well, is it not appropriate that in fiscal year 1980, if we are phasing out dumping, that eventually we ought to be phasing out the monitoring of those dump sites?

Now, this $8.1 million figure came from somewhere. I know it is a number that is being kicked around somewhere in your shop, and it does give me some concern that it is twice as much as you have requested for fiscal year 1979.

I think last year Dave Wallace said that dump site monitoring efforts should not be stepped up when the dumping itself will soon be phased out. The planned monitoring efforts in fiscal year 1980 give me some concern, in that perhaps those funds could be more appropriately used in some other area.

Dr. HESS. Mr. Chairman, am I not correct that the dumping program for a dredge spoils is not going to terminate in 1981? This program covers not only industrial waste and sewage sludge dumping, but studies under the Corps of Engineers' dredge spoil dumping program.

Mr. BREAUX. There is no question about that, but one of the most controversial areas is the dumping of sewage sludge. If that is going to be phased out, then it seems there would be a corresponding phaseout of the monitoring.

Dr. HESS. The two dumpsites in the Gulf of Mexico which we are talking about starting work on this year are both ones which will involve dredge spoil dumping.

Mr. BREAUX. Well, I want to make sure that you understand that we have some concerns about this. We want to know that future appropriations are going to be used effectively.

Additional funds for a new program are fine, but bear in mind it might be more difficult to justify an increase for an existing program, so be prepared to do so.

In your opinion, is there effective interchange or coordination between NOAA and EPA under the act?

Dr. HESS. Yes and no. We have a close working relationship between EPA region II and our New York Bight program office on Long Island. That has resulted in cooperative studies of the alternative dumpsites and recommendations from NOAA to EPA concerning the question of moving the present dumpsite to one of the alternative dumpsites, and the present studies on deepwater dumpsite 106.

I think that relationship is quite close and quite productive. I think maybe the working relationship at headquarters is not quite that close.

One of the things that we have done under this section is to work with EPA to decide which dumpsites should be studied first. EPA provided us with priority ordering of dumpsites. The first one that they wanted us to work on, other than the ones being done through the MESA program, was the deepwater dumpsite 106, and the second one the Puerto Rican dumpsite, and the ones that we will undertake this year in the Gulf of Mexico will be the next priority one.

Mr. BREAUX. Mr. Bleicher, under the marine sanctuary program that you talked about today, can you tell me in a little more detail how the program is coordinated between a State adjacent to a marine sanctuary and your office?

Mr. BLEICHER. Of course, as a practical matter, the way you carry it out is by meeting with State officials in dealing with State and local government people who are interested in the problem. This is being done in a number of ways.

First of all, I am going to be meeting with the Governors or other high ranking officials in Alaska and other States to talk about the possibility of marine sanctuaries off their coast before any further steps are taken.

Second, the program has been traditionally associated with the coastal zone management program, and although it is no longer located in that office, contacts have been developed between marine sanctuaries' people and the coastal zone management people in the various States, and that gives us some additional sense of who we should be talking with to coordinate our efforts in the States.

Of course, the legislation provides specifically that no sanctuary can be designated within State waters without the approval of the Governor of the State. So it would be foolhardy of us to make any effort to go forward without working with the Governor of the State, and even if we were talking about an area beyond territorial waters, we would want to have that kind of arrangement.

Finally, I would say, as a practical matter one of the most effective ways is to work with State agencies which are willing to provide the personnel to do the surveillance, so we are going to be working with State governments.

The two sanctuaries that we have have both been contracted with State government.

Mr. BREAUX. Although it has not been in the past, title III of the marine sanctuaries program is potentially an extremely powerful section of this act in the sence of what it can accomplish. Although

not much has been accomplished so far, what, for instance would happen if the State of Alaska decided to set up marine sanctuaries in areas that the Department of Interior considers should be leased for offshore oil and gas production? What happens under that set of circumstances?

If the State does not want sanctuaries within their territorial waters, they have a veto. What happens if they do propose a sanctuary and several agencies support its designation, but Interior does not want it? How is that dispute resolved in the Government?

Mr. BLEICHER. Two levels, I would day. First, we are trying to develop a close working relationship with the Bureau of Land Management of the Department of the Interior on their decision-making processes. We have been talking to them about participating in intergovernmental working groups that they are establishing on the leasing and transportation of offshore oil and gas.

The Department of the Interior has designated a coordinator to work with us on marine sanctuaries problems. Ultimately, the answer is that no marine sanctuary can be established without the approval of the President and, if necessary, we will take the issue to the President if we feel that we cannot work our problem out with the Department of the Interior.

I would hope in normal situations we would be able to do so and we would be able to reach a mutually agreeable natural direction on these matters.

[The following was submitted:]

U.S. DEPARTMENT OF COMMERCE,
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,
Rockville, Md., February 6, 1978.

Hon. JOHN B. BREAUX,
Chairman, Subcommittee on Oceanography,
House of Representatives, Washington, D.C.

DEAR JOHN: Thank you for the opportunity to appear before the joint hearings of your subcommittee and the Subcommittee on Fisheries and Wildlife Conservation and the Environment to discuss the prospects and implementation of title III of the Marine Protection, Research and Sanctuaries Act of 1972. With your permission, I would like to expand my answer to your question about the relationship of marine sanctuaries and Outer Continental Shelf (OCS) oil and gas development. Your question assumed the creation of a sanctuary would preclude oil and gas development and it focused on procedures for resolving such a conflict within the executive branch. My answer also proceeded on the basis of that assumption.

The creation of a marine sanctuary, however, does not necessarily preclude OCS oil and gas development. Sanctuary regulations are tailored to meet many combinations of resource values and threats to them. The key element in determining whether to create a sanctuary is the need and desirability for active, conscious, and comprehensive management. OCS oil and gas development in or near a sanctuary may be affected in only marginal ways, involving operational techniques or pipeline and platform location. In each case, every effort will be made to assure the optimum utilization of all the resource values in the sanctuary area.

I am enclosing information about past expenditures on the designation and operation of marine sanctuaries. I hope this information can be brought to the attention of the Subcommittees and included in the record of the hearing.

Sincerely,

SAMUEL A. BLEICHER,
Director, Office of Ocean Management.

BUDGET, FISCAL YEAR 1975-1978, FOR DESIGNATION AND OPERATION OF MARINE SANCTUARIES

Fiscal year 1975—$75,000

The *Monitor* marine sanctuary was designated in January 1975 and funding was provided for processing the nomination and designation. Because staff time was integrated in other NOAA programs, an exact accounting of money spent is not available. However, a conservative estimate for expenditures is $75K. The costs incurred include: travel to North Carolina, meetings for determining sanctuary regulations, preparation and printing of the draft and final environmental impact statements, a public hearing in North Carolina, and the designation ceremony.

Fiscal year 1976—$75,000

The Key Largo Marine Sanctuary was designated in December 1975. As in Fiscal Year 1975, funding for processing the nomination and designation was provided by NOAA. The cost was approximately $75K, and provided for travel to Key Largo, Fla, and a more complex environmental impact statement.

Fiscal year 1977—$140,000

For 1977, funds were provided from the Administrator's office for the operation of the two marine sanctuaries. A contact was signed with the Center for Natural Areas for $75,000 to undertake a four-part "framework" study of title III and the marine sanctuary program. The remainder of funds expended by NOAA in Fiscal Year 1977 was for management of the two marine sanctuaries. At Key Largo, the State of Florida (Department of Natural Resources) performed on-site management under a contract for $25,000. The U.S. Coast Guard was given $30,000 to provide enforcement personnel. NOAA also spent approximately $10,000 for a data gathering expedition at the *Monitor* marine sanctuary in cooperation with the Harbor Branch Foundation, Inc. A no-cost contract with the State of North Carolina (Department of Cultural Resources) for review and evaluation of proposals for research at the *Monitor* marine sanctuary was also signed by NOAA.

Fiscal year 1978

As in 1977, the program will be funded through the Administrator's office. The marine sanctuaries program was incorporated into NOAA's Office of Ocean Management on November 1977, and no budget has yet been established for the Office. Commitments to date for management of the two designated sanctuaries include $25,000 to the State of Florida for Key Largo and $14,000 to the State of North Carolina for the *Monitor*. Future planned commitments in this fiscal year include $80,000 for an environmental assessment at Key Largo Marine Sanctuary, and $20,000 for a photogrammetric and archaeological assessment for the *Monitor* marine sanctuary.

The remainder of the available funding (which is limited by the $500,000 authorization in title III and by the extent to which the Administrator can reprogram funds from other programs) will be used for evaluation and designation of new sanctuaries.

Mr. BREAUX. I guess if there is a string diffrence of opinion on whether a sanctuary should be established between various departments of the Federal Government, the final answer, of course, rests with the President who has to sign off on any approval.

Mr. BLEICHER. Yes; that is explicitly in the statute. We consult with other departments as well.

Mr. BREAUX. Right.

Despite the tremendous authority, granted under title III, NOAA cannot do anything without any funding. Now, NOAA has requested $2 million for fiscal year 1979, but OMB has only approved $500,000 for fiscal year 1979.

Can you tell me, practically, how this is going to affect the grandiose plans that you have set for the sanctuaries program?

Mr. BLEICHER. Well, looking over our previous budget figures, which I have just been able to track down the last few days, in

fiscal year 1975, about $75,000 was spent to create the *Monitor* marine sanctuary. In fiscal 1976, about $67,000 was for the Key Largo, and in 1977, $140,000 was spent, of which $70,000 was a general framework paper by a contractor. The remaining $65,000 was spent for management of the two sanctuaries. The program can be conducted at whatever level we have the funding to conduct it.

Obviously we will nominate and designate fewer sanctuaries and manage them less thoroughly if we have lesser funds.

Mr. BREAUX. Is your goal of designating five sanctuaries a year possible under the recommended OMB funding level?

Mr. BLEICHER. It would be much more difficult, yes.

Mr. BREAUX. Mr. Leggett.

Mr. LEGGETT. Thank you, Mr. Chairman. I think you have done an excellent job of covering most of the areas that we normally review.

I would like to cover just one issue. In the OMB approved items for 1979, for 202 projects you have $2.5 million. On page 5 of your statement, Mr. Hess, you indicate that you want to allocate half of that dough to figure out the sources in volume of various pollutants in the ocean.

Now, is that not reinventing the wheel? Have we not been working on this under the Federal Water Pollution Control Act? Has not EPA done a lot of studies on this? Are we not trying to make our water drinkable and swimmable by various and sundry dates? Is this the best way to spend that money?

Dr. HESS. I think it is, sir. There are certain local areas, local sources, which are quite well understood. If you look at the coastal zone in total, I do not think anybody has a picture of what the sources are of pollution going into the coastal zone.

Working in our New York Bight project, only last year or the year before, were we able to get a satisfactory total input of material in the New York Bight. That is one of the most substantially contaminated areas around our coast, and that information was not available until we summarized it.

Mr. LEGGETT. How much have you spent on that project?

Dr. HESS. The New York Bight project runs now $2.7 million a year.

Mr. LEGGETT. That is $2.7 million for just one small area?

Dr. HESS. Yes. But——

Mr. LEGGETT. And here you have $2.6 million of which you are going to spend $600,000 in the Gulf of Mexico?

Dr. HESS. But the New York Bight project is not only to look at sources, it looks at all processes and problems in the bight. And I was using it as an example of an area where we had to study the source and the input function determination, and it was hard enough to do in that example so that I think we are being realistic in saying that is one of the major problems that we have to look at as we move forward into the larger problem of the entire coastal zone.

Mr. LEGGETT. Are you going to use that $1.2 million, if it is appropriated to look at specific areas, or is that going to be spread all over the country?

Dr. HESS. We do not have a detailed plan on that yet. We have told the committee we will come back to the staff when it is written. Clearly part of that program will be to look in general at the entire coastal zone. The intent of section 202 is to look at long-range, long-time and, in general, lower level pollutant problems than those very serious ones that occur in certain special areas.

Mr. LEGGETT. How do you plan to apportion your research in-house?

Dr. HESS. We do not have a plan that is completely laid out, but I would say that they would be roughly equal in-house and out-of-house.

Mr. LEGGETT. That is a very rough estimate.

Dr. HESS. We will come back with a detailed plan to the committee when we have it, sir.

Mr. LEGGETT. All right. I think that is all the questions that I have.

Mr. BREAUX. Thank you.

Mr. Forsythe.

Mr. FORSYTHE. Thank you, Mr. Chairman.

Dr. Hess, Let me first reiterate what the chairman said about the amendment that would transfer 203 research to EPA. I fully support it and I think that maybe this will help move that research where it is going to be effective rather than where it really has not had much effect in the past year. I gather that you fully endorse that?

Dr. HESS. Yes, sir.

Mr. FORSYTHE. And I would like to go to section 201, under which the investigation continues on 106. I know this is not the unanimous view, but I have expressed it before and I think I must on the record again.

It seems to me counterproductive to continue to be expending research funds in this specific area where we are trying desperately to eliminate those who are dumping there or any others that might necessarily go there by eliminating the ocean dumping in the New York Bight, of these materials. I know your research, the National Science Foundation research, and many others indicated that ocean dumping was not a relatively major problem, really, with respect to the fish kill situation and the other problems that we have had in that New York Bight. So I do not know how I can really stop what you are doing, but it does seem to me it is really an expenditure that has very little utility down the long road.

I think there are other areas that are very, very significant in this, and you have mentioned them. I am very concerned with dredge materials, In that New York Bight it is as important that we look at dredge materials as at ocean dumping of sewage sludge and industrial waste. Apparently half of the toxic pollutants in that bight are coming from that dredge operation. And if we are only looking at half of the problem, I can't be satisfied.

I would like your response to those statements.

Dr. HESS. First on the program being carried out, deepwater dumpsite 106, this is under 201 of the act. Under 201 we coordinate with EPA and accept their priority rankings of the dumpsites that they consider the most important ones to study. This was at the top of their list and, therefore, we are working on it. I agree with your

statement that it is a proper thing to do to stop sewage sludge dumping in the ocean.

NOAA has taken the position that we very strongly support EPA's action in this direction to accomplish that by 1981. Our recommendation in connection with the study that we made for EPA a couple years ago on the alternate dumpsites was not to start dumping sewage sludge at those sites but rather to, as rapidly as possible, phase out that dumping, and during that interim period, when it was going to continue, do it at the present dumpsites.

Mr. FORSYTHE. Good. As you know, I have said the same thing to EPA.

Dr. HESS. Let me pick up on one point that you made, and maybe add a point to it. We are of the opinion that the major pollutant comes not from dredge spills but the material that is transited in the bight through the Hudson River system. That may well contribute more to the total problem than the dumping.

Mr. FORSYTHE. Basically outfalls.

Dr. HESS. Yes, from upstream.

Mr. FORSYTHE. I fully agree with you, but I think EPA is trying to assure us that they are at least biting that bullet also, and that is the reason why was moving on to dredge in this regard.

That is all I have, Mr. Chairman. Thank you very much.

Mr. BREAUX. Thank you.

Mr. Hughes?

Mr. HUGHES Thank you, Mr. Chairman. Thank you, Dr. Hess.

I am curious about something. I heard it said often that perhaps the 106 dumpsite is not the right dumpsite for sewage sludge and, yet, when Camden was having its difficulties in trying to comply with the interim permits, and extension was granted, I believe for Camden to dump at the 106 site.

Is that not true?

Dr. HESS. I believe it was.

Mr. HUGHES. My curiosity is aroused by the logic. When we are really down to the wire with a municipality, and we have other dumpsites that are closer to shore, and a court forces us to extend a deadline for a municipality, we require them to dump at the 106 site? But when EPA is not forced to issue a permit, they opt for other sites.

Dr. HESS. Well, I am sorry but I have to refer both of those questions to EPA.

Mr. HUGHES. I thought maybe you had given them some input on that.

Dr. HESS. No.

Mr. HUGHES. You have been monitoring 106 for sometime, have you not?

Dr. HESS. We have been studying 106 to try to provide information to EPA for their purposes, but we were not involved in those decisions.

Mr. HUGHES. If EPA is still here, maybe we can find out from them the logic of those decisions.

Let me ask you some questions that bear more directly on your own responsibility. I am just delighted that we finally caught up with the fact, after about 5 years, that 203 responsibility really belongs to EPA and not NOAA. But I suppose that is progress in

the Congress. It only takes 5 years to catch up with some shortcomings.

Let me ask you about the dumpsites in Puerto Rico. Are they basically just chemical dumpsites?

Dr. HESS. I believe that is correct.

Mr. HUGHES. How much of the funds earmarked for title II programs are for those particular dumpsites? Can you tell me?

Dr. HESS. $600,000 this year will be used for that dumpsite study.

Mr. HUGHES. $600,000. Is that a deepwater dumpsite, too, just like 106?

Dr. HESS. 6,000 meters deep. It is deep.

Mr. HUGHES. That is deep.

How many years have we been monitoring that particular dumpsite?

Dr. HESS. This is the first year.

Mr. HUGHES. What is it that is so different about that particular deepwater dumpsite that we would have to be looking at that dumpsite as well as the 106 dumpsite which is primarily a chemical dumpsite?

Dr. HESS. Again I have to defer to EPA because this was the second on their list of priorities, and taking their priorities, it is the second one that we start working on. It is a dumpsite that has special characteristics in that some of the material which is dumped there deals with pharmaceutical production, materials—organics, which may be rather more bothersome in the ocean than other materials.

Mr. HUGHES. And you think that that is perhaps the reason for EPA suggesting that that is a priority dumpsite?

Dr. HESS. It is certainly part of it.

Mr. HUGHES. How much of your fiscal 1979 budget do you aniticipate utilizing for monitoring in the New York Bight area under title II?

Dr. HESS. The program that we have studying the dumpsites, other than 106 and the New York Bight, I would not call it monitoring, it is a research program which has two objectives.

First, to study the problems attached to dumping of various materials in the bight and, second, to understand all the processes going on there so that one can hopefully develop some predictability of the body of water en toto.

Mr. HUGHES. But how much money is being committed?

Dr. HESS. That program is $2.7 million per year.

Mr. HUGHES. Are any moneys committed to examining the impact of dumping in what is called the old Philadelphia dumpsite?

Dr. HESS. No.

Mr. HUGHES. When did NOAA cease monitoring in any fashion, whether by research or what have you, that particular dumpsite?

Mr. BREAUX. Would the gentleman yield?

Just to bring out a point here. It is my undertanding, along the lines that the gentleman from New Jersey is following that under the interagency agreement between EPA and NOAA, EPA is supposed to identify one dumpsite that NOAA is supposed to study. It is EPA's responsibility to point out which dumpsites should be studied.

Dr. HESS. That is correct.

Mr. BREAUX. Do you have a list from EPA setting out the priorities or the type of interagency contacts you have with EPA to study particular dumpsites?

Dr. HESS. As we move forward in the program we get from EPA their idea of what the highest priority items are. I am not sure we have a written list, but we have statements from them that first the deepwater dumpsites, 106, then second Puerto rico, and then Gulf of Mexico.

Mr. BREAUX. They have not submitted a written communication to you covering order of priorties?

Dr. HESS. I do not believe so.

Mr. BREAUX. That seems to me to be pretty critical.

Dr. HESS. I think we will get that taken care of shortly.

Mr. BREAUX. I would hope so.

Mr. HUGHES. I am a little confused. Where is the New York Bight dumpsite?

Dr. HESS. There are several dumpsites in the New York Bight.

Mr. HUGHES. You referred to 106. I do not think that 106 is in the New York Bight.

Dr. HESS. I agree. I agree it is not in what we call the New York Bight.

Mr. HUGHES. Then what I am trying to find out is where does the New York Bight, which is like the dumping grounds of the world, as far as I am concerned, fit into the relative priorities?

We have more stuff being dumped in the New York Bight than probably all the other places combined.

Dr. HESS. Yes, I agree with that, and we have been carrying out a program of research in the new York Bight for 5 years, I believe it is. That is not a program that has been started under the Marine Protection, Research, and Sanctuaries Act. It was started before that law, and it will continue through 1981.

We have coordinated with EPA on certain parts of the work that we do, but that is a NOAA research project.

Mr. HUGHES. What I am trying to point out is how is that funded?

Dr. HESS. It is funded under a program called MESA, Marine Ecosystem Analysis.

Mr. HUGHES. Let me get back to the Philadelphia dumpsite again.

As I recall, one of the last reports I saw, which emanated from NOAA, indicated that there were traces of cadmium and mercury years after we ceased dumping at the Philadephia site. I am just wondering, would it not be important for us to try to find out what the traces of cadmium and mercury are now that we have ceased dumping at that site.

One of the problems we have in the New York Bight area is that we find traces of cadmium and mercury, 100 times over the safety level postulated by EPA, and it would seem to me, in looking at the relative priorities, that it is very important to find out, years after we have stopped dumping at a site, just what traces of mercury and cadmium we have. I cannot understand why we do not have some further studies of that particular dumpsite.

Dr. HESS. I agree with you, it would be a good idea to study a large number of dumpsites. I think Mr. Jorling mentioned 67 sites

that are active now. We have to work on those with highest priority.

Mr. HUGHES. You know, what concerns me, I do not know where this Puerto Rican dumpsite is, but I know in the Philadelphia dumpsite area we have clammers all over the place. I would think it would be very important, from the standpoint of health and the environment, to determine just what has been the impact of this dumping.

If we interrupt the monitoring now, we are going to lose a real good opportunity to find out more about the impact of ocean dumping.

Dr. HESS. But it is not a matter of interrupting the monitoring of the Philadelphia dumpsite as far as we are concerned. We have not been involved in studies of that sort.

Mr. HUGHES. I understood you were.

Dr. HESS. No, I am sorry, we are not.

Mr. HUGHES. Do you have any idea who has? Is it EPA?

Dr. HESS. EPA did the entire study on the Philadelphia dumpsite. We were not involved.

Mr. HUGHES. I suppose you have the same problem as I do, i.e. trying to determine which of the agencies have jurisdiction. I can see where you have problems with the Army Corps, with dredge materials, because they are doing things that also fall within your jurisdiction.

Your suggestion is then that NOAA has never participated in monitoring the Philadelphia dumpsite?

Dr. HESS. Correct.

Mr. HUGHES. Do you coordinate your findings on other dumpsites with EPA? Is there an exchange of information?

Dr. HESS. Yes, very closely.

The New York Bight, sewage dumpsite, being the best example, there has been a close relationship between our people and the people running the MESA project.

Mr. HUGHES. Would it be helpful if we had one lead agency that would actually coordinate those activities? I mean you are doing some monitoring, the Army Corps of Engineers is doing some monitoring, EPA is doing some monitoring, and even though I hear you when you tell me there is interagency coordination, I often find that is not the case.

I just wonder, is this a major flaw in our effort to try to learn more about programs such as ocean dumping? You have one agency determining priorities, doing some monitoring of your own, another agency, the Army Corps of Engineers, that determines their own priorities, which is doing some monitoring, and then you have NOAA, which would seem to have a great deal of technical expertise, and depth in this area, but nobody in the final analysis is really coordinating these activities.

Do you envision that this is a major problem in trying to attack a common goal?

Dr. HESS. I think that we would work better if we had a single agency coordinating these things.

Mr. HUGHES. You, of course, would suggest that EPA be the lead agency?

Dr. HESS. I have not thought of that answer, sir.

Mr. HUGHES. Thank you, Mr. Chairman.

Mr. BREAUX. Mr. Pritchard?

Mr. PRITCHARD. Yes, I will be following this matter closely, Dr. Hess, as to how you are coming in the Puget Sound area with MESA.

That is all I have, Mr. Chairman, just 20 seconds.

Mr. BREAUX. It was not even 10 seconds.

You might note, Mr. Hughes, that there is pending in the House, legislation which would designate NOAA as the lead agency in all marine pollution research and monitoring. It has already passed the Senate, and is pending in the House right now. It would designate NOAA as the lead agency, and clear up once and for all, which agency should have one lead and help to coordinate the Federal effort to conduct ocean pollution research and development.

Gentlemen, thank you.

We will have some additional questions that we would like to submit.

Sam, I would like to ask you one other thing.

Do we have any plans for the *Merrimac?*

Mr. BLEICHER. There are a number of other Civil War wrecks that people have suggested to use as possible sanctuaries.

Mr. BREAUX. Thank you, gentlemen.

With that, the subcommittee will stand adjourned subject to the call of the Chair.

[The following was submitted for the record:]

U.S. ENVIRONMENTAL PROTECTION AGENCY,
OFFICE OF WATER AND HAZARDOUS MATERIALS,
Washington, D.C., February 7, 1978.

Hon. JOHN B. BREAUX,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Thank you for your letter of January 6, 1978, expressing your concern about the ability of some ocean dumpers of harmful sewage sludge to meet their compliance schedules for stopping ocean dumping by December 31, 1981. We share your concern and are using every administrative and legal remedy open to use to insure that the legal requirements are met for stopping the ocean dumping of harmful sewage sludge.

In your letter you specifically mention potential problems with Westchester County and New York City in complying with the recently passed law mandating the cessation of ocean dumping of harmful sewage sludge by December 31, 1981. I would like to bring you up to date concerning the implementation schedules of these two ocean dumping permittees. As you are aware, permits issued and effective August 1, 1976, contained an implementation schedule which included nine interim dates leading up to the cessation of ocean dumping by the end of 1981. As part of the Environmental Protection Agency (EPA) Region II's annual review of permits and permit conditions, both New York City and Westchester County requested changes in certain of these interim dates but not in that final date.

After considerable discussion between Region II and the respective permittees, the new permits were issued January 10, 1978, granting the revised schedules submitted by the applicants/permittees. In the case of New York City, the schedule now contains 28 interim dates leading to the cessation of ocean dumping in 1981. Similarly, in the case of Westchester County, there are 13 interim dates. It should also be noted that all interim permits issued on January 10 by Region II to 35 sewage sludge generators contain an implementation schedule for the cessation of their current practice of ocean dumping on or before December 31, 1981, in accordance with 40 CFR Section 220.3(d) and the statutory deadline imposed by Public Law 95-153. The interim dates included in these permits are, to a great extent, those suggested by the permittees as dates they believe can be met. The inclusion of a larger number of identifiable milestones in the permits will enable us to monitor

permittees' activities more closely than before and will also provide us with additional bases on which appropriate enforcement action can be instituted.

In issuing those permits, the Region notified each permittee that, under EPA regulations, unless the Regional Administrator determines that the permittee has an implementation schedule adequate to insure cessation of all ocean dumping by 1981 at the latest, no further permits may be issued to the permittee after April 23, 1978. EPA has no discretion to do otherwise since the 1981 deadline has been made statutory by Public Law 95-153.

Region II is closely monitoring the activities of all permittees under the newly issued permits and is implementing an enforcement strategy which includes immediate enforcement action by the Region if any of the specified interim dates are missed.

The schedules for implementation are indeed tight and have little allowance for slippage. There is certainly some chance that unforeseen and uncontrollable factors such as strikes and delays in funding or deliveries of equipment will create problems difficult to resolve. However, we believe that our careful monitoring of each permittee's activities will afford the highest probability of forestalling any such occurrences and will result in all permittees ceasing to dump harmful sewage sludge by December 31, 1981.

I will be happy to keep you informed of our progress in phasing out the sewage sludge dumpers.

Sincerely yours,

THOMAS C. JORLING,
Assistant Administrator.

WESTCHESTER COUNTY DEPARTMENT OF ENVIRONMENTAL FACILITIES,
White Plains, N.Y., December 30, 1977.

Hon. JOHN BREAUX,
House of Representatives, Subcommittee on Merchant Marine and Fisheries, Longworth House Office Building, Washington, D.C.

DEAR SIR: On October 13, 1977 I wrote to you expressing concern over a provision of proposed bill H.R. 5851 which would impose fines, or would require a high rate of expenditure of funds to study and develop land-based alternatives to ocean disposal of sludge. I appreciate your detailed response of October 18, 1977 which also requested further information from this department.

As you indicated, compliance with the December 31, 1981 date, now required by provisions of H.R. 4297, will be difficult. Numerous environmental, economic and regulatory considerations will effect such compliance and must be thoroughly addressed.

The County has "taken the deadline seriously", has undertaken major steps toward achieving the goal, and has been cooperative and responsive to Federal and State Agencies in this regard. The County has not yet chosen a specific land based alternative, but is moving rapidly toward such decision which will be consistent with the time constraints imposed by law.

The following responses to the five items of information requested in your October 18 letter are offered:

(1) Westchester County operates six municipal wastewater treatment plants, of which only the facility located in Yonkers is herein addressed. The other plants already utilize or are in the process of implementing methods of land based sludge disposal. The County is currently under engineering contract for $236,619 for preparation of a facility plan relative to disposal of sludge from the treatment plant at Yonkers. Previously, a Sludge Management Study costing $140,000 and also addressing the Yonkers facility was begun in 1975 and completed in February 1977. Department staff has expended considerable effort associated with these studies.

(2) The Federal and State funding, relative to the above noted $236,619 study work, will amount to 87½ percent of costs.

(3) Westchester County will complete the above noted Step 1 work by June 1, 1978, which will establish the alternative for implementation. Plans and specifications (Step 2) are to be completed by June 15, 1979. Construction of facilities (Step 3) is to begin by February 1, 1980, with completion before the end of 1981. Funding for Step 2 and Step 3 work will depend upon the alternative chosen.

(4) The most serious problems which could effect meeting of the deadline are likely to be beyond the control of this County. Such occurrences as formal protests, court actions, strikes or excessive material and equipment delivery problems could impose delays in the program. The current schedule has little room to absorb any such delays. Each available alternative involves considerable cost and environmen-

tal implications, and must be thoroughly investigated in accordance with the State and Federal regulations prior to commitment for implementation. Many of the procedures cannot be shortened.

(5) With regard to the United States Environmental Protection Agency, Region II has been willing and available to provide technical assistance and advice regarding environmental acceptibility of land based alternatives. The decision as to need for an E.I.S. will await evaluation of the Environmental Assessment and is not predictable at this time.

In conclusion, this County has undertaken a program which can meet the December 31, 1981 deadline. The proposal for imposition of fines and legal sanctions, as indicated in our October 13th letter, are viewed as non-productive, themselves presenting a possible impediment. Such will do nothing toward avoiding the most severe type delays outside of County control. If special legislative action were to be considered, such would better address the topics noted in item (4) above.

I thank you for your interest and consideration regarding the serious problems facing communities such as Westchester County in addressing this endeavor.

WILLIAM G. BORGHARD, P.E.,
Commissioner.

OCTOBER 18, 1977.

WILLIAM G. BORGHARD, P.E.,
Commissioner, Department of Environmental Facilities,
White Plains, N.Y.

DEAR COMMISSIONER BORGHARD: Thank you for your letter of October 13, 1977 explaining your views on the bill, H.R. 5851. The Subcommittees on Oceanography and Fisheries and Wildlife Conservation and the Environment held hearings on the bill on September 20. During these hearings I brought up the very point you discuss in your letter.

The intent of the legislation is to ensure that interim permit holders will implement acceptable land-based alternatives by December 31, 1981. The Committee is aware that in some cases, particularly New York City, compliance with this deadline will be difficult. The Committee feels very strongly that this deadline must be met and realizes that the time to correct situations which may impede progress toward this goal is now.

According to testimony given by the Environmental Protection Agency at the September 20 hearings, most interim permit holders have not yet chosen a definite land-based sewage sludge disposal alternative. I take it from your letter that Westchester County falls into that category. A little more than four years remain before the ocean dumping of sewage sludge must end. Consequently, I think the Members of the Committee are justified in their concern over the possibility of meeting the deadline.

No further action is anticipated for H.R. 5851 this session. I have directed the staffs of the Subcommittees to look into our mutual concerns regarding any adverse impact this legislation would have on interim permit holders and their efforts to phase out ocean dumping by December 31, 1981.

You could assist me and the staff by providing the following information:

1. How much has Westchester County spent on the development or implementation of land-based alternatives in the last five years?

2. How much Federal and State funding has Westchester County received or is expected to receive for purposes of developing or implementing land-base alternatives in the last five years?

3. Describe Westchester County's schedule which will lead to the complete phaseout of ocean dumping by December 31, 1981. In this description please include an accounting of funds which will be spent and the date when an alternative will be chosen (if an alternative has already been chosen explain that alternative.)

. A discussion of any problems which may prevent Westchester County from achieving phaseout by December 31, 1981.

5. Has the Federal EPA provided to Westchester County technical assistance or advice regarding the environmental acceptability of land-based alternatives? Will EPA require an EIS to be prepared before any alternative is implemented?

Thank you for your interest and your assistance.

Sincerely,

JOHN BREAUX,
Chairman, Subcommittee on Oceanography.

33-546 O - 78 - 9

ANSWERS BY EPA TO QUESTIONS OF MR. BREAUX

Question 1. Exactly what type of research does EPA conduct under Title I? How is this research coordinated with NOAA's research under Title II?

DEFINITIONS

In the context presented here, "research" includes all of these specialized ocean field investigations:

A. Routine monitoring—Periodic sampling at specified locations of a limited number of indicator parameters selected to identify gross impacts of specific pollutants.

B. Baseline or trend assessment surveys—Broad-scale short-time seasonal series of surveys of a particular area designed to provide a synoptic picture of the overall environment at and near the area studied.

C. Research studies—Long-range studies of specific phenomena to understand complex environmental interactions, particularly cause and effect relationships.

NOTE.—These specific definitions are presented because there are many differences in interpretation of the terms "research" and "monitoring," and much confusion has resulted from lack of understanding of how these terms are used in particular contexts.

ACTIVITIES

A. Routine monitoring

Answer. EPA Region II (New York) conducts some shoreline monitoring of beaches during summer months as part of their overall water quality monitoring activities. They also sample about 12 stations in the New York Bight for water column and sediment chemistry on a periodic basis.

Some permittees using ocean dumping sites in the New York Bight are required to conduct monitoring activities at their own expense. These are industrial dumpers using the Acid Dumpsite, the 106-mile site, and municipalities dumping at the sludge dump site.

Region III monitors the Philadelphia sludge dumping site on a quarterly basis, frequently in cooperation with NOAA and the Coast Guard.

Precise estimates of the costs to EPA of these activities are not available because these items are not budgeted separately, but it is estimated the total cost of all these activities exceeds $1,000,000 per year.

Because measurements of pollutants impacts obtained by conventional means are not adequate to detect other than gross changes, EPA has sponsored the development of an *in situ* biological monitoring device, which was used last summer at the Philadelphia dumpsite in a pilot study, and which will be used in the New York Bight for monitoring this summer. This technique has the capability of detecting impacts long before irreversible changes occur. The total cost of development and testing over a three-year period has been about $500,000, and activities this year will run about $150,000.

B. Baseline and trend assessment surveys

These are the types of studies needed to designate dumpsite in accordance with Section 102(c). The EPA ocean dumping regulations establish guidelines for conducting such surveys. These are essentially data-gathering operations at each ocean disposal site; the data collected cover a wide range of site characteristics and are used to describe existing conditions at each site as part of an EIS in support of the site designation.

A contract has been negotiated to prepare EIS's on all sites for which continuing use is anticipated after January 1980 (the date when the interim designations in the present regulations expire). The base cost of this contract is $1,600,000 over a three-year period. Baseline survey costs would be in addition to this and would depend on how many surveys are needed. The total need for surveys is not known as yet, but could be an additional $3.5 million over the same time period if the existing data base on many of these sites is small. This contract does not include any dredged material sites at the present time although a substantial modification is being considered to include dredged material sites.

This contract is set up so that the baseline surveys are options on a case-by-case basis. An Interagency Agreement has been developed with NOAA so that they can do some of the needed surveys if they can be scheduled along with NOAA research studies under Sections 201 and 202 in such a fashion that the data are provided to EPA in a timely fashion.

NOAA participated in the development of the guidelines for site surveys in the EPA regulations, and has been kept advised of site survey and designation prior-

ities. Under the EPA/NOAA interagency agreement (IAG), NOAA is to consult with EPA on site survey plans. Coordination of the overall research effort under Sections 201 and 202 is not required under the IAG, and EPA has had no significant input to planning other NOAA research activities under these sections.

C. Research studies

Studies of this type are the responsibility of NOAA under Title II, and EPA does not conduct these types of studies.

EPA has, however, conducted some field studies of a research nature in its efforts to evaluate incineration at sea as a viable waste disposal alternative. In 1974, EPA did air and sea monitoring of a research burn of organochlorine wastes in the Gulf of Mexico. NOAA provided a vessel, on a reimbursible basis, but was unable to assist in the investigations otherwise.

Question 2. Exactly how many meetings have been held between NOAA and EPA pursuant to the EPA/NOAA interagency agreement?

Answer. The EPA/NOAA IAG, signed in March 1975, is only one of many aspects of contact and coordination between EPA and NOAA in implementing the Marine Protection, Research, and Sanctuaries Act. There have been cooperative studies in the New York Bight Apex, at the 106-mile dumpsite, and at the 40-mile (Philadelphia) site. NOAA representatives are invited to attend our Regional Coordinators Meetings, and NOAA staff frequently participate in EPA public hearings. EPA participates in NOAA planning sessions for studies at EPA dumpsites and assists NOAA in preparing budget justifications for some of its field research activities related to ocean dumpsite research. There are numerous meetings at various staff levels as needed on specific problems. We do not have records showing exactly how many meetings in the past three years have dealt specifically with the IAG only. In 1978, there have been two meetings so far on this subject, and there were four during the last three months of 1977 which dealt with various aspects of the IAG. We estimate that about 12 meetings over the past three years have dealt with substantive matters under this IAG.

Question 3. What additional funds to Title I would be needed in order to effectively implement responsibilities pursuant to the transfer of Section 203 of Title I of the Act?

Answer. Transfer of Title III of EPA would require a thorough reevaluation of present activities in the light of the new responsibilities which this section includes. These new requirements would require reexamination of our permit-issuing process, particularly with regard to the demonstration of new or innovative technologies under Section 203, and the reorientation of some of our site designation procedures, particularly toward the disposal of dredged material so as to create new estuarine habitats or artificial islands.

This reevaluation would be done as part of the Zero-Bases-Budgeting process in relation to other EPA programs and the funds presently being expended in research on alternatives to ocean dumping. This is a very complex process, and we are unable to provide an answer to this question at the present time. We will, however, be happy to provide you with the results of this analysis as soon as the budget formulation process is complete.

Question 4. Is EPA's work on radiological waste dumpsites funded under Title I of the Act? How much is this each year?

Answer. Radiological waste dumpsite studies have, in the past, been funded primarily by EPA's Office of Radiation programs (ORP), which does not receive funds under Title I. However, these funds have been supplemented by amounts varying from $50,000 to $100,000 per year from resources allocated to Title I activities.

Question 5. Does EPA now have a ship to assist with its ocean dumping program?

Answer. In developing a program of work under the EIS Contract mentioned earlier, an analysis was made of the relative costs for vessel support for baseline surveys under this contract. We found that the cost of conversion and operation of a surplus Navy vessel for the period of this contract would result in a saving of over $1 millon over a two-year period. Since a suitable vessel was availabel for transfer at no cost to EPA, we proceeded to acquire it and turned it over to our Contract for conversion and operation under this contract. Acquistion ad use of this vessel is based solely on its being the most cost- and time- effective method for obtaining the survey data we need in a timely fashion. We have no plans at present to support the use of this vessel beyond the present contractual commitment.

Question 6. Is there a need to step-up dumpsite survey efforts if most of these dumpsites will be discontinued by the end of 1981?

Answer. The present contract deals only with sites presently used for the disposal of sewage sludge and industrial wastes, and with sites which will be used for

incineration at sea in the future. We do not plan on doing further work or completing EIS's on those sites which will be phased out by January, 1980, when the interim site designations presently in the EPA ocean dumping sites and on the 106-mile site has already been done, and EIS's will be completed on these sites so they can be formally designated for use in 1980 and 1981, and, for the 106-mile site, after that time for a special permit.

Dredged material dumpsites require the same types of studies and designation procedures as other sites. The present study effort does not include any dredged material sites although we are considering modifying the present contract to include some dredged materials sites in place of those sites which are being discontinued. However, this will only be about 3 out of the 127 sites that are presently designated. We believe that 15-30 of the dredged material sites now in use require detailed study for designation.

Question 7. Has EPA ever fined a permit holder for not complying with conditions in a permit?

Answer. Yes. In 1976 six fines totalling $6,700 were assessed in addition to the $225,000 penalty assessed Philadelphia. In 1977, three fines were assessed totalling $51,000. Some cases are still pending.

Question 8. How do you perceive the pending NOAA/Corps interagency agreement?

Answer. We have seen only an initial draft of an agreement prepared by NOAA, which was provided to us by the Corps of Engineers. This draft is similar to the EPA/NOAA IAG in its basic provisions, and calls for NOAA to do baseline surveys for the Corps of Engineers for dredged material sites. We support the principle of NOAA doing baseline surveys for both EPA and the Corps of Engineers to the extent they can produce a timely product to support the regulatory program. However, NOAA has been unable to do this for EPA and we see little likelihood that they will be able to do it for the Corps of Engineers.

Question 9. On page 7 of your testimony you state, "the thrust of the NOAA activities under Title II is, however, directed toward understanding the complex processes occurring in the ocean through long-range research activities, and not toward obtaining the types of site specific data required for us to designate and manage sites in a timely manner." NOAA, under Section 201, is directed to "initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters," etc. Also, NOAA, under the EPA/NOAA interagency agreement, is supposed to provide research support for site designations and management. Could you be more specific as to how NOAA is falling short in fulfilling its aforementioned responsibilities? Include any recommendations you have for improving NOAA's role in dumpsite designation and management efforts.

Answer. As noted in our response to Question 1, the term "research" is subject to widely varying interpretations. The definitions presented in our response to that question identify three categories of "research"; of these, the first two represent the priority needs of the regulatory program, while the third identifies the types of long-range studies which NOAA is conducting under Section 201 of Title II. Under the EPA/NOAA IAG, NOAA has agreed to adapt these research efforts to the extent feasible to assist EPA in designating dumpsites. There are, however, certain factors which have limited the extent to which the NOAA research studies have proven useful to EPA in meeting its operational requirements. These are:

a. NOAA dumpsite cruises are planned and conducted as oceanographic research studies through grants and contracts, not as broadscale dumpsite surveys. That is, a group of "principal investigators" is selected to plan and conduct the study, and the work done is that in which they and their students are interested, which has been frequently not that required by EPA guidelines for dumpsite surveys. For example, in the studies of the 106-mile dumpsite, less than half the samples were taken at or near the dumpsite.

b. Each NOAA survey is planned as a separate operation, not as part of an overall program. Planning normally requires 6-12 months for each survey after grants have been given to the principal investigators. The total planning and study period for each survey is so long that conditions at a site may have changed materially between surveys and it becomes impossible to tell whether observed changes are seasonal or the result of pollution.

c. Reports on surveys are not available in a timely manner. The results of surveys are often presented by the principal investigators in scientific meetings long before the results are made available to EPA in a report suitable for use in a site designation.

The only site survey report we have received from NOAA covers three cruises at the 106-mile dumpsite. This survey was requested in 1973, surveys were conducted in 1974, 1975, and 1976, and a report was finally published in late 1977. Even then, the report did not recommend acceptable waste loadings or an appropriate monitoring scheme for this site.

Improvement in NOAA's role in dumpsite designation and management would require a reorientation of their overall approach from a basic research mode to the provision of technical services and support.

ANSWERS BY NOAA TO MR. BREAUX'S QUESTIONS

Question 1. On page 7 of Mr. Jorling's prepared testimony he states: "the thrust of the NOAA activities under Title II is, however, directed toward understanding the complex processes occurring in the ocean through long-range research activities and not toward obtaining the types of site specific data required for us to designate and manage sites in a timely manner." NOAA under section 201, is directed to "initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters," etc. Also, NOAA, under the EPA/NOAA interagency agreement, is supposed to provide research support for site designations and management. Is NOAA falling short in fulfilling its aforementioned responsibilities?

Answer. We interpret Mr. Jorling's statement as addressing our Marine Ecosystems Analysis (MESA) program which, although not funded under Title II, is directed toward understanding the complex processes occurring in the ocean through long-range research activities in selected areas. The MESA project for the New York Bight is aimed at determining the impacts of a wide range of man's activities upon that ecosystem, but it is also providing specific information and assessemnts to assist EPA in making management decisions concerning ocean disposal. The New York Bight project is related more closely to our proposed fiscal year 1979 section 202 program than our ongoing section 201 effort and accordingly might be interpreted as in Mr. Jorling's testimony.

Our Ocean Dumping Program in response to section 201 and our responsibilities under the NOAA/EPA interagency agreement are separate and are carried out by our National Ocean Survey. This program has been providing information for our recommendations to EPA with respect to the movement of present dumpsites to site DWD-106 off the continental shelf. We also have been working through this program with EPA Region II on the problems associated with the dumping of pharmaceuticals at a site off Puerto Rico. These activities together with our MESA research on the dumpsites in New York Bight, have been fulfilling NOAA's responsibilities under the law and, in addition, have been providing site specific data useful to EPA in meeting its management responsibilities.

Question 2. How are NOAA's Title II programs coordinated with other NOAA programs such as the MESA project and Sea Grant programs?

Answer. The Ocean Dumping Program in response to section 201 of Title II has close coordination with the MESA project through frequent working level contact and visits of personnel including the respective managers. A formal coordinating committee also has been established, meeting approximately once each quarter. Plans for field projects are exchanged and preliminary findings discussed. Joint positions are developed on issues (e.g., movement of dumping from one site to another) and public hearings (e.g., New York, Toms River, etc.).

Coordination with Sea Grant programs has taken the form of evaluating current Sea Grant sponsored studies to assure integration of their findings into related Title II programs. The tie between the Sea Grant Program and the Ocean Dumping Program will be strungthened if the requested funds for complementary research in ocean dumping, now before the Congress, are appropriated. We plan to build upon Sea Grant studies at selected sites. This cooperation between the two programs will take on greater importance when dredge material disposal sites are studied, as most Sea Grant work has addressed this problem.

Question 3. Can you explain the sudden change of attitude by OMB in regard to funding for NOAA's Title II efforts?

Answer. There has been no sudden change in the OMB attitude in regard to funding NOAA's Title II efforts. The total appropriation for Title II in fiscal year 1977 was $1.37 million for the initial phase of our section 201 program. The President's proposed spending for Title II in fiscal year 1978 was $3.0 million; $1.87 million of which the Congress appropriated. For fiscal year 1979, the Administration now has before the Congress a request to increase Title II funding to $5.9 million.

Question 4. How are section 201 and 202 programs administered within NOAA? Does the fact that these programs fall under different NOAA major line components present a coordination problem?

Answer. The Title II programs administered by NOAA are presently directed at our section 201 responsibilities. The Ocean Dumping Program of the National Ocean Survey (NOS) which carries out the NOAA responsibilities under the NOAA/EPA interagency agreement, is in response to section 201. There is no authorized program for section 202 research in fiscal year 1978. The proposed program for section 202 in the President's Budget for fiscal year 1979, if approved by the Congress, will be undertaken by the Environmental Research Laboratories (ERL) and the National Marine fisheries Service.

Close working relationships exist between the program manager of the Ocean Dumping Program and the managers of other NOAA research programs that complement Titles II research. These relationships have been effective in minimizing coordination problems and provide a means of integrating the results of NOAA research.

Question 5. What is the status of the pending NOAA/CORPS interagency agreement? Does EPA support this agreement?

Answer. A draft of the proposed interagency agreement is under discussion by NOAA and the Corps of Engineers. The interagency agreement is needed to formalize the procedures for site assessments by NOAA to support Corps of Engineers regulatory functions, especially in reference to dredge material disposal. The agreement is to facilitate the setting of joint priorities and establish procedures for the development of analyses and dissemination of information.

We have not sought nor have we been advised of EPA's position on this proposed agreement as it is specifically addressing the Corps of Engineers ocean dumping activities and our related supporting functions.

Question 6. Is there effective coordination between NOAA and EPA under this Act? Is the NOAA/EPA interagency agreement working effectively? How many meetings have been held pursuant to NOAA/EPA interagency agreement?

Answer. We believe that the Act has served to define the relative responsibilities of the two agencies. The NOAA/EPA interagency agreement has further clarified these responsibilities and provided a basis for coordinating associated activities. It has been especially useful at the operating level between managers of the NOAA Ocean Dumping and MESA programs and officials from EPA Regions II and VI.

Annual meetings are held between the two agencies as required by the interagency agreement. These meetings are used to establish priorities for dumpsite investigations, determine the major problems to be studied at each site, and develop procedures to be followed including joint assessment of NOAA findings. The interagency agreement has been effective in developing the priorities and needs for the NOAA to address within its available resources.

Question 7. Do you expect a supplemental appropriation to Title II in fiscal year 1978? Are any discussions going on about such a supplemental appropriation?

Answer. There are no plans or discussions presently underway regarding a supplemental appropriation for Title II in fiscal year 1978. Our requirements for increased Title II activities are reflected in the President's Budget for fiscal year 1979.

Question 8. NOAA's budget request for fiscal year 1979 indicate accelerated survey efforts on dumpsites that will soon be discontinued. Last year in authorization hearings before these Subcommittees, Dave Wallace stated that he felt it was a waste of money to begin expensive surveys of dumpsites, the use of which will hopefully be terminated in a few years. Please explain this change in attitude.

Answer. The program proposed in the fiscal year 1979 request includes continuation of the investigations at DWD-106 and the industrial waste dumpsite off Puerto Rico, as well as the initiation of studies at two dredge material dumpsites in the Gulf of Mexico. Additional dredge material dumpsites are being considered in our planning. This increasing emphasis on dredge material sites is in response to a shift in priorities resulting from regulations on ocean dumping issued by EPA in January 1977 which calls for the cessation of sewage sludge and industrial waste dumping by the end of 1981. It is unlikely that all ocean dumping will cease by that time. The survey work at the dumpsites we have selected for investigation is providing one of the first bodies of information concerning pollution effects on ocean waters.

[Whereupon, at 12:42 p.m., the subcommittes adjourned, subject to the call of the Chair.]

OCEAN POLLUTION RESEARCH

MONDAY, OCTOBER 3, 1977

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
SUBCOMMITTEE ON OCEANOGRAPHY,
Washington, D.C.

The subcommittee met at 9:33 a.m., in Room 1334, Longworth House Office Building, Hon. John B. Breaux (chairman of the subcommittee) presiding.

Present: Representatives Breaux, AuCoin, and Pritichard.

Staff Present: Judy A. Townsend, professional staff; Grant Wayne Smith, professional staff; Thomas R. Kitsos, professional staff; Curits L. Marshall, professional staff, minority; and Donna Kay Firkin, subcommittee clerk.

Mr. BREAUX. The subcommittee will please come to order.

Today the Subcommittee on Oceanograph of the House Merchant Marine and Fisheries Committee convenes hearings on Federal ocean pollution research and monitoring. In particular, we will be considering the need for additional legislation providing for the coordination of Federal programs relating to such research.

On September 26, 1977, the House Committee on Science and Technology reported amendments to S. 1617, a bill to establish a program of ocean pollution research and monitoring. Our committee has subsequently been referred the bill for a period of time ending not later than Octobler 17, 1977.

[The bill follows:]

95TH CONGRESS
1ST SESSION

S. 1617

[Report No. 95–626, Part I]

IN THE HOUSE OF REPRESENTATIVES

AUGUST 5, 1977

Referred to the Committee on Science and Technology

SEPTEMBER 26, 1977

Reported with amendment(s), referred to the Committee on Merchant Marine and Fisheries for a period ending not later than October 17, 1977 for consideration of such provisions of the bill as fall within the jurisdiction of that committee under clause 1(n), Rule X, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italic]

AN ACT

To establish a program of ocean pollution research and monitoring, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 ~~That this Act may be cited as the "Ocean Pollution Research~~
4 ~~Program Act".~~
5 ~~SEC. 2. DECLARATION OF POLICY.~~
6 ~~(a) FINDINGS.—The Congress finds and declares the~~
7 ~~following:~~
8 ~~(1) Man's activities in the ocean and the coastal~~
9 ~~zone can have profound short-term and long-term im-~~
10 ~~pacts on the marine environment.~~
11 ~~(2) There is need to establish a comprehensive Fed-~~

1 ~~eral program of ocean pollution research and monitor-~~
2 ~~ing, particularly in regard to the inputs, fates, and~~
3 ~~effects of pollutants, including petroleum, in the marine~~
4 ~~environment.~~
5 ~~(3) Numerous agencies, departments, and instru-~~
6 ~~mentalities of the Federal Government sponsor, support,~~
7 ~~or fund activities relating to ocean pollution research and~~
8 ~~monitoring. However, such programs are often unco-~~
9 ~~ordinated and can result in unnecessary duplication.~~
10 ~~(4) Better planning and more effective and efficient~~
11 ~~use of available funds, facilities, vessels, and personnel~~
12 ~~is the key to an effective Federal program of ocean pollu-~~
13 ~~tion research and monitoring.~~
14 ~~(b) PURPOSES.—It is therefore the purpose of the~~
15 ~~Congress in this Act—~~
16 ~~(1) to establish a comprehensive Federal program~~
17 ~~of ocean pollution research and monitoring;~~
18 ~~(2) to designate the National Oceanic and Atmos-~~
19 ~~pheric Administration as the lead Federal agency for~~
20 ~~ocean pollution research and monitoring; and~~
21 ~~(3) to provide for the assistance of the Director of~~
22 ~~the Office of Science and Technology Policy, through~~
23 ~~the Federal Coordinating Council for Science, Engineer-~~
24 ~~ing, and Technology, in coordinating, on a continuing~~

1 ~~basis, the Federal program of ocean pollution research~~
2 ~~and monitoring.~~
3 ~~SEC. 3. DEFINITIONS.~~
4 ~~As used in this Act, unless the context otherwise~~
5 ~~requires:~~
6 ~~(1) The term "Administrator" means the Admin-~~
7 ~~istrator of the National Oceanic and Atmospheric~~
8 ~~Administration.~~
9 ~~(2) The term "Council" means the Federal Co-~~
10 ~~ordinating Council for Science, Engineering, and~~
11 ~~Technology.~~
12 ~~(3) The term "Director" means the Director of the~~
13 ~~Office of Science and Technology Policy in the Execu-~~
14 ~~tive Office of the President.~~
15 ~~(4) The term "marine environment" means the~~
16 ~~coastal zone, defined in section 304(1) of the Coastal~~
17 ~~Zone Management Act of 1972 (16 U.S.C. 1453(1)); ;~~
18 ~~the seabed, subsoil, natural resources, and waters of the~~
19 ~~territorial sea of the United States; the waters of the~~
20 ~~contiguous zone; the waters and fishery resources of any~~
21 ~~zone over which the United States asserts exclusive~~
22 ~~fishery management authority; the waters of the high~~
23 ~~seas; and the seabed and subsoil of the Outer Continental~~
24 ~~Shelf of the United States.~~

1 ~~(5) The term "ocean pollution" means any short-~~
2 ~~or long-term change in the marine environment.~~
3 ~~(6) The term "research plan" means the Federal~~
4 ~~plan to be prepared pursuant to section 204.~~
5 ~~SEC. 4. FEDERAL PROGRAM AND PLAN.~~
6 ~~(a) LEAD AGENCY FOR PLAN.—The Administrator~~
7 ~~with the assistance of the Director and the Council, shall~~
8 ~~prepare a comprehensive, three-year research plan for ocean~~
9 ~~pollution research and monitoring which shall be submitted~~
10 ~~to the Congress and the President within one year after~~
11 ~~the date of the enactment of this Act and every third year~~
12 ~~thereafter, in accordance with section 5.~~
13 ~~(b) CONTENT OF PLANS.—Each research plan shall~~
14 ~~contain, but need not be limited to—~~
15 ~~(1) a detailed listing of all Federal programs re-~~
16 ~~lating to ocean pollution research and monitoring, in-~~
17 ~~cluding general research on ocean ecosystems and~~
18 ~~research into the inputs, fates, and effects of pollutants,~~
19 ~~including petroleum, in the marine environment;~~
20 ~~(2) a listing and explanation of the research priori-~~
21 ~~ties identified by the Administrator in accordance with~~
22 ~~subsection (d);~~
23 ~~(3) a description of actions taken by the Admini-~~
24 ~~trator and the Director to coordinate the budget review~~

1 ~~process to insure interagency cooperation and to elim-~~
2 ~~inate unnecessary duplication; and~~
3 ~~(4) the goals and estimated cost of each such Fed-~~
4 ~~eral program.~~
5 ~~(c) INTERAGENCY COORDINATION AND COOPERA-~~
6 ~~TION.—The head of each agency, department, or other in-~~
7 ~~strumentality of the Federal Government which is engaged~~
8 ~~in or concerned with, or which has authority over, programs~~
9 ~~relating to ocean pollution research and monitoring—~~
10 ~~(1) may, upon a written request from the Director~~
11 ~~or the Administrator, make available to the Director or~~
12 ~~the Administrator, on a reimbursable basis or otherwise,~~
13 ~~such personnel (with their consent and without prejudice~~
14 ~~to their position and rating), services, or facilities as~~
15 ~~may be necessary to assist the Director or the Admin-~~
16 ~~istrator to achieve the purposes of this Act; and~~
17 ~~(2) shall, upon a written request, furnish such data~~
18 ~~or other information as the Director or the Administra-~~
19 ~~tor deems necessary to fulfill the purposes of this Act.~~
20 ~~(d) PRIORITIES.—The Administrator shall identify~~
21 ~~priorities for the Federal program of ocean pollution research~~
22 ~~and monitoring prior to preparation of the research plan,~~
23 ~~after consultation with the Director, other Federal agencies,~~
24 ~~departments, or other instrumentalities, the National Acad-~~

1 ~~emies of Sciences and Engineering, the academic community,~~
2 ~~industry, State and local governments, and other interested~~
3 ~~parties.~~

4 ~~(c) PLAN REVISIONS.—The Administrator, with the~~
5 ~~assistance of the Director, shall prepare and submit to Con-~~
6 ~~gress and the President, as part of the annual report required~~
7 ~~by section 6, a detailed explanation of any revisions of the~~
8 ~~research plan during the period of such plan.~~

9 ~~SEC. 5. AUTHORITY OF THE ADMINISTRATOR.~~

10 ~~(a) RESEARCH AND DEVELOPMENT ASSISTANCE.—~~
11 ~~The Administrator shall identify specific national needs and~~
12 ~~problems in fields related to ocean pollution research and~~
13 ~~monitoring. The Administrator may provide financial assist-~~
14 ~~ance in the form of grants or contracts with respect to such~~
15 ~~needs and problems, if such needs and problems are not being~~
16 ~~addressed by any other Federal agency.~~

17 ~~(b) APPLICATION FOR ASSISTANCE.—Any person~~
18 ~~(including a governmental entity) may apply for financial~~
19 ~~assistance under this section for the conduct of research~~
20 ~~and monitoring projects, and, in addition, specific proposals~~
21 ~~may be invited. Each grant or contract under this subsec-~~
22 ~~tion shall be made pursuant to such rules as the Administra-~~
23 ~~tor shall prescribe. Each application for financial assistance~~
24 ~~shall be made in writing in such form and with such content~~
25 ~~and other submissions as the Administrator may require. The~~

1 ~~Administrator is authorized to enter into contracts under this~~
2 ~~subsection without regard to section 3709 of the Revised~~
3 ~~Statutes of the United States (41 U.S.C. 5).~~
4 ~~(c) EXISTING PROGRAMS.—The activities supported~~
5 ~~by grants or contracts made or entered into under this sec-~~
6 ~~tion shall, to the maximum extent practicable, be admini-~~
7 ~~stered through existing Administration programs including~~
8 ~~the national sea grant program. The total amount paid pur-~~
9 ~~suant to any such grant or contract may, in the discretion~~
10 ~~of the Administrator, be up to 100 percent of the total cost~~
11 ~~of the program, project, or activity involved.~~
12 ~~(d) ACTION BY ADMINISTRATOR.—The Administrator~~
13 ~~shall act upon each application for a grant or contract re-~~
14 ~~ceived by him under this section within six months after the~~
15 ~~date on which all required information is received.~~
16 ~~(e) RECORDS.—Each recipient of financial assistance~~
17 ~~under this section shall keep such records as the Admini-~~
18 ~~trator shall prescribe, including records which fully disclose~~
19 ~~the amount and disposition by such recipient of the proceeds~~
20 ~~of such assistance, the total cost of the project or undertaking~~
21 ~~in connection with which such assistance was given or used,~~
22 ~~the amount of that portion of the cost of the project which~~
23 ~~was supplied by other sources, and such other records as will~~
24 ~~facilitate an effective audit. Such records shall be maintained~~
25 ~~for three years after the completion of such a project or~~

1 ~~undertaking. The Administrator and the Comptroller General~~
2 ~~of the United States, or any of their duly authorized rep-~~
3 ~~resentatives, shall have access, for the purpose of audit and~~
4 ~~examination, to any books, documents, papers, and records of~~
5 ~~receipts which, in the opinion of the Administrator or of the~~
6 ~~Comptroller General, may be related or pertinent to such~~
7 ~~financial assistance.~~

8 ~~SEC. 6. ANNUAL REPORT.~~

9 ~~The Administrator, with the assistance of the Director,~~
10 ~~shall submit to the Congress and the President, not later than~~
11 ~~February 15 of each year, a report on the status of ocean~~
12 ~~pollution research and monitoring. Each such report shall~~
13 ~~include—~~

14 ~~(1) the research plan, and any revision thereof,~~
15 ~~prepared under section 4;~~

16 ~~(2) an evaluation of the Federal Government's~~
17 ~~research capabilities, including the status of personnel,~~
18 ~~vessels, facilities and equipment; and~~

19 ~~(3) a summary of the efforts undertaken and~~
20 ~~planned to coordinate the Federal program of ocean~~
21 ~~pollution research and monitoring.~~

22 ~~SEC. 7. DISCLAIMER.~~

23 ~~Nothing in this Act shall be construed to amend, restrict,~~
24 ~~or otherwise alter the authority of any Federal agency or~~

1 ~~department, under any law, to undertake research related to~~
2 ~~ocean pollution.~~
3 ~~SEC. 8. AUTHORIZATION FOR APPROPRIATIONS.~~
4 ~~There are authorized to be appropriated to the Admin-~~
5 ~~istrator for the purposes of carrying out his responsibilities~~
6 ~~under this Act, not to exceed $5,000,000 for the fiscal year~~
7 ~~ending September 30, 1978, and not to exceed $6,000,000~~
8 ~~for the fiscal year ending September 30, 1979.~~
9 *That this Act may be cited as the "Marine Pollution En-*
10 *vironmental Research and Development Act".*
11 *SEC. 2. FINDINGS AND DECLARATION OF POLICY.*
12 *(a) FINDINGS.—The Congress finds and declares the*
13 *following:*
14 *(1) Man's activities in the ocean, coastal zone, and*
15 *coastal waters can have profound short-term and long-term*
16 *impacts on the marine environment.*
17 *(2) There is need to establish a comprehensive*
18 *Federal program of marine pollution environmental re-*
19 *search and development, particularly in regard to the*
20 *inputs, fates, and effects of petroleum, sewage sludge,*
21 *and other pollutants in the marine environment.*
22 *(3) Numerous agencies, departments, and instru-*
23 *mentalities of the Federal Government sponsor, support,*
24 *or fund activities relating to marine pollution environ-*

1 *mental research and development. However, such pro-*
2 *grams are often uncoordinated and can result in un-*
3 *necessary duplication.*
4 *(4) Oil pollution of the marine environment is*
5 *expected to increase in the future because of the need to*
6 *import large quantities of petroleum and petroleum prod-*
7 *ucts from abroad.*
8 *(5) Better planning and more effective and efficient*
9 *use of available funds, facilities, vessels, and personnel*
10 *is the key to an effective Federal program of marine*
11 *pollution environmental research and development.*
12 *(b) PURPOSES.—It is therefore the purpose of the Con-*
13 *gress in this Act—*
14 *(1) to establish a comprehensive five-year plan for*
15 *Federal marine pollution environmental research and*
16 *development, including monitoring;*
17 *(2) to designate the National Oceanic and Atmos-*
18 *pheric Administration as the lead Federal agency for*
19 *marine pollution environmental research and develop-*
20 *ment;*
21 *(3) to establish within the National Oceanic and*
22 *Atmospheric Administration a comprehensive program of*
23 *environmental research and development related to ma-*
24 *rine pollution.*

33-546 O - 78 - 10

1 *(4) to insure close cooperation between the Na-*
2 *tional Oceanic and Atmospheric Administration, the*
3 *Environmental Protection Agency, and the Department*
4 *of the Interior in marine pollution environmental re-*
5 *search and development;*
6 *(5) to provide for the assistance of the Chairman*
7 *of the Council on Environmental Quality in marine*
8 *pollution environmental research and development; and*
9 *(6) to provide for the assistance of the Director of*
10 *the Office of Science and Technology Policy, through*
11 *the Federal Coordinating Council for Science, Engineer-*
12 *ing, and Technology, in coordinating, on a continuing*
13 *basis, the Federal program of environmental research*
14 *and development related to marine pollution.*
15 *SEC. 3. DEFINITIONS.*
16 *As used in this Act, unless the context otherwise*
17 *requires:*
18 *(1) The term "Administrator" means the Admin-*
19 *istrator of the National Oceanic and Atmospheric*
20 *Administration.*
21 *(2) The term "Chairman" means the Chairman of*
22 *the Council on Environmental Quality in the Executive*
23 *Office of the President.*
24 *(3) The term "Director" means the Director of the*

1 *Office of Science and Technology Policy in the Execu-*
2 *tive Office of the President.*
3 *(4) The term "Council" means the Federal Co-*
4 *ordinating Council for Science, Engineering, and*
5 *Technology.*
6 *(5) The term "research and development" means*
7 *research, studies, scientific investigations, experimenta-*
8 *tion, development including engineering development,*
9 *monitoring, and full and pilot scale demonstrations.*
10 *(6) The term "marine pollution" means any pollu-*
11 *tion in oceans or in coastal zones or coastal waters as*
12 *defined in section 304 of the Coastal Zone Manage-*
13 *ment Act of 1972.*
14 ***SEC. 4. FEDERAL PLAN AND PROGRAM.***
15 *(a) LEAD AGENCY FOR PLAN.—The Administrator, in*
16 *close coordination with the Administrator of the Environ-*
17 *mental Protection Agency and in consultation with the*
18 *Chairman, the Director, and the Council, shall prepare a*
19 *comprehensive five-year plan for marine pollution environ-*
20 *mental research and development (including particularly*
21 *monitoring) which shall be submitted to the Congress and*
22 *the President within one year after the date of the enactment*
23 *of this Act. Such plan shall be appropriately revised annually*
24 *in accordance with section 5.*

1 *(b) CONTENT OF PLANS.—The comprehensive plan and*
2 *each annual revision shall contain, but need not be limited*
3 *to—*
4 *(1) a detailed listing of all Federal programs re-*
5 *lating to environmental research and development re-*
6 *lated to marine pollution, including monitoring, general*
7 *research on marine ecosystems, and research into the*
8 *inputs, fates, and environmental effects of petroleum,*
9 *sewage sludge, and other pollutants in the marine*
10 *environment;*
11 *(2) a description of actions taken by the Admin-*
12 *istrator, the Chairman and the Director to coordinate the*
13 *budget review process to insure interagency coopera-*
14 *tion and to eliminate unnecessary duplication; and*
15 *(3) the goals and estimated cost of each such Fed-*
16 *eral program.*
17 *(c) PRIORITIES.—The Administrator shall recommend*
18 *priorities for Federal environmental research and develop-*
19 *ment related to marine pollution in conjunction with the prep-*
20 *aration of the comprehensive five-year plan and each annual*
21 *revision, after consultation with the Chairman, the Director,*
22 *and other Federal agencies, departments, and other instru-*
23 *mentalities (including especially the Environmental Protec-*
24 *tion Agency and the Department of the Interior), the Na-*

1 *tional Academies of Sciences and Engineering, the academic*
2 *community, industry, State and local governments, and other*
3 *interested parties.*

4 *(d)* INTERAGENCY COORDINATION AND COOPERA-
5 TION.—*The head of each agency, department, and other*
6 *instrumentality of the Federal Government which is engaged*
7 *in or concerned with, or which has authority over, programs*
8 *relating to environmental research and development related*
9 *to marine pollution—*

10 *(1) is authorized and directed to cooperate with*
11 *the Administrator in carrying out the purposes of this*
12 *Act;*

13 *(2) may, upon a written request from the Admin-*
14 *istrator, make available to the Administrator, on a re-*
15 *imbursable basis or otherwise, such personnel (with*
16 *their consent and without prejudice to their position and*
17 *rating), services, or facilities as may be necessary to*
18 *assist the Administrator to achieve the purposes of this*
19 *Act; and*

20 *(3) shall, upon a written request, furnish such data*
21 *or other information, as the Administrator, the Chair-*
22 *man, or the Director deems necessary to fulfill the pur-*
23 *poses of this Act.*

24 *(e)* FEDERAL COORDINATION.—*The Administrator*
25 *shall take such actions as are necessary to assure that the*

1 *program of environmental research and development related*
2 *to marine pollution which is carried out in the National*
3 *Oceanic and Atmospheric Administration is, as far as prac-*
4 *tical, consistent and coordinated with, and supportive of,*
5 *related regulatory, enforcement, research, development, and*
6 *monitoring programs of the Environmental Protection*
7 *Agency and other Federal agencies.*

8 ***SEC. 5. AUTHORITY OF THE ADMINISTRATOR.***

9 *(a) RESEARCH AND DEVELOPMENT ASSISTANCE.—*
10 *The Administrator shall identify specific national needs and*
11 *problems in fields related to environmental research and de-*
12 *velopment related to marine pollution. The Administrator*
13 *may provide financial assistance in the form of grants or*
14 *contracts to the extent authorized in appropriations Acts with*
15 *respect to such needs and problems, if he determines that such*
16 *needs and problems are not being adequately addressed by*
17 *any other Federal agency.*

18 *(b) APPLICATION FOR ASSISTANCE.—Any person*
19 *(including a governmental entity) may apply for financial*
20 *assistance under this section for the conduct of research and*
21 *development projects, and, in addition, specific proposals*
22 *may be invited. Each grant or contract under this subsec-*
23 *tion shall be made pursuant to such rules as the Administra-*
24 *tor shall prescribe. Each application for financial assistance*
25 *shall be made in writing in such form and with such content*

1 *and other submissions as the Administrator may require.*
2 *The Administrator is authorized to enter into contracts under*
3 *this subsection without regard to section 3709 of the Revised*
4 *Statutes of the United States (41 U.S.C. 5).*
5 *(c) EXISTING PROGRAMS.—The activities supported*
6 *by grants or contracts made or entered into under this sec-*
7 *tion shall, to the maximum extent practicable, be adminis-*
8 *tered through existing Administration programs. The total*
9 *amount paid pursuant to any such grant or contract may, in*
10 *the discretion of the Administrator, be up to 100 percent of*
11 *the total cost of the program, project, or activity involved.*
12 *(d) ACTION BY ADMINISTRATOR.—The Administrator*
13 *shall act upon each application for a grant or contract re-*
14 *ceived by him under this section within six months after the*
15 *date on which all required information is received.*
16 *(e) RECORDS.—Each recipient of financial assistance*
17 *under this section shall keep such records as the Adminis-*
18 *trator shall prescribe, including records which fully disclose*
19 *the amount and disposition by such recipient of the proceeds*
20 *of such assistance, the total cost of the project or undertaking*
21 *in connection with which such assistance was given or used,*
22 *the amount of that portion of the cost of the project which*
23 *was supplied by other sources, and such other records as will*
24 *facilitate an effective audit. Such records shall be maintained*
25 *for three years after the completion of such a project or un-*

1 *dertaking. The Administrator and the Comptroller General*
2 *of the United States, or any of their duly authorized repre-*
3 *sentatives, shall have access, for the purpose of audit and*
4 *examination, to any books, documents, papers, and records*
5 *of receipts which, in the opinion of the Administrator or of*
6 *the Comptroller General, may be related or pertinent to such*
7 *financial assistance.*

8 ***SEC. 6. ANNUAL REPORT.***

9 *The Administrator, with the assistance of the Chairman*
10 *and the Director, shall submit to the Congress and the Presi-*
11 *dent, not later than February 15 of each year, a report on*
12 *the status of marine pollution environmental research and de-*
13 *velopment. Each such report shall include—*

14 *(1) the comprehensive plan prepared under section*
15 *4 as currently revised;*

16 *(2) an evaluation of the Federal Government's*
17 *research capabilities, including the status of personnel,*
18 *vessels, facilities, and equipment;*

19 *(3) a summary of the efforts undertaken and*
20 *planned to coordinate the Federal program of marine*
21 *pollution environmental research and development; and*

22 *(4) an estimate of the adverse environmental im-*
23 *pact caused by increased shipments of foreign oil into*
24 *the United States during the preceding year.*

1 *SEC. 7. DISCLAIMER.*

2 *Nothing in this Act shall be construed to amend, re-*
3 *strict, or otherwise alter the authority of any Federal agency*
4 *or department, under any law, to undertake research related*
5 *to environmental pollution.*

6 *SEC. 8. AUTHORIZATION OF APPROPRIATIONS.*

7 *There are authorized to be appropriated to the Adminis-*
8 *trator, for the purposes of carrying out his responsibilities*
9 *under this Act, not to exceed $10,000,000 for the fiscal year*
10 *ending September 30, 1979.*

Amend the title so as to read: "A bill to establish a program of environmental research and development related to marine pollution, and for other purposes.".

Passed the Senate August 3 (legislative day, July 19), 1977.

Attest: J. S. KIMMITT,
Secretary.

Mr. BREAUX. Briefly, S. 1617 would designate the National Oceanic and Atmospheric Administration as the lead agency to carry our a Federal ocean pollution research program with the assistance of the Director of the Office of Science and Technology Policy. The bill requires NOAA to closely coordinate this program with the Environmental Protection Agency. NOAA would prepare and revise annually a 5-year plan for ocean pollution research and monitoring. In addition, an annual report would be required including a description of the plan and the status of Federal capabilities to conduct ocean pollution research and monitoring.

The act would authorize NOAA, in consultation with other Federal agencies, to idenfity specific national research needs and to provide financial assistance in the form of grants or contracts to the Government and private sector.

Today we will hear testimony from the National Oceanic and Atmospheric Administration and the Environmental Protection Agency, two Federal agencies directly involved in ocean pollution research and monitoring.

I feel that, when discussing an issue like ocean pollution research, it should more appropriately be thought of in the context of an overall national ocean policy plan. The Oceanography Subcommittee has taken the lead role in the House in helping to formulate a comprehensive and coherent national ocean policy.

Last September, this subcommittee had the Secretaries of the Departments of Commerce, Interior, Transportation, Navy, and the Director of the Office of Science and Technology Policy testifying on the need for a national ocean policy. I have established in the House of Representatives HOPAC, the House Ocean Policy Advisory Committee, which meets periodically to discuss issues of primary importance relating to national ocean policy. Continuing in this role, the Oceanography Subcommittee will convene, in the beginning of the next session, extensive hearings on the formulation of a national policy for the oceans. In the course of our work we will be looking closely at the need for a coordinated Federal effort to conduct ocean pollution reseach and monitoring.

I might add that this subcommittee is aware that there is a wide disperion of ocean pollution research programs in the Federal Government. I feel that there is a need to provide for the proper coordination and coherent focus of the Federal effort. Whether this would be better accomplished through existing laws, such as the Marine Protection, Research, and Sanctuaries Act of 1972, or through new legislation will be the main topic of discussion today and in future hearings on ocean policy before this subcommittee.

I would like to welcome Mr. Stephen Gage, Assistant Administrator for Research and Development with the Environmental Protection Agency, and I see that you are accompanied by a colleague. Would you please identify him for the record.

We welcome you here today and we have the copy of your testimony and will ask you to proceed as you see fit.

STATEMENT OF DR. STEPHEN J. GAGE, ACTING ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, OFFICE OF RESEARCH AND DEVELOPMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY DELBERT S. BARTH, DAA FOR HEALTH AND ECOLOGICAL EFFECTS, OFFICE OF RESEARCH AND DEVELOPMENT

Dr. GAGE. Thank you, Mr. Chairman.

I would like to introduce my colleague, Dr. Delbert Barth, DAA for Health and Ecological Effects within ORD. Dr. Barth and I will handle together any questions that you may have at the conclusion of my statement. You do have a written version of the statement, as you indicated, and I would like that submitted for the record.

Mr. BREAUX. Without objection, the entire statement will be made to matter of the record.

[The following was received for the record.:]

STATEMENT OF DR. STEPHEN GAGE, ACTING ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, OFFICE OF RESEARCH AND DEVELOPMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman, it is a pleasure to appear before this committee to testify on the proposed bill dealing with marine pollution research and development.

The bill recognizes that there is need to establish a comprehensive Federal program of marine environmental research and development, particularly with regard to the introduction, fate, and effects of petroleum, sewage sludge, and other pollutants. The proposed legislation also acknowledges that pollution in the marine environment is expected to increase in the future, largely due to the need to import large quantities of petroleum and petroleum products from abroad. The Legislation would designate the National Oceanic and Atmospheric Administration (NOAA) as the lead Federal agency for oil and marine pollution environmental research and development to be carried out through close coordination among NOAA, EPA and the Department of the Interior (DOI). The bill calls for a 5-year plan which would include a detailed inventory of on-going Federal programs in this area including monitoring and general research on marine ecosystems. Such a plan will also enumerate the goals and estimated costs of each Federal program, and provide a list of actions taken to fully coordinate interagency efforts.

The intent of the bill is to eliminate duplication. We recognize this need and strongly support those efforts which are aimed at providing a cohesive, coordinated Federal program of marine protection and research.

Through formal agreements as well as through informal cooperative efforts, EPA has worked with NOAA in a number of research areas. For example, the baseline research being managed by NOAA for the Bureau of Land Management provided data which helped form the basis for our objection (under section 309 of the Clean Air Act) to specific lease-sales inthe Northeast Gulf of Alaska. In this instance, NOAA studies identified concerns (active fault areas, unconsolidated sediments, fish nursery and spawning areas, etc.) which were helpful in making our case that such lease-sales should be considered by DOI only after NOAA's studies were completed and a sufficiency of baseline data acquired.

We work closely with NOAA in other areas. We are currently, under our energy pass-through program, funding a number of NOAA studies including an actual study of a Gulf of Mexico oil field where the effects of energy development are being examined. The NOAA studies will aid us specifically with information needed for criteria development and will give us some idea of what to expect from increased outer continential shelf development. NOAA's offshore capability is this instance has helped supply our specific need for regulatory data.

We recognize that NOAA has built a solid base of scientific capability, especially in the offshore marine area, and we have often been the beneficiary of such expertise and competence. These capabilities have been developed, for the most part, in response to NOAA's increasing legislative responsibilities.

Catastrophies like the Argo-Merchant spill tend to dramatize marine pollution from oil tanker accidents. While it is generally agreed that oil pollution in the marine environment will increase, it is a fact that the largest fraction of oil contamination reaching the marine environment comes from land sources through our rivers. In general, most marine pollution derives from sources onshore. A wide

variety of pollutants—pesticides, industrial chemicals, metallic wastes, thermal discharges, municipal sludge, etc.—find their way into the oceans, inadvertently or intentionally.

EPA is concerned with all anthropogenic marine pollutants because of the Agency's several legislative mandates to regulate and control such pollution before it enters the natural environment. To be specific, EPA must respond to the congressional mandates embodied in the Federal Water Pollution Control Act of 1972, the Marine Protection, Research and Sanctuaries Act of 1972, the Federal Insecticide, Fungicide and Rodenticide Act, and the new Toxic Substances Control Act.

Consequently, EPA's Officer of Research and Development (ORD) and its associated research laboratories have developed substantial expertise in the process of supporting the Agency's regulatory efforts. Specifically regarding marine regulatory research, ORD is currently conduting numerous research activities in response to provisions of the four Acts previously identified. A detailed enumeration of research objectives as well as the associated manpower and funding data has been supplied for your information in the attached appendix.

I must emphasize that EPA's research efforts are designed to substantiate the regulatory approach which EPA must follow in carrying out its mission. Research which is tailored to support regulatory activities requires a philosophy and focus significantly different from that which is oriented toward solely advancing scientific understanding. Our programs do not emphasize so-called "basic" research, although many of our efforts do add substantially to a more fundamental comprehension of environmental processes and effects.

It is critical that regulatory agencies, such as EPA, not be encumbered by requirements which would interfere with the planning and implementation of research which must be performed to support their regulatory missions. EPA, for example, needs to know more than the simple fact that a substance such as arsenic is toxic, in order to write a permit under the National Pollution Discharge Elimination System. In most instances, we must be able to quantify the health and ecological effects of exposure to specific substances at different concentrations. Our current efforts in the marine area are designed to provide such critical information.

As I mentioned earlier, other Federal agencies have contributed information and expertise to our regulatory effort. We anticipate this will continue.

EPA supports the general intent of the bill which we are considering today. In my experience, regulatory agencies rarely suffer from excessive coordination. Of equal importance are cooperation and communication at all levels. As a matter of fact, my staff is convening today the first sessions of a major conference on estuarine research sponsored by six Federal agencies, Symposia such as this are an important mechanism for improving coordination, coopertion and communication.

We must, however, raise two questions on the proposed legislation. The first relates to section 4(b) which requires the Administrator of NOAA to "recommend priorities for the Federal program of environmental research and development related to marine pollution". While that section also requires coordination with EPA and other organizations, we do not feel that the Administrator of NOAA can set priorities for EPA's research in support EPA's regulations. EPA could certainly include its long-term marine pollution research within such a priority ranking, but the priorities for the Agency's marine research in support of regulation are established by the Congressional mandates identified earlier.

The second question relates to possible overlapping mandates for marine pollution research coordination. The proposed bill essentially assigns such a responsibility to NOAA in sections 4(a) and 4(c). On the other hand, other legislation now being considered by the Congress, would also require the Administrator of EPA to identify all Federal environmental research and to recommend measures, including legislation, to assure coordination of these efforts. Further, this bill would require the Chairman of the Council on Environmental Quality to study environmental research coordination and to make appropriate recommendations. If the aforementioned legislation and H.R. 8823 were both enacted, then the problems of overlapping and possibly conflicting mandates would still exist.

In view of the foregoing we believe that this legislation is premature at this time. As an immediate alternative, improved efforts for coordination could be initiated immediately under the Federal Coordinating Committee on Science, Engineering and Technology (FCCSET). All Federal marine research efforts could be reviewed and coordinated under the auspices of FCCSET.

Meanwhile, the President's Reorganization Task Force is currently studying all Federal problems dealing with natural resources and the environment with an eye toward possible realignment of the various Agency responsibilities. Therefore, the administration does not currently support legislation of this type.

Mr. Chairman, I would like to close by saying that the EPA marine laboratories are currently at the state-or-the-art on determining the impact of pollutants on the marine environment. This is the result of the in-house expertise which has been developed over many years, and also due to professional associations established and maintained with marine scientists outside the government. With a properly implemented Federal marine research program, we are optimistic that solutions to many current pollution problems may be well within our grasp. EPA will continue to interact with sister agencies through interagency agreements, workshops, symposia, and other cooperative efforts.

We are encouraged by your recognition of the need for improved coordination and cooperation in marine pollution research and development. We share your concern. We would be pleased to assist the Committee in any way possible.

Thank You Mr. Chairman. I will be glad to answer any questions.

MARINE AND ESTUARINE RESEARCH OF THE ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF RESEARCH AND DEVELOPMENT

Marine and estuarine research is conducted by the U.S. Environmental Protection Agency, Office of Research and Development (OR&D) at laboratories located at Corvallis, Oregon, Gulf Breeze, Florida and Narragansett, Rhode Island. Complementing the studies conducted at the laboratories, grants and contracts are sponsored by OR&D at colleges and universities throughout the United States.

The research projects conducted and sponsored by the laboratories are assembled below according to the following eight topics:

A. Ocean Disposal

B. Oil and Petrochemicals

C. Pesticides

D. Carcinogens

E. Thermal pollution

F. Anti-biofouling agents

G. Complex wastes

H. Ecosystem dynamics

Each research objective is identified by title and the sponsoring Environmental Research Laboratory: Corvallis (CERL), Gulf Breeze (GBERL), Narragansett (NERL) and the Health Effects Research Laboratory (HERL) at Cincinnati. Funding is identified as in-house (I.H.) or extramural (Extra.) within the fiscal year budgets of FY 76 and FY 77.

OCEAN DISPOSAL

A-1 TITLE: Development of procedures and guidelines for assessing the biological effects of ocean disposal of dredge spoils, including chemical/physical characterization and impact on benthic community

LABORATORY: CERL

MANPOWER: (M-Y): 6.9

FY 76 FUNDING ($K): 303 I.H.
300 Extra.

FY 77 FUNDING ($K): 288.7 I.H.

OBJECTIVES:

Determine the mobilization of metals, H2S, toxic organics, and biostimulants as influenced by partical size, sediment compaction, and degree of dispersion in dredging and discharge modes. The rate of mobilization is hypothesized as being mediated by biochemical processes involved in stabilization of organic materials, and this rate mediating process needs to be quantified to assess acceptable levels for disposal practices. Develop alternative criteria for determining the upland edge of wetlands and assess potential levels of environmental protection of these different criteria.

A-2 TITLE: Development and validation of predictive models which describe pollutant distribution and interactions

LABORATORY: CERL

MANPOWER: (M-Y): 0.8

FY 76 FUNDING ($K): 24 I.H.

FY 77 FUNDING ($K): 31.9 I.H.

OBJECTIVES:

Periodically update the ocean outfall analysis manual describing advances in predicting the physical, chemical, and biological mechanisms in nature which influence the fate of pollutants discharged from pipelines and bays. Emphasis is placed on describing water quality concentrations of pollutants and the time-varying nature of these concentrations so that assessments of biological effects can be made. Conduct research to improve the characterization of waste materials in terms that are appropriate for use in the models, and to improve the mathematical terms when new mechanisms of behavior are elucidated.

A-3 TITLE: Biological responses and chemical interactions in mixing zones

LABORATORY: CERL

MANPOWER (M-Y): 0.4

FY 76 FUNDING ($K): 80 I.H.
20 Extra.

FY 77 FUNDING ($K): 10.9 I.H.
100 Extra.

OBJECTIVES:

Report on the effects of treated municipal wastes on coral ecosystems in Southeast Florida coastal waters, the accumulation of viruses from treated effluents in sediments and organisms collected near Southeast Florida ocean outfalls, the influence of treatment methods (including disinfection) on survival of viruses in mixing zones and the relationship of treatment method and suspended solids concentrations on survival and transport of viruses beyond the mixing zone in Southeast Florida outfalls.

A-4 TITLE: Responses of aquatic ecosystems to physical factors influencing pollutant transport and retention

LABORATORY: CERL MANPOWER (M-Y): 2.6

FY 76 FUNDING ($K): 39 I.H. 194 Extra. FY 77 FUNDING ($K): 122.3 I.H. 90 Extra.

OBJECTIVES:

Determine the physical factors affecting algal assay procedures (AAP) results in estuaries. Use existing data (from Oregon estuaries) as a basis for understanding individual ocean and river sources of nutrient limitation or stimulation and their longitudinal and vertical extent. Conduct AAP surveys based on preliminary findings to delimit the three-dimensional extent of nutrient (and other chemical) influence, and concurrent physical-chemical factors, in a variety of estuarine types (i.e., well mixed, stratified, etc.). Apply HN modeling techniques developed in Beaufort Sea to Port Valdez and other areas. Conduct minimum verification studies in support of these studies. Complete the analysis of New York sludge dumping field experiments conducted by the Marine & Freshwater Ecology Branch and other agencies and institutions. Determine mechanisms affecting the distribution of particulates and changes as indicated by size distribution, physical-chemical composition and accretion-erosion processes occurring over river-estuary, within-estuary, and estuary-ocean regimes.

A-5 TITLE: Nearshore marine and estuarine ecosystem effects associated with the discharge of municipal and industrial wastewaters treated by a variety of processes

LABORATORY: CERL MANPOWER (M-Y): 0.2

FY 76 Funding ($K): 106 I.H. 350 Extra. FY 77 FUNDING ($K): 35 I.H.

OBJECTIVES:

Determine effects of the discharge of wastewaters on marine biota in habitats localized near major ocean outfalls in southern California. Study several sites to evaluate the influence of treatment methods on chronic effects, bioaccumulation and food chain biomagnification in one or more species which are identical or which occupy similar niches

in localized ecosystems near the outfalls. Devote attention to organisms which are of direct importance to man, especially where human health may be related to seafood consumption. Concern for the stability and preservation of marine ecosystems must also be an intergal part of the research approach. Hexachlorobenzine (HCB), PCB and possibly other persistent organics possessing CMT properties will be the primary pollutants to be investigated. Metals, especially mercury, cadmium, and chromium, may be substituted as the target criteria or considered for future attention. Initial studies will be on adverse effects on marine organisms, using clam, oyster, mussel, and crab larvae as indicators due to CMT materials in pulp mill and refinery effluents in Pacific Northwest marine waters.

A-6 TITLE: Fate, transport, and effects of organic and inorganic pollutants on marine species, ecosystems, community structures and populations resulting from ocean disposal

LABORATORY: CERL

MANPOWER (M-Y): 6.8

FY 76 FUNDING ($K): 196 I.H.
250 Extra.

FY 77 FUNDING($K): 281.4 I.H.
139 Extra.

OBJECTIVE:

Determine marine phytoplankton response in New York Harbor reflecting water quality changes which should result from new treatment plants in New York City and vicinity. Future years will cover other areas and other responses.

A-7 TITLE: Development of effluents and receiving water criteria for ocean outfalls and ocean dumping

LABORATORY: CERL

MANPOWER (M-Y): 4.6

FY 76 FUNDING ($K): 111 I.H.
50 Extra.

FY 77 FUNDING ($K): 159.3 I.H.

OBJECTIVE:

Use microcosm studies (environmental simulators) to determine chemical behavior and ecosystem responses to perturbations associated with waste discharges and diffuse source inputs to representative marine environments. Use results along with data from field observations, field experiments (bags, ponds, etc.) to verify, or suggest changes in water quality criteria and effluent restrictions.

A-8 TITLE: Development of bioassay procedures using multi-species assemblages (microcosms) to assess ecological impact of dredge material disposal

33-546 O - 78 - 11

LABORATORY: CERL MANPOWER (M-Y): 1

FY 76 FUNDING ($K): 35 I.H.
50 Extra.

FY 77 FUNDING ($K): 39.7 I.H.

OBJECTIVE:

Conduct a comparative study of the effects of clean and polluted sediments on multi-species macrofaunal, benthic microcosms. Use test species that are representative of the dominant taxocenes of continental shelf communities in the development of acute bioassay guidelines. Chronic effects of dredge material toxicity on the structure and function of the microcosms will be investigated in later phases of the accomplishment plan.

A-9 TITLE: Development of transport models to predict the magnitude and distribution of settled and suspended material resulting from dredge material disposal under applicable hydrologic regimes

LABORATORY: CERL MANPOWER (M-Y): 0.3

FY 76 FUNDING ($K): 71 I.H.
50 Extra.

FY 77 FUNDING ($K): 9.4 I.H.
50 Extra.

OBJECTIVES:

Mathematical models exist that predict the transport and distribution of settled and suspended solids resulting from dredged material disposal. Relate these physical predictions with applicable "effect" studies. Assess and develop methods of accomplishing this integration through (a) the development of effective parametric descriptors of drege material -- particularly those required as direct model inputs and (b) the documentation of relationships and/or rational approaches for interpreting model output in terms of ecological effects.

A-10 TITLE: Development of bioassay procedures using single species in static and flow-thru systems to estimate the ecological impact of dredge material disposal

LABORATORY: GBERL MANPOWER (M-Y): 0

FY 76 FUNDING ($K): 50K

FY 77 FUNDING ($K)

COMPLETION DATE: FY 78

OBJECTIVE:

Develop lethal and behavioral bioassays to estimate the impact of dredge spoils disposal on estuarine and marine benthic environments. Emphasis will be placed on benthic systems containing the lugworm Arenicola cristata.

A-11 TITLE: Development of ecosystem models of benthic environments

LABORATORY: GBERL

MANPOWER (M-Y): 0

FY 76 FUNDING ($K): 100K

FY 77 FUNDING ($K)

COMPLETION DATE: FY 78

OBJECTIVE:

Construct models to demonstrate bioaccumulation in important representative benthic organisms, correlation with contaminant concentration assessed in terms of bioavailability, rates of transport and physical/chemical state.

Determine the impact of dredge material disposal on estuarine and marine benthic communities. The ultimate objective is to develop the capability of describing quantitatively the fate and effects of contaminants in dredge spoils on representative benthic environments. These studies will proceed in the following step-wise fashion:

(1) Geochemical Movement and Transformation
(2) Biological Accumulation and Community Metabolism
(3) Mathematical Modeling

A-12 TITLE: Development of mathematical models of chemical equilibrium of metals in seawater

LABORATORY: NERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 28 Extra.

FY 77 FUNDING ($K): 31 Extra

COMPLETION DATE: FY 77

OBJECTIVE:

Improve and apply chemical equilibrium and rate constants to the development of a chemical model describing transformations and distributions resulting from disposal of barged wastes and from sediment water column exchange phenomena.

A-13 TITLE: Development of bioassay, procedures for evaluation of dredge material

LABORATORY: NERL

MANPOWER (M-Y): 0

FY 76 FUNDING ($K): 25 I.H.
120 Extra.

FY 77 FUNDING ($K): 0

COMPLETION DATE: FY 76

OBJECTIVE:

Develop a scientifically valid bioassay approach to evaluate potential and actual ecological impact of disposal of dredged materials.

A-14 TITLE: Chemical/physical analyses of sites currently under investigation

LABORATORY: NERL

MANPOWER (M-Y): 0

FY 76 FUNDING ($K): 115 I.H.

FY 77 FUNDING ($K): 0

COMPLETION DATE: FY 76

OBJECTIVE:

Provide analytical support for in-house efforts in ocean dumping. Increase output of in-house analytical services and provide for grain-size and hydrocarbon analyses through outside sources.

A-15 TITLE: Development of an environmental evaluation decision scheme

LABORATORY: NERL

MANPOWER (M-Y): 0

FY 76 FUNDING ($K): 50 Extra.

FY 77 FUNDING ($K):

COMPLETION DATE: FY 76

OBJECTIVE:

Develop an Environmental Evaluation Decision Scheme (EEDS) to provide a "decision tree" analysis that incorporates descriptions of the project, ecological data and socio-economic and cultural considerations to arrive at permit decisions. When developed EEDS will also serve as the COE and EPA mechanism for revision of dredge materials guidelines as required by P.L. 92-500 and P.L. 92-532.

A-16 TITLE: Biological decay and fate of microbial pathogens and fecal indicators in marine environments

LABORATORY: HERL, Cinn.

MANPOWER (M-Y):

FY 76 FUNDING ($K): 25 I.H.
75 Extra.

FY 77 FUNDING ($K): 75 Extra.

COMPLETION DATE: FY 80

OBJECTIVE:

Obtain decay constants from the discharge of a slug of sewage into the Los Angeles Bight and the dumping of a barge load of sewage into the New York Bight and compare these with decay constants obtained in continuous flow tanks (land based) and in "in situ" enclosed chambers. Insert this information into transport models for a single pulse discharge. Then verify the models in field trials to determine the fate and disposition of the pathogens and fecal indicators in the water column, sediments and fauna at the two experimental sites.

OIL AND PETROCHEMICALS

B-1 TITLE: The fate and ecological effects of oils and derived hydrocarbons and guidelines for damage assessment and methods for predicting impact from new sources

LABORATORY: CERL

MANPOWER (M-Y): 0.5

FY 76 FUNDING ($K): 63 I.H.
45 Extra.

FY 77 FUNDING ($K): 49.4 I.H
45 Extra.

OBJECTIVES:

Develop an intertidal sampling design to assess damage from oil spills. Document impact and recovery from actual and simulated oil spills with field experiments. Conduct evaluation and analysis of the extensive research currently underway in arctic and subarctic marine environments to assess the fate and ecological effects of oil on these ecosystems. Identify indicator organisms and develop assessment and criteria documents to provide environmental protection guidance during O.C.S. development in Alaska.

B-2 TITLE: The nature, loading, distribution and long-term effects of crude oil in Gulf of Alaska marine and estuarine ecosystem

LABORATORY: CERL

MANPOWER: (M-Y):

FY 76 FUNDING ($K): 150 Extra.

FY 77 FUNDING ($K): 150 Extra.

COMPLETION DATE: FY 79

OBJECTIVE:

Conduct field and laboratory studies to determine the nature, loading, and long-term effects of crude oil in the Gulf of Alaska intertidal environment. Using comparative field studies relate a defined chronic input of petroleum in an oil seep area to biological changes at the organism and community levels with a control area not exposed to oil. Investigate phytoplankton and the sessile benthic infauna and epifauna and analyze concentrations of oil in both the organisms and the seawater. Use Laboratory studies including challenge experiments to determine if oil hardy or oil sensitive strains have been developed.

B-3 TITLE: The toxicity to marine organisms of petrochemicals and energy related organic solvents derived from off-shore activities and ocean dumping

LABORATORY: GBERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 250

FY 77 FUNDING ($K): 250

COMPLETION DATE: FY 78

OBJECTIVE:

Access the effects of emissions due to offshore petroleum extraction and transportation on marine organisms and communities. Bioassays on single species and communities will be continued on selected components of drilling muds. Work will be initiated on whole drilling muds, pollutants emitted from extraction activities such as cutting and man-mobilized petroleum hydrocarbons.

B-4 TITLE: Determination of the dynamics of pollutants using direct chemical analysis

LABORATORY: NERL

MANPOWER (M-Y): 14

FY 76 FUNDING ($K): 618 I.H.
310 Extra.

FY 77 FUNDING ($K): 542 I.H.
114 Extra.

COMPLETION DATE: FY 81

OBJECTIVES:

Report on the distribution of carcinogenic compounds derived from oil. Produce a manual on recommended methods for analysis of petroleum hydrocarbon content of marine bivalve molluscs. Report on rates of degradation of oil and oil fractions in marine sediments.

Report on the biological availability of contaminants from sewage sludge and on the steady state and equilibrium distribution of metals derived from ocean dumped materials. Produce a manual on recommended methods for analysis of inorganic pollutant content of marine bivalue molluscs.

B-5 TITLE: Development and application of organism and community level bioassays

LABORATORY: NERL

MANPOWER (M-Y): 27

FY 76 FUNDING ($K): 1138 I.H.
74 Extra.

FY 77 FUNDING ($K): 1042 I.H.
217 Extra.

COMPLETION DATE: FY 81

OBJECTIVES:

Produce a final report on the fate and effects of oil in the Gulf Coast environment and a manual of short-term static and flow through bioassay procedures for oil and oil components for use with fish and crustacean larvae and early life stages.

PESTICIDES

C-1 TITLE: The species level effects of selected pesticides and other organic compounds on marine and estuarine organisms

LABORATORY: GBERL MANPOWER (M-Y): 22

FY 76 FUNDING ($K): 754.7 FY 77 FUNDING ($K): 630

OBJECTIVES:

Expose selected marine and estuarine organisms to pesticide-heavy metal combinations. Determine toxicological and physiological effects, rates of pollutant accumulation and rates of response of organisms to individual pollutants.

Determine, for marine and estuarine organisms commonly utilized in laboratory investigations, the range of environmental parameters optimal for health and survival under unstressed conditions. Environmental parameters to be investigated include temperature, dissolved oxygen, salinity, etc. Determine requirements for culturing, holding and maintaining marine and estuarine organisms. Develop methods of rearing marine and estuarine organisms from egg stage to egg stage.

For organisms exposed to varying concentrations of organic and inorganic pollutants determine acute and chronic effects of pollutants, both singly and in combination, on various life stages of organisms. Determine dose-response relationships, "no effect" levels and application factors for use in extrapolating data to untested organisms.

C-2 TITLE: The effects of selected pesticides and other organic compounds on marine and estuarine ecosystems

LABORATORY: GBERL MANPOWER (M-Y): 5

FY 76 FUNDING ($K): 230 FY 77 FUNDING ($K): 230

OBJECTIVES:

Utilizing flow-through laboratory systems, introduce pesticides at varying concentrations. Determine effects of pesticide concentrations on the development of estuarine ecosystems or communities. Measure changes in benthic and planktonic species composition and diversity and migration out of the system.

Develop a balanced laboratory ecosystem for use in determining effects of pollutants on estuarine ecosystems. Develop hardware for the system. Choose organisms as representative of Gulf Coast area estuaries. Determine system dynamics under stressed and unstressed conditions.

TITLE: The pesticide-microbial interactions in the estuarine environment

LABORATORY: GBERL | MANPOWER (M-Y): 3

FY 76 FUNDING ($K): 240 | FY 77 FUNDING ($K): 240

OBJECTIVES:

Expose estuarine microorganisms to pesticides in combination with commonly occuring petroleum hydrocarbons and determine effects on growth rate. Identify pesticide and hydrocarbon breakdown products. Identify, in naturally occuring estuarine oil slicks, microbial degradation and degradation products of pollutants, including hydrocarbons, pesticides and chlorinated biphenyls. Determine the effects of the pollutants on the physiology of the predominant microorganisms in the surface films. Determine the rates of accumulation and/or degradation. Determine the effects of varied salinities and temperatures and light on pesticide degradation rates and products formed.

:-4 TITLE: Ecosystem fate of Kepone under field and laboratory conditions

LABORATORY: GBERL | MANPOWER (M-Y):

FY 76 FUNDING ($K) | FY 77 FUNDING ($K)

COMPLETION DATE: FY 78

OBJECTIVE:

Determine the fate of the pesticide Kepone in an estuarine ecosystem. Utilizing field studies at a contaminated estuary such as the James River, and laboratory investigations, determine the distribution of Kepone in the water, sediment and organisms and changes in levels over time.

:-5 TITLE: Development and validation of suitable systems to comparatively evaluate selected candidate substitute pesticide chemical effects upon estuarine and/or marine biota

LABORATORY: GBERL | MANPOWER (M-Y): 1

FY 76 FUNDING ($K) 171.2 | FY 77 FUNDING ($K): 96

OBJECTIVES:

Develop and characterize a model system composed of grass shrimp and fish. Introduce a pollutant and establish the response of the system as determined by effects of the pollutant on predator-prey relationships. Determine the efficiency of the system for use as tool to evaluate potential effects of candidate substitute chemicals on estuarine biota.

BEST AVAILABLE COPY

Establish an artificial salt-marsh ecosystem. Characterize the unstressed artificial system using a natural system as control. Introduce a pollutant and determine the transport, degradation, ultimate fate of the pollutant and the effects on species diversity, and productivity.

Develop a Lugworm model ecosystem. Characterize the unstressed system. Introduce a pollutant and establish responses of the system. Determine the effects of pollutants on lugworm behavior.

C-6 TITLE: Assessment of the comparative ecological effects of selected candidate substitute pesticide chemicals upon suitable marine and/or estuarine organisms

LABORATORY: GBERL MANPOWER (M-Y):

FY 76 FUNDING ($K): 100 FY 77 FUNDING ($K): 175

OBJECTIVES:

Expose selected estuarine and marine organisms to compounds, such as insect growth regulators and juvenile hormone mimics, which may be substituted for synthetic organic pesticides. Determine the effects of sublethal concentrations of these compounds on the growth and development of the organisms, the behavior of the organisms and on long-term mutagenesis.

Expose selected estuarine and marine organisms and laboratory ecosystems to candidate substitute chemicals, particularly organophosphate pesticides. Determine the levels of acetylcholinesterase inhibition produced by these compounds.

C-7 TITLE: The relation of virus occurance and effects in the marine and estuarine environments to the response of marine and estuarine organisms to chlorinated hydrocarbon pesticides

LABORATORY: GBERL MANPOWER (M-Y): 3

FY 76 FUNDING ($K): 140 FY 77 FUNDING ($K): 140

OBJECTIVES:

Relate virus growth and occurance to the degree of exposure of shrimp to chlorinated hydrocarbon pesticides. Determine the biochemical and biological characteristics of the pink shrimp polyhedrous virus.

Expose selected estuarine and marine organisms to mirex derivatives and related compounds. Determine ATP'ase inhibition and quantify development of antibodies. Determine the degree of in vitro reactivation of inhibition enzyme systems. Develop methods to relate specific antibody production to mirex levels in animal tissues.

Expose estuarine or marine organisms to selected pollutants. Determine the effect of pollutants on osmoregulation. Relate the activity of ATP'ases in gill tissue to effects of pollutants on osmoregulation. Determine in vivo and in vitro effects of pollutants using configurational changes and changes in rapid-rate kinetics.

BEST AVAILABLE COPY

CARCINOGENS

TITLE: The significance of the occurrence in the marine and estuarine environments of carcinogenic compounds, with emphasis on organic compounds

LABORATORY: GBERL

MANPOWER (M-Y): 4

FY 76 FUNDING ($K): 120

FY 77 FUNDING ($K): 120

OBJECTIVES:

Expose Marine and estuarine organisms to infectious pathogen agents in the presence of environmentally occuring chemicals. Determine the effects of chemicals on the pathogenicity of the agents. Expose selected marine and estuarine species to suspected carcinogens, teratogens and mutagens. Determine the relation between cogenesis and chemical concentrations. Compare results with those obtained for mammals.

D-2 TITLE: Assessment of the hazards of human exposure to carcinogens which reach man through bioconcentration in the food chain of the marine environment

LABORATORY: GBERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 313

FY 77 FUNDING ($K): 137

COMPLETION DATE: FY 79

OBJECTIVE:

Study the effects of pollutants associated with energy development. Assess hazards of human exposures to organic chemicals which reach man through bioconcentration in the food web of the marine environment.

D-3 TITLE: Assessment the of carcinogenicity of pollutants in the marine environment

LABORATORY: NERL

MANPOWER (M-Y): 1

FY 76 FUNDING ($K): 30 I.H.

FY 77 FUNDING ($K): 45 I.H.
60 Extra.

COMPLETION DATE: FY 81

OBJECTIVES:

Study and report on mutagenicity of six inorganic test compounds and additional, potentially direct-acting compounds. Develop reverse mutation assay procedures and other test procedures for mutagenicity and carcinogenicity.

BEST AVAILABLE COPY

THERMAL POLLUTION

E-1 TITLE: Extention of a multi-layer, two-dimensional (horizontal) model of circulation to accept a heated discharge as a pollutant

LABORATORY: CERL

MANPOWER (M-Y): 0.1

FY 76 FUNDING ($K): 3 I.H.
40 Extra.

FY 77 FUNDING (K$): 3 I.H.
40 Extra.

OBJECTIVE:

Determine the influence of possible errors in specifying physical offshore open-boundary conditions on the distribution of pollutants within the hydrodynamical-numerical (HN) pollution model. Conduct sensitivity analyses of exchange processes in multi-layer components. These models are being used in pollutant transport predicti ns in estuaries and coastal waters in regional applications.

E-2 TITLE: Ecological impact of variations in environmental parameters and environmental requirements of marine organisms

LABORATORY: NERL

MANPOWER (M-Y): 6

FY 76 FUNDING ($K): 282 I.H.
274 Extra.

FY 77 FUNDING ($K): 239 I.H.
208 Extra.

COMPLETION DATE: FY 81

OBJECTIVES:

Report on effects of thermal plume shock on fish and invertebrate larvae and on the dynamics of fouling communities under low-level, long-term thermal addition. Produce culture manuals for eight marine species and for the sand launce.

E-3 TITLE: Thermal effects of energy utilization in combination with other pollutant stresses

LABORATORY: NERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 25 I.H.
50 Extra.

FY 77 FUNDING ($K): 20 I.H.
50 Extra.

COMPLETION DATE: FY 78

OBJECTIVE:

Conduct studies which will provide defensible bases for applying thermal evaluation criteria to all areas under the jurisdiction of EPA. Such studies will recognize the interactions between thermal stress and those resulting from simultaneous or intermittent stresses from other sources.

BEST AVAILABLE COPY

ANTI-BIOFOULING AGENTS

F-1 TITLE: Persistence and dispersion of chlorine from on-shore cooling discharges

LABORATORY: CERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 47 Extra.

FY 77 FUNDING ($K): 47 Extra.

OBJECTIVES:

Evaluate the California marine water quality standard for chlorine concentration in mixing zones of power plant discharges, and the recommendations of plant practice for biocide addition.

Evaluate persistence and dispersion of CMT properties in treated effluents from refineries utilizing Alaskan crude stock in petrochemical processing--marine waters of Pacific Northwest.

F-2 TITLE: Organism and ecosystem level effects of anti-fouling biocides and disinfectants on estuarine organisms and ecosystems

LABORATORY: GBERL

MANPOWER (M-Y): 10

FY 76 FUNDING ($K): 300

FY 77 FUNDING ($K): 300

OBJECTIVES:

Expose selected estuarine organisms to various concentrations of antifouling biocides and disinfectants such as chlorine. Determine acute toxicity to important life stages. Determine chronic effects such as behavioral changes, reproductive success, etc., on estuarine organisms.

Expose natural estuarine communities to various concentrations of biocides and disinfectants. Determine effects on community composition, rates of development, population dynamics, species diversity, etc.

BEST AVAILABLE COPY

F-3 TITLE: The dynamics of dispersion and dissipation in marine and estuarine waters, the effects on marine and estuarine organisms, and long-term ecosystem impacts of waste heat and biocide derived from coastal and offshore power plants

LABORATORY: GBERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 250

FY 77 FUNDING (K$): 250

COMPLETION DATE: FY 78

OBJECTIVES:

Identify and quantify halogenated compounds formed when chlorine is added to seawater. Initial emphasis will describe the inorganic and organic reactions which lead to long lasting by-products. Follow up studies will investigate the complex and physical chemical fate of identified compounds in simulated and natural marine ecosystems including complexing with sediments, or uptake and bioaccumulation by organisms. Develop ecosystem models of the fate and effects of thermal and biocide discharges ranging from simple planktonic assemblages to controlled field studies.

F-4 TITLE: Effects of ozone and other chlorine substitute processes on estuarine ecosystems

LABORATORY: GBERL

MANPOWER (M-Y):

FY 76 FUNDING ($K):

FY 77 FUNDING ($K):

OBJECTIVES:

Test the effects of ozone upon selected marine and estuarine life history stages against varying environmental conditions of temperature, salinity, organic constitutents and seasonal changes. Design determinations to establish dose response relationships, physiological, histopathological and other potential effects upon specific stages of life histories of marine/estuarine organisms. Testing will be conducted in different sites including Chesapeake Bay and its tributaries and in South Carolina estuaries to gain insight of interactions of specific regional conditions with the action of the oxidant, and the potential by-products produced.

BEST AVAILABLE COPY

COMPLEX WASTES

G-1 TITLE: The effects of selected complex organic wastes on estuarine and marine organisms and ecosystems

LABORATORY: GBERL

MANPOWER (M-Y): 2

FY 76 FUNDING ($K): 170

FY 77 FUNDING ($K): 120

OBJECTIVE:

Develop procedures for sampling and conducting bioassays of complex organic wastes. Account for variation in effluent concentrations in the sampling plan.

G-2 TITLE: Environmental assessment and bioassay development

LABORATORY: GBERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 0

FY 77 FUNDING ($K): 100

COMPLETION DATE: FY 79

OBJECTIVE:

Provide assistance to the Environmental Assessment Program of the OEMI in the determination of the environmental acceptability of specific levels of control on industrial waste streams impacting marine and estuarine environments. This will involve the development of marine bioassay procedures for on site evaluation of the waste stream control. Decision criteria and the impact factors involved in environmental assessment will be developed in conjunction with other OHEE laboratories and OEMI.

BEST AVAILABLE COPY

Report on the uptake and localization of polycyclic aromatic hydrocarbons in clams. Recommend criteria for protection of marine life from oil from various sources. Produce a summary report on cancer induction in marine bivalves due to oil contamination.

Publish the ODAM II Manual and a publish bioassay and biological site monitoring methods with emphasis on benthic systems. Produce preliminary scientifically valid criteria for dredge spoils. Develop bioassay procedures reflecting effects at the population level.

Design criteria for a mobile effluent bioassay laboratory and publish methodology for computerized automated monitoring of behavior in populations of both large and microscopic organisms.

;-3 TITLE: Development and application of ecosystem level bioassays

LABORATORY: NERL

MANPOWER (M-Y): 8

FY 76 FUNDING ($K): 346 I.H.
185 Extra.

FY 77 FUNDING ($K): 303 I.H.
239 Extra.

COMPLETION DATE: FY 81

OBJECTIVE:

Develop simulated ecosystems in which population dynamics closely approximate natural assemblages. Use the systems to predict fate and effects of pollutants resulting from ocean dumping and ocean discharge of oil.

BEST AVAILABLE COPY

ECOSYSTEM DYNAMICS

H-1 TITLE: Develpment and testing of biostatistical methods for quantitative assessment of the effects of stress on marine communities

LABORATORY: CERL

MANPOWER (M-Y): 2.9

FY 76 FUNDING ($K): 100 I.H.
150 Extra.

FY 77 FUNDING ($K): 117 I.H.
120 Extra.

OBJECTIVE:

Determine the efficacy of biomathematical indices of various structural parameters (diversity, dominance, richness, spatial-temporal heterogeneity) as criteria of the impact of pollution in marine-ecosystems. Comparative study of the effects on community structure of different stresses applied to different assemblages in different biogeographical provinces will identify those indices which are most useful in quantitative impact assessment.

H-2 TITLE: Dynamics of polluted and unpolluted estuarine ecosystems

LABORATORY: GBERL

MANPOWER (M-Y): 1

FY 76 FUNDING ($K): 280

FY 77 FUNDING ($K): 230

OBJECTIVES:

Identify physical, chemical and biological components of an undisturbed estuary by measuring spatial and temporal characteristics of water quality, flora, and fauna. Determine interrelationships among ecosystem components by measuring such parameters as: nutrient cycling, productivity species diversity, predation, energy flow, etc. For use in mathematical models, formulate coefficients and expressions which represent terms describing the ecosystem processes of natural, unstressed, estuaries.

Identify physical, chemical and biological components of a Gulf Coast estuary in which pollution stress has been reduced by measuring spatial and temporal characteristics of water quality, flora and fauna. Using past and current water quality data examine the stress on water quality.

H-3 TITLE: Dynamics of energy related pollutants in marine systems

LABORATORY: NERL

MANPOWER (M-Y): 0

FY 76 FUNDING ($K): 290 Extra.

FY 77 FUNDING ($K): 60 Extra.

COMPLETION DATE: FY 79

OBJECTIVES:

Determine the nature, loading distribution and effects of hydrocarbons organic, and inorganic pollutants and metals in marine and estuarine ecosystems. Develop ecosystem models of pollutant discharges to marine and estuarine waters on scales ranging from simple planktonic assemblages to controlled field systems. Determine correlation between results of laboratory bioassays of system components and field studies of bio-accumulation, system dynamics and routes to man from pollutants released from offshore drilling refinery processing and oil/water separator effluents entering marine and estuarine waters.

H-4 TITLE: Impacts of pollutants from petroleum extraction refineries and fossil fuel utilization

LABORATORY: NERL

MANPOWER (M-Y):

FY 76 FUNDING ($K): 36 I.H.
985 Extra.

FY 77 FUNDING ($K): 30 I.H.
940 Extra.

COMPLETION DATE: FY 81

OBJECTIVE:

Establish a major facility for ecosystem simulation and laboratory scale bioassay. Receive, evaluate and implement proposals which will provide meaningful and immediately useful answers regarding the relationships between ecosystem response and more traditional bioassays to support regulatory and planning actions.

33-546 O - 78 - 12

Dr. GAGE. I would like to summarize several statements within the testimony just to highlight some of our dealings in the Environmental Protection Agency.

The legislation which you referred to in your opening comments, Mr. Chairman, would designate the National Oceanic and Atmospheric Administration as the lead Federal agency for oil and marine pollution environmental research and development to be carried out through close coordination among NOAA, EPA, and the Department of the Interior.

The intent of this bill is to eliminate duplication. We recognize this need and strongly support those efforts which are aimed at providing a cohesive coordinated Federal program of marine protection and research.

Through formal agreements, as well as through informal cooperative efforts, EPA has worked with NOAA in a number of research areas. Through these associations, we have come to recognize that NOAA has built a solid base of capability, especially in the offshore marine areas, and we also have been the beneficiaries of such expertise and competence. These capabilities have been developed, for the most part, in response to NOAA's increasing legislative reponsibilities.

We also have our legislative responsibilities in the Environmental Protection Agency, Mr. Chairman. Catastrophies, such as the *Argo-Merchant* spill, tend to dramatize marine pollution from oil tanker accidents. While it is generally agreed that oil pollution in the marine environment will increase, it is a fact that the largest fraction of oil contamination reaching the marine environment comes from land sources through our rivers. In general, most marine pollution derives from sources onshore. A wide variety of pollutants—pesticides, industrial chemicals, metallic wastes, thermal discharges. municipal sludge, et cetera—find their way into the oceans, inadvertently or intentionally.

EPA is concerned with all anthropogenic marine pollutants because of the Agency's several legislative mandates to regulate and control such pollution before it enters the natural environment. To be specific, EPA must respond to the congressional mandates embodied in the Federal Water Pollution Control Act of 1972, the Marine Protection, Research, and Sanctuaries Act of 1972, the Federal Insecticide, Fungicide, and Rodenticide Act, and the new Toxic Substances Control Act.

Consequently, EPA's Office of Research and Development and its associated research laboratories have developed substantial expertise in the process of supporting the Agency's regulatory efforts. I have attached an enumeration of our research of activities relating to the marine pollution area to the testimony, and I would call that to your attention.

I must emphasize that EPA's research efforts are designed to substantiate the regulatory approach which EPA must follow in carrying out its mission. Research which is tailored to support regulatory activities required a philosophy and focus significantly different from that which is oriented toward solely advancing scientific understanding. Our programs do not emphasize so-called basic research, although may of our efforts do add substantially to

a more fundamental comprehension of environmental processes and effects.

It is critical that regulatory agencies, such as EPA, not be encumbered by requirement which would interfere with the planning and implementation of research which must be performed to support their regulatory missions

EPA supports the general intent of the bill which we are considering today. We must, however, raise two questions on the proposed legislation. The first question relates to section 4(d) which requires the Administrator of NOAA to "recommend priorities for the Federal program of environmental research and development related to marine pollution." While that section also requires coordination with EPA and other organizations, we do not feel that the Administrator of NOAA can set priorities for EPA's research in support of EPA's regulations. EPA could certainly include its long-term marine pollution research within such a priority ranking, but the priorities for the Agency's marine research in support of regulation are established by the congressional mandates identified earlier.

The second question relates to possible overlapping mandates for marine pollution research coordination. The proposed bill essentially assigns such a responsibility to NOAA in sections 4(a) and 4(c). On the other hand, other legislation now being considered by the Congress would also require the Administrator of EPA to identify all Federal environmental research and to recommend measures, including legislation, to assure coordination of these efforts. Further, this bill would require the chairman of the Council on Environmental Quality to study environmental research coordination and to make appropriate recommendations. If the aforementioned legislation and H.R. 8823 were both enacted, then the problems of overlapping and possibly conflicting mandates would still exist.

In view of the foregoing, Mr. Chairman, we believe that this legislation is premature at this time. As an immediate alternative, improved efforts for coordination could be initiated immediately under the Federal Coordinating Committee on Science, Engineering and Technology. All Federal marine research efforts could be reviewed under the auspices of FCCSET.

Meanwhile, the President's reorganization task force is currently studying all Federal problems dealing with natural resources and the environment with an eye toward possible realignment of the various agency responsibilities. Therefore, the administration does not currently support legislation of this type.

With a properly implemented Federal marine research program, we are optimistic that solutions to many current pollution problems may be well within our grasp. EPA will continue to interact with sister agencies through interagency agreements, workshops, symposia, and other cooperative efforts.

Thank you, Mr. Chairman. I will be happy to respond to any questions that you may have.

Mr. BREAUX. Thank you, Dr. Gage.

I get the impression—it is a concern that I have, too—that we are starting to overlap again in this whole area of ocean pollution. And I notice you cite the Ocean Dumping Act, Federal Water Pollution Control Act and Insecticide statutes, all of which directs

EPA at one point or another to be engaged in research and development, And here is another statute that is the same thing essentially.

I see as one of your proposed solutions to coordinate things through the FCCSET—quite frankly, I am not even aware of what that is. Could you tell me more about that?

Dr. GAGE. Yes, Mr. Chairman. That is the Federal entity which was set up to succeed the FCST, the old Federal Council for Science and Technology which had previously operated under the Office of Science and Technology. With the legislation which established the new Office of Science and Technology Policy, FCCSET was established as well. The purpose of this organization is to bring together all Federal agencies to review research plans and implementation in various subject areas which are selected by the President, by the President's Science Adviser, or by the collegial actions of the agencies participating.

Mr. BREAUX. Would it not be more preferable for Congress to go ahead and enact a statute which thoroughly designates who and what agency is going to be the lead agency for R. & D. efforts in oil pollution and pass a statute, instead of having three or four running around saying the same thing?

Dr. GAGE. Mr. Chairman, I think what you are proposing will just end up setting up possibly more overlap and more conflict. There are many authorizations which affect many agencies in this area.

We were only addressing this problem from EPA's point of view, but under the mandates given to us in the acts, which I identified in my testimony, we have to take regulatory actions affecting the marine pollution area. Unless you are going to repeal those, or reassign those responsibilities to NOAA or some other agency, you are just adding to the problem of overlap rather than resolving it. It is very difficult to cut through this Gordian knot of interagency interaction in the area of marine pollution.

The world is not so neatly divided into just marine and other activities. The area that we are talking about now would just as much fall under the general term of environmental research and development as it does marine research and development.

So I think a careful sorting through of these areas, and a genuine cooperation among the agencies that are involved, will get to the root of the problem, if in fact serious problems do exist.

Mr. BREAUX. I get the impression that we direct too much of our efforts at putting out so-called brush fires that occur on occasion, and we come in with a task force to look at it and study it. Would not a coordinated 5-year plan to direct the agencies to work together, to come up with a coordinated effort, be a better way of operating than the harum-scarum type of action that we see now?

I am not criticizing. I just think we are going off in a shotgun approach and not being coordinated by any one group.

Dr. GAGE. I agree with that, Mr. Chairman. In fact, the Office of Research and Development has been preparing a 5-year plan for its environmental reserach for the past 2 years. We are now embarking on our third 5-year plan

As I understand this particular piece of legislation would call for a summary report in marine pollution areas. As I indicated in my

testimony, we would be happy to participate fully under such legislation with NOAA, or any other agency, as far as our longer term, more fundamental research is concerned. We would be more than happy to provide descriptions of the research which we are performing in support of our regulatory activities, as well.

It is just when that next step is taken—the establishment of a lead responsibility—which leads to one Administrator setting which represents, in fact, an abrogation of the responsibilities of the other Administrators and Secretaries who are charged with carrying out other pieces of legislation—that we begin to have strong philosophical problems.

Mr. BREAUX. On that point, I would like, if you would, to have submitted for the record, for the committee, a listing of existing laws and Executive orders that EPA is operating under, that grant EPA authority to become involved in any programs relating to ocean polution research and development. That would be helpful for us to see what authority you are operating under, and how diverse it is.

Dr. GAGE. We would be happy to do that.

[The following was received for the record.]

MARINE RESEARCH PUBLIC LAWS

Public laws under which the Environmental Protection Agency conducts marine research:

Federal Water Pollution Control Act Amendments of 1972.
Marine Protection, Research and Sanctuaries Act of 1972.
Federal Insecticide, Fungicide and Rodenticide Act.
Toxic Substances Control Act.
National Environmental Policy Act.

Mr. BREAUX. do you happen to have OMB's recommendations for EPA's research and development programs for fiscal years 1978 and 1979?

Dr. GAGE. The recommendations for our fiscal year 1978 budget were incorporated in the President's budget which was sent to the Congress in February 1977. Our appropriations bill, I believe, has passed both the House and Senate, so the fiscal year 1978 budget is certainly available to you at this point.

On the other hand, we are very early in the budget cycle for fiscal year 1979. In fact, only last Friday morning did the hearing for the Office of Research and Development before the Office of Managment and Budget take place. No decisions have been taken with respect to what research and development funding level will be and what its programmatic thrust would be for fiscal year 1979.

Mr. BREAUX. Of your 1978 budget, for research and development, how much of the total budget is allocated to research and development in the area of ocean pollution?

Dr. GAGE. I would like to supply that for the record, Mr. Chairman. I do not have the right at the tip of my fingers.

[The following was received:]

BUDGET FOR RESEARCH AND DEVELOPMENT

EPA FISCAL YEAR 1978 RESOURCES WHICH SUPPORT MARINE RESEARCH

[In thousands of dollars]

	Water	Pesticides	Toxics	Energy	Total
Corvallis	1,576			420	1,996
Gulf Breeze	250	1,660	135	750	3,065
Narragansett	2,690			1,100	3,790
Subtotal					8,851
Energy passthrough					2,585
Total					11,436

Mr. BREAUX. Could you give us a guestimate, so to speak, 10 percent, 50 percent, approximate?

Dr. GAGE. If I may correct this for the record, I will go ahead and take a guess.

Mr. BREAUX. Right, the record will be the best evidence. I am curious to learn, approximately.

Dr. GAGE. I would say that our marine-related pollution research would probably be running on the order of $12 to $15 million. That includes about $5 million which we do pass through to other agencies, either under the auspices of the energy/environmental research program, which EPA manages, or to other agencies directly, to help them respond to responsibilities which have fallen to EPA.

Mr. BREAUX. That is $12 to $15 million of a total budget of approximately how much?

Dr. GAGE. $250 million.

Mr. BREAUX. $250 million for research?

Dr. GAGE. That is right.

Mr. BREAUX. In another area, how does your agency coordinate its responsibilities under title I with NOAA at the present time?

Dr. GAGE. I am not conversant with what activities we do have in that area, Mr. Chairman. I would be happy to provide that for the record. I have been on an acting basis in this position for just a little over 2 months at this point, and I am not conversant with all of our interactions with all the other agencies.

[The following was received for the record.]

INTERAGENCY COORDINATION BETWEEN NOAA AND EPA

The interagency coordination between the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA) which takes place under the Marine Protection, Research and Sanctuaries Act of 1972 is done on an informal basis. Most of these contacts are at the working level. In addition, there exists an interagency agreement between NOAA and EPA which provides for ocean disposal site surveys and evaluations and a study on the effects of ocean disposal at the deepwater dumpsite (106 mile site). This agreement is not between EPA's office of Research and Development and NOAA, but is between NOAA and the program office within EPA which administers the ocean dumping permit program. There has also been interagency coordination in the preparation of the annual reports to Congress on ocean dumping.

Mr. BREAUX. I might have said title I. I meant title II of the Ocean Dumping Act, which gives to NOAA the lead responsibility in ocean dumping research and development. I know that EPA

coordinates with them, which is similar authority to what this bill does, which is one of the reasons why I am referring to it.

Dr. GAGE. Good. We will get back to you within a day with a writeup on that.

Mr. BREAUX. The Ocean Dumping Act comes up for reauthorization on Wednesday of this week, on the House floor. So it is very significant, and I do not think we should be going off in one direction in one piece of legislation, authorizing research and development, if another bill does almost the same thing.

Mr. Pritchard?

Mr. PRITCHARD. Well, I am just trying to catch up here, and I apologize for being late. The reason I was late is that I was concerning myself with the problems of some of the rules and regulations which affect our municipalities and our cities in dumping into the ocean off the State of Washington.

Would your agency be concerned with that aspect, going off the Shelf there, and into deep waters off the west coast. Is that something that would come under your jursidiction?

Dr. GAGE. It does not come directly under the concern of the Office of Research and Development, which I have, Mr Pritchard, but it does come under the agency's responsibility for the ocean dumping regulations.

I believe Mr. Jorling, the Assistant Administrator for Water and Hazardous Materials, was before this committee earlier on, I think September 20, and it is his responsibility within the Environmental Protection Agency to offer those programs.

Mr. PRITCHARD. We have a significant problem, because we are getting into an area where the law is somewhat counterproductive. By going to secondary treatement of all municipalities, sewage in all areas, it is extremely costly and it may not be necessary depending upon environmental conditions. The local environmental community people and groups in Seattle are convinced that we are better off if we stay with primary treatment, and put it out into the deep ocean where it can be safely dispersed rather than creating the sludge which requires a lot of energy to burn. At this point we have not been able to get relief on this issue with EPA, even though everybody agrees there are problems with the implementation of these standards in these deepwater areas.

So I was just concerned whether that would fall under your purview, as you see it.

Dr. GAGE. I certainly would call this to the attention of Mr. Jorling. He is quite familiar with the problems that do confront a number of the coastal States in dealing with the buildup of municipal sludges.

Mr. BREAUX. Would the gentleman yield?

Mr. PRITCHARD. Yes.

Mr. BREAUX. Your shop in EPA has the responsibility for doing R. & D. under Mr. Jorling, who regulates the permits. I think that is what he is talking about.

You have the responsibility under title I of the Ocean Dumping Act, and EPA has the authority to do the regulations. Your shop has the authority to do the research and development, and ways to do it better. Tht is your shop's responsibility.

Dr. GAGE. I understood that, Mr. Chairman. I thought Mr. Pritchard was discusssing the possibility of legislating, relief for the State of Washington in getting dumping permits to place the sludge off the coast, or if failing that, to go to primary rather secondary treatment.

Mr. PRITCHARD. Well, that is true, and I guess what I am aiming at, is to find what part of this puzzle you people play, and I guess you are in charge of the R. & D.?

Dr. GAGE. That is right.

Mr. PRITCHARD. We have a situation where the law requires secondary treatment, which most of the experts say is counterproductive, and highly expensive to the municipalities in our area, which are short of resources and have all kinds of other needs. The city of Seattle is being threatened with a $60 or $70 million expenditure, and then the experts sit down and say this may be a waste of money because this level of ocean disposal is not that harmful to the marine environment. They argue that you are better to go to primary than to go to secondary and have to work with the sludge.

Yet at this point we have not been getting too much help from the Government on this issue. There is an amendment, hopefully affecting this issue up on the floor tomorrow or the next day, and I guess I am sort of casting about to see where you people were on this problem. But your responsibility is simply the research and development in this area; is that right?

Dr. GAGE. That is right. I just want to add, Mr. Pritchard, that while there are a number of scientists who do believe that dumping of waste from primary treatment plants into the marine environment would not cause serious problems, there are quite a number of other scientists who take a more conservative view, and are really quite concerned about placing such waste, particularly those containing any contaminant from industrial processes, into the marine environment.

So the evidence, I guess, is not clear, I believe, weighed in favor of one or the other.

Mr. PRITCHARD. However, it makes a great deal of difference as to the physical and environmental conditions and the amounts disposed in a particular area. What we are looking for is some flexibility where people can make judgments on the conditions in a particular area, and whether it can safely absorb a certain level and type of sewage wastes rather than just following blindly some rule which says we should not dump things in the ocean regardless.

You know, this is very hard on the public perception of Government, when we get stuck with unreasonable laws, and people simply say, well, that is the law. We just would like to feel that people are trying to match up the needs with the laws rather than just going down the road to implement a standard which may be unnecessary and wasteful of a city's precious dollars.

I guess what you are saying is that even though there is a number of people who believe in ocean disposal in certain areas, you are still better off to go to sludge than to do primary treatment.

Dr. GAGE. There is mixed opinion on what is the most efficacious way, Mr. Pritchard.

Mr. PRITCHARD. When you have mixed opinion, and yet you look at some city like Seattle, and say, invest $70 million, and that is at the cost of storm sewers and a whole lot of other things that we desperately need, it has cut down on a feeling or perception of reasonableness in Governement, or the best way to apply our laws to a given need.

OK, Mr. Chairman, that is all I have.

Mr. BREAUX. Thank you.

The question that I really wanted you to get back on, and I am surprised you do not have the answer yet this morning, is an explanation of how your shop coordinates its efforts with NOAA under the Marine Protection, Research and Sanctuaries Act. That seems like it should be such an obvious answer that it does not need anybody to go back to NOAA on. How does your shop coordinate with both the Coast Guard and NOAA in regard to oil pollution and the Ocean Dumping Act?

Dr. GAGE. Well, my only answer to the question right at this point, Mr. Breaux, is my lack of experience in this particular area. I have just been in this position for a short period of time, and I am not fully conversant with all activities.

I can give you, anecdotally, some of the information that we do have. In certain areas I know that the interaction is quite high. For instance, EPA and NOAA have been cosponsoring workshops, starting a recent one in Hartford, Conn., to develop a joint plan for responding to oil spills, and for assessing the amount of ecological damage which is associated with the oil spills.

This was really brought to a head at the time of the *Argo Merchant* spill this last winter. What we are trying to do at this point is to develop a joint program so that the expertise of the several agencies can be used to move in very rapidly after a spill occurs, and to carry out, not only physical assessment of the damage, but also biological assessment of the damage, associated with the spills. These interactions are going on at a number of levels.

Dr. Hess and I just spoke briefly before the hearing about the plans that we would have to make to move this on up to the policy level in our respective agencies, and get agreement as to what sort of detailed plans and commitments of resources we are going to have to make available in order to be able to respond to such needs.

Mr. BREAUX. Well, I am sure that somewhere in the shop there exists some kind of a memorandum of some sort that states in precise terms how NOAA and EPA coordinate their efforts in NOAA under the title II authority, and if you would go back and see if you have that, I would appreciate it.

All right, Dr. Gage and Mr. Barth, thank you very much. We appreciate your appearance. Thank you for your testimony.

Dr. GAGE. Thank you for your consideration in letting me appear first, and I will ask staff here to listen to the NOAA testimony, and will continue working with them.

Mr. BREAUX. Our next witness is Dr. Wilmot N. Hess.

Dr. Hess, the committee welcomes you, and if you have a statement, that will, of course, be submitted in the record in its entirety, you may proceed as you see fit.

Please identify your colleague with you.

STATEMENT OF DR. WILMOT N. HESS, ACTING ASSOCIATE ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE, ACCOMPANIED BY WILLIAM C. BREWER, JR., GENERAL COUNSEL, NOAA

Dr. HESS. Thank you, Mr. Chairman.

I am joined this morning by the general counsel of NOAA, Mr. William Brewer.

I appreciate this opportunity to be here today to present the views of the Department of Commerce concerning S. 1617, a bill designed to establish a program of environmental research and development related to marine pollution.

Our Agency supports the objectives of this bill which are to establish a comprehensive Federal plan for environmental research and development related to pollution of the marine environment and to assure that an adequate program is developed to meet the Nation's needs with regard to assessing the marine pollution problems through a coordinated Federal effort. This is an extremely important issue and is being addressed by the administration at this time as a part of the overall plan of the President to review all Federal agency programs and organizational structures with the intent of achieving a goal that we all share—more effective and efficient use of the Federal dollars and other resources. In light of this ongoing review, the administration opposes enactment of this bill.

There are numerous Federal agencies engaged in marine environmental research. While it is presumed that most of these activities provide useful and necessary information in support of agency missions, there remains at issue the fragmented nature of the overall Federal research effort which may be resulting in a duplication of effort.

In 1972, Congress passed the Marine Protection, Research and Sanctuaries Act. Although the primary purpose of that legislation was to address the problem of ocean dumping, section 202 of that act assigned responsibility to the Secretary of Commerce for initiating a comprehensive and continuing program of research into the long-range effects of ocean pollution, overfishing, and other man-caused changes of marine ecosystems.

Section 202 showed considerable foresight on the part of the Congress. The activities of man on land, in the coastal zone, and in the open ocean are causing changes to ocean ecosystems. It is essential that we improve our understanding of these cause-and-effect relationships.

This legislation which was passed 5 years ago is sound in principle but in practice it has been difficult to administer.

One of the reasons for this was the continued existence of multiple Federal programs which made it difficult to coordinate the activities of the Federal agencies engaged in research on long-range effects of pollution in the marine environment. A second reason was the difficulty in differentiating between research on long-range effects and other scientific investigations related to marine pollution.

A third reason was that section 202 seemed to emphasize creation of a new program when its emphasis should also have been to coordinate the various research activities already funded in order to identify duplication and gaps. Certain beneficial results came from NOAA's attempt to implement that provision of law.

One was that in our annual reports to Congress, the current Federal effort in this area was described. It was found to be substantial although fragmented. Second, as an agency, in our planning activities we now make a distinction between long-range and short-range research even though, as I have stated, it is difficult at times to draw the line between the two.

Even though these problems exist, the solution, in our opinion, clearly is not to superimpose another large research program over the existing tangled web of research. In our opinion, the solution is to specifically ascertain the total Federal effort, to identify overlap and gaps, to set priorities, and to implement a comprehensive plan. The administration has already set in motion the process to accomplish this solution.

As I mentioned earlier, the President's reorganization project already has activities underway which are designed to assist in the consolidation of existing programs, the elimination of unnecessary duplication, the establishment of effective coordination processes, and principally, to give direction to the Federal efforts.

With this administration effort underway, the administration believes that it is premature to enact legislation such as S. 1617.

Mr. Chairman, this concludes my statement. I will be happy to answer any questions you may have.

Thank you.

Mr. BREAUX. Thank you very much, Dr. Hess.

Are you still commuting from Colorado?

Dr. HESS. That is correct. Every week, sir.

Mr. BREAUX. Well, we particularly appreciate your being with us today and sharing your testimony with the committee.

You point out, rather graphically, one of the concerns that I have, and that is the Marine Protection, Research and Sanctuaries Act. Section 202 of title II of that legislation already calls for NOAA to engage in long-range research and development efforts in this area of pollution research.

I fear that in this legislation we are just merely stating that perhaps in a little more detail, but I notice you also point out a couple of reasons why it has been difficult to administer section 202. Very diplomatically, you did not indicate what I think is probably the largest reason that you do not have any money in it. You do not have any funds in section 202.

Dr. HESS. That is correct, sir.

Mr. BREAUX. That has to be one major reason why it is difficult to administer, too, is it not?

Dr. HESS. Yes; we have certain program elements which we consider fall under the general provisions of 202, but they are things which are already in place.

Mr. BREAUX. What you really have to do to get anything out of 202 is to shift funds around from other ongoing programs, and try to get appropriations for this 202?

Dr. HESS. That is correct.

Mr. BREAUX. Well, what do you think about just abolishing section 202 authority completely under the Ocean Dumping Act, and putting the program under a similar program, such as this legislation creates, which is a separate and distinct ocean pollution research and development act?

Dr. HESS. We think the objectives of the new legislation are completely proper, and we would like to see them brought into being, but the administration feels it is proper to wait until they have gone through the review process and the reorganization process looking at ocean policy in total, before that is accomplished.

Mr. BREAUX. Maybe you can tell us what I was hoping to get from EPA. How do you coordinate with EPA on the Ocean Dumping Act, as far as research and development?

Dr. HESS. In certain areas we have quite close cooperation. We have an interagency agreement which deals with section 201, ocean dumping, the studies of dumping at particular sites.

Mr. BREAUX. You have money in that section, do you not, section 201?

Dr. HESS. Yes; we do have ocean dumping money in section 201, and under that section, we have coordinated with EPA. We have received from them a list of candidate sites of ocean dumping areas that should be studied, and we are working on several of those sites now, doing monitoring and characterization of those sites. So in that particular area there is quite good coordination.

One other area where we have worked together has been in the New York Bight, where we have carried out the Marine Ecosystem Analysis [MESA]—New York Bight project, which is a research effort aimed at understanding what is going on in the New York Bight, an area of water which has been seriously challenged by people dumping sewage, dredge spoils, and other kinds of noxious materials into it.

In connection with the studies in the New York Bight, we have worked with EPA on the problem of the possible relocation of the sewage dumpsite. That is being carried on rather well.

Mr. BREAUX. Is there a formal memorandum existing between the two agencies as far as how they are monitoring, I mean how your cooperative efforts are to be conducted?

Dr. HESS. Under section 201 there is a formal interagency agreement, Mr. Chairman.

Mr. BREAUX. If you could, we would like to have it submitted for the record.

Dr. HESS. Yes.

[The following was received for the record.]

EPA-NOAA INTERAGENCY AGREEMENT CONCERNING BASELINE SURVEYS AND EVALUATIONS OF OCEAN DISPOSAL SITES, UNDER MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

SECTION I. BACKGROUND AND PURPOSE

A. Title I of the Marine Protection, Research and Sanctuaries Act, 33 U.S.C. 1401-1444, directs the Administrator of EPA to regulate the dumping of materials into ocean waters, including issuance of permits for such dumping, establishment of critieria for reviewing and evaluating permit applications, and designation of sites and times for such dumping.

The Administrator of EPA will require baseline surveys and evaluations of existing and proposed disposal sites for the purpose of evaluating or predicting the effect of ocean disposal operations on the marine environment and guiding regulatory

decisions and for the preparation of EIS's. Such surveys and evaluations will involve collection, analyses and interpretation of existing data and information related to existing or proposed sites and field surveys designed to determine physical, chemical, geological and biological characteristics of these sites.

B. Title II of the Marine Protection, Research and Sanctuaries Act directs the Secretary of Commerce, in coordination with the Secretary of the Department in which the Coast Guard is operating and with the Administrator of EPA, to initiate a comprehensive and continuing program of monitoring and research on the effects of ocean dumping, and to report his findings at least annually to the Congress. Responsibility for conduct of this program has been delegated to NOAA.

C. The purpose of this interagency agreement is to provide for coordination between EPA and NOAA in a program of ocean disposal site baseline surveys and evaluations. This program is consistent with the coordination required under the Act, and is intended to assure that NOAA programs of monitoring and research, while fulfilling NOAA's mandate under Title II of the Act, also provide information required by EPA for site evaluation and management.

SECTION II. PROVISIONS

A. EPA will identify its requirements for disposal site surveys and evaluations for regulatory purposes. Specifications of information required will be developed in cooperation with NOAA, and EPA will give full consideration to NOAA views and guidelines in formulation or revision of regulations and guidelines specifying requirements for such studies.

B. EPA will develop and provide to NOAA a schedule of priorities for surveys and Environmental Impact Statements at existing and proposed disposal sites.

C. NOAA will provide detailed study plans to EPA, and conduct the necessary studies. EPA will provide information on the types and quantities of wastes discharged. Funding will be either under NOAA resources or by reimbursement from EPA. In the event that NOAA cannot contract or undertake the required surveys in accordance with EPA's operational program priorities under either NOAA or reimbursable EPA funding, EPA will contract or undertake these surveys directly to the extent of its resources.

D. As a result of surveys and evaluations of each disposal site, NOAA will prepare a report or reports on findings in cooperation with EPA. NOAA will provide copies of all survey data, as requested, together with these reports. The reports will be structured, as possible and feasible, to serve as input to preparation by EPA of Environmental Impact Statements required for each disposal site.

E. Where deemed necessary, NOAA will provide EPA and EPA contractors technical assistance in the interpretation of the NOAA collected oceanographic data during the preparation of Environmental Impact Statements. This effort may be reimbursed to NOAA by EPA at the discretion of the agency coordinators (see Section III.A.).

F. Where EPA imposes monitoring requirements on permittees, these requirements will be developed in consultation with NOAA to reduce the possibility of duplication of effort and insure the standardization of equipments, methodologies, and quality control.

G. Under Section 112 of the Marine Protection, Research and Sanctuaries Act, the EPA Administrator is required to report annually to the Congress on his administration of Title I. Under Section 201 of the Act, the Secretary of Commerce is required to report at least annually on the findings of the program of monitoring and research. In order to meet these reporting requirements in a coordinated manner, the following provisions will apply:

(1) The EPA report will summarize the numbers and types of surveys made, the emphasis on their relation to site designation and other aspects of the regulatory program, and the application of the information to the needs of the regulatory program.

(2) The NOAA report will summarize the detailed scientific findings of the surveys, with emphasis on describing the ambient conditions in the disposal sites and the general scientific conclusions drawn from these and other such surveys.

(3) Both agencies will make provision for full exchange of information on all aspects of the ocean dumping program, and each agency will be afforded full opportunity to review and comment on the report of the other agency.

(4) Data and information obtained under this agreement shall be available through free access from appropriate data centers to all parties. Freedom of information will be adhered to under the broadest interpretation. EPA will be provided with copies of all data requested and will have access to original data upon request. All data collected by NOAA or NOAA contractors will be formatted and transmit-

ted to the National Oceanographic Data Center, National Geophysical and Solar Terrestrial Data Center, and other centers as desired by EPA.

SECTION III. IMPLEMENTATION

A. Each agency will designate a staff member as responsible for coordinating implementation of the provisions of the Interagency Agreement. These staff members will be responsible for establishing channels of communication and coordination within their respective agencies.

B. The agency coordinators will be responsible for establishing a schedule of baseline surveys which take into account EPA's priorities and needs; and the budgetary resources and capabilities of each agency. Budget requests will be developed in coordination with a concerted effort to program adequate resources. EPA will support NOAA's request to OMB for resources to conduct the agreed upon program. Provisions for reimbursement will be made as necessary, where NOAA budgetary resources are not adequate to meet EPA's schedule and priorities, particularly when these occur without adequate lead time for budgetary planning.

C. The agency coordinators may, as determined necessary, explore the feasibility of cooperative programs including but not limited to (1) establishment of a mutually supported centralized staff to design and implement ocean surveys for dumpsite characterization purposes, (2) formation of bilateral EPA/NOAA ad hoc committees for special purposes associated with dumpsite characterization, e.g., for survey finding assessment and analysis, and (3) possible dedication of NOAA vessels and/or EPA laboratories for periods of time.

D. The Administrators or their designated policy representatives shall meet annually to receive a report on implementation of the provisions of this Interagency Agreement. The report shall include:

(1) Progress reports covering completed and ongoing baseline surveys and evaluations of ocean dumping sites.

(2) An agreed upon program of work for the coming year.

(3) Estimated budgets for both agencies required to fund the program.

(4) Any problems being encountered in implementation of the program.

E. Each agency shall apprise the other prior to the issuance of releases to the news Media of preliminary findings and final conclusions of baseline surveys and evaluations carried out cooperatively pursuant to this agreement.

F. Interagency agreements on individual surveys or for provision of special services in support of the ocean dumping permit program must be approved by the respective agency coordinators before they are effective.

SECTION IV. OTHER

A. Nothing contained herein shall abrogate the statutory responsibility or authority of either agency signatory to this agreement.

B. This agreement may be terminated by the Administrator or either agency by written notification at least 60 days prior to effective date of termination. Terms and provisions of this agreement may be modified by concurrence of both agency coordinators or their representatives and approval by the Administrators of both agencies.

JOHN W. TOWNSEND, Jr.,
Associate Administrator,
National Oceanic and Atmospheric Administration.

JAMES L. AGEE,
Assistant Administrator,
Environmental Protection Agency.

Mr. BREAUX. How about under section 202?

Dr. HESS. There is no memorandum there.

Mr. BREAUX. What is your Agency's total budget for research and development as regards ocean pollution? Could you give us that?

Dr. HESS. I will supply information for the record on that. I would estimate it between $10 million and $15 million.

However, if we include: (1) ship time in support of R. & D.; (2) instrumentation development and testing; (3) Sea Grant support of research and (4) Great Lakes research, the total would be much higher.

Mr. BREAUX. Out of a total research and development budget of how much?

Dr. HESS. I will have to supply that for the record. Our books are not kept quite in that fashion.

[The following was received for the record:]

Research and Development, NOAA—fiscal year 1978

	Dollars in millions
Total R. & D. (atmospheric and marine)	155
Marine environmental R. & D.	[1] 50
Reimbursable R. & D. funded by BLM, EPA and FEA (estimate)	22

[1] In addition there are parts of other programs such as resource assessments, that are not specifically identified as environmental research, but supply valuable environmental data.

Mr. BREAUX. EPA had stated that they have a total R. & D. budget of approximately $250 million. Out of that approximately $12 million to $15 million, was done for ocean pollution. Is NOAA in the same area?

Dr. HESS. No, sir, I think we have considerably less than that. I would estimate it under $100 million.

Mr. BREAUX. So you are spending, percentagewise, more for ocean dumping research and development than EPA would be, I guess?

Dr. HESS. I think that is correct.

Mr. BREAUX. One of the things that gives me some concern, I will not hold you to those figures, but your are the lead agency as far as the oceans are concerned, and yet what you are saying is that your research and development for ocean pollution is only about 10 percent of your total research and development effort as an agency, which strikes me as surprisingly small.

Dr. HESS. It is difficult to categorize a particular program as research, as opposed to management. As an example, some of the things that we do in the National Marine Fisheries Service in support of the Fishery Conservation and Management Act could be put in either category.

I think probably I should supply something for the record on this point.

Mr. BREAUX. I think it would be helpful to give us a breakdown of what your Agency is spending in the area of ocean pollution research and development. It would be helpful to list the type of programs that come under that program, and how much is being spent in each part.

Dr. HESS. We will do that.

[The following was received for the record:]

NOAA—Marine environmental research, fiscal year 1978

Line item:	*Dollars in thousands*
Regional projects (MESA) and ocean dumping	6,299
Effects of marine environmental alterations	2,033
Fisheries habitat investigations	5,228
Fishery oceanography	1,505
Estuarine and lake investigations	2,247
Great Lakes research	3,051
Structure and motion of oceans research	3,076
Man under sea	1,498
Data buoy development and maintenance	7,853
Marine environmental research (sea grant)	4,415
Ocean instrumentation development	1,077
Calibration and testing services	2,396
Marine technology and instrument development	464
Ship operations	8,774
Total	49,916

Mr. BREAUX. Mr. Pritchard?

Mr. PRITCHARD. Thank you, Mr. Chairman.

I have no questions of Dr. Hess, except to say that I join in agreement with what he said in his approach to this particular bill.

Dr. HESS. If it is all right, Mr. Chairman, I would like to pick up on the question that Mr. Pritchard asked Mr. Gage of EPA concerning the problems of municipal wastewater disposal in the Puget Sound area.

Mr. PRITCHARD. I would be delighted.

Dr. HESS. We have a research program looking specifically at that problem. It is called the MESA Puget Sound Project. It has two objectives, one is to look at the central basin, and the other has to do with the problems of oil in the northern area. the program has been underway for about a year, and as I said, it is a relatively small effort at this time, but we do feel that within the next year we should have something useful to say about the question of the necessity for secondary treatment.

Mr. PRITCHARD. Well, I appreciate that.

What we would like to do is not be forced into some action until that study is completed. If this action is determined to be necessary, then it is necessary, but the pressure has already been exerted on us to take some steps to start secondary treatment, even though this study by NOAA has not been completed.

I am aware of what you are saying. This is not just the Puget Sound area, you have it off California, and off Hawaii, and I really feel upset when EPA is pushing us down one road, and yet we have not yet done the research to know whether that is in the best interest or not.

So I appreciate what you people are doing there, and we are very anxious that we get some answers to these important questions so that we can make some sound economic decisions regarding water quality in Puget Sound.

Thank you, Dr. Hess.

Mr. BREAUX. Well, Dr. Hess, I guess your bottom line is that the administration and your Agency do not support legislation before us at this time, because it is not timely, and because you think you have the existing authority.

I quite frankly feel that while your Agency may have authority, that there has not been a lot done. Particularly, I am looking at section 202 of the Ocean Dumping Act.

Now, there are a lot of reasons. You listed three, and I listed a fourth one, which is no money, which is probably the largest reason.

I do not think there is enough thinking about the section 202. Either we are going to get aggressive under that section, or Congress is going to end up in duplication, end up mandating that it be done, and hopefully shake someone loose in OMB, in order for the money to be appropriated. Whether it is going to be EPA or NOAA, or the Coast Guard, or the Corps, someone is going to have to really get aggressive and get active in the area of research and development as far as ocean pollution is concerned. Right now we have the shotgun type of approach, and it isn't working, and there are a lot of reasons why it is not. I am not putting it all at the doorstep of NOAA, but the money is one of the most crucial problems why it is not running. You cannot run a research and development program if you do not have the funds.

I am not sure that that has been sought out as aggressively as I would have liked it to have been. I hope to work with you in the future very closely. We would hope a great deal of attention on the part of NOAA would be given to section 202 of title II of the Dumping Act.

I do not know if I asked this or not of your Agency, Dr. Hess.

Could you give us, for the record, a listing of the existing laws, and any Executive orders, under which NOAA is presently given authority to establish and administer any programs relating to ocean pollution research? Therefore, we could have before us a collection of different areas of your authorization for these types of programs, and to try to straighten it out.

Dr. HESS. Yes, sir, Mr. Chairman, we will supply it.

[The following was received for the record:]

MARINE RESEARCH LEGISLATION

The following is a list of the more pertinent legislative authorities pertaining to marine research. Attached to the list, for your convenience, are a few excerpts from each of the statutory authorities pinpointing research and development. We have only included the more obvious sections.

NOAA LEGISLATIVE AUTHORITIES FOR MARINE RESEARCH

Marine Protection, Research, and Sanctuaries Act of 1972, 33 U.S.C. 1401-1444, 16 U.S.C. 1431-1434.
Marine Mammal Protection Act of 1972, 16 U.S.C. 1361-1407.
Fishery Conservation and Management Act of 1976, 16 U.S.C. 1801-1882.
Coastal Zone Management Act of 1972, 16 U.S.C. 1451, et seq.
Coastal Zone Management Act Amendments of 1976, P.L. 94-370.
Fish and Wildlife Act of 1956, 16 U.S.C. 742a-74K.
Fish and Wildlife Coordination Act, 16 U.S.C. 661-666C.
Sea Grant Program Improvement Act, 1976, 33 U.S.C. 1121 et seq.
Reorganization Plan No. 4 of 1970.
Endangered Species Act of 1973, 16 U.S.C. 1531-1543.
Special Energy Research and Development Appropriation Act, 1975, P.L. 93-322.
Migratory Game Fish Study Act, 16 U.S.C. 760e-760g.
Commercial Fisheries Research and Development Act of 1964, 16 U.S.C. 779-779f.
Anadromous Fish Conservation Act, 16 U.S.C. 757a-757f.
The Act of August 4, 1947 (The Farrington Act), 16 U.S.C. 758-758d.
Gulf States Marine Fisheries Commission Act, 63 Stat. 70.

33-546 O - 78 - 13

North Pacific Fisheries Act of 1974, 16 U.S.C. 1021-1032.
Atlantic States Marine Fisheries Commission Act, 16 U.S.C. 667a.

Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1401-1444; 16 U.S.C. 1431-1434)

Title II. Comprehensive Research on Ocean Dumping

Sec. 201. Secretary of Commerce * * * shall * * * initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters or other coastal waters where the tide ebbs and flows or into the Great Lakes or their connecting waters and shall report from time to time, not less frequently than annually, his findings (including an evaluation of the short-term ecological effects and the social and economic factors involved) to the Congress.

Sec. 202. (a) The Secretary of Commerce * * * shall * * * initiate a comprehensive and continuing program of research with respect to the possible long-range effects of pollution, overfish, and man-induced changes of ocean ecosystems.

Marine Mammal Protection Act of 1972 (16 U.S.C. 1361-1407)

Sec. 1361. (4) Negotiations should be undertaken immediately to encourage the development of international arrangements for research on, and conservation of, all marine mammals; * * *

Sec. 1362. (2) The terms "conservation" and "management" means * * * Such terms include the entire scope of activities that constitute a modern scientific resource program, including, but not limited to, research * * *.

Sec. 1378. (b)(1) In addition to the foregoing, the Secretary shall—

(A) in consultation with the Marine Mammal Commission established by section 1401 of this title, undertake a study of the North Pacific fur seals to determine whether herds of such seals subject to the jurisdiction of the United States are presently at their optimum sustainable population and what population trends are evident; and * * *.

Sec. 1379. (b) The Secretary is authorized to make grants to states * * *. programs shall include planning and such specific activities including but not limited to research * * *.

Sec. 1380. (a) The Secretary is authorized to make grants, or to provide financial assistance * * * to any Federal or State agency, public or private institution, or other person for the purpose of assisting such agency, institution, or person to undertake research in subjects which are relevant to the protection and conservation of marine mammals.

Sec. 1381. (a) Research and development program; report to Congress; authorization of appropriations. The Secretary is hereby authorized and directed to immediately undertake a program of research and development for the purpose of devising improved fishing methods and gear so as to reduce to the maximum extent practicable the incidential taking of marine mammals in connection with commercial fishing.

Fishery Conservation and Management Act of 1976 (16 U.S.C. 1801-1882)

Sec. 304. (e) Fisheries Research.—The Secretary shall initiate and maintain a comprehensive program of fishery research to carry out and further the purposes, policy, and provisions of this Act. Such progam shall be designed to acquire knowledge and information, including statistics, on fishery conservation and management, including, but not limited to, biological research concerning the interdependence of fisheries or stocks of fish, the impact of pollution on fish, the impact of wetland and estuarine degradation, and other matters bearings upon the abundance and availability of fish.

Coastal Zone Management Act of 1972 (16 U.S.C. 1451. et seq.)

Sec. 305. The Secretary is authorized to make annual grants to any coastal state for the purpose of assisting in the development of a management program for the land and water resources of its coastal zone.

(b) Such management program shall include: (3) an inventory and designation of areas of particular concern within the coastal zone.

Sec. 312. Estuarine Sanctuaries.—The Secretary, in accordance with rules and regulations promulgated by him, is authorized to make available to a coastal state grnts of up to 50 percentum of the costs of acquisition, development, and operation of estuarine sanctuaries for the purpose of creating natural field laboratories to gather data and make studies of the natural and human processes within the estuaries of the coastal zone.

Coastal Zone Management Act Amendments of 1976 (P.L. 94-370)

Sec. 9. Research and Technical Assistance.—The Coastal Management Act of 1972 is further amended by adding immediately after section 309 (as added by section 8 of this Act) the following:

"Research and Technical assistance for Coastal Zone Management

"Sec. 310.(a) The Secretary may conduct a program of research, study, and trainng to support the development and implementation of management programs * * *

"(b) The Secretary may make grants to coastal states to assist such states in carrying out research, studies * * *

"(c)(1) The Secretary shall provide for the coordination of research, studies, and training activities under this section with any other such activities that are conducted by, or subject to the authority of the Secretary.

"(2) The Secretary shall make the results of research conducted pursuant to this section available to any interested person."

Sec. 12. Acquisition of access to public beaches and other public coastal areas.

Section 315 of the Coastal Zone Management Act of 1972, as redesignated by section 7 of this Act (16 U.S.C. 1461), is amended to read as follows: "Estuarine Sanctuaries and Beach Access

"Sec. 315. The Secretary may, in accordance with this section and in accordance with such rules and regulations as the Secretary shall promulgate, make grants to any coastal state for the purpose of—

"(1) acquiring, developing, or operating estuarine sanctuaries; to serve as natural field laboratories in which to study and gather data on the natural and human processes occurring within the estuaries of the coastal zone; and

Sec. 16. Shellfish sanitation regulations.

(a) The Secretary of Commerce shall—

(1) undertake a comprehensive review of all aspects of the molluscan shellfish industry, including, but not limited to, the harvesting, processing, and transportation of such shellfish; and

(2) evaluate the impact of Federal law concerning water quality on the molluscan shellfish industry.

Fish and Wildlife Act of 1956 (16 U.S.C. 7420-742K)

The Congress further declares that the fishing industry, in its several branches, can prosper and thus fulfill its proper function in national life only if certain fundamental needs are satisfied. * * * Among these needs are:

(3) Assistance * * * (b) research services for economic and technologic development and resource conservation and (c) resource management to assure the maximum sustainable production for the fisheries.

Sec. 742d. Investigations; preparation and dissemination of information; reports.

The Secretary shall conduct continuing investigations, prepare and disseminate information, and make periodical reports to the public, to the President, and to Congress, with respect to the following matters: (1) The production and flow to market of fish and fishery products domestically produced, and also those produced by foreign producers which affect the domestic fisheries; (2) The availability and abundance and the biological requirements of the fish and wildlife resources;

Sec. 742f. Policies, procedures and recommendations.

(1) develop and recommend measures which are appropriate to assure the maximum sustainable production of fish and fishery products and to prevent unnecessary and excessive fluctuations in such production;

(4) take such steps as may be required for the development, advancement, management, conservation, and protection of the fisheries resources; and

Fish and Wildlife Coordination Act (16 U.S.C. 661-666C)

Sec. 662. Impounding, directing or controlling of waters.

(b) Reports and recommendations; consideration. In furtherance of such purposes, the reports and recommendations of the Secretary * * * based on surveys and investigations conducted by the United States Fish and Wildlife Service and such State agency for the purpose of determining the possible damage to wildlife resources * * *

(Prior to Reorganization Plan No. 4 of 1970)

Title 33, Sec. 883a, 883d.

Sec. 883a. Surveys and other activities. To provide charts and related information for the safe navigation of marine and air commerce, and to provide basic data for engineering and scientific purposes and for other commercial and industrial needs, the Director of the Coast and Geodetic Survey, hereinafter referred to as the Director, under direction of the Secretary of Commerce, is authorized to conduct the

following activities: (1) Hydrographic and topograhic surveys; (2) Tide and current observations; (3) Geodetic-control surveys; (4) Field surveys for aeronautical charts; and (5) Geomagnetic, seismological, gravity, and related geophysical measurements and investigations, and observations for the determination of variation in latitude and longitude. (Aug. 6, 1947, ch. 504. Sec. 1. 61 Stat. 787; Apr. 5, 1960. Pub. L. 86-409, 74 Stat. 16.)

Sec. 883d. Improvement of methods, instruments, and equipments; investigations and research.

To improve the efficiency of the Coast and Geodetic Survey and to increase engineering and scienfitic knowledge, the Director is authorized to conduct developmental work for the improvements of surveying and cartographic methods, instruments, and equipments; and to conduct investigations and research in geophysical sciences (including geodesy, oceanography, seismology, and geomagnetism).

Sea Grant Program Improvement Act 1976 (33 U.S.C. 1121, et seq.)

Sec. 206.(a) In General.—The Secretary shall identify specific national needs and problems with respect to ocean and coastal resources. The Secretary may make grants or enter into contracts under this section with respect to such needs or problems.

Sec. 3.(a) In General.—The Secretary of Commerce (hereafter in this section referred to as the "Secretary") may enter into contracts and make grants under this section to—(1) enhance the research and development capability of developing foreign nations with respect to ocean and coastal resources, as such term is defined in section 203 of the National Sea Grant Program Act; and * * *.

Reorganization Plan No. 4 of 1970

National Oceanic and Atmospheric Administration

Section 1. Transfers to Secretary of Commerce. The following are hereby transferred to the Secretary of Commerce:

(a) All functions vested by law in the Bureau of Commercial Fisheries of the Department of the Interior or in its head, together with all functions vested by law in the Secretary of the Interior of the Department of the Interior which are administered through that Bureau or are primarily related to the Bureau . . .

(e) Those functions vested in the Secretary of Defense or in any officer, employee, or organizational entity of the Department of Defense by the provision of Public Law 91-144, 83 Stat. 326, under the heading "Operation and maintenance, general" with respect to "surveys and charting of northern and northwestern lakes and connecting waters," or by other law, which come under the mission assigned as of July 1, 1969, to the United States Army Engineer District, Lake Survey, Corps of Engineers, Department of the Army and relate to (1) the conduct of hydrographic surveys of the Great Lakes and their outflow rivers. Lake Champlain, New York State Barge Canals, and the Minnesota-Ontario border lakes, and the compilation and publication of navigation charts, including recreational aspects, and the Great Lakes Pilot for the benefit and use of the public. (2) the conception, planning and conduct of basic research and development in the fields of water motion, water characteristics, water quantity, and ice and snow, and (3) the publication of data and the results of research projects in forms useful to the Corps of Engineers and the public, and the operation of a Regional Data Center for the collection, coordination, analysis, and the furnishing to interested agencies of data relating to water resources of the Great Lakes.

Endangered Species Act of 1973 (16 U.S.C. 1531-1543)

Sec. 1532 (2) The terms "conserve", "conserving", and "conservation" mean to use and the use of all methods and procedures . . . to . . . Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, . . . law enforcement. . . .

Sec. 1533 (a)(2) with respect to any species over which program responsibilities have been vested in the Secretary of Commerce pursuant to Reorganization Plan Numbered 4 of 1970—

(A) in any case in which the Secretary of Commerce determines that such species should—(i) be listed as an endangered species or a threatened species, or (ii) be changed in status from a threatened species to an endangered species, he shall so inform the Secretary of the Interior who shall list such species in accordance with this section; * * *.

Sec. 1536.* * * All other Federal departments and agencies shall * * * utilize their authorities * * * by carrying out programs for the conservation of endangered and threatened species * * *.

Special Energy Research and Development Appropriation Act, 1975 (P.L. 93-322)

Title I, Chapter V—Department of Commerce, National Oceanic and Atmospheric Administration; Operations, Research, and Facilities

For necessary expenses of the National Oceanic and Atmospheric Administration to reactivate, equip, and operate certain oceanographic research vessels for the purpose of conducting assessments of energy-related offshore environmental problems associated with energy activities, $6,630,000 to remain available until expended.

Migratory Game Fish Study Act (16 U.S.C. 760e-760g)

Directs the Secretary to undertake a comprehensive continuing study of the migratory marine fish of interest to recreational fishermen, including species inhabiting offshore waters and species which migrate through inshore waters. Included in such study shall be research on migration, identity of stocks, growth rates, mortality rates, variations in survival, environmental influences including pollution, to develop wise conservation policies and constructive management. The Secretary is authorized to acquire lands and construct facilities, purchase boats, equipment, and apparatus, and to employ state and other institutions and make public the results of the research conducted pursuant to the Act.

Commercial Fisheries Research and Development Act of 1964 (16 U.S.C. 779-779f)

Authorizes the Secretary of the Interior (prior to Reorganization Plan No. 4 of 1970) to cooperate with the States through their respective State agencies which regulate commercial fisheries in carrying out projects designed for research on the development of the commercial fisheries resources of the Nation. Puerto Rico, American Samoa, the Virgin Islands, Guam, and the Trust Territory of the Pacific Islands are treated as States.

Anadromous Fish Conservation Act (16 U.S.C. 755a-757f)

Authorizes the Secretary, on the basis of studies carried out under the Act, to make recommendations to HEW Secretary concerning elimination or reduction of pollutants detrimental to fish and wildlife in interstate or navigable waters.

The Act of August 4, 1947 (The Farrington Act) (16 U.S.C. 758-758d)

Sec. 758 a. The Secretary of the Interior, through the Fish and Wildlife Service of the Department of the Interior, (prior to Reorganization Plan No. 4 of 1970), is authorized and directed to conduct such fishing explorations and such necessary related work as oceanographical, biological, technological, statistical, and economic studies to insure maximum development and utilization of the high seas fishery resources * * *.

Sec. 758 c. There is hereby authorized to be appropriated * * * such amounts as may be necessary for the construction, including architectural services, and for furnishings and equipment of a fishery research laboratory and experiment station in the State of Hawaii and necessary substations at suitable locations, together with suitable dock and storehouse facilities to be used in conjunction with the operation of research and experimental fishing vessels and for the procurement and for the modification, refitting, and equipment of two experimental high-seas fishing and oceanographical research vessel, together with all necessary gear and appurtenances, including necessary naval architectural and * * *.

Gulf States Marine Fisheries Commission Act (63 Stat. 70)

Designates the U.S. Fish and Wildlife Service (prior to the Reorganization Plan No. 4 of 1970) as the primary research agency.

North Pacific Fisheries Act of 1974 (16 U.S.C. 1021-1032)

Makes certain funds available to the Secretary for research and related activities to carry out the program.

Atlantic States Marine Fisheries Commission Act (16 U.S.C. 667a)

Designated the U.S. Fish and Wildlife Service (prior to the Reorganization Plan No. 4 of 1970) as the primary research agency to promote better utilization of the Atlantic Coast fish and shellfish resources.

Mr. BREAUX. All right, we appreciate your appearance, and look forward to having you before the committee in the future.

With that, the Subcommittee on Oceanography will stand adjourned until further notice.

[Whereupon, at 10:20 a.m., the subcommittee adjourned, subject to the call of the Chair.]

NUCLEAR WASTE DISPOSAL

MONDAY, MAY 15, 1978

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
SUBCOMMITTEE ON OCEANOGRAPHY,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:30 a.m., in room 1334, Longworth House Office Building, Hon. John Breaux (chairman of the subcommittee) presiding.

Present: Representatives Breaux, Hughes, and Pritchard.

Mr. BREAUX. The Subcommittee on Oceanography will please come to order.

The 1970's mark the beginning of an era in which the world is becoming increasingly concerned about the limits of the Earth's energy resources.

Since the major increase in the world price of oil in 1973, the United States and other countries have begun critical evaluations of their energy consumption patterns and trends.

A widespread apprehension about our growing dependence on one energy resource, petroleum, is compelling many nations to look at alternative energy resources, especially coal and nuclear fuel, to meet their future energy demands.

The need to develop acceptable methods to dispose of the extremely hazardous wastes generated from the nuclear fuel cycle will become more and more critical as domestic and global use of nuclear energy increases.

Today, the Subcommittee on Oceanography convenes oversight hearings on the disposal of nuclear wastes in the ocean. I feel that these hearings are important and timely for a number of reasons.

First, several European countries are currently dumping low-level radioactive wastes into the ocean. This activity is going on under the supervision of the Nuclear Energy Agency.

Our country for many years dumped containerized low-level radioactive wastes in several dumpsites off our coasts. We terminated this practice in 1970 and now use shallow-land burial for these wastes.

The Environmental Protection Agency, which we will hear from today, is now studying the disposition of these canisters. The information obtained from this research will help in our country's efforts to negotiate acceptable international environmental guidelines for such dumping.

Second, many countries are becoming aware of very serious impending problems with respect to their growing stockpiles of high-level radioactive wastes. These countries, some of which are not endowed with suitable geological formations, are looking with great

interest at the alternative of disposing high-level radioactive wastes in the seabed.

The President, as part of his national energy plan, has created a task force directed by the Department of Energy to develop and evaluate various alternatives for the disposal of high-level radioactive wastes.

One of the alternatives being considered by the task force is the disposal of these wastes in the seabed. A research team coordinated through Sandia Laboratory in Albuquerque, N. Mex., is pursuing this alternative. Today, we will hear from that group's director, as well as the Department of Energy.

The Subcommittee on Oceanography, which has jurisdiction over issues concerning the conservation and development of marine resources, marine research, and protection of the ocean environment, has a particular interest in the issue of nuclear waste disposal in the oceans and seabed.

The subcommittee has also followed the progress of negotiations at the United Nations Law of the Sea Conference and is acutely interested in our Nation's role in negotiations pertaining to the London Convention on Ocean Dumping and Marine Pollution.

I, for one, have an interest in this issue because one of the alternatives being considered for the disposal of high-level radioactive wastes is the salt domes in my district.

Finally, the Congress recently passed, and the President signed into law on March 10, the Nuclear Non-Proliferation Act of 1978.

This act, among other things, states that this country shall endeavor in negotiating trade agreements for the export of nuclear fuel and technology to insure that the environment is protected from radioactive contamination.

I think that this is significant in that there are countries to which we export nuclear fuel which have not ratified the International Convention on Ocean Dumping.

We will be asking the Department of State and the U.S. Nuclear Regulatory Commission about the implications of this act with respect to this issue today.

We will proceed in the following order. We will take first Dr. James Liverman, Acting Assistant Secretary for the Environment with the Department of Energy, and Dr. John Deutch, Director of Energy Research for the Department of Energy, together as a panel.

We will then take Mr. Sheldon Meyers, Director of the Division on Fuel Cycle and Material Safety of the Nuclear Regulatory Commission, and then Mr. Rowe, Deputy Assistant Administrator for Radiation Programs in the EPA.

Then Mr. Bill Long, for the Department of State, and then Dr. Anderson and Dr. David Reese as a panel.

With those opening remarks, the Subcommittee on Oceanography would like to welcome Dr. Liverman and Dr. Deutch, who we invite to sit as a panel.

Gentlemen, we have copies of your testimony, which, of course, will appear as presented in our record. I would ask, perhaps, if you can, to please summarize your prepared testimony in order that we might get into some questions. I invite you to proceed.

[The information follows:]

STATEMENT OF DR. JOHN M. DEUTCH, DIRECTOR OF ENERGY RESEARCH, DEPARTMENT OF ENERGY

I am pleased to appear before you today representing the Office of Energy Research to discuss the major initiatives which the Department of Energy and the Administration are undertaking in nuclear waste management.

BACKGROUND

The formulation of a credible and broadly accepted nuclear waste management policy is a matter of the highest importance because we must ensure that nuclear wastes can be effectively isolated from the biosphere. Large quantities of nuclear waste exist today as a by-product of 30 years of production of nuclear materials used in our National defense, and from an increasing amount of electricity generation for domestic use. In order to provide the proper perspective on the waste management issue which we are discussing today, I have attached to my written statement information which summarizes the current and projected waste generation situation. Table I shows the current disposition and quantities of U.S. commercially generated low-level (LLW), transuranic (TRU), and high-level (HLW) wastes, and projected quantities of these wastes. Table II provides similar information for defense (DOE)-generated wastes. Table III provides estimates of current and projected spent fuel generation both dometically and worldwide, which will have to be dealt with through either storage or reprocessing. There is a legitimate public concern over potential disposition of these wastes. The development of an effective and responsible nuclear waste management program that meets these public concerns is an important step toward assuring that commercial nuclear power will continue to play an important role in meeting our energy needs.

President Carter, in his April 29, 1977, National Energy Plan, directed that a review of the entire waste management program be undertaken. The Secretary and senior officials of the Department consider this review of the overall nuclear waste management program to be a matter of the highest priority. The Department has taken the first steps toward conducting that review and developing a comprehensive Administration policy on nuclear waste management and a realistic program to implement this policy.

A DOE Task Force was established by Under Secretary Myers to define the issues and options for dealing with nuclear waste. This task force, under my direction, was composed of members from Energy Technology, Environment, Policy and Evaluation, Intergovernmental and Institutional Relations, Controller, General Counsel, and members of my staff. The report of that Task Force was released approximately two months ago.

TASK FORCE REPORT

The Task Force report presents an assessment of the current nuclear waste managment programs, identifies important issues, and explores alternative courses of action for resolving these issues. While the report contains significant recommendations, it is not intended to establish new policy or to commit the Department or the Federal Government to specific new programs or schedules. Rather, it hopefully should serve as the vehicle to stimulate discussion among a wider range of interested parties during the remainder of the policy formulation process. The issues raised by the Task Force will be addressed by the Administration after a thorough public review.

The Task Force report raises a number of issues with regard to present nuclear waste management policy and programs. I should like to highlight some of the very preliminary recommendations which I consider most significant for management of wastes.

1. A majority of independent technical experts have concluded that high-level waste (HLW) can be safely disposed in geological media, but validation of the specific technical choices will be an important element of the licensing process.—Existing technical issues relate to the selection of the medium. Specific site and repository designs should be considered for each medium. Research is necessary to resolve medium selection and repository design issues. An accelerated effort to compile and analyze existing evidence hearing on geological disposal and feasible alternatives is also needed. The licensing process will assure that there is appropriate public scrutiny of our efforts and that the technical approaches taken are valid.

2. Reprocessing is not required for the safe disposal of commercial spent fuel.—From the point of view of the design at a repository for safe disposal, there is no significant difference between spent fuel and reprocessed high-level waste. Since a repository can be designed to accept either spent fuel or commercial HLW, disposal of spent fuel can be pursued initially.

3. Consideration should be given to an early demonstration of the geologic disposal of a limited number of spent fuel assemblies in the Waste Isolation Pilot Plant (WIPP).—This disposal should take place with full licensing. It should be compatible with the results of on-going R. & D. and it should employ conservative repository design characteristics.

4. The Spent Fuel Policy announced by President Carter in October 1977 must be integrated with the Waste Management Policy.—At issue here is the methodology that will be used to determine the one-time charge to utilities for the interim storage and subsequent disposal of spent fuel. Such a methodology must be developed and integrated with adoption of a detailed scenario for future storage/disposal. The principle of a "one-time" charge is essential, although utilities may be offered various storage/disposal options (bearing different costs).

5. The Task Force report highlights the importance of an intermediate Away from Reactor (AFR) storage required between on-site storage of spent fuel at the utility reactors and ultimate disposal which will not be available before 1985.—The character and amount of AFR storage required over time is sensitive to installed nuclear power, repository availability, and implementation of the spent fuel policy. Initial AFR storage is needed by 1983. Additional work is needed to define future interim storage capacity needs and to study ways for private industry implementation.

6. The target for initial operation in 1985 of a National Waste Repository (NWR) for the permanent disposal of commercial HLW or spent fuel may not be met; this does not affect the mid 1980's schedule for WIPP.—The potential delay in NWR arises from the site selection process and a more realistic assessment of licensing requirements relative to previous plans. These considerations need not significantly impact the scheduling of WIPP as a near-term demonstration facility where site selections and evaluation are currently underway.

7. The responsibility for the ultimate disposal for all forms of nuclear waste should rest with the Federal Government and long-term waste disposal facilities should be subject to NRC licensing.—The importance of effective nuclear waste management and the national character of the production and disposal of waste may lead to an expanded Federal role. This issue should be carefully reviewed in light of its long-term financial and management consequences to the Federal Government. A licensing process that allows broad participation will lead to improved public confidence in long-term disposal.

8. The NEPA process is an integral part of the nuclear waste management program and DOE efforts in this regard must be strengthened.—Additional effort is needed on the Generic Environmental Impact Statement (GEIS) on commercially generated radioactive waste because the GEIS will play a major role in the process leading to disposal of commercial waste.

9. There are substantioal budgetary impacts of the Task Force recommendations and legislation would be required to carry out many of the suggested changes.—Additional effort is needed on defining future budget impacts under some of the recommendations and determining how these budget impacts should be financed.

INTERAGENCY TASK FORCE

The Department of Energy report was a very important first step in the development of a comprehensive waste management policy. The DOE Task Force report and the public response to it will serve as the initial input to the Interagency Task force on Nuclear Waste Management which was recently established by the President. The Interagency Task Force is charged to make policy recommendations and to review ongoing programs to assure that the policy is implemented in a timely manner. Task Force membership includes EPA, OMB, CEQ, OSTP, NSC, Domestic Policy Staff, NASA, the Arms Control and Disarmament Agency, and the Departments of State, Interior, Transportation, Energy and Commerce. The Nuclear Regulatory Commission has been invited to participate in the Task Force as they judge appropriate. The Task Force will make final recommendations to the President by October 1, 1978.

In a meeting with state governors attending the recent National Governors' Conference, President Carter spoke of the need to produce such a waste management policy by the end of this year. We hope to meet this schedule.

A successful nuclear national waste management policy must reflect the views of other government agencies, Congress, States, industry and the concerned public, in addition to those of the Department of Energy. Only with broad understanding and acceptance of this policy can a program be successfully developed and implemented that will satisfy public concerns. We anticipate that an extensive series of interagency and public discussions will take place leading to adoption of an Administration policy. We are particularly eager to assure that the public and technical

experts are given the opportunity to participate in these policy discussions. The Interagency Task Force will establish mechanisms for this to happen. Such a process will assure that all alternatives have been examined and that the resulting policy has undergone the most rigorous scrutiny.

For example, during the week of April 10, Deputy Secretary O'Leary, other DOE officials, and I were in New Mexico holding three public meetings in Carlsbad, Albuquerque and Santa Fe, on the proposed WIPP geological disposal facility near Carlsbad. These meetings provided a very useful forum to hear and discuss the issues which concern the citizens of New Mexico.

Throughout this process we intend to establish close communication with interested Members of Congress and their staffs, as well as state and local officials.

RESEARCH AND DEVELOPMENT DISPOSAL PROGRAMS

As I indicated above, the DOE Task Force has recommended an early demonstration of geologic disposal. I would like to stress the importance of maintaining at the same time a broadly based R. & D. program. In any technical program, highest priority should be given to the most promising solution. However, until final answers are obtained, it is important to maintain a parallel, broad R. & D. approach exploring the viability of other promising options. This broad approach should be exercised in the waste disposal program.

There appears to be a substantial consensus and valid technical basis in the United States for the view that present planning and actions should be based upon a reliance on geological containment of wastes. Similar views have recently been expressed in Government-supported reviews in other countries (e.g., West Germany, Sweden, and Canada). In the midfifties, the National Academy of Sciences recommended the isolation of waste in deep bedded salt type geological structure. This approach has constituted the major thrust of the U.S. program. A high priority has been placed on the near-term demonstration of this approach at the proposed WIPP, as part of the defense waste terminal storage program.

This major thrust should be supplemented on at least three levels to insure that alternative options receive appropriate consideration.

First, it is important to examine geological media other than salt. Work to evaluate alternatives such as basalt, shale and granite is currently underway and should continue.

Second, entirely different geologic alternatives should be explored. The major alternate terrestrial method is a seabed repository. While probably more expensive, it could provide isolation reliability equivalent to deep geologic repositories and would be available to most countries. Besides cost, another major problem appears at this time to be international acceptance of seabed repositories for radioactive wastes. Studies analyzing seabed repositories are in progress. Other alternate geologic approaches which have been suggested include island disposal, techtonic plate disposal and rock melting alternatives.

Finally, the R. & D. base should be broadened by considering nongeological approaches. Two such options which have received some attention are nuclear transmutation and space disposal. Space disposal, as in the case of seabed disposal, would require international acceptance. Transmutation would require fuel reprocessing. Studies leading to the more complete evaluation of the transmutation (by DOE) and space disposal (by NASA) options are in progress. Initial assessments suggest that other alternatives to geologic approaches which have been suggested, e.g., ice sheet disposal and chemical resynthesis, are not as viable as those currently under consideration.

Table IV shows the level-of-funding that is being spent principally by DOE in the waste disposal R. & D. areas disucssed above. To put these numbers in perspective, Table V provides a breakdown of DOE-funding for nuclear energy research in general.

Once again, I would like to stress the importance of sustaining a broadly based long range R. & D. program which explores the more promising alternatives in parallel with our high priority thrust to demonstate the most promising near-term option. Some of the alternatives have advantages, in principle, which would be very attractive if feasibility can be established.

For example, in the transmutation alternative, long-lived radio-nuclides from high-level waste would be transmuted into shorter-lived or even stable isotopes. An assessment of this approach is scheduled for completion in 1979 with publication of a report in 1980. In the space disposal alternative, wastes would be unambiguously removed from the biosphere for all time. DOE is providing information to support the ongoing NASA study and is participating in NASA program reviews. By the end

of fiscal year 1978 this study should be completed. It will provide the basis for consideration of further work on this alternative.

SUMMARY

In summary, the DOE Task Force has laid the groundwork from which a national nuclear waste managment policy can be developed. The Interagency Task Force now underway should provide the necessary policy recommendations concerning the long-term management of nuclear waste. At this time, there is broad technical consensus that disposal in geologic formations is the most promising alternative. However, a broad-based R. & D. program should be maintained to determine the viability and practicality of other options.

I will be pleased to answer any questions that the committee may have.

TABLE I.—U.S. COMMERCIAL WASTE [1]

[Cumulative millions of cubic feet]

Year	LLW	TRU	HLW
1977	[2]19.1	[2]0.01	[3]0.08
1980	30.1	.04	.08
1985	60.2	.09	([4])
1990	109.4	.14	
1995	180.0	.19	
2000	275.8	.24	

[1] Based on nuclear growth consistent with the National Energy Plan and no volume reduction for LLW and TRU.
[2] Buried at 5 commercial LLW burial sites.
[3] Stored (liquid) in underground tanks at NFS.
[4] Final disposition unknown.

TABLE II.—U.S. DEFENSE WASTE [1]

[Cumulative millions of cubic feet]

Year	LLW	TRU	HLW
1977	[2]39.1	[3]15.0	[4]9.4
1980	42.8	15.7	9.3
1985	89.1	47.2	9.1
1990	135.3	78.7	([5])
1995	181.6	103.7	
2000	227.8	128.7	

[1] Based on no volume reduction for LLW and TRU.
[2] Buried at 7 major DOE sites and numerous small sites.
[3] Buried at 6 DOE sites; includes 13,000,000 ft^3 buried with DOE LLW and 2,000,000 ft^3 retrievably stored under current policy. Excludes 1,600,000 gal of waste at ORNL, plus 90,000 gal produced annually, which is disposed of on-site via shale hydrofracturing.
[4] In-tank storage. Decline is result of evaporation and processing.
[5] No data available beyond 1985.

TABLE III.—PROJECTED SPENT FUEL GENERATION

[Cumulative]

Year	United States [1]		Foreign [2]	
	MTHM [3]	TCF [4]	MTHM	TCF
1977	3,300	43.2	9,000	117.9
1980	7,000	91.7	18,000	235.8
1985	16,800	220.1	40,000	524.0
1990	34,800	455.9	78,000	1,021.8
1995	61,200	801.7	136,000	1,781.6
2000	97,800	1,281.2	217,000	2,842.7

[1] Based on a nuclear growth consistent with national energy plan.
[2] Free World only.
[3] Metric tons of heavy metal.
[4] Thousands of cubic feet.

TABLE IV.—WASTE DISPOSAL RESEARCH FUNDING

[Operating dollars in millions]

Activity	Fiscal year 1977 actual	Fiscal year 1978 planned	Fiscal year 1979 proposed
Defense waste terminal geologic storage R. & D. [1]	6.0	11.5	18.5
Commercial waste terminal geologic storage R. & D. [2]	30.1	68.0	106.1
Seabed	1.3	3.1	3.1
Transmutation	1.8	1.4	1.3
Space [3]	.4	.4	3.0
Total	39.6	84.4	132.0

[1] Excludes waste processing R. & D.
[2] Excludes waste processing R. & D. and spent fuel packaging R. & D.
[3] NASA-funded, except for $1,200,000 (DOE) in fiscal year 1979.

TABLE V.—DOE NUCLEAR ENERGY RESEARCH FUNDING

[Operating dollars in millions]

Activity	Fiscal year 1977 actual	Fiscal year 1978 planned	Fiscal year 1979 proposed
Breeder reactor R. & D	479.5	455.2	[1] 279.7
Fuel cycle R. & D. [2]	53.4	92.4	51.9
Commercial waste management [3]	82.7	158.5	152.1
Nuclear research and applications	159.4	208.1	249.7
International spent fuel		5.0	3.0
Defense waste management [4]	23.0	42.3	61.4
Total	798.0	941.5	797.8

[1] Funding does not reflect compromise currently under negotiation.
[2] Does not include commercial waste management, but includes domestic spent fuel storage of $3,000,000 in fiscal year 1979.
[3] Includes terminal storage and waste processing R. & D.
[4] Includes only terminal storage and waste processing R. & D.

STATEMENT OF JAMES L. LIVERMAN, ACTING ASSISTANT SECRETARY FOR ENVIRONMENT, U.S. DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Subcommittee, I am pleased to have this opportunity to discuss with your the Office of Environment's ocean bed emplacement program. I would like to begin my discussion with the general responsibilities of the Assistant Sectretary for the Environment in terms of the Department of Energy Waste Management Programs, the concept of ocean bed emplacement, and the relationship with other Federal and International Agencies regarding the development and evaluation of the sub-seabed emplacement alternative for nuclear waste disposal. I will conclude with the technical status of DOE's ocean bed emplacement program.

The Office of Environment is responsible for providing guidance to the Secretary on Department-wide compliance with environmental laws and procedures as well as on health and safety issues related to DOE programs. In this role the Assistant Secretary for the Environment conducts comprehensive research and development to determine possible environmental effects and safety of radioactive waste management technologies and systems. The Assistant Secretary for Energy Technology is responsible for the development and operation of Commercial Waste Management Facilities.

The major thrust of the Department of Energy's (DOE) Commercial Waste Management Program under the Assistant Secretary for Energy Technology is towards the isolation of the wastes within stable geological formations at depths reachable by conventional mining methods. The geologic formations of primary interest are bedded salt, salt domes and anticlines, basalt, shales and granites.

The existence of deep-sea technology, such as deep seabed drilling, bore hole reentry, and deep-sea emplacement and recovery of large equipment, makes it possible to consider the geological formations beneath the deep oceans as alternative formations for radioactive waste isolation. The basic concept for emplacement is that radioactive wastes will be put within a blanket of deep ocean sediments which are stable and have accumulated over millions of years and are in the process of becoming sedimentary rock. Such a protective blanket might provide perpetual isolation of the wastes. However, the feasibility of the concept of sub-seabed emplacement of radioactive waste needs to be established. Therefore, the Ocean Bed Emplacement Program, under the Assistant Secretary for Environment, is considered a long-range concept for waste isolation. While having a potential for future use, it is still in the evaluation stage at this time.

The near-term objective of the Ocean Bed Emplacement Program is to determine whether the deep ocean sediments are an effective barrier for the confinement and isolation of suitably treated and packaged high-level radioactive wastes emplaced within the geologically stable and biologically inactive regions of the deep ocean floor. The research efforts are primarily focused on oceanographic, radiation and thermal effects investigations directed towards a thorough understanding of the barriers to radionuclide migration. Research results will provide evidence on whether the sediments are an adequate barrier to radionuclide migration and the presence of the radioactive material will adversely affect the environment of the seabed. A secondary purpose of the current program is to maintain the capability of assessing similar evaluaton programs developed by other countries. In short, the environmental feasibility of the concept is being examined.

Several Federal and International Agencies have responsibilities for radioactive waste management. The Department of Energy, under the Energy Reorganization Act of 1974 and the Atomic Energy Act of 1954, has responsibility for developing the technology for and the management of designated radioactive waste shipped to the Federal Government. The Nuclear Regulatory Commission, under the Energy Reorganization Act of 1974, has responsibility for the licensing of "facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under such Act * * * and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Administration, * * *." The Environmental Protection Agency has responsibility for establishing guidelines on radioactive materials released to the environment, and under the Marine Protection Research and Sanctuaries Act of 1972, has responsibility for the regulation of disposal of material in the ocean. It is my understanding an EPA permit would be required for deep seabed emplacement of wastes.

On an international level DOE participates with the Nuclear Energy Agency (NEA) of the Organization for Econonmic Cooperation and Development (OECD) in a Seabed Working Group which I will discuss later under the technical description of seabed emplacement programs.

In the general area of radioactive waste control, DOE provides technical advice and participates with the State Department, EPA, NRC, and other Federal agencies in developing U.S. positions for participation in agreements, such as the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, and with the International Atomic Energy Agency in its responsibility for Definitions and Recommendations regarding radioactive wastes under the London Convention.

I would now like to outline the technical status of the Ocean Bed Emplacement Program and international cooperation on the concept. The investigations began in 1974 and are presently concentrating on the mid-gyre, mid-tectonic plate regions of the North Pacific and North Atlantic oceans. Detailed assessments are being made of:

The deep ocean sediments as a barrier to radionuclide migration;
Vertical and horizontal consistency of the sediments;
Heat and heat tranfer effects;
Characteristics of biological communities in the ocean depth; and
Possible biological transfer and interactions of radionuclides.

Technical program management is provided by Sandia Laboratories, in conjunction with Woods Hole Oceanographic Institution, Scripps Institution of Oceanography, and the University of Rhode Island. Other participating organizations include Lamont-Doherty Geological Observatory, University of Washington, University of New Mexico, Harvard University, and Princeton University.

Within the near-term planning period of 1978 to 1983, the major objectives are to acquire oceanographic, biological, and sedimentologic data to establish that the deep sediments in isolated regions of the ocean floor are an effective barrier to the dispersal of radionuclides from suitably emplaced waste. Provided that feasibility of sediment as a barrier is established, appropriate data would be accumulated to allow further consideration of the seabed emplacement option.

During 1974, the first year of this program, general oceanic areas were identified for consideration for seabed emplacement, and initial investigations were undertaken. It was concluded that the water column or depth, i.e., the mass of water extending from the seabed to the surface in the mid-gyre regions (about 15,000 to 20,000 feet deep), should not be considered as a primary barrier or as the medium for the disposal of the high-level wastes.

During the second year, research emphasis shifted from the water column to the mid-tectonic plate, mid-ocean gyre sediment and natural processes in these sediments. Based on the results, a more comprehensive investigation began to assess the ocean bottom sediments as a disposal medium and primary barrier to the migration of radioactive waste.

In October 1976, a 4½-inch diameter, 80 foot-long core sample of the sediments was acquired from a study area about 600 miles north of Hawaii in the middle of the central North Pacific. This core provided samples of a major section of the sediment column for geotechnical, chemical, and microbiological laboratory analyses and a first-hand look at the geologic history of the region, as well as an opportunity to correlate remotely acquired geophysical data with the realities of the geologic structure. Analysis of these date indicate that the sediments have been stable for about 70 million years. No surprises or anomalies have been found which would preclude the use of the sediments as a confinement medium. Initial laboratory work with samples of the deep ocean red clays and selected radioactive chemicals has shown the clays to have very favorable retention properties.

Activities of the program currently underway include: (1) development of a number of analytical models as part of the overall systems analysis effort; (2) evaluation of the sorption properties of the sediments; (3) assessment of the thermal problems associated with the heat produced by the waste and the impact of this heat upon the physical and chemical properties of the sediments; (4) continuation of the characterization and environmental predictability studies of the sediments; (5) development of analytical and laboratory capabilities to investigate waste canister emplacement techniques; (6) corrosion studies to evaluate potential canister materials; (7) biological investigations in support of assessment studies addressing accident scenarios and environmental impact; and (8) development of an international program of scientific investigations and information exchange. Figure 1 shows the project's historical funding level and request for fiscal year 1979.

Other nations are moving rapidly ahead with nuclear technology but are not as fortunate as the U.S. in having available relatively large, sparsely populated, land masses containing geological formations potentially suitable for disposal of high-level waste products of that technology. Since seabed emplacement may eventually be a technical viable alternative to land masses for ultimate waste disposal and

since there are many international implications of such a system, a basis for international cooperation and interchange of information and data is being developed with other interested countries.

A seabed working group has been established as an informal subgroup of the OECD/NEA, Radioactive Waste Management Committee—Canada, Japan, France, United Kingdom, and the United States are currently participating. The purposes of this group are to: provide a forum for discussions, assessment of progress, and planning of future R&D efforts; encourage and coordinate cooperative research vessel cruises and experiments; share facilities and test equipment; and maintain cognizance of international policy issues. Specific topical areas of cooperation include physical oceanography, waste form and canister development, biological characterization, sediment and rock assessment, site characterizations, and systems analysis.

In conclusion, I would reiterate that ocean bed emplacement is still in the evaluation stage. Some of the scientific highlights to date include the identification of geologically stable, remote areas which have no apparent present or future biological or mineral resources. Other ocean regions, such as fracture zones, trenches, or great river deltas, have been suggested for assessment because they offer hope for fast burial by natural process. These areas have initially been down-graded, because they are tectonically or otherwise unstable, and sedimentation is not predictable. The "mid-plate, mid-gyre" regions are large, and initial results to date show the sediments are uniform and predictable over large areas.

We do know there are potential advantages and disadvantages associated with ocean bed emplacement. Some of the potential advantages include: the remoteness from human activities, the high confinement capability of ocean sediments, the high heat sink capability of the ocean, the large area available, and the possible international solution for long-term waste management. Some of the potential disadvantages of the concept are: the present day difficulty in monitoring and retrievability; the added port, ship and ocean transport requirements; the concept acceptability, contrary to trends of existing international laws and agreements; and the need for demonstrations of emplacement techniques.

If you have any questions, my staff and I are available to provide answers. Dr. D. R. Anderson, Seabed Project Manager, from Sandia Laboratories, and Dr. David Deese, Harvard University, have prepared testimony on additional technical details of the program and trends in International laws and agreements using the ocean and seabed as disposal media.

Thank you.

ASSESSMENT OF OCEAN BED EMPLACEMENT

[Thousands of fiscal year dollars]

1974	1975	1976	1977	1978	1979
[1] $1,500	$260	$897	$1,300	$3,050	$3,100

[1] Funds provided by the Division of Military Application and the Office of Naval Research.

NOTE.—From fiscal year 1975 through fiscal year 1979 the total funding has been by DOE.

STATEMENT OF JOHN M. DEUTCH, DIRECTOR OF ENERGY RESEARCH, DEPARTMENT OF ENERGY

Dr. DEUTCH. I am John Deutch, Mr. Chairman.

With your permission, let me report on two facts.

First of all, Jim Liverman seems to be stuck in traffic and is on his way here.

I will lead off the Department of Energy testimony, to be followed by Mr. Liverman, assuming that he makes it here in time. He is stuck in traffic, so with your permission, sir——

Mr. BREAUX. I understand. The same thing happened to me this morning.

We welcome you.

Dr. DEUTCH. Thank you, Mr. Chairman.

Mr. Chairman, with your permission, I would like to submit my prepared remarks for the record and just speak for a few moments about some of the broad aspects of the administration's efforts in radioactive waste management policy.

I believe that the committee in its letter of invitation to us requested certain discussion of the steps the administration is taking in radioactive waste management. If that is agreeable to you, sir, I will proceed.

Mr. BREAUX. Without objection, it is made part of the testimony.

Dr. DEUTCH. Thank you, sir.

Both the Department of Energy, the administration, and other concerned Government agencies place the highest importance on improving our record and our performance in radioactive waste management problems.

There are a variety of radioactive wastes. I will try here today to cover the status and issues bearing on each type, ranging from uranium mill tailings, through low-level wastes, transuranic wastes, high-level defense wastes, and commercial spent fuel.

In addition, we recognize that the problem of radioactive waste management has an important international dimension. It involves the concerns of other nations, as well as our own. We have a stake not only in responsible and effective waste management in the United States, but for other nations of the world as well.

The national energy plan called for a major administration review of our radioactive waste management programs. Late last year, the Secretary of Energy asked me to lead an intradepartmental review of the radioactive waste management programs of the department. That review was intended to be a diagnosis, as opposed to a cure, for some of the problems that confront us.

In March of this year the Department released the results of the report, Review of Waste Management, conducted by the Department of Energy under my chairmanship.

On the same day, President Carter announced the formation of an interagency task force, where representatives of essentially all interested Government agencies, ranging from the Department of State to NOAA and EPA, were to participate in establishing policy, programs, and mission assignments in the area of radioactive waste management.

That interagency task force is due to report its findings on October 1, 1978. We anticipate that this will be a first step toward a cure of some of the problems that face us.

Now, with that background about what the administration is doing, I would like to say a few remarks about the salient findings of the Department of Energy task force review of waste management programs.

While these findings do not commit the Department or the administration to any particular set of programs or policies, the findings are serving as the basis of the inquiry underway by the interagency task force.

First and most important, perhaps, we found that the majority of independent technical experts have concluded that high-level wastes or spent fuel can be safely disposed in geological media, but that validation of specific technical choices bearing on geological

33-546 O - 78 - 14

medium, specific site engineering and site characteristics, is still required, and is an important element of the licensing process.

The second finding is that reprocessing is not required for the safe disposal of commercial spent fuel.

The Department also believes that it is important to give consideration to an early demonstration of geological disposal of a limited number of spent fuel assemblies in a waste isolation pilot project scheduled for New Mexico or some similar facility.

We pointed to the need in the task force report for the spent fuel policy announced by the President in October 1977, to be implemented and integrated with waste management policy.

We also have as a major finding the need for a way from reactor storage, beginning in 1983, for storage of spent fuel assemblies before disposal.

The initial schedule for the availability of the first geological commercial waste repository was 1985. The task force found that the 1985 date could not be met, and that the earliest date by which a geological repository could be licensed and in operation would be in 1988.

The task force strongly believes that the NEPA process—the National Environmental Policy Act—is a vital part of our waste management programs and that the efforts of the Department in that regard had to be strengthened.

These are some of the salient findings of the task force report.

I might add that the major thrust of our departmental waste management programs for high-level waste or commercial spent fuel is directed toward geological disposal, disposal in deep underground geology on land.

Presently, a bit more than half of our efforts are directed toward salt formations, with that geological medium having received more attention than any other in the program.

The remaining half of our program deals with exploration of other geological media, in particular the salt, hard rock, shale, and a variety of other rock forms.

In addition to these major efforts on geological disposal, which have over the years received the greatest amount of support from independent technical observers, the Department is also attending to and proceeding with exploration of nongeological alternatives for the disposal of high-level wastes or spent fuel.

Let me mention just a few of them.

In addition to ocean disposal, we have the possibility—which has been raised by some—of space disposal, and the Department is at least undertaking some paper studies in this regard.

There are, in addition, other proposals made for disposition of wastes. One of them is to try and build a special reactor which will transmute the longest lived elements into lower lifetime radioactive elements.

We believe that the R. & D. programs that support our basic thrusts toward geological exploration of wastes must be maintained. On the other hand, it is clear that on the basis of the available knowledge we have today, geological disposal on land will remain our first and primary mainline effort. We are also concerned with pursuing R. & D. on these nongeological alternatives I have mentioned to you.

Thank you very much, Mr. Chairman.

Mr. BREAUX. Thank you very much. Thank you for summarizing your testimony, also. Do we have a waste management policy for the disposal of nuclear wastes today?

Dr. DEUTCH. Yes, sir, I believe we do have a policy. We have a policy that perhaps is not either as credible or articulated as one would like to have in this country, but we do have a policy.

The major effort of the interagency waste management task force that I mentioned to you in my remarks is intended to establish at the highest levels of the executive branch a clear policy with credible implementing programs.

Mr. BREAUX. The reason I ask is because I noticed on page 8 of your testimony that you mentioned a meeting that President Carter had at the National Governor's Conference, at which he spoke of the need to produce such a waste management policy by the end of this year.

You point out that you hope to meet this schedule. Actually, I guess we are in the process of forming a policy. We don't really have one that you could say is our policy as far as the disposal of high-level nuclear waste is concerned. The policy is to try to reach a policy determination, I would imagine.

Dr. DEUTCH. Sir, I think there is not much of a difference in the way you express it and the way I would express it. I would say we do have implicitly a policy. We certainly have programs. What I think we would both agree is they may not have the credibility or the pace we would like to see them have.

Mr. BREAUX. I get the impression that there seems to be a feeling that the idea of disposing of nuclear wastes on land-based sites is a preferable to the idea of disposing of them in the oceans and seabeds.

Dr. DEUTCH. I think that is correct, Mr. Chairman. The weight of technical opinion has favored land-based disposal for some period of time. That does not mean that efforts should not be underway to evaluate and to continue to assess the seabed disposal possibilities.

Were Mr. Liverman here, he would be able to address in detail the steps we are taking in that regard.

Mr. BREAUX. Looking further into the budget, I notice in the appendix of your testimony that DOE's budget for high-level waste alternative research is less than 5 percent of the Department of Energy's research budget to promote nuclear technology.

It also indicates that a seabed disposal research comprised only 3.2 percent of DOE's total budget for high-level waste disposal research in 1977, and will drop down further to only 2.3 percent in fiscal year 1979.

It seems as if we have kind of put the idea of seabed disposal on the back burner, so to speak. Is that correct? If seabed disposal it is something you have not determined as being a good alternative, that is one thing.

Dr. DEUTCH. I would say we have not concluded it is not a good alternative. I would say the program reflects a certain amount of confidence that geological land-based disposal will be proven to be an adequate method of disposal.

That does not mean that over time other alternatives, such as the ones mentioned here, may not prove to also be adequate and perhaps in some respects more attractive.

May I just go back for a moment. You said that it was less than what percent of our nuclear budget?

Mr. BREAUX. The figures in the appendix of your testimony indicate that DOE's budget for high-level waste alternative research is less than 5 percent of your research budget to promote nuclear technology.

Dr. DEUTCH. The alternatives to geological disposal.

Mr. BREAUX. Right.

Dr. DEUTCH. I would point out that the total waste disposal program is $132 million, which is a significant fraction of our whole nuclear budget, including breeder technology, and I would anticipate that fraction would grow in the future substantially.

Mr. BREAUX. There are no complaints about that. The question is, are we spending enough to look at the alternative of seabed research. It seems there is an awfully small amount being earmarked for research for the alternative of seabed disposal in comparison with other alternatives.

What are other countries that do not have suitable geological formations on land doing as far as disposal of the high-level wastes.

Dr. DEUTCH. I believe that many other countries find themselves in as concerned a position with respect to disposal of nuclear wastes as we do.

To my knowledge, the only nation which has given greater weight to seabed disposal than we have is Japan.

Sweden, United Kingdom, Soviet Union, Germany and Iran, those nations who have or are contemplating disposal at the present time, favor land-based disposal. I believe it is also the view of certain international bodies concerned with nuclear energy, like the Nuclear Energy Agency in Paris. So, I would guess that Japan is the principal country which places greater weight on potential sea-based disposal than we do.

Mr. BREAUX. Suppose after the first phase of your consideration of the various alternatives that you decide that seabed disposal is not the way to go, and a decision is made by DOE to cease research on the idea of disposing of nuclear wastes in the seabeds?

What effect will such a decision have on other countries? I guess they would proceed to continue their research in this area, without the United States.

Dr. DEUTCH. Let me say two things in response to that comment, Mr. Chairman.

In the first place, if other countries are going ahead with sea-based disposal, and this Nation were to make a judgment that such disposal was less attractive than land-based, I would think that on those grounds alone the United States would want to maintain some R. & D. effort so that we could be smart about what other people were doing, and what the potential problems were.

So, even if the circumstances that you mention were to take place, I would still think that the United States would want to preserve research and development in the area, in order to keep current on what options other nations were pursuing.

If we really believed, incidentally, that seabed disposal was unsatisfactory relative to land-based disposal, and I don't think that the information or the knowledge that we have yet would affirmatively support such a position, then it would be part of our diplomatic efforts to try and encourage other countries to adopt those methods of disposal that we believed were safest and best for mankind.

Mr. BREAUX. This issue has broad international implications, particularly considering the possible impact on the oceans of the world.

If we decide, like we very well might, that seabed disposal is not the best way to go, how do we communicate that policy to other countries of the world, such as Japan, that might be pushing forward with all haste to use the seabeds as a disposal medium?

Are we interacting with them at the present time?

Dr. DEUTCH. Mr. Chairman, I want to tell you that there is enormous mutual recognition by all nations that have nuclear power, or are contemplating the use of commercial nuclear power, about the importance of these questions of waste management.

So, the communication, both at a technical level and at the policy level, between countries is very good on this subject. It is recognized as being an important problem of mutual concern.

Mr. BREAUX. Is it coordinated through DOE, through the State Department, or do you have direct communication?

Dr. DEUTCH. We have communication at all levels, ranging from bilateral arrangements with the Department to informal contacts, which are perhaps the most valuable, between the technical people working in our laboratories in this Nation, and technical people from other nations.

There are a variety of international agencies which are concerned with these issues. I would say that this is one subject in nuclear energy for which we have developed a spirit of working together.

There are, of course, some aspects of waste management that are more controversial than others. But generally speaking, I would say that the dialog between the nations is good, from the technical level, all the way to the policy level.

Mr. BREAUX. One of the reasons why I feel we have made a mistake in the President's decision on the fast breeder nuclear reactor is because of the fact that other countries are proceeding forward with their development plans.

If our theory is not to proceed in the hopes that such action will encourage other countries to follow suit, it is just not working.

Other countries are developing the reactor. I visited the one in France, and visited an underground salt dome disposal site in Germany. They are going along with or without us.

So, I would certainly encourage international interaction, particularly in regard to ocean disposal.

Doctor, on page 6 of your testimony you state that "The normal slow diffusion of waste elements through the highly impermeable deep sea clay is reduced more than 1,000-fold by the suspension properties of the clay."

My question is, that sounds as if there is a very safe type of soil underneath those seabeds. How does it compare with the stability of the salt domes?

Dr. DEUTCH. Mr. Chairman, could you indicate once again, sir, where you are reading from?

Mr. BREAUX. I think it is in Dr. Anderson's testimony. I am sorry. He said, on page 6—he was talking about the properties of the clay in the deep seabed, apparently that it is very stable.

I was wondering how you compare the stability of underground salt domes with the stability of the clay underneath the seabed.

Dr. DEUTCH. I am not an expert in this question. We do have access to experts, but I am not an expert. My understanding is that the partial available geological information we have today does suggest that the deep ocean sediments are more stable than the prominent land formations, but I would have to get you a more informed answer for you to rely upon.

Mr. BREAUX. OK. You say it seems that the deep seabed subsurface soil is very stable. In addition it would seem to be a safe place in the sense of being protected from what you might call guerrilla activities—that is, as far as invading or sabatoging a disposal site—if you have it underneath 2,000 feet of water, or even deeper than that.

What considerations have led the Department of Energy to approach a finding that the onland disposal sites are more preferable than the deep seabed disposal sites?

I know that if you ask people who happen to be living near an onground disposal site whether they prefer seabed disposal to onland near their particular place of residence, there is no question what kind of answer you are going to get.

Dr. DEUTCH. There is absolutely no question, Mr. Chairman. I think there are two reasons that have led us toward the land.

The first one is that the study of the land formations is certainly easier, the seismic characteristics, the geology, the chemical characteristics, the whole question of experimenting on any kind of salt, granite, basalt, any kind of land geological formation is made somewhat easier if it is not under 2,000 feet of water.

The second thing is that material can be retrieved for an initial period of operation of a repository better on land than it could be done under 2,000 feet of water.

These are two of the prominent reasons, although not the exclusive reasons, for having encouraged people to look at the land-based option first.

Mr. BREAUX. On the question of retrievability—apparently President Carter intends that a further reprocessing of the spent nuclear fuel will be deferred. Does that mean the usable uranium and plutonium in the spent fuel rods will eventually be placed in permanent disposal?

Dr. DEUTCH. The proposal that has been made by our task force, and by me, is that at least initially a small limited number of spent fuel assemblies would be disposed of with a retrievable option in salt at Carlsbad, N. Mex.

That is the proposal that I have forwarded to the Secretary. So, it would be retrievable. The spent fuel assemblies, before they are reprocessed, would be disposed of in salt.

Let me make two remarks about that. First, the number of spent fuel assemblies that are under issue for the waste isolation pilot project in Carlsbad, N. Mex. is 1,000 spent fuel assemblies.

It is a very limited number. The alleged plutonium value that those spent fuel assemblies might have is really quantitatively insignificant compared to the quantities of spent fuel that is going to be generated over time.

Second, let me say that the reason for retrievability in that case is based not on the alleged commercial value of the spent fuel but rather on the wish to be able to come back and retrieve the spent fuel assemblies, and remove them from the depository, if some unanticipated event should take place.

Third, let me say that when we have a a major commercial waste repository in operation, it would be designed to accept either spent fuel or high-level vitrified waste, the product of a commercial reprocessing plant, depending upon what economic circumstances prevailed at that time.

Mr. BREAUX. Apparently in the evaluation of the two alternatives a great deal of the consideration has been given to the retrievability of the spent fuel rods.

Dr. DEUTCH. Yes, sir.

Mr. BREAUX. How does that mesh with President Carter's policy decision to defer the whole question of retrievability?

Dr. DEUTCH. For these thousand assemblies?

Mr. BREAUX. Yes.

Dr. DEUTCH. The motivation for that retrievability option is the recognition that if something is to go wrong with that repository during its first 10 or 15 years of operation, that one would have a way of going back and getting the canisters out quickly.

Now, let me clarify what I mean by something going wrong. It is not based on any doubts about the licensing of the facility or of geological stability.

The fact of the matter is that these repositories, their elevators, their canisters, are built by human beings, and until you have a few years experience in opertion with the actual mechanical details of the repository, one cannot be confident that things are working according to plan.

So, it is very important for the first few years of operation for any technical plant to make sure you allow for a shakedown period during which corrections can be made.

So, that is the purpose of the retrievability option there.

Mr. BREAUX. How long before a final decision on the alternative of seabed disposal is reached?

Dr. DEUTCH. Mr. Chairman, I don't believe we have set any date for such a determination. I believe it will be a continuing subject of study as long as we face radioactive waste management needs.

At any stage of the game, our knowledge might suggest to us either that the land-based geology is becoming less attractive for one reason or another or sea-based disposal is becoming more attractive for one reason or another, and we would shift our program accordingly.

I don't think we have any specific milestone which would lead us to accept or exclude seabed disposal at this time.

Mr. BREAUX. According to table 3, in the appendix of your testimony, the levels of spent fuel in this country is projected to increase by almost 30 times by the end of this century, and that in

other countries these quantities are expected to increase by 24.1 times by the year 2000.

So, we rapidly are approaching a date sometime in the future when we are going to be forced to make a final decision on what is the best disposal method.

I guess what I am trying to find out is do we have a time frame that we are working within that by the year 1990, or what have you, we will have a final decision made?

Dr. DEUTCH. We anticipate, sir, having a commercial land-based geological repository available sometime in the late 1980's or early 1990's.

All of our programs are directed towards the availability of the first commercial repository by the late 1980's, early 1990's, which would be available to accept something like 60,000 metric tons equivalent of the spent fuel assemblies which are listed on table 3.

Mr. BREAUX. That first commercial site would be an underground salt dome?

Dr. DEUTCH. Not necessarily, sir. Likely, but not necessarily.

Mr. BREAUX. All indications I guess point to a land disposal site.

Dr. DEUTCH. That is certainly right.

Mr. BREAUX. In other words, if you went to a sea disposal site, you would have to make rather major shifts in direction, as far as still complying with your timetable?

Dr. DEUTCH. There would be enormous implications in changes for direction. I don't see that happening for the first repository.

Mr. BREAUX. Okay. Suppose we reach the conclusion that seabed disposal is not the best alternative.

Do we have any assurances that other foreign countries that are not endowed with the geological formations that we have will not proceed forward with seabed disposal?

Dr. DEUTCH. No, sir, we do not. Let me once again say that we do have very good communications with these other nations. We also have underway now a 2-year study on the international fuel cycle.

It is called the international fuel cycle evaluation which we are undertaking with 30 or 40 other countries on various aspects of the nuclear fuel cycle.

One of the six or eight working groups that are in that study has to do with nuclear waste disposal.

There is another one on spent fuel storage. That particular international study group, which has formal representation at very high policy levels from all participating nations, does in fact look at all the alternatives, and we are very closely aware of and in close communication with the other countries about their future plans and intentions.

Mr. BREAUX. Is there any talk about either the United States or other countries with suitable geological formations sharing our storage facilities with other foreign nations?

Dr. DEUTCH. Let me make a distinction between storage and disposal. As you know, the President's spent fuel policy announced in October 1977 put forward the possibility that we would accept foreign spent fuel for storage in the U.S. under limited circumstances when it served our nonproliferation objectives.

Mr. BREAUX. Is that high-level waste?

Dr. DEUTCH. Yes, sir, spent fuel.

Mr. BREAUX. What about the research and development into low-level wastes? We have pretty much been talking about the high-level waste disposal. What is DOE doing with the low-level waste?

Dr. DEUTCH. There are six commercial low-level burial grounds in existence in this country. I am not sure that our activities there are so much a matter of research and development as they are a matter of proper management.

Some of these low-level commercial burial grounds do have management problems. The Department of Energy task force report recommended that the Federal Government take over responsibility for those low-level burial grounds.

It is quite clear that some States would regard that as advantageous because these low-level burial grounds are usually licensed by State agreements, between the NRC and the State in question.

It is quite clear that some States would welcome the Federal Government taking a larger effort in managing, controlling, and regulating those low-level burial grounds.

But there are other States which believe they are functioning quite properly and accordingly would resist having the Federal Government take over the responsibilities for low-level wastes.

So, at the present time I would argue that our major problems with low-level waste have to do with management, rather than research and development.

Mr. BREAUX. Dr. Deutch, what about the research into the dumping of low-level wastes and the placing of canisters in the deep seabeds? Are we looking at that with regards to low-level waste?

Dr. DEUTCH. I am really not informed, Mr. Chairman. In the absence of Mr. Liverman I cannot answer that authoritatively. I would be happy to get you an answer for the record. Is that legally permissible now?

Mr. BREAUX. It would be regulated under the Ocean Dumping Act.

Dr. DEUTCH. I would have to come back to you with an answer on that.

Mr. BREAUX. The Ocean Dumping Act strictly prohibits the dumping of high-level wastes but not low-level wastes.

Dr. DEUTCH. I would not see there is any great reason to favor ocean dumping of low-level wastes, or to worry about it one way or the other.

Mr. BREAUX. Dr. Deutch, we appreciate your testimony. I find it very interesting. I am very interested in the progress and continued research by DOE into the seabed issue.

I think it is vital that we make as much of our research available that we can to other countries that are considering the seabed dumping issue. I would hate for us to make a definitive finding that it is not in the national interest, and then have other countries come to different conclusions and not know the environmental consequences.

Thank you very much. Please tell Dr. Liverman his statement will appear in the record. Perhaps we will have some questions we would like to get back to him with.

Dr. DEUTCH. Thank you very much, Mr. Chairman. I know were he here, he would want me to extend his apologies because he

certainly had intended to be here. Traffic must have really held him up.

If there are any questions you would like answered for the record, we will get it right to him.

Mr. BREAUX. Very well. Thank you very much.

The committee would like to welcome Mr. Sheldon Meyers, Director of the Division of Fuel Cycle and Material Safety for the Nuclear Regulatory Commission

Mr. Meyers, your testimony will appear in the record. You may proceed as you wish.

STATEMENT OF SHELDON MEYERS, DIRECTOR, DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, U.S. NUCLEAR REGULATORY COMMISSION

[The statement follows:]

STATEMENT OF SHELDON MEYERS, DIRECTOR, DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, U.S. NUCLEAR REGULATORY COMMISSION

Mr. Chairman, I am pleased to be here today to discuss with the Subcommittee the disposal of radioactive materials into or under the sea. Because of past U.S. policies to restrict such activity, this is an area of nuclear waste disposal with which the NRC has had little involvement since its formation in 1975. However, I can provide you with an overview of the NRC regulatory authority, the history of AEC policies which lead to those of the NRC, and a summary of the few ongoing NRC activities with direct bearing on the subject of disposal of radioactive materials at sea.

NRC AUTHORITY

NRC authority to regulate possession and disposal of radioactive waste is derived from three acts: The Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and the National Environmental Policy Act of 1969. The Act of 1954 gave the Atomic Energy Commission (AEC) authority to license and regulate possession, use and disposal by persons [1] of source, byproduct, and special nuclear material. The AEC and its prime contractors were exempt from licensing control.

Title II of the Energy Reorganization Act of 1974 transferred the regulatory authority given in the Atomic Energy Act to the Nuclear Regulatory Commission. ERDA (now part of DOE) and its prime contractors remained exempt from NRC regulatory authority except as provided in Section 202 of the 1974 Act. Section 202 of the 1974 Act gives NRC specific authority to license certain DOE waste managment activities for storage and disposal of high-level radioactive wastes.[2]

Section 202(3) provides for licensing of "Facilities used primarily for the receipt or storage of high-level radioactive wastes resulting from licensed activities." Thus the NRC must license a DOE storage or disposal facility which is used primarily to receive high-level radioactive waste from industrial producers of that waste (i.e., reactors, reprocessing plants, etc.).

Section 202(4) provides for licensing of "Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Administration whch are not used for, or are part of, research and development activities." Thus with the exception of reserch and development activities, NRC must license DOE operations for the long-term storage (or disposal) of high-level wastes generated by DOE.

Under Section 274 of the 1954 Act NRC may relinquish to the states certain regulatory authority over byproduct, source, and special nuclear materials in quantities not sufficient to form a critical mass. The discontinuance of NRC authority is accomplished by entering into formal agreements with the states. there are currently 25 such Agreement States. Under the agreement and pursuant to 10 CFR Part

---

[1] Persons are any individuals, firms, or agencies (with exception of NRC and DOE).

[2] High-level liquid waste has a specific meaning within current NRC regulations. It is defined in Title 10, Code of Federal Regulations, Part 50, Appendix F, as follows: "High-level liquid radioactive wastes mean those aquaeous wastes resulting from the operation of the first cycle solvent extraction system, or equivalent * * * in a facility for reprocessing radiated reactor fuels."

150, these Agreement States license commercial burial sites for low-level waste including low-level transuranic waste.[3] Regulatory authority over sea disposal of these wastes is retained in the NRC.

NRC regulatory authority over radioactive waste is defined by statutes which specify who and what is to be regulated. Insofar as DOE activities are concerned, it is not based primarily on the degree of hazard posed by the waste, the lifetime of the waste, or the waste form.

HISTORY OF U.S. AND NRC POLICY REGARDING DISPOSAL OF RADIOACTIVE MATERIALS AT SEA

I am submitting, for the record, a brief history of U.S. waste management policy. In relative terms, few resources and little effort have gone into development of regulations or research regarding disposal of radioactive materials at sea in recent years.

During the early decades of the U.S. nuclear development, disposal at sea of low-level radioactive wastes was permitted under license by the USAEC. Between 1946 and 1970 the former U.S. AEC licensed the dumping of more than 86,000 containers of low-level radioactive wastes into the Atlantic and Pacific Oceans. In June 1960 the Commission discontinued issuance of new licenses for sea disposal. Existing licenses authorizing sea disposal were permitted to remain in effect and licensees were permitted to continue waste disposal operations at sea. Early in 1960 the AEC also authorized licensees to use, on an interim basis, AEC land burial sites in Idaho Falls, Idaho and Oak Ridge, Tennessee. In September 1962 the first commercial land burial facility, located in Nevada, was licensed and became available for use by private organizations. Shortly thereafter, the AEC withdrew the use of the land burial sites at National Laboratories by licensees. Since that time, licensed commercial land burial facilities have been established in the States of Kentucky, New York, Washington, Illinois, and South Carolina.

There has been very little interest in sea disposal in the last few years due primarily to the availability of land burial sites. At the time the AEC stopped issuing new licenses became effective, there were seven commercial firms licensed by the AEC to collect radioactive waste from other persons and to dispose of the waste at sea. In addition, there were eight organizations licensed by the AEC to dispose of waste generated in their own laboratories. Since 1965, less than 200 curies of radioactive waste have been disposed of at sea. The last disposal at sea under an AEC license was made in June 1970. At this time, no NRC licenses exist which allow ocean dumping of radioactive wastes.

In December 1971 the USAEC published an amendment to its regulations (10 CFR Part 20) directed at ocean dumping of radioactive wastes. The exact words of 10 CFR Part 20.302(c) are:

"The Commission will not approve any application for a license for disposal of licensed material at sea unless the applicant shows that sea disposal offers less harm to man or the environment than other practical alternative methods of disposal."

The adoption of this rule did not mean that the Commission considered sea disposal of radioactive waste an unsafe practice. Rather, it imposes on licensee operations a policy which already existed for the AEC's own operations. No licenses have been granted for sea disposal under these provisions of regulations. Further the rule is consistent with the CEQ's recommendations of October 1970 to establish a "comprehensive national policy on ocean dumping to * * * strictly limit ocean disposal of any materials harmful to the marine environment."

Thus over a period of approximately a decade, dumping of radioactive waste at sea has been phased out as a waste disposal system, although sea disposal is not precluded by regulation. This shift in disposal methods was driven by (1) international objection to sea disposal on environmental grounds, (2) a change of AEC disposal philosophy to contain wastes (as in land burial) rather than disperse wastes (as in sea dumping), and (3) because land burial was more economically attractive to the commercial industry.

In 1972 the AEC/CEQ philosophy was further codified by the Congress in the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA). Under the provisions of that act, dumping of nuclear wastes in the ocean, where such acts are subject to U.S. jurisdiction, requires a permit issued by EPA. Permits may only be issued in the light of criteria defined by statute. MPRSA gives the NRC no formal

[3] Transuranic nuclides are nuclides with atomic numbers above that of uranium (i.e., 92). These nuclides are produced in the fuel elements during operation of a nuclear reactor. Most are long-lived and highly radiotoxic. For example, plutonium-239, whch has a half-life of 24,000 years is a transuranic nuclide.

regulatory role except to the extent that EPA may be required to consult under the following clauses:

"In establishing or revising such criteria, the Administrator shall consult with Federal, State, and local officials, and interested members of the general public, as may appear appropriate to the Administrator.

"In reviewing applications for permits, the Administrator shall make such provision for consultation with interested Federal and State agencies as he deems useful or necessary."[4]

Ocean dumping activities regulated under the Act[5] are not subject to NRC regulation, in view of the fact that "licenses * * * other than those issued (by EPA) * * * shall be void and no legal effect, to the extent that they purport to authorize any activity regulated by (MPRSA)." It appears that NRC would nonetheless become involved because no one would be authorized to receive radioactive material to dump at sea except under an NRC license. That is, while NRC would not license the act of dumping, the Atomic Energy Act of 1954 requires all persons to have a license for the possession and use of such material. Although it appears that seabed disposal would come under the provisions of MPRSA, it is a concept not envisaged in 1972.

Finally, the restrictions of MPRSA apply only to "dumping," which by definition excludes "a disposition of any effluent from any outfall structure to the extent that such disposition is regulated under * * * the provisions of the Atomic Energy Act of 1954." That is, small normal effluents into the ocean are licensed by the NRC and kept as low as reasonbly achievable.

HISTORY OF INTERNATIONAL ACTIVITIES

Although no ocean disposal of low-level radioactive wastes is allowed by the U.S., several European nations dispose of low-level radwastes in the Atlantic Ocean within the framework of the Nuclear Energy Agency (NEA) of the Organizaton for Economic Co-Operation and Development (OECD). The NEA requires prior notification and consultation between NEA member nations as well as supervision of the disposal operation by representatives nominated by the NEA.

Since 1967 the NEA has supervised the dumping of some 290,000 curies of solidified low-level radioactive wastes (packaged in 55 gallon drums) from eight European countries in a deep dump site near the Iberian Abyssal Plain in the Northeast Atlantic.

An OECD press release of July 1977 gives a concise picture of the NEA/OECD program. I have a copy which I can submit for the record.

An international agreement on ocean dumping was reached in December 1972, resulting in the London Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter. The Convention has been ratified by thirty-five countries. It prohibits the dumping of high-level wastes or other high-level radioactive matter defined by the IAEA as unsuitable for dumping at sea and requires a special permit for the dumping of other than high-level radioactive wastes.

The IAEA recently revised its Provisional Definition and Recommendations Concerning Radioactive Wastes and Other Radioactive Matter and will submit the revision to the Third Consultative Meeting of Contracting Parties in September 1978. The recommended definition is based on immediate release and dispersion of the material.[6] The U.S. is reviewing analyses used to derive the definition. The results may be unnecessarily conservative in that they take no credit for containers. Such an approach means that improvements in containers are unlikely to be applied in practice. The Department of State and EPA have the lead for U.S. involement in this activity. NRC participates in interagency meetings and provides technical input.

NRC PROGRAMS

In April of 1975 NRC created a functional unit in the Division of Fuel Cycle and Material Safety (Office of Nuclear Materials Safety and Safeguards) with the title and mission of Waste Management. This program has grown from essentially no resources at the time of its formation to nearly forty staff and five million dollars of

---

[4] EPA's regulations do not provide, however, for consultation with NRC. See 40 CFR § 222.3.

[5] Such activities presumably include disposal of high-level radioactive waste (including spent fuel), even though the Act expressly prohibits issuance of permits in relation to such material.

[6] The disposal philosphy being developed within the agencies in the U.S. (mainly the EPA and NRC) is to contain rather than disperse the wastes. Early U.S. dumping operations were based on the dispersal philosophy; the philosophy still followed by many European countries remains one of dilution and dispersion. In the current U.S. approach, the ocean becomes merely a final containment barrier between the wastes and mankind in the event that the containment fails in some of the containers.

contractural support (fiscal year 1979 Presidential Budget). It is aimed at developing and implementing a regulatory program governing the storage and disposal of nuclear wastes. Because of existing policies, only a small porton of that effort has direct bearing on disposal into the sea (or the seabed).

The NRC program for low-level waste is described in NUREG-0240, "The Nuclear Regulatory Commission Low-Level Radioactive Waste Management Program" which I can submit for the record along with NUREG-0217 which describes in detail the history of disposal of low-level waste by shallow land burial and discusses future regulatory options.

One of the elements of the NRC low-level waste program which was just recently begun is a study of alternatives to shallow-land burial for the disposal of low-level radioactive wastes. That study will investigate ocean dumping with respect to environmental effects, technical aspects, social and political implications, and economics. If ocean dumping is found to have several significant advantages over shallow land burial and other alternatives, it is expected that a study may be funded to develop criteria for waste performance and site suitability and to identify potential environmental impacts.

Because there will always be a limited number of alternatives for the disposal of wastes (deep-geologic, shallow land burial, and ocean dumping are the only ones now practiced or under serious consideration) we feel that an important part of our program is the development of a classification system for radioactive wastes which will allow us to decide where each waste may be sent for disposal. The first phase of our work is nearing completion, and reports are almost ready which will lay out in some detail the principles of waste classification and the methodology to implement those principles.

The effort thus far has been directed mainly at deep geological disposal and shallow land burial. In the second phase of the program, we are considering applying the principles to ocean dumping to see what wastes in what sort of packages might be consistent with the principles we have derived. Classification for ocean disposal would need to consider the ground disposal alternative and vice versa. For example the determination of whether a given transuranic waste should go to deep geologic disposal, shallow land burial or be dumped in the ocean would be based on the consideration of potential exposures to individuals and populations, dose commitments and economic impacts. Note that the definitions could vary from country to country since the alternatives and costs vary from country to country.

In the area of seabed disposal (actual emplacement of wastes within the deep-sea sediments) the NRC staff has done little more than follow closely the progress of the DOE program and the international program under the NEA. In that regard, we can say that seabed disposal of concentrated (high-level) radioactive wastes has some conceptual advantages and maybe even some safety advantages. However, the ammassed knowledge regarding the option is not sufficient to draw definitive conclusions. It is certainly a disposal concept which deserves continued study and development—perhaps for the second or third generation of disposal sites.

From a regulatory viewpoint, seabed disposal may offer one singular advantage. The seabed geologic regime is one of the simplest on the planet. There is vast horizontal uniformity, there are no hydraulic gradients to drive nuclides out of the sediments, the sediments themselves are uniform and highly retentive, and the known geologic processes are all very slow and depositional rather than erosional. Apparently nothing has changed on portions of the seafloor for fifty million years. The NRC staff is considering the development of a risk assessment capability for seabed disposal. This could bring important contributions to our understanding of the more complex land-based geologies, and we could provide better information to the DOE program regarding which geologic paramenters are important in seabed disposal.

THE NUCLEAR NON-PROLIFERATION ACT OF 1978

You asked that we briefly discuss the implications of the Nuclear Non-Proliferation Act of 1978 on sea disposal. One purpose of the Nuclear Non-proliferation Act of 1978 is to provide for effective international control over the proliferation of nuclear explosive capabilities. The Act does not directly address the manner in which nations importing nuclear materials and technology from the U.S. will dispose of nuclear wastes. The Act does, however, encourage international undertakings providing for spent fuel storage. It also instructs the President to endeavor to provide for cooperation between the U.S. and importing countries in protecting the international environment from radioactive, chemical, or thermal contamination from peaceful nuclear activities, which would include waste disposal.

Moreover, one of the export licensing criteria of the Act (set forth in Section 305) provides that no source or special nuclear material proposed to be exported from the U.S. or produced through the use of U.S. exported material will be reprocessed and no irradiated fuel elements shall be altered in form or content without prior approval of the U.S. Thus, the U.S. will be making determinations which may impact on certain waste management or disposal strategies in importing countries although the basis for making such determinations will relate solely to non-proliferation concerns.

CONCLUSION

In brief, although ocean dumping of radioactive wastes is not prohibited under NRC regulations and the Commission has not made any finding that ocean dumping is unsafe no such sea dumping has taken place since 1970. Seabed disposal is an intriguing concept, still in the research phase, and this research should be carried forward at least until we have a bit more knowledge.

The ocean is a resource whose potential is not fully realized. Care must be taken in any plans for sea disposal to avoid preventing the use of potential resources by future generations.

We would favor a somewhat different regulatory scheme than presently exists: that EPA set generally applicable environmental criteria for all forms of ocean disposal as they will for land disposal; NRC should then develop the regulatory framework and licensing procedures to ensure that the environmental criteria set by EPA are satisfied. When it appears that license applications for ocean disposal might be forthcoming, the NRC should develop the necessary regulatory and licensing base for its part of the regulatory responsibilities. Legislation would however ultimately be required.

Mr. MEYERS. I am pleased to be here today to discuss with the subcommittee NRC's interest in the disposal of radioactive materials into or under the sea.

As you suggest, I will summarize my remarks.

Because of past U.S. policies to restrict such activity, this is an area of nuclear waste disposal with which the NRC has had little involvement since its formation in 1975. However, I can provide you with an overview of the NRC regulatory authority, the history of AEC policies which lead to those of the NRC, and a summary of the few ongoing NRC activities with direct bearing on the subject of disposal of radioactive materials at sea.

NRC authority to regulate possession and disposal of radioactive waste is derived from three acts: The Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and the National Environmental Policy Act of 1969.

The Act of 1954 gave the Atomic Energy Commission authority to license and regulate possession, use and disposal by persons of source, byproduct, and special nuclear material. The AEC and its prime contractors were exempt from licensing control.

Title II of the Energy Reorganization Act of 1974 transferred the regulatory authority given in the Atomic Energy Act to the Nuclear Regulatory Commission.

ERDA, now part of DOE, and its prime contractors remained exempt from NRC regulatory authority except as provided in section 202 of the 1974 Act. Section 202 of the 1974 Act gives NRC specific authority to license certain DOE waste management activities for storage and disposal of high-level radioactive wastes.

NRC regulatory authority over radioactive waste is defined by statutes which specify who and what is to be regulated. Insofar as DOE activities are concerned, it is not based primarily on the degree of hazard posed by the waste, the lifetime of the waste, or the waste form.

In relative terms, few resources and little effort have gone into development of regulations or research regarding disposal of radioactive materials at sea in recent years.

During the early decades of the U.S. nuclear development, disposal at sea of low-level radioactive wastes was permitted under license by the U.S. AEC. Between 1946 and 1970 the former U.S. AEC licensed the dumping of more than 86,000 containers of low-level radioactive wastes into the Atlantic and Pacific Oceans.

In June 1960 the Commission discontinued issuance of new licneses for sea disposal. Existing licenses authorizing sea disposal were permitted to remain in effect and licensees were permitted to continue waste disposal operations at sea.

Early in 1960 the AEC also authorized licensees to use, on an interim basis, AEC land burial sites in Idaho Falls, Idaho, and Oak Ridge, Tenn. In September 1962 the first commercial land burial facility, located in Nevada, was licensed and became available for use by private organizations.

Shortly thereafter, the AEC withdrew the use of the land burial sites at National Laboratories by licensees. Since that time, licensed commercial land burial facilities have been established in the States of Kentucky, New York, Washington, Illinois, and South Carolina.

There has been very little interest in sea disposal in the last few years due primarily to the availability of land burial sites. At the time the AEC stopped issuing new licenses, there were seven commercial firms licensed by the AEC to collect radioactive waste from other persons and to dispose of the waste at sea.

Since 1965 less than 200 curie of radioactive waste have been disposed of at sea. The last disposal at sea under an AEC license was made in June 1970. At this time, no NRC licenses exist which allow ocean dumping of radioactive wastes.

Thus, over a period of approximately a decade, dumping of radioactive waste at sea in this country has been phased out as a waste disposal system, although sea disposal is not precluded by regulation.

This shift was drive by (1), international objection to sea disposal on environmental grounds; (2), a change in AEC disposal philosophy to contain wastes, as in land burial, rather than disperse wastes, as in sea dumping; and (3), because land burial was more economically attractive to the commercial industry.

The NRC program for low-level waste is described in NUREG-1240, "The Nuclear Regulatory Commission low-level radioactive waste management program," which I can submit for the record, along with NUREG-0217, which describes in detail the history of disposal of low-level waste by shallow land burial and discusses future regulatory options.

One of the elements of the NRC low-level waste program which was recently begun is a study of alternatives to shallow land burial for the disposal of low-level radioactive wastes.

That study will investigate ocean dumping with respect to environmental effects, technical aspects, social and political implications and economics.

In the area of seabed disposal—actual emplacement of wastes within the deep sea sediments—the NRC staff has done little more

than follow closely the progress of the DOE program and the international program under the NEA.

In that regard, we can say that seabed disposal of concentrated—high-level—radioactive wastes has some conceptual advantages and maybe even some safety advantages.

However, the amassed knowledge regarding the option is not sufficient to draw definitive conclusions. It is a disposal concept which deserves continued study and development, perhaps for the second or third generation of disposal sites.

From a regulatory viewpoint, seabed disposal may offer one singular advantage. The seabed geologic regime is one of the simplest on the planet.

There is vast horizontal uniformity, there are no hydraulic gradients to drive nuclides out of the sediments, the sediments themselves are uniform and highly retentive, and the known geologic processes are all very slow and depositional rather than erosional. Apparently nothing has changed on portions of the seafloor for 50 million years.

You asked that we briefly discuss the implicatons of the Nuclear Non-Proliferation Act of 1978 on sea disposal of wastes. One purpose of the Nuclear Non-Proliferation Act of 1978 is to provide for effective international control over the proliferation of nuclear explosive capabilities.

The act does not directly address the manner in which nations importing nuclear materials and technology from the United States will dispose of nuclear wastes. The act does, however, encourage international undertakings providing for spent fuel storage.

It also instructs the President to endeavor to provide for cooperation between the United States and importing countries in protecting the international environment from radioactive, chemical, or thermal contamination from peaceful nuclear activities, which would include waste disposal.

Moreover, one of the export licensing criteria of the act, set forth in section 305, provides that no source or special nuclear material proposed to be exported from the United States or produced through the use of U.S. exported material will be reprocessed and no irradiated fuel elements shall be altered in form or content without prior approval of the United States.

Thus, the United States will be making determinations which may impact on certain waste management or disposal strategies in importing countries although the basis for making such determinations will relate solely to nonproliferation concerns.

In brief, although ocean dumping of radioactive wastes is not prohibited under NRC regulations and the Commission has not made any finding that ocean dumping is unsafe, no such U.S. dumping has taken place since 1970. Seabed disposal is an intriguing concept, still in the research phase, and this research should be carried forward.

The ocean is a resource whose potential is not fully realized. Care must be taken in any plans for sea disposal to avoid preventing the use of this resource by future generations.

Thank you, Mr. Chairman. I will be delighted to answer any questions you may have.

Mr. BREAUX. Thank you much, Mr. Meyers, for your testimony.

Apparently during the period that the United States was ocean dumping wastes, it was all low-level waste, is that correct?

Mr. MEYERS. That is correct.

Mr. BREAUX. And you list three reasons why disposal at sea was discontinued: International objections, a change in AEC philosophy, and because land burial was more economically attractive to the commercial industry.

Is either one of those three more important than another? It would seem as if the commercial aspects were the prominent reason for the discontinuance of the ocean dumping.

Mr. MEYERS. I think that clearly was one of the driving forces. On the other hand, as you well know, the international community, by virtue of varius conferences that have been set up to be concerned about the ocean, and what goes into it, was also one of the driving forces.

With the various interests from the international community and the availability of an alternative that was both technically and economically feasible, I think it just naturally homed in on shallow land burial.

Mr. BREAUX. Is the ocean dumping or disposal in the seabed of nuclear wastes, low-level or high-level, prohibited by regulation or by any statute of Congress at the present time?

Mr. MEYERS. Not that I know of.

Mr. BREAUX. In other words, anyone who would request permission or a permit or a license to do so would go through the NRC?

Mr. MEYERS. That is right.

In other words, we would have to license anyone or any organization that wished to dispose of low-level wastes at sea.

Mr. BREAUX. What about the Environmental Protection Agency?

Mr. MEYERS. There is the Marine Protection, Research and Sanctuaries Act of 1972, known as the Ocean Dumping Act, that gives EPA the authority to permit the dumping itself. Our NRC involvement would be up to the point of actually dumping.

We would have to license someone to possess the material, transport it, and thereafter EPA would have to issue the permit to actually dump.

Mr. BREAUX. I am really confused about the regulatory process with regard to this issue. I am not sure that we are all on the same wavelength as far as the regulatory process at the present time for any disposal request.

You say that NRC would be a licensing commission, one would have to receive a license from NRC before any wastes were disposed of at sea.

Mr. MEYERS. EPA would actually issue the permit for the disposal at sea. NRC, on the other hand, has authority for whoever brings it up to that point to possess the material and transport it to the pont of actually dumping it.

Mr. BREAUX. When we were dumping the low-level wastes in the ocean, in which areas were we dumping them?

Mr. MEYERS. I believe that there are some sites in the Pacific, and also the Atlantic.

Mr. BREAUX. Has NRC done any followup research into the effects of the wastes that have been there for the last 10 years or so?

33-546 O - 78 - 15

Mr. MEYERS. As far as I know, we have not, although I understand that EPA is investigating right now some of those areas that have been used as dumpsites.

Mr. BREAUX. I get the impression—I will let you comment on this—that you seem to somewhat favor more continued research into the question of the dumping of nuclear wastes in the seabed perhaps than DOE is presently putting into the program.

Mr. MEYERS. Well, again we don't feel that all the information is in. Right now, what we favor is continued investigation as distinct from actual disposal at sea.

Whether or not after one has sufficient information you decide that disposal at sea is more environmentally sound from the standpoint of protecting man, you would have to have more ifnormation to make that determination.

Mr. BREAUX. I am surprised at what looks to me to be a very small amount of money being committed to seabed disposal relative to what is being allocated to other disposal alternatives. I pointed out that something like 3 percent of DOE's total nuclear waste disposal research budget is being allocated to the seabed issue. Apparently, I seemed to find a recommendation from you that perhaps we ought to be giving it a little bit more emphasis.

Mr. MEYERS. At DOE?

Mr. BREAUX. At any place. Apparently NRC is not doing any at all; is that correct?

Mr. MEYERS. That is correct.

Mr. BREAUX. Did NRC do any alternate disposal research at any time?

Mr. MEYERS. Right now what we are doing is in the form of studies, we are studying alternate ways of disposing of low-level waste, and one of the options we are looking at—and this is purely a study as opposed to research—is sea disposal, and we have not taken any position with DOE as to whether or not thier research ought to be expanded, contracted, or remain the same.

Mr. BREAUX. The Nuclear Regulatory Commission is in fact engaged in a study at the present time of alternate disposal sites?

Mr. MEYERS. For low-level waste, right.

Mr. BREAUX. For low-level waste only?

Mr. MEYERS. Not sites, methods.

Mr. BREAUX. Means of disposal.

Mr. MEYERS. Right.

Mr. BREAUX. And one of those means being studied is the seabeds? How much money is NRC putting into that effort?

Mr. MEYERS. Several hundred thousand.

Mr. BREAUX. Several hundred thousand?

Mr. MEYERS. Yes.

Mr. BREAUX. When can we expect the report, and findings based on the study?

Mr. MEYERS. This autumn.

Mr. BREAUX. Is the purpose of the study to make additional recommendations for further research on disposal methods, or is it to come up with a conclusion or a final decision or a final recommendation?

Mr. MEYERS. It could do a number of things, but one of the main reasons we embarked on that kind of study was to support our

licensing activity. For example, if we were to receive a license for a commercial burial site, we would have to look at alternatives to decide that that was the best approach, and this kind of analysis helps us. This is for the National Environmental Policy Act impact statement process. However, it can also indicate where areas of research need to be done or whether something makes more sense than what we are doing now.

Mr. BREAUX. We have DOE doing some studies and seemingly the same type of studies that you are doing at the Nuclear Regulatory Commission.

How does DOE and NRC interact?

Mr. MEYERS. We meet with them frequently. We have a good interchange. As Dr. Deutch mentioned, we are on that task force and looking at the whole range of waste options, and our staff is on the phone daily.

Mr. BREAUX. It looks to me as if we are getting two different opinions from NRC and DOE with respect to the acceptability and feasibility of seabed disposal. Maybe not. Maybe that is just my initial impression from your testimony.

Mr. MEYERS. I think Dr. Deutch indicated the work was going on, and we feel that work ought to continue.

Mr. BREAUX. But 3 percent as compared to the other 97 percent being considered for land-based disposal sites. It is kind of a disproportionate share.

Mr. MEYERS. That may very well be. From our perspective, though, it is difficult for us to say to DOE that you ought to be spending *x* amount more on a particular disposal option.

Mr. BREAUX. Of course, I guess what the Congress is concerned about is getting a fair assessment. The 97-3 split, if that is what it turns out to be, gives me some concern and, I think, the subcommittee some concern that perhaps we are not spending enough on considering seabed sites as a disposal alternative.

Do you feel we are?

Mr. MEYERS. Well, again, I can't really say how much more we ought to be spending, but I do feel that we should be investigating seabed disposal as one of the options. Again remember we have been talking about disposal sites. There very likely to be more than one disposal site.

Mr. BREAUX. I am aware of that.

When I say "disposal sites," I am really referring to disposal alternatives or means of disposal.

Mr. MEYERS. And it is possible that one of the future sites could be seabed disposal.

Mr. BREAUX. But, according to DOE, that will not happen unless there are some dramatic shifts in the emphasis of their current program.

Let me ask you how does our U.S. definition of high-level radioactive waste compare with the definition of the International Atomic Energy Agency?

Mr. MEYERS. We use the definition that derives from the reprocessing step, and I believe it is the same.

Mr. BREAUX. Let me let counsel ask another question. Of course, the definition of high-level and low-level waste is very critical from

an environmental and legal standpoint. I think we have an indication that we are using two different definitions.

Mr. BATEY. As I understand it, the IAEA definition employs the curie, which is a measurement of radioactivity whereas the definition included in the EPA regulations for the Ocean Dumping Act defines high-level waste as a product of the nuclear fuel process.

Mr. MEYERS. As I undestand it, that is a new definition on the part of IAEA.

Mr. BATEY. How do you compare the two definitions?

Mr. MEYERS. Curies are a measurement of the disintegration. What they haven't commented on is a requirement for shielding and heat removal. I said it was a new definition.

Another point that is of interest is that we have a study underway right now that is nearing completion on waste classification. We are trying to get away from the term high-level and low-level and are trying to define waste in such a way that it either goes to a geologic repository or elsewhere, such as a shallow land burial site.

Mr. BATEY. Do you have any problems with the current definition used by EPA for high-level waste?

Mr. MEYERS. That is the one that we have been using as well, and since there is no reprocessing, it is difficult to come to grips with the spent fuel issue. For example, one can dispose of spent fuel without calling it a waste.

Mr. BREAUX. I take it that EPA's definition is a result of interpreting the Ocean Dumping Act that the Congress passed and trying to fit it into their regulatory policy.

I am not sure the current definition is adequate for the purposes of the Nuclear Regulatory Commission. Perhaps it is something that someone has looked into. Maybe it is a result of a deficiency in the statute. It would be helpful, I think, if someone on your staff could take a look at it for us.

Mr. MEYERS. We can certainly do that, but my guess is that EPA and NRC are using the same definition of high-level waste.

Mr. BREAUX. Which is perhaps different from the International Atomic Energy Agency.

Mr. MEYERS. That is possible.

Mr. BREAUX. I have got people in the audience shaking their heads that way and some shaking their heads this way and some not shaking their heads at all. Let's take a look at it——

Mr. MEYERS. Yes, we can get that for you.

Mr. BREAUX [continuing]. To get some kind of definitive answer to it.

Congressman Hughes of New Jersey.

Mr. HUGHES. Thank you, Mr. Chairman.

I am just interested in knowing, and maybe you have covered it, just exactly what type of research is being conducted now. Apparently there are two types of disposal, ocean and land-based dumping as well as seabed dumping. I am interested in knowing just the exact nature of the research which is presently being carried on.

Mr. MEYERS. The NRC is doing no research in either area. The research that is being done is being done by the Department of Energy, and the Nuclear Energy Agency in Paris, and EPA is investigating some of the sites that have been used for disposal in the past.

Mr. HUGHES. Is it mostly monitoring or are there other types of research being done?

Mr. MEYERS. EPA work, I believe, is mostly monitoring, but Dr. Rowe can speak to that when he comes up. As far as the DOE work goes, it is basically research.

Mr. HUGHES. I notice that one of your recommendations is that EPA actually set forth the criteria for all forms of nuclear waste disposal, but that NRC actually promulgate the rules and regulations for carrying out any such ocean and seabed dumping.

Why do you feel that the NRC should have that responsibility?

Mr. MEYERS. Right now, I mentioned earlier, that if one were to get involved in nuclear waste disposal at sea, you would have to deal with two agencies. You have to deal with NRC, since the Atomic Energy Act requires a license for possession of the material. Then you transport it some place to the point where it has to be dumped, and at that time you need a license or permit from EPA, and all we are suggesting there is that it is more efficient to deal with one Federal agency than several.

Mr. HUGHES. Thank you, Mr. Chairman.

Mr. BREAUX. Thank you, Mr. Hughes.

Thank you, Mr. Meyers. You brought out some very good points. I personally feel that even if the United States decides that seabed disposal is not the best alternative relative to land disposal, we still should know everything we possibly can about it. If we get into international conferences and international meetings, we should be in a position to argue as to why other countries shouldn't be doing it. If we reach that decision, we should have as much data as to why so as to support our position with other countries in international forums.

With that, we thank you very much. We would like to have you respond, for the record, to our requests for information.

Our next witness will be Dr. William Rowe, who is deputy assistant administrator for radiation programs with the U.S. Environmental Protection Agency. Perhaps we can get into this with him.

Dr. Rowe, the committee welcomes you, also your colleague, if you would please introduce him for the record.

STATEMENT OF DR. WILLIAM D. ROWE, DEPUTY ASSISTANT ADMINISTRATOR FOR RADIATION PROGRAMS, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY ROBERT S. DYER, PROJECT OFFICER

Dr. ROWE. I am William D. Rowe, Deputy Assistant Administrator for EPA.

I have with me Mr. Robert Dyer, the project officer for the ocean disposal research and evaluation program that we implement.

In order to summarize my testimony because the testimony we have submitted for the record is lengthy, I would like to cover four major subjects.

The first one is our present program under the Ocean Disposal Act for the disposal of low-level wastes at sea.

The second subject covers some of our international activities which pertain to getting the international community alined with our program in a proper way from the environmental point of view as we attempt to go ahead with our sea disposal.

Next, we have brought some slides with us of our ongoing site surveys under the deep ocean, and finally we have a few words on the seabed disposal option. If this meets with your approval, I will proceed.

EPA's regulatory efforts to control disposal of nuclear wastes in the ocean is under the Marine Protection Research and Sanctuaries Act of 1972, called the Ocean Dumping Act. It is intended to control the disposal of all materials into the ocean, including radioactive materials. Disposal of high-level wastes and radiological warfare agents are specifically prohibited in the act, as are chemical and biological warfare agents.

For the materials not specifically banned under the act, EPA administers a permit program regulating the ocean disposal of such materials. This includes the class of wastes referred to as low-level radioactive wastes; for example, contaminated equipment, clothing, rags, experimental animals, decontamination liquids, and hospital wastes from nuclear medicine applications.

In order to implement its permit review authorities, EPA issued an initial set of regulations and criteria in 1973 to control the transportation for dumping and dumping of material into the ocean waters. These regulations and criteria have undergone several revisions.

We submit for the record the Final Revision of Regulations and Criteria issued on January 11, 1977. I would like to specifically call your attention to part 227, Criteria for the Evaluation of Permit Applications for Ocean Dumping of Materials. Part 227.5 prohibits the disposal of high-level radioactive wastes. Part 227.7 requires that all other radioactive materials must be packaged or containerized to prevent their dispersion or dilution in ocean waters.

We introduced this isolation and containment philosophy in the initial 1973 criteria and it has remained unchanged as the basic operating philosophy for our regulatory development program on ocean disposal of nuclear wastes. It is also clear from this requirement that the EPA view of "dumping" or disposal is far different from past practices, and envisions a system of containment on or in the ocean bottom. In this context we view the ocean not as a waste dilution medium but as a disposal location which will assure undisturbed isolation and containment.

Part 227.11 requires that the wastes be containerized or packaged so that the radioactive materials can radio decay to environmentally innocuous levels within the life expectancy of the container and/or its inert matrix. These are the EPA regulations as they stand today and they shall provide the basis for future regulatory development.

The United States has not disposed of any radioactive wastes into the ocean since 1970, and the EPA has issued no permits for ocean disposal of radioactive wastes. However, the international community has participated in formal ocean dumping operations since 1967 under the supervision of the International Nuclear Energy Agency, and land burial alternatives for low- and intermediate-level wastes are meeting with increased opposition both in the United States and abroad. This has resulted in increasing interest in examining the potential merits of ocean disposal of low- and intermediate-level wastes.

The Office of Radiation Programs of the EPA has initiated two courses of activity since publication of the initial ocean dumping criteria and regulations in 1973—One: A series of environmentally focused initiatives to improve the International Ocean Dumping Treaty recommendations. Two: A domestic deep-sea radioactive waste dumpsite survey program to determine the fate of radioactive wastes dumped by the United States between 1946 and 1970.

I shall describe our activities in each of these two areas in turn, since progress and success in these two undertakings has provided and will continue to provide the basis for our ocean disposal standards development program.

INTERNATIONAL INITIATIVES

The United States signed the International Ocean Dumping Treaty, formally called the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, in November 1972 shortly after enactment of the domestic ocean dumping legislation. The United States ratified the convention in April 1974 and the treaty entered into force in August 1975. Today, 37 nations have ratified or acceded to the treaty.

The treaty contains three annexes of which the first two have specific provisions governing radioactive materials. Annex I lists those materials which are prohibited from ocean disposal and includes high-level radioactive wastes. Annex II lists those substances which require special care when considered for ocean disposal and includes radioactive materials not otherwise prohibited under annex I.

What is particularly interesting about the treaty annexes is that only radioactive materials are singled out for special consideration, specifically by the competent international body in this field, at present the International Atomic Energy Agency [IAEA].

In order for IAEA to fulfill its obligation under annexes I and II to the treaty, an advisory group consisting of interested IAEA member countries was formed to develop both a definition of high-level radioactive wastes or other high-level radioactive matter unsuitable—prohibited—for dumping at sea, and recommendations governing the disposal of all other radioactive wastes. It is important to note that the definition under annex I is mandatory for contracting parties to the treaty while annex II recommendations are not mandatory although it is expected that they would be adhered to.

Since 1973 the EPA has participated as the U.S. member to the IAEA advisory group. While there have been a number of difficult technical and policy issues addressed by the advisory group during the last 5 years, four major problems all identified by the United Sates have been of continuous concern:

One: The oceanographic model upon which the initial IAEA definition of high-level radioactive wastes was based did not accurately reflect the actual ocean transport processes that might pertain in many parts of the ocean.

Two: A philosophy of isolation and containment was not adequately reflected in the IAEA recommendations, instead the oper-

ating principle was dilution and dispersion of the radioactive wastes.

Three: The minimum acceptable disposal depth of 2,000 meters was unacceptable as it did not take account of fisheries exploitation below 2,000 meters. EPA continue to advocate a minimum acceptable disposal depth of 4,000 meters or greater.

Four: IAEA recommendations under annex II did not provide any procedures or restrictions to control dumping of liquid and unpackaged radioactive wastes into surface and shallow waters.

A series of advisory groups, panels, and consultative groups have been convened over the past 3 years, resulting in proposed revised recommendations which have reflected positively on the above four problem areas. However, these proposed revisions were subject to the approval of the most recent IAEA advisory group meeting held in February 1978. Again EPA represented the United States at this recent meeting and we are pleased to say that the above four issues have been resolved and approved by the advisory group as follows, respectively:

One: The oceanographic basis of the definition has been extensively revised to more adequately reflect ocean transport processes, although there is still much work to be done to perform actual ocean measurements to validate present assumptions;

Two: The EPA's suggested language to reflect the need for isolation and containment of radioactive wastes dumped in the ocean was accepted to read:

> It is essential that a general policy of continued isolation and containment of radioactive waste after descent to the seabed should be pursued through the use of suitable packaging to minimize to the extent reasonably achievable the radioactivity which might ultimately be released, thereby preventing unnecessary contamination of the marine environment;

Three: The minimum acceptable average disposal depth was increased to greater than 4,000 meters. In addition any dumping is to be restricted to areas of the ocean between 50° north and 50° south; and

Four: The EPA suggested specific language at the February 1978 advisory group meeting to prevent the dumping of liquid and unpackaged wastes into the oceans. This language was accepted by the representatives of the 22 other countries present at the meeting and states:

> The dumping of liquid or unpackaged radioactive waste into surface and shallow waters should not be authorized until such time as the IAEA formulates appropriate recommendations governing such dumping. The direct dumping of unpackaged liquid radioactive waste into the deep sea shall be prohibited since such waste would not be sufficiently dense or immiscible with seawater to descend to and remain on the seabed. The dumping of packaged liquid radioactive waste into the deep sea is specifically excluded * * *

Thus, we feel that significant progress has been made in revising the IAEA recomendations to reflect environmental concerns over sea disposal of all radioactive materials. However, there are still many critical areas for improvement, such as the numerical definition of high-level radioactive wastes, monitoring requirements in and around radioactive waste dump sites, the development of more specific guidance on de minimus levels of radioactivity, and packaging designs for waste isolation and containment.

Let me say, Mr. Chairman, in answer to a previous question on the definition of high-level waste, that the present ones in force for high-level waste for EPA, NRC, and IAEA are all the same. There is change being considered which would more closely define the high-level wastes, but they are not yet in force.

The revised IAEA definition and recommendations will be submitted for approval to the IAEA Board of Governors in June 1978 and subsequently will be submitted for ratification by the contracting parties to the treaty at the Third IMCO [Intergovernmental Maritime Consultative Organization] consultative meeting in October 1978, since IMCO has taken over secretariat duties under the International Ocean Dumping Treaty.

To add one more slight element of confusion to the somewhat complex framework of international controls over ocean disposal of radioactive wastes, there is a separate decision document developed by the Organization for Economic Cooperation and Development [OECD] which sets up within the Nuclear Energy Agency [NEA] of OECD a consultative and surveillance mechanism for sea dumping of radioactive waste. This decision document was designed to establish procedures for ocean disposal of radioactive waste by NEA member countries. It replaces the direct NEA supervision of ocean dumping conducted by several European NEA members between 1967 and 1976, and was implemented beginning with the 1977 sea disposal operations.

The United States became a formal member of NEA in October 1976, and since then EPA has been actively participating in NEA activities through the U.S. delegation to the NEA Steering Committee and as a representative to the NEA Committee on Waste Management in reviewing and making recommendations to improve the NEA consultative and surveillance mechanism for sea dumping of radioactive wastes. We feel that this NEA mechanism is an acceptable working document and support the NEA in developing a timetable to address specific technical areas rquiring periodic review and revision.

EPA RADIOACTIVE WASTE DUMPSITE SURVEY PROGRAM

Since 1974 EPA has been of the view that as a first step toward implementing the domestic ocean dumping regulations for the marine disposal of radioactive wastes it was necessary to answer the following basic questions:

One: Does the technology exist to precisely survey or monitor a deep ocean site to detect the possible release and movement of radioactive materials?

Two: What was the fate of the radioactive waste packages dumped by the United States under Atomic Energy Commission—AEC—licensing authority between 1946 and 1970?

A search of the available records indicated that four dump sites received more than 95 percent of the estimated radioactivity dumped. The location, depth, estimated activity dumped, and other pertinent information is shown in table I.

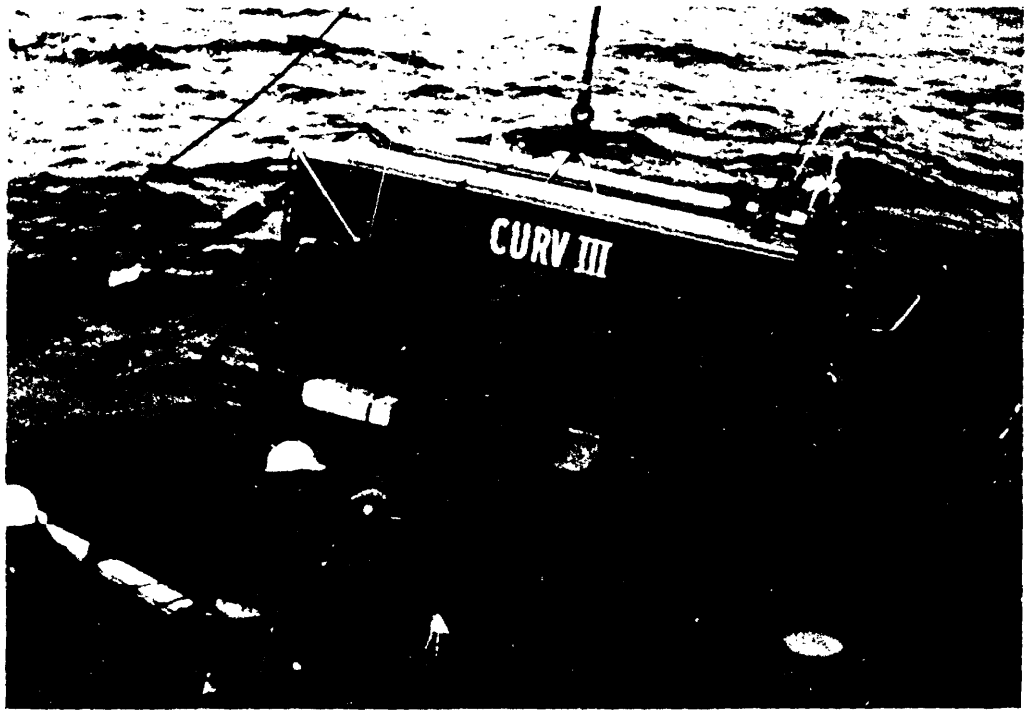
The two basic questions EPA set out to answer above are related by the fact that past survey methods using surface ships were not adequate to determine the fate of radioactive waste packages

dumped in the past. The Pacific dumpsites at 900 meters—3,000 feet—and 1,700 meters—5,700 feet—per table I were the subject of two AEC surveys in 1957 and 1960, and the two Atlantic dumpsites at 2,800 meters—9,300 feet—and 3,800 meters—12,500 feet—were surveyed by the AEC in 1961. Over 11,000 underwater photographs were taken in these surveys by lowering a camera to the ocean bottom yet none of the more than 75,000 radioactive waste packages dumped were identified. From 1961 to 1974 no further dumpsite investigations were conducted.

Do we have time to show the slides?

Mr. BREAUX. Yes.

Dr. ROWE. In 1974 the Office of Radiation Programs at EPA set out to conduct the precise dumpsite surveys needed to determine the fate of radioactive waste packages dumped in the past. The solution lay with the use of submersibles, either manned or unmanned.



SLIDE 1

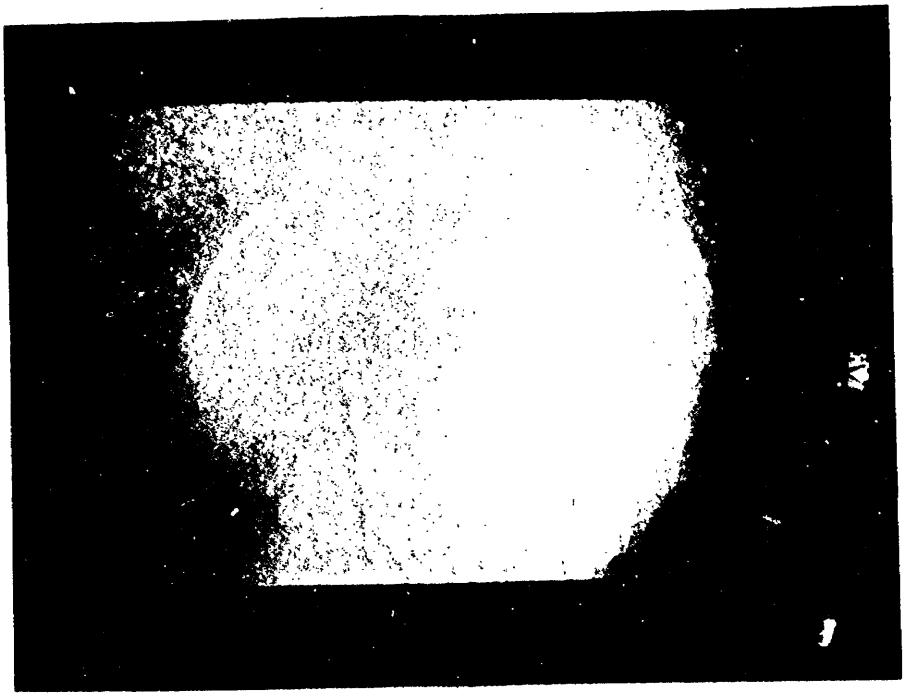
SLIDE 2

In the 1974 survey of the Pacific 900-meter dumpsite at the Farallon Islands we successfully used the unmanned submersible CURV III, shown here in slide 1, to not only locate 55-gallon radioactive waste drums for the first time, but to take sediment cores around these drums to detect whether any radioactive materials were released.

A similar survey was conducted in 1975 by the Office of Radiation Programs—EPA at the Farallon Islands dumpsite at a depth of 1,700 meters. Preliminary results of these surveys have been extensively reported on by EPA and I am submitting for the record a paper given by Mr. Robert Dyer which he presented at an International Atomic Energy Agency symposium in 1976.

Although more extensive analysis of the sediments has been completed, the results for the Pacific 900-meter site still indicate plutonium-239, 240 contamination around the radioactive waste drums at concentrations ranging from 2–25 times higher than the maximum expected weapons testing fallout concentration for this latitude and depth of water.

However, the plutonium-239, 240 concentration measured in sediments around the radioactive waste drums at the 1,700-meter site shows only moderately elevated levels ranging from approximately two to four times higher than the maximum expected fallout concentrations for this latitude and depth.



SLIDE 3

SLIDE 4

Slides 2 and 3 show radioactive waste drums from the 900-meter dumpsite.

The drum in slide 2 shows minor implosion. It has been turned over by the submersible to show that the drum has not been visibly breached in the reducing conditions of the sediment and that it has penetrated the sediment to only a few centimeters.

Slide 3 shows a drum with relatively severe implosion.

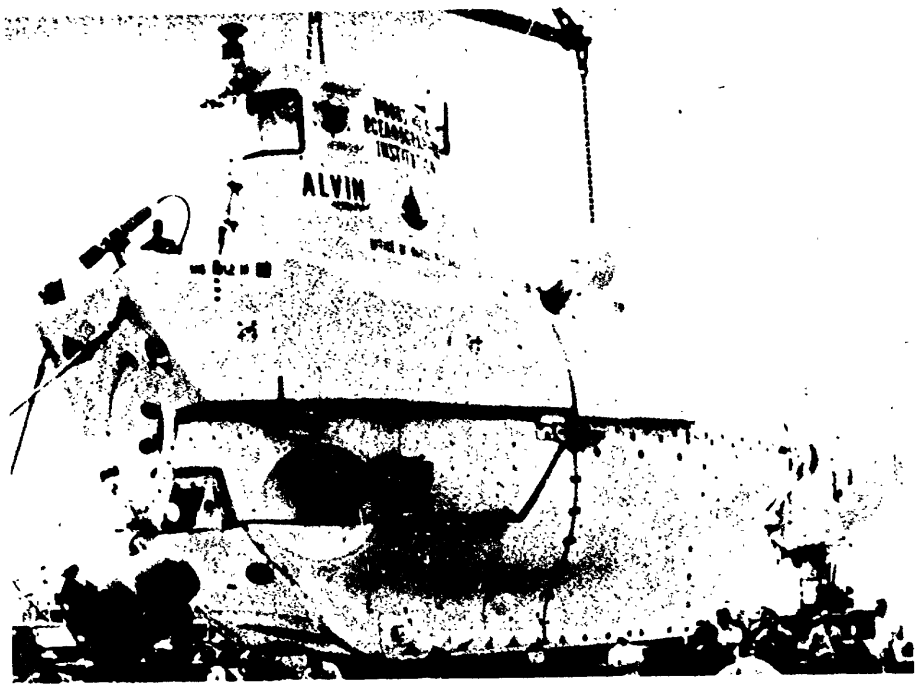
Slides 4 and 5 were taken at the Farallon Islands 1,700-meter dumpsite.

Slide 4 shows no hydrostatic pressure effects and is color coded, most probably indicating some slightly higher activity.

Slide 5 shows severe implosion due to hydrostatic pressure acting on air voids in the drum. Such problems could be resolved by using a homogenous solid matrix or, in some cases, pressure equalization devices.

The Atlantic dumpsite at 2,800 meters was surveyed by the EPA Office of Radiation Programs in 1975 using the manned submersible ALVIN, seen here in slide 6. This survey successfully located, for the first time, radioactive waste drums dumped in an Atlantic deep-sea disposal site. Sediment cores were taken close to the drums and cesium-137 was detected at levels ranging from 3 to 70 times higher than the maximum expected fallout concentration for this latitude and depth. Since the drums investigated were not imploded, the method of release of the cesium was most probably by leaching as opposed to leaking from the drums. A more detailed discussion of specific radio analytical results are contained in Mr. Dyer's paper which we submitted for the record.

SLIDE 5



SLIDE 6

Slide 7 shows one of the drums around which sediment samples were taken. This is an 80-gallon drum as opposed to the usual 55-gallon drum but it has the usual concrete matrix as seen by the concrete cap on the end of the drum.

In 1976 we conducted a more extensive survey of the Atlantic 2,800-meter site using the submersible ALVIN. One of the primary objectives of this survey was to recover one of the radioactive waste drums examined during the 1975 survey to determine the corrosion rate of the metal container and the leach rate and degradation rate of the concrete matrix. Specifically we wanted to recover one of the intact drums containing packaging information showing low dose levels of dumping at the surface of the container at the time of dumping; information such as on the drum shown in slide 8.

Using the results of the sediment radio analysis from the 1975 survey as an indicator of levels of leachable radioactivity in the drum, we determined that one of three drums examined in 1975 would be suitable for recovery while insuring that no health or contamination risks would result from recovering the drum. However, the basic problem was to relocate one of the three drums located one year earlier in 9,300 feet of water, 120 miles at sea.

Using interpolation of the submersible acoustic locating data coupled with Loran C navigation information, we descended on July 29, 1976, to within 300 feet of one of the three target drums. On July 30, 1976, the drum was recovered. The recovery involving two ships and the submersible is described fully in the October 1976 issue of Woods Hole notes. I am submitting the excerpted article for the record.

SLIDE 7

SLIDE 8

33-546 O - 78 - 16

Slide 9 shows the drum prior to recovery, while slide 10 shows the recovered drum.

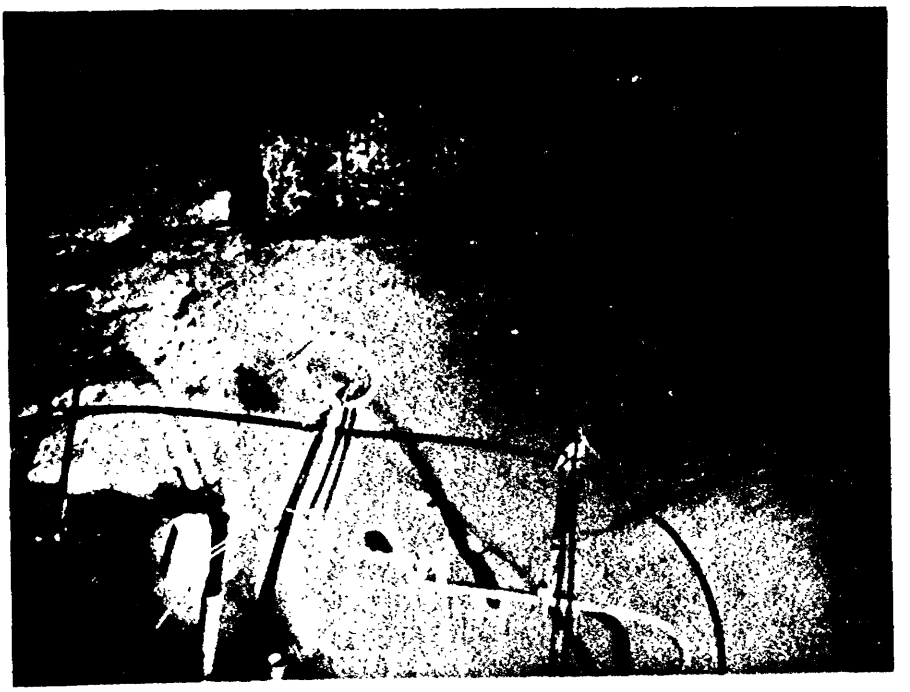
Slide 11 shows the detailed packaging information on the drum. The technical report on the drum analysis is being prepared by Brookhaven Laboratories and should be available in about 6 weeks. It is our hope that you will include it in the record.

A summary of the findings to date indicates that the wastes were packaged 16 years ago and have been submerged for 15 or 16 years. The primary radioactive waste was cobalt-60 contained in filters. These filters were encased in metal cylinders which were imbedded in cement poured into an 80-gallon drum. There have been varied degrees of metal corrosion over the drum surface with enhancement of corrosive attack at the sediment buried regions. Some corrosion areas have been perforated but the concrete matrix has remained intact with only slight dissolution of the concrete near the exposed cap.

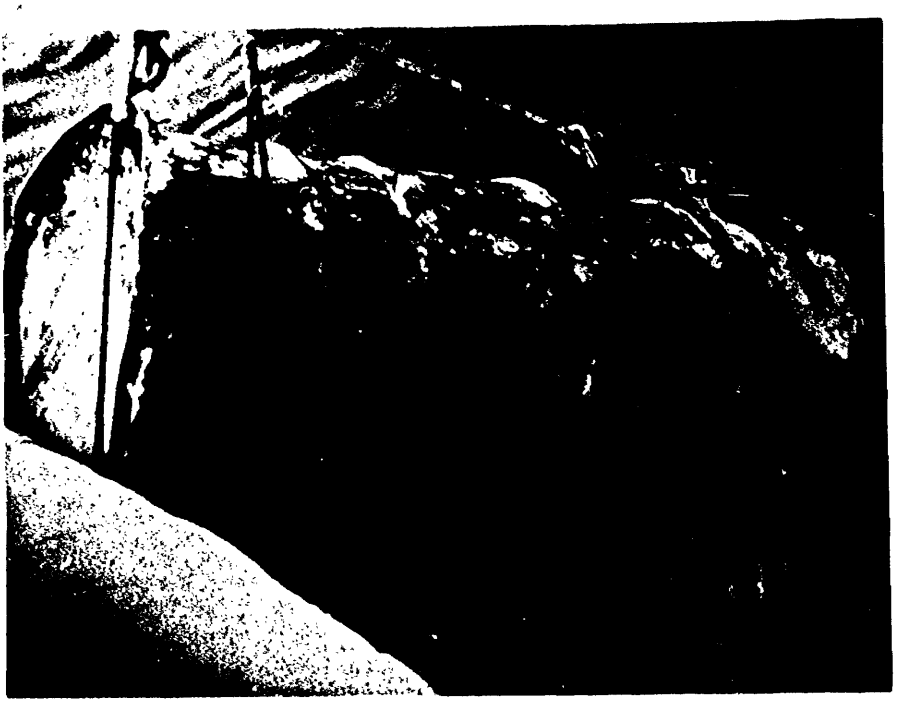
It is important to note that no cobalt-60 was detected in the sediments around the drums and that this may indicate that the cobalt-60 was not released from the drums after 15- or 16-years' immersion.

We conducted many other technical analyses in the dumpsite region, including sediment geochemistry, infaunal and epifaunal characterizations, sediment radio analysis, current measurements, and bathymetric-topographic studies. Preliminary data indicates, for example, that: Currents with velocities up to 40 centimeters per second exist in the dumpsite, a meandering channel runs through the dumpsite—as seen in slide 12—and radioactive cesium-137 in excess of that found in the 1975 survey exists around some of the drums. There is also preliminary evidence, however, that this cesium-137 drops off markedly within six concentration increases with depth in the sediment to at least a depth of 21 centimeters.

Until such time as the data analysis is complete, however, we would not want to draw any general conclusions regarding potential mobility and biological uptake of such radioactive materials as cesium, plutonium, or cobalt.



SLIDE 9

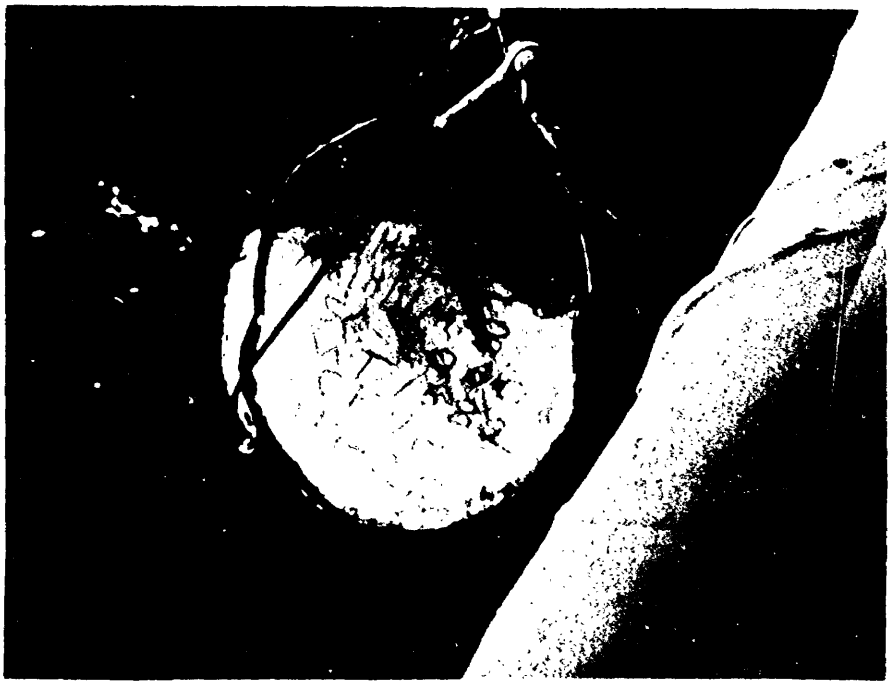


SLIDE 10

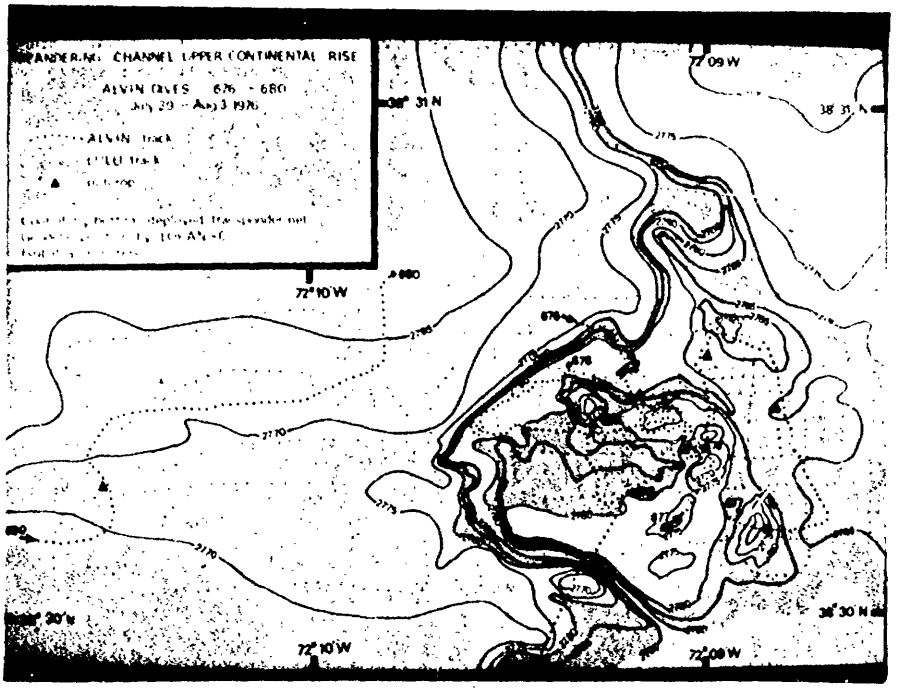
In 1975, our office conducted an extensive two-phase survey of the Farallon Islands 900-meter and 1,700-meter Pacific dumpsites with the objectives of more extensive physical, biological, and radiological characterization of the dumpsites. In this survey program we used the Pisces VI manned submersible—shown in slide 13—to successfully recover a 55-gallon radioactive waste drum from a depth of 900 meters—3,000 feet—to compare the metal corrosion and matrix degradation rates in this marine environmental with the same rates in the different environmental conditions at the Atlantic 2,800-meter site. This comparative information should be of particular interest since the Pacific 900-meter drum was recovered from an oxygen minimum zone. Specific logistical details and objectives of the two 1977 Pacific surveys are included in the two press releases the EPA issued which I would like to include for the record. The data is still being analyzed and no information is presently available.

At this time I would like to request that the comprehensive report on the 1974-75 surveys, which is at the printers, be submitted for the record when it is available, which we estimate will be in 8 weeks. Additionally, I would like to insert into the record after these hearings any pertinent technical reports on the 1976 Atlantic 2,800-meter survey that may become available within the next 8 weeks if that meets with your approval.

I think that we have now demonstrated that submersibles can be used to conduct precise survey and monitoring programs around selected deep-sea radioactive waste dumpsites. The information we have gathered to date also gives an indication that certain radioactive materials may not migrate rapidly or appreciably from the packaging used in the past, and the development of packaging designs incorporating improved matrices can significantly increase the isolation and containment capability of packages used for any future sea disposal, either domestic or international.



SLIDE 11



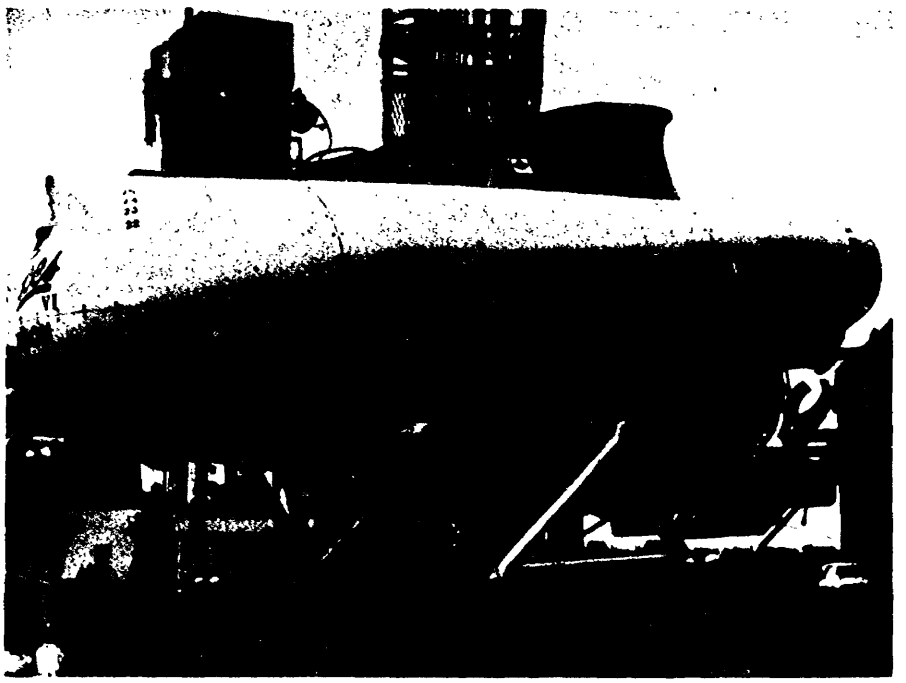
SLIDE 12

With what we perceive to be an improved international operating philosophy coupled with technical information we presently have and hope to have in the near future, I shall now briefly outline our plan for developing expanded ocean disposal regulations and standards. We have scheduled the development of interim ocean disposal regulations and criteria by the end of fiscal year 1980 for short-lived materials, with expanded regulations and standards in fiscal year 1985.

These regulations and criteria will codify decisions on the acceptability of specific ocean disposal practices based upon EPA's environmental assessment surveys and waste packaging evaluations, and would designate approved ocean disposal sites, if any, for the receipt of low-level radioactive waste. The regulations and criteria will provide assurance that both the public health and the environment would be protected if an applicant is issued a permit for ocean disposal of radioactive waste.

By 1980 we plan to have interim site selection criteria to complement the 11 basic criteria outlined under section 228.6 of the Final Revision of Regulations and Criteria which we have submitted for the record. This will reflect many of the specific IAEA recommendations discussed earlier with a thorough consideration of the need to be more restrictive in our domestic regulations. We will also develop, by 1980, interim packaging requirements based on the best available demonstrated containment and packaging systems. The third milestone to be reached by 1980 is interim monitoring requirements, including a designation of the parameters to be measured and extent and periodicity of the measurements.

Both the interim and final regulations to be developed by EPA will apply equally to disposal on, in, or beneath the seabed since they all fall within the regulatory framework of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended.



SLIDE 13

We note that research activity is being undertaken within the United States to outline the scope of the problems involved in the potential use of the seabed as a disposal site for high-level wastes. We feel that such research is a reasonable first step in determining the feasibility of such an option, while recognizing at the same time that such an option is presently prohibited by statute. In addition we strongly feel that the realization of a high-level waste seabed emplacement option is questionable at best until the feasibilty of low-level radioactive waste emplacement in the seabed, including retrievability of the emplaced material, has been demonstrated.

We see an increasing interest in, use of, and concomitant concern for marine disposal as a low-level radioactive waste management alternative both domestically and internationally. The trend toward dumping more radioactive wastes into the ocean is reflected in table 2, a summary of the NEA/OECD sea disposal operations from 1967 to 1976.

There has been a fourfold increase in the activity of beta-gamma waste—excluding tritium—dumped into the ocean and a threefold increase in the alpha activity of waste dumped into the ocean in that 9-year period. We must stress that the universality of the oceans dictates the need to continue encouraging greater international concern for the consequences of marine disposal of increasing quantities of radioactive wastes, since release of radioactive materials to the oceans is an irreversible commitment.

Thank you, Mr. Chairman. We would be pleased to answer any questions the subcommittee may have.

[The information follows:]

TABLE 1.—PRIMARY U.S. RADIOACTIVE WASTE DUMPSITES

Site	Coordinates	Depth (meters)	Distance from land (kilometers)	Years dumpsite used	Estimated number of 55-gal drums dumped	Estimated activity in drums at time of packaging (curies)
Atlantic	38°30′ N. 72°06′ W.	2,800	190	1951–56 1959–62	14,300	[1]41,400
Atlantic [2]	37°50′ N. 70°35′ W.	3,800	320	1957–59	14,500	2,100
Pacific:						
Farallon Island (site A)	37°38′ N. 123°08′ W.	900	60	1951–53	3,500	1,100
Farallon Island (site B)	37°37′ N. 123°18′ W.	1,700	77	1946–50 1954–65	44,000	13,400

[1]This does not include the pressure vessel of the N/S Seawolf reactor with an estimated induced activity of 33,000 curies.
[2]This site has not yet been investigated by the Environmental Protection Agency.

Source: Dyer, R. S., "Environmental Surveys of Two Deepsea Radioactive Waste Disposal Sites Using Submersibles," management of radioactive wastes from the nuclear fuel cycle, IAEA, Vienna (1976).

TABLE 2.—NEA/OECD SEA DISPOSAL OPERATIONS

Year	Dumped weight (tonnes)	Approximate activity	
		Alpha (curies) (actinides)	Beta-gamma (curies) (including ^3H)
1967	10,840	250	7,600
1969	9,180	500	22,000
1971	3,970	630	11,200
1972	4,130	680	21,600
1973	4,350	740	12,600
1974	2,270	420	[1]100,000
1975	4,460	780	[2]60,500
1976	6,770	880	[3]53,500
Total	45,970	4,880	289,000

[1]Tritium almost exclusively.
[2]Including about 30,000 curies of tritium.
[3]Including about 21,000 curies of tritium.

Mr. BREAUX. Thank you very much, Dr. Rowe, for your presentation and your slide presentation as well.

Does EPA's research to date indicate that the decision to allow low-level waste dumping into the ocean was a proper decision, or was it one that we would probably not make today?

Dr. ROWE. We would certainly not make the same decision today to dump into the sea considering the way the disposal program was carried out up to 1970.

Mr. BREAUX. What would we do differently?

Dr. ROWE. Pardon me?

Mr. BREAUX. What would we do differently today?

Dr. ROWE. First, we think the sites are too shallow. We think new sites must be below 4,000 meters where the currents would be less and no food fish would be found.

Second, we think that the packaging has to be changed to prevent the implosion of packages when they are sent to the sea bottom.

Third, we think that proper sites have to be found and investigated and determined prior to disposal, and that we need monitoring requirements so we can assure that the disposal took place properly and continues to operate properly.

Mr. BREAUX. What has EPA found the effect on the marine environment to be at the disposal sites that you have studied?

Dr. ROWE. We have found that some of the radioactivity has leaked and the sediment samples have very high-levels of radioactivity, and probably a lot more radioactivity has leached into the ocean and been dispersed. How much, we don't know. There has been some dispersion and dilution.

Mr. BREAUX. That is what happened?

Dr. ROWE. That is what has happened.

Mr. BREAUX. The next question is, what effect has the leaking waste had on the marine environment in the area? Is someone looking at that, in connection with the actual determination of what happened to the canister?

Dr. ROWE. We have been taking samples and we have been looking at some of the fish in the area and other kinds of wildlife. We don't have any results yet, do we, Bob?

Mr. DYER. No; When you are looking at low-level-wastes, you are not looking at easily measurable direct effects on the biological environment.

Mr. BREAUX. Shouldn't somebody be doing that?

Mr. DYER. What we are looking at is the potential for bioaccumulation of materials in the event that they were to be released at higher levels. We are not really critiquing past disposal activities other than to look at those disposal sites as potential or generic examples of transport environments; that is, in the future if you were to put in an order of magnitude higher activity of waste in a more soluble form or less soluble form or whatever, what would be the likely radionuclide transport mechanisms that would exist in that site?

And one of the things we found in the shallower sites is that productivity is very high, and that the potential of these sites for transport of these materials through food chain leading to man would be greatly increased compared to deeper ocean sites. So as far as actual assessment of bioeffects, the state of the art is such that it would be very difficult to determine the effect of a low-level radioactve material over, for example, a heavy-metal, nonradioactive material. And because of the cumulative insults on the marine environment in the shallow sites, you could not necessarily distinguish the effect from one source of pollutant versus another. However, as was shown earlier, the levels of radioactivity in radioactive wastes that may be generated in any future year are expected to be orders of magnitude higher than the total amount dumped in the ocean during the past 10 or 15 years.

Mr. BREAUX. I know I am going to have to read your answer to determine whether I agree with you or disagree, because it is not clear to me. My qustion is very simple. You have found out that it does leak. And my question is, what effect does it have on the

marine environment? How does it affect fish? How does it affect marine life?

Mr. DYER. That is the problem. How do you distinguish the cause of any effect on the marine environment when you are looking at a dumpsite that also received heavy-metals, explosives, and toxic wastes as well as radioactive wastes?

Mr. BREAUX. I guess I am trying to pin you down really. We have dumped, for a period of time in relatively shallow water, low-level radioactive wastes. EPA has looked at it and determined that some of the drums have cracked open just a little bit and radioactivity has leaked out.

My question is, is anyone determining what effect the radioactive waste has had on the marine environment? Is NOAA looking at it or is any other agency or shop studying the effect on the marine environment?

Dr. ROWE. I think I could summarize it this way. We are determining the cumulative pathways. At intermediate levels, no direct effect is going to be seen. Our interest is the accumulation of the leached materials through different pathways, some of which could reach to man. There is no major impact that we have measured directly.

Mr. BREAUX. I guess one of the concerns I have is that it seems to me it would be very difficult to set standards for the dumping of the low-level waste unless we know what the effects of the dumping could be and would be on the marine environment.

Dr. ROWE. I think we in our standards program are taking the reverse attitude. We argue that if you can have adequate containers that reach the seabed properly and stay there without leaching or having a breach, we could be assured of no effect on the marine environment.

Mr. BREAUX. I agree with that. If it doesn't leak, it won't affect the marine environment.

Dr. ROWE. That is our objective.

Mr. BREAUX. But the ones we have dumped in the past apparently have leaked.

Dr. ROWE. Yes, sir.

Mr. BREAUX. So it is really important to find out what effect they have had on marine environment because it might happen in the future.

Dr. ROWE. We are studying it, sir. The problem is that the levels we are talking about were very low-levels indeed. We have measured background levels which are higher. There is sea life which might be contaminated, but its movement makes sampling difficult, such that at any given time the levels are so low that they are hard to measure.

Mr. BREAUX. Do the Europeans have a monitoring program of their low-level waste ocean dumping sites?

Dr. ROWE. No, sir, they have no monitoring program whatsoever.

Mr. BREAUX. How do we know they are following all of our wonderful recommendations that we have been printing up?

Dr. ROWE. In truth, sir, we don't know. It is a surveillance mechanism which NEA oversees, and they have observers. The observers watch the disposal of the barrels. Nobody inspects what

is inside the barrels. What the disposing country says is in the container is marked on the outside of the barrel and accepted.

Mr. BREAUX. Doesn't that give you some concern?

Dr. ROWE. Yes, sir, it does.

Mr. BREAUX. What are we doing internationally trying to establish or encourage some sort of a monitoring program?

Dr. ROWE. We have been working through the IAEA. They have accepted most of our recommendations, and NEA has agreed that when those recommendations are in force they will then implement the new regulations. I think that would be a major step forward in correcting the problem.

Mr. BREAUX. How many foreign countries are currently dumping low- level wastes into the ocean?

Dr. ROWE. The OECD mechanism is the only one I know of, and I think there are four countries operating under that mechanism.

Mr. BREAUX. Four?

Dr. ROWE. Four, I believe.

Mr. BREAUX. What about the problem that we have talked about with respect to the regulations of EPA as far as the definition of high-level radioactive wastes? How does that compare with the definition of NEA?

Dr. ROWE. The existing definition for IAEA is the same as ours. Now through this advisory program we are working on, there has been some effort to change the definition to include some quantitative activity levels in addition to the present qualitative defintion. The definition that we hope will result will not only include our definition but have additional conditions as well, We will not lose anything in the definition process.

Mr. BREAUX. Does EPA feel that we have done enough and sufficient research into the effects of seabed disposal?

Dr. ROWE. Are we talking high-level waste or low-level waste, sir?

Mr. BREAUX. I guess I am talking about both, really.

Dr. ROWE. We think that for low-level waste emplacement on the bottom of the sea probably will be a useful technique which is economically feasible. To go further to see whether——

Mr. BREAUX. Let me interrupt. I thought I heard one gentleman say one of the main reasons why they discontinued it is because it was not economically feasible as compared to a land disposal.

Dr. ROWE. Some agencies other than EPA have indicated that they may want to dispose of some wastes in this manner and want to have, the option for doing it. We think that such disposal can be done economically for certain low-level short-lived wastes, and we think that we should make the option available. We think we can make it available in 1980-85 period.

Now emplacement within the floor of the seabed requires a significant, greater investment, and at this time we are not sure that greater investment would result in a desirable option. However, there is no reason why feasibility research shouldn't be undertaken at some modest level. But, remember high-level wastes, under both our act and the international act are illegal. In our opinion the bottom of the sea is a very stable medium, and that if material could be placed in the seabed properly, that this might be a possible long range, desirable approach.

Mr. BREAUX. What about possible retrievability?

Dr. ROWE. That is what I was going to get to next, sir. The problem is the emplacement of waste, the difficulty of getting it down there. If you make a mistake in disposing of a package, a corrective action would be required. This is what I would call short term retrievability—by "short term" I am talking about retrievability during the disposal operation where one must verify that you have put a canister in the proper place and that disposal has taken place properly. It may even take some greater period to assure that you have taken the action properly. We are talking about retrievability, for correcting mistakes, not in terms of recovery of wastes. We think this is where the difficulty is going to lie in developing any seabed disposal program. The techniques for doing this are not even available for low-level waste yet. So far all we have ever done is brought back two low-level waste canisters from the top of the seabed with great difficulty. We think if the feasibility studies show that this is a possible option, and that other methods are not going to work, that a long-term research and development program necessary to establish a seabed disposal program might then be worth the effort. At the present time we think it is a very long-range program.

Mr. BREAUX. Mr. Pritchard.

Mr. PRITCHARD. I haven't any questions of the witness.

Mr. BREAUX. Dr. Rowe and Mr. Dyer, we appreciate very much your testimony. You have raised some very interesting points and comments. I really think we need to know more about the potential effect of radioactive materials on the marine environment.

I wonder why NOAA is not involved in this. Perhaps they should be.

We appreciate your testimony, and if we have any additional questions, we will submit them to you for your response.

Thank you very much.

Dr. ROWE. Fine.

Mr. BREAUX. The subcommittee will announce that we will receive testimony from the State Department and from Dr. Anderson and Dr. Deese following the recess.

We will have to catch the quorum.

There will be a recess until 1:30. We will return at 1:30.

The subcommittee will stand in recess until that time.

[Whereupon, at 12:20 p.m., the subcommittee was recessed, to reconvene at 1:30 p.m., this same day.]

Mr. BREAUX. The Subcommittee on Oceanography will please come to order.

This afternoon the subcommittee will welcome Mr. Bill Long, Acting Deputy Assistant Secretary for International Environmental and Population Affairs for the Department of State.

Mr. Long, we do have your testimony. It will appear in the record in its entirety. We invite you to summarize, if you can, the contents of your testimony so we can proceed with some questions.

We welcome you.

STATEMENT OF BILL LONG, ACTING DEPUTY ASSISTANT SECRETARY FOR INTERNATIONAL ENVIRONMENTAL AND POPULATION AFFAIRS, U.S. DEPARTMENT OF STATE, ACCOMPANIED BY ROBERT DYER, ENVIRONMENTAL PROTECTION AGENCY

Mr. LONG. Mr. Chairman, I appreciate being here on behalf of the Department of State this afternoon. I think this is a classic global environmental issue, in view of the fact that many countries are responsible for the problem, or potential problem * * * any solution requires a collaborative effort by a number of countries * * * and it certainly will require the United States to maintain leadership internationally if we are to resolve the issue of ocean disposal of nuclear wastes in a fashion acceptable to us.

I will summarize my prepared statement Mr. Chairman. I intend to lay out for the committee a picture of where the world community stands today with respect to dealing with this issue, and then, describe what the U.S. role is within the international community.

I would like to start by laying out some of the precepts on which U. S. policy, strategy, and objectives are based at the present time.

First of all: The basic principle to be applied in the management of radioactive wastes under all conditions and situations is to protect man and other sensitive elements of the biosphere from harmful exposure to ionizing radiation emissions from these wastes;

Second: In the face of increasing worldwide demand for energy, and growing interest in and reliance on nuclear energy, pressures to utilize the marine environment for disposal of wastes will increase;

Third: Events over the past 5 years indicate that the nations of the world are sensitive to the potential environmental risks associated with nuclear waste disposal in the oceans, and are prepared to collaborate and cooperate to provide necessary safeguards;

Fourth: The United States can continue to be a major positive force in erecting and maintaining such safeguards if we are prepared to lead by example through our domestic policies and actions in this area, and also are willing and able to spearhead the international search for environmentally safe and cost effective nuclear waste disposal sites and technologies;

And, finally: The international arrangements and machinery now in place provide a broad and flexible framework within which it is possible for the United States to pursue its principal objectives for nuclear waste disposal.

This morning a number of speakers testified on domestic policy, and I don't propose to go into this, except to say that by virtue of the existence and implementation of our own domestic legislation, and the fact that the United States terminated its dumping of nuclear wastes in the ocean in 1970, we posssess the experience, expertise, and the credibility to exert international leadership and influence in this field.

As called for in the Marine Protection, Research and Sanctuaries Act of 1972, we have attempted to do just that. While many extremely complex issues and requirements remain, the United States can legitimately take credit for proposing a number of the initiatives which provide much of the structure and the direction of current international efforts with respect to dumping of nuclear

wastes in the seas. Also, U.S. policymakers and scientists are continuing to play key roles in virtually all of the ongoing negotiations, studies and programs I will shortly review.

In 1971 the United States tabled a draft treaty on ocean dumping at the first meeting of an international working group on marine pollution which was formed to prepare for the 1972 Stockholm Conference on Human Environment. After a complex set of negotiations, the convention on the prevention of marine pollution by dumping of wastes and other matter—the so-called "London Dumping Convention"—emerged in December 1972.

Several speakers have already described the London Dumping Convention, and the fact that it deals specifically with ocean dumping of nuclear materials in two annexes. I don't propose to repeat this.

The convention came into force in August 1975 and to date 37 nations have ratified or acceded to it, including the Soviet Union, the United Kingdom, France, the Federal Republic of Germany, Canada, and the United States.

Japan and the Republic of China are important nations with nuclear waste disposal requirements which are signatories to the Convention but have not yet ratified it, although Japan has indicated its intention to ratify the Convention in the near future.

Responsibility for administering the Convention has been assigned to the Inter-Governmental Maritime Consultative Organization—IMCO—which, in the discharge of its responsibilities, convenes annual consultative meetings of contracting parties. The third consultative meeting is scheduled for this coming October.

Similar to the requirements of the U.S. Marine Protection, Research and Sanctuaries Act, the London Dumping Convention calls upon nations to prohibit completely the dumping of high-level nuclear wastes and to govern the disposal of lower-level wastes through a permit system which would be based on internationally accepted criteria for disposal.

Responsibility for defining what constitutes high-level wastes and for developing recommendations which contracting parties should take into account when issuing permits for ocean dumping of all other radioactive wastes, has been assigned under the Convention to the International Atomic Energy Agency—IAEA—in Vienna.

In view of this assignment of responsibility, and in recognition of the IAEA's strong capabilities and its broad international representation, the United States looks to the IAEA as a principal international mechanism for addressing scientific and technical issues related to radioactive waste disposal in the marine environment.

In 1976, at the first consultative meeting of the contracting parties to the Convention, the IAEA presented a provisional definition of high-level wastes and recommendations for disposal of lower level wastes. The United States has subsequently worked to modify and strengthen the definition and recommendations which will be presented in revised form to the IAEA Board of Governors next month for approval, and then to the third consultative meeting of the contracting parties in October.

Principal U.S. objectives being pursued within the IAEA framework include the following:

One: Gaining international agreement on a definition of high-level wastes which specifically prohibits certain sources and types of wastes from being dumped, along the lines of our domestic legislation;

Two: Affirming and gaining acceptance of the importance of waste isolation and containment through improved packaging as a necessary measure to reduce releases of radioactivity to the oceans;

Three: Specifying, within the provisional disposal criteria for lower level wastes, the requirement for environmental monitoring to assess and validate assumptions on deep sea radionuclide transport, immobilization, and potential environmental effects; and

Four: Obtaining a limit on the number of dumping sites, and a total prohibition on dumping of wastes in waters of less than 4,000-meter depth, which would resolve the issue of the minimum acceptable disposal depth for dumping packaged, solidified wastes.

While we believe that the IAEA's efforts to date—and particularly the broad-based international support the IAEA role and work have engendered—are extremely promising, important, and difficult issues remain.

One of the most critical requirements is to gain agreement on the definition of high-level wastes. If a definition based solely on the quantitative level of radioactive emissions is agreed to, then any type of waste could theoretically be dumped by countries which argue that their containment technology will keep radiation levels below the permissible limits. This would, in effect, be a conclusion that no nuclear wastes are unsuited for dumping, a position opposed by the United States.

On the other hand, U.S. proposals to prohibit dumping in water less than 4,000 meters have been accepted by the IAEA, and other proposals designed to limit dumping sites and to strengthen packaging and monitoring requirements are beginning to attract broad support.

A second important international mechanism which the United States is utilizing to further our goals and objectives in this area is the Nuclear Energy Agency of the Organization for Economic Cooperation and Development (OECD).

Established in 1957 as the European Nuclear Energy Agency, the NEA has, since 1967, supervised a series of low-level-radioactive waste disposal operations at sea in which various member countries have participated. A single dumping site in the northeast Atlantic has been used. The United States has not been involved in the operations either before or since it became a member of the NEA in 1976.

With the coming into force of the London Dumping Convention in 1975, NEA decided to redefine its role in the ocean dumping area and to devise more formal procedures that take into account that convention and the guidelines for the disposal of radioactive waste that were to be developed by the IAEA.

While the United States has expressed major reservations about ocean disposal of low-level radioactive wastes within the OECD and other international forums, we believe that as long as such disposal methods are being used it is essential that they be effectively supervised. We, therefore, have favored a continued NEA supervi-

sory role within the OECD along lines that are fully consistent with the London Dumping Convention and IAEA guidelines.

Since becoming a full member of the NEA, the United States has worked to encourage tighter regulations and controls on the dumping operations conducted by member nations. One focus has been on improving disposal procedures, and we see movement within the NEA toward recognition that containment and isolation of wastes through stricter packaging requirements must be seriously considered as the more acceptable alternative to dispersal and dilution; and also that site monitoring before, during, and after dumping operations must be seriously considered by countries which engage in dumping operations.

In addition, the United States has supported the NEA's efforts to establish surveillance and prior notification and consultation procedures in relation to members dumping activities. A new detailed set of procedures was formally approved by the OECD Council last July.

We routinely receive notifications of planned dumping operations and have the opportunity to raise questions if we see fit. We have, on one recent occasion, sought and received supplementary information. No formal consultations so far have been held on any specific dumping operation under the new system.

Finally, the United States has also pressed successfully within the OECD for explicit provision of a consultative role for the OECD Environment Committee on policy matters related to the NEA ocean dumping program. We are pleased that our efforts to get the OECD Environment Committee constuctively involved with NEA activities has borne fruit.

In concluding my discussion of the NEA activities, it is worth noting that the Agency has scheduled an experts meeting to assess the current dumping site for the fall of 1978 in order to decide whether the site can continue to be used, or another selected for future operations. Additionally, a second meeting of experts will be convened this fall to review the question of radiological monitoring programs in relation to the dumping operations which NEA oversees.

An adjunct of the NEA relevant to this subcommittee's interests is the Seabed Working Group of the Radioactive Waste Management Committee. The group consists of representatives from Canada, the United Kingdom, France, Japan, the United States, and the NEA Secretariat.

This working group meets annually, the last time being in February 1978, and is a forum for the review of research and development activities relating to seabed disposal of high-level nuclear waste materials. The Department of Energy provides U.S. representation on the working group. The participating countries are principally engaged in exchanging information on national programs and projects, and in trying to coordinate them to the extent feasible.

There are a number of other international bodies which have the potential to do useful work in the area of ocean disposal of nuclear wastes. I won't go into these in any detail. They are described in our testimony. They include the International Energy Agency; the International Nuclear Fuel Cycle Evaluation Program, which the

representative of the Department of Energy described this morning; and one that hasn't been mentioned earlier, the U.N. Environment Program—UNEP.

UNEP was the international body that sponsored the Barcelona meeting which produced the 1976 Convention for the Protection of the Mediterranean Sea Against Pollution. While UNEP does not have plans to engage in any large-scale work in the area of ocean disposal. I would like to make this point about an important role it might play in the future. UNEP is a major international forum in which developing countries actively participate. I think it is fair to say that in today's world, with the developing countries seeking a share in resources of the oceans, they have a vested interest in seeing that the oceans are not polluted. Consequently "Third World" nations may emerge as a significant force to constrain the more industrialized nations from using the oceans for purposes judged to be inimical to their own objectives.

Having described some of the international institutional mechanisms, I would like to briefly review the actual dumping situation.

No nation has dumped, or is dumping, high-level wastes into the marine environment. Also, there are no indications that any nation will press to initiate such actions in the reasonable future.

As already implied, the question of possible disposal within the seabed is very complex. The NEA has stated on this issue that "* * * a large number of questions must be answered and many studies performed before a feasibility assessment of the concept is possible."

In addition, the London Dumping Convention clearly prohibits disposal of high-level wastes on the sea floor and would, at a minimum, ban the disposal of such wastes under the seabed unless it could be demonstrated that they would not pose a threat to the marine environment.

Under U.S. law, the Marine Protection, Research and Sanctuaries Act seems to prohibit any American disposal of high-level wastes in or under the ocean.

Low-level nuclear wastes have been disposed of via ocean dumping for some 25 years. During the 1950's the United States dumped containerized low-level wastes off both the Atlantic and Pacific coasts under supervision of the Atomic Energy Commission. There was a major curtailment of this program in 1962, and it was stopped entirely in 1970. Since 1974, the EPA has been conducting an extensive survey program to determine the fate of these radioactive wastes.

Several European countries utilized ocean dumping for small quantities of nuclear wastes in the early 1960's, and since 1967 seven European countries have been periodically participating in the NEA-supervised dumping operation. These countries are Belgium, the Netherlands, Switzerland, the United Kingdom, West Germany, France, and Italy, although since 1971 only the first four have dumped.

The NEA reports that during the 1967–77 period low-level wastes mixed with concrete and totaling 51,500 metric tons have been dumped under its auspices in the northeast Atlantic. The current site is approximately 900 kilometers southwest of Land's End, United Kingdom.

33-546 O - 78 - 17

Mr. BREAUX. Mr. Long, if I may. We have a recorded vote. Let me run down and catch that. We will be in recess until the completion of the vote. I will be right back.

[Brief recess.]

Mr. BREAUX. The subcommittee will come to order.

Would you proceed, Mr. Long.

Mr. LONG. Mr. Chairman, I was in the process of describing current ongoing dumping activities. I had pointed out since 1971 only four European countries have been involved in ocean disposal of low-level nuclear wastes, those countries being Belgium, the Netherlands, Switzerland, and the United Kingdom.

The NEA reports during the 1967-77 period low-level wastes mixed with concrete and totaling 51,500 metric tons have been dumped under its auspices in the northeast Atlantic.

In that regard, Mr. Chairman, I might call the committee's attention to the fact that we do get reports before and after the fact on dumping operations by individual countries. The document I am holding is for a dumping operation last year conducted by the United Kingdom. To give you an example of the types of materials that are being dumped, I would like to read just a brief sentence:

> These wastes include radioactive chemical sludges and liquids incorporated in the cement, shredded plastics, metallic objects, such as pumps, tools, pipework, et cetera, laboratory trash, crushed glass, rubber gloves, protective clothing, and air filters.

The report describes the form in which the waste is packaged for disposal; and it also describes the fact that there will be a representative of the Nuclear Energy Agency on the ship to monitor the dumping operation.

The United Kingdom and the Netherlands have, in the past 2 years, been responsible for the largest quantities of dumped nuclear wastes. While each of these countries has been responsible for approximately the same amount by total tonnage of the low-level wastes, the United Kingdom wastes have exceeded those of the Netherlands by a factor of some 75 in terms of contained radioactivity.

Based on the radioactivity of the materials—measured in curies—disposed of by all participating European countries, there has been a clearly, albeit slowly increasing trend in the period 1967 through 1977. The level of alpha particles dumped increased some fourfold during this period, as did the amount of beta plus gamma radiation, excluding tritium. If 1969 is used as a base, the increase is closer to twofold in both cases, but the trend is still upward.

I might point out our figures include the year 1977, which the EPA figures presented this morning do not. If anybody wants to make a cross comparison, they might keep in mind that our figures do include 1 additional year. None of the other major industrialized nations or any of the developing nations are known to be engaging in ocean dumping of low-level wastes.

Attitudes with respect to ocean dumping of nuclear wastes vary. Clearly those countries currently engaged in dumping view this as a necessary approach, based largely on grounds that suitable land-based alternatives do not exist in their relatively small land areas. Other European nations, notably Sweden, Portugal, Finland, Norway, and Denmark, have consistently expressed opposition in

principle to sea dumping of radioactive waste while working within both the IAEA and OECD/NEA frameworks to insure that ongoing and future dumping operations by others are rigidly controlled.

The Soviet Union has been a vigorous supporter of the London Dumping Convention and has also opposed, in principle, ocean disposal of nuclear wastes. Japan has carried out a research and development program on ocean dumping since 1972, and has indicated plans to commence dumping of nuclear wastes in 1979, although this may be delayed.

Internationally, our policy has been, and is, to state that the United States has major reservations about ocean disposal of radioactive wastes and is itself not dumping. However, recognizing that some countries will continue to use this method of disposal, and also that the expanding amount of such wastes being generated may increase both the amounts deposited and the number of countries involved, the United States is pursuing within the IAEA and NEA the goal of insuring that such waste as is deposited in the oceans is handled in the environmentally safest way.

We are continuing to press for effective surveillance and consultation procedures; careful selection and limitation in the number of dumping sites; an acceleration of research on the impact of radioactive emissions on the marine ecosystem; international acceptance of the need to utilize isolation and containment of nuclear wastes based on application of improved packaging techniques; and development and implementation of comprehensive monitoring programs before, during, and subsequent to any disposal operations.

While working toward these objectives, we have joined with other nations in stating that the international agreements, studies, and decisions to which we are parties should not be interpreted as encouraging the dumping of radioactive wastes in the marine environment.

In conclusion, Mr. Chairman, there is some cause for optimism with respect to safeguarding the marine environment from indiscriminate and environmentally damaging dumping of nuclear wastes. The London Dumping Convention, and the work programs of the IAEA and the OECD/NEA in particular, have collectively provided an effective framework for engaging countries in information exchange, debate, and decisionmaking on approaches and obligations with respect to ocean dumping.

We believe that significant steps have been taken by the international community since the convention came into force only 3 years ago. In addition, the public attention being given to ocean dumping operations and the need for strong controls on environmental grounds is a powerful force on those countries engaging in ocean dumping.

The fact that the majority of the nations of the world—the developing countries—are not yet themselves faced with significant nuclear waste disposal problems, and are voicing interest in and concern about protecting and sharing the resources of the global oceans may well be another constraint on expanded ocean dumping.

On the other hand, ocean dumping of low-level wastes is "legal," internationally, under provisions of the London Dumping Convention. Many of the industrialized nations do not have the land-based

disposal options that the United States and others possess because of their small size and/or geologic conditions.

In relation to especially the question of disposal of high-level wastes, there is also the vital issue of nuclear proliferation which, inter alia, arises from the pressure some nations feel to reprocess their spent fuel for energy economy and, possibly erroneously, to lessen the magnitude and cost of the waste disposal problem. Through initiatives such as INFCE and the President's spent fuel policy, we are seeking to encourage nations to move in directions which will minimize proliferation risks and, as a corollary benefit, promote the most environmentally sound approaches to waste management practicable.

It is difficult to judge the ability of the United States to influence whether, or how, the oceans will be used as a dumping ground or repository for nuclear wastes over the long term. Clearly, our domestic policy and actions with respect to ocean dumping have enabled the United States to influence quite significantly recent international decisions and programs in this area from a base of experience and credibility.

Prospects for the future, however, will depend largely on the ability of the international community as a whole to examine the options thoroughly and reach a common meeting of the minds on the best approach or approaches to dealing with the nuclear waste disposal problem.

In this regard, U.S. scientific and technological knowledge and guidance in this field is much in demand, and our ability to influence what materials, if any, are disposed of in the world's oceans and seabed is critically dependent on the degree of leadership we are able to exert with respect to the identification, analysis and, finally, the selection of environmentally sound waste disposal technologies.

Thank you, Mr. Chairman.

Mr. BREAUX. Thank you, Mr. Long, for your testimony. Let me ask you this. In your opinion, is there any monitoring currently taking place of the low-level waste dump sites used by some of the European nations?

Mr. LONG. To my knowledge, there is not, Mr. Chairman. That is a particular concern of ours. As I tried to point out in my testimony, I think we are heartened by the fact that we have put in place very rapidly the international institutional and juridical framework necessary to deal with the issues which confront us at the present time with respect to ocean dumping.

I must say it personally bothers me when we see even low-level wastes dumped in the ocean, and we are not quite sure what is happening to them. The idea of "out of sight out of mind" can easily prevail. Therefore, the United States is pressing within the IAEA, and also the OECD, for strong monitoring, so we know exactly what happens to these wastes when they move out of the containers into the ecosystem.

Mr. BREAUX. Even the countries that are doing the dumping are apparently not monitoring the effects, is that correct?

Mr. LONG. That is correct. The requirement is for monitoring of the transport and the dumping operations. But information on what happens to these wastes when they are dumped into the sea

at a depth which is now, I believe, 4,500 meters, is not being collected.

That is something we certainly must continue to press for. But, one can only move in so many directions so fast. We have focused to date on definitions, prior notification procedures, and getting acceptance, in principle, of monitoring and evaluation. Within the IAEA and the OECD framework we will continue to press more and more vigorously for such things as monitoring.

Mr. BREAUX. So there is no requirement that any of the low-level waste dumpsites be monitored. As I understand it, there is really no requirement either that they follow the recommendations, in appendix 2, of the London Convention as to the type of containers and other matters regarding the handling of the wastes?

That is really only a recommendation. It is not really required that what is contained in appendix 2 be followed, is that correct?

Mr. LONG. The countries that are currently dumping, the European countries, are, as far as I know—and I will verify this for you—adhering to the IAEA's so-called provisional recommendatons. Based on the descriptions we get of what is dumped, and the packaging, I believe that they are meeting those recommendations. Those requirements are more or less minimal, however, and that is another area where work needs to be done. But, I think we do have some knowledge of the packaging and how the materials are being dumped.

Mr. BREAUX. I would imagine that our only source of information is what they tell us that they did.

Mr. LONG. Exactly right.

Mr. BREAUX. There is no monitoring by the IAEA at all.

Mr. LONG. In relation to the dumping which is supervised by the Nuclear Energy Agency of the OECD, there are observers on the vessels. To the extent that all current operations are being conducted within the OECD framework, and we have no reason to believe that there are exceptions, then there is that degree of monitoring.

Mr. BREAUX. OK. It seems that your statement, on page 14, when you refer to the interpretation of the London Convention as prohibiting the disposal of high-level waste into the ocean differs somewhat from the interpretation of Mr. David Deese, on page 14 of his testimony. He has not testified, but we have his testimony.

Dr. Deese seems to think there is some question as to whether the London Convention does indeed prohibit the dumping of high-level waste in the ocean, if it is in fact placed on the seabeds.

Mr. LONG. Our testimony talks about high-level waste disposal within the seabed, and states that the London Dumping Convention would appear to prohibit it unless it could be demonstrated that any such activity would not pose a threat to the marine environment. However, one of the issues we are concerned about relates to whether the London Dumping Convention would apply if a country were to state that it is not dumping high-level wastes into the seabed, but is emplacing the wastes in such a manner that they could be retrieved; namely, a storage rather than dumping operation.

I am not a lawyer. It is difficult for me to interpret. But reading through the literature on this, and talking to people, I sense this as an area that needs further examination.

Mr. BREAUX. Mr. Hughes?

Mr. HUGHES. Thank you, Mr. Chairman. Thank you, Mr. Long.

How were the initial dumpsites selected by the countries that are presently dumping? Is there any criteria used that seems to be central in all the countries, or was site selection just on a haphazard basis. Was there any effort to find out just what would be good sites or was it just the out-of-sight, out-of-mind approach which you mentioned earlier?

Mr. LONG. The situation now is that there is a single dumping site, but also that the international community is beginning to examine alternatives to that.

Now, just how that initial site was selected, I am not at all clear. Maybe Mr. Dyer of EPA, who I think may still be here, and has participated as one of our principal experts in the international negotiations, on ocean disposal of nuclear wastes, may have that answer. With your permission, I would be willing to let him respond directly. Or, I could submit it later for the record.

Mr. HUGHES. Do you know offhand how the initial sites were selected?

Mr. DYER. Yes, I do. The sites were primarily selected to be remote from land, and hopefully in an area below a depth of 3,500 meters. There was a relocation to the present dumpsite that the NEA is using, after certain countries such as Portugal complained that the original dumpiste was too close to their seacoast. Most of the early dumping was conducted by countries other than the ones that were closest to the dumpsite.

Mr. HUGHES. We have the same problem with sludge dumping.

Mr. DYER. The basic problem is the site still has not yet been surveyed in the true sense of making actual environmental measurements.

Mr. HUGHES. I also gather from all the testimony that I have read here today that there doesn't seem to be a consensus on what constitutes low-level radioactive material.

Since there has been no monitoring, I guess we can safely assume that we have all gradations of radioactive material being dumped. Does that concern you?

Mr. LONG. It concerns us a great deal. Again, if I may, I will refer the question to my expert I just inherited from EPA, because we have discussed this extensively. Mr. Dyer participated recently in the IAEA meetings on the subject of provisional recommendations and definitions. He is very much up to date, and I would like him to give you an answer to that, if I may.

Mr. DYER. I don't think there is a major problem regarding the specific numerical definition, for example, of what is low-level waste. There is a concern for the positive identification of the contents of the waste.

In the past there has been a difficulty in determining the curies of activity, the actual curie units of material that were in the wastes to be dumped.

The problem has been approached from the other direction, which I think the chairman discussed this morning and that was to

define high-level radioactive wastes, and to assume that everything else that is not under the definition of high-level wastes is therefore low-level wastes, including some degree of gradation there.

The problem again that was unresolved this morning is what is the international community doing about defining what is high-level waste, with the understanding that everything below that definition can be, with the proper review, considered for sea disposal. The definition that the United States has for high-level radioactive waste, and what the International Atomic Energy Agency (IAEA) has defined as high-level radioactive wastes are not the same.

We have a qualitative definition that describes a class of materials. Internationally, the IAEA is attempting to quantify the qualitative U.S. definition, by putting numerical limits onto this definition.

As an example, the IAEA has defined as high-level-radioactive waste any tritium wastes exceeding ten-to-the-sixth curies per ton of waste. That is considered high-level radioactive waste, unsuitable for sea disposal.

Mr. BREAUX. Let me interrupt on that point. This seems to be a different answer than we got this morning. We were asking a question about EPA's definition of high-level waste. I think your boss said it is the same as IAEA's definition. Now, I think you are saying they are different.

Mr. DYER. What I am saying is that the domestic definition is qualitative and does not contain numerical guidance. It is defined as first-cycle solvent extraction wastes from the reprocessing of nuclear fuel. In the IAEA definition for sea disposal, that definition is not used.

An attempt to quantify the meaning of the qualitative U.S. definition is what the international community is pursing. They are saying that if this is the qualitative definition, what does that mean in curies of radioactivity.

We are in fact talking about the same definition, one being a quantification of the U.S. qualitative definition.

Mr. BREAUX. Are we ever going to get them together?

Mr. DYER. Pardon?

Mr. BREAUX. Are we ever going to get the two definitions the same? This is very important.

Mr. DYER. This has been the attempt. The basic problem we have had is that the approach to defining high-level wastes for land disposal regulations, or should I say the factors to be considered in defining high-level radioactive wastes for land disposal regulations versus sea disposal regulations are different, in that there may be different pathways, as we attempted to discuss this morning, that would be much more critical in a sea disposal situation.

So, we may come up with a numerical definition of high-level radioactive wastes unsuitable for disposal that would not necessarily be totally applicable to a land burial situation or vice versa.

Mr. BREAUX. I thank the gentleman for yielding.

Mr. HUGHES. Just one more question. Mr. Long, besides Japan, are there any other dumpers, or potential international dumpers that are not signatories to the convention?

Mr. LONG. Are you speaking now of high-level wastes, or low-level?

Mr. HUGHES. Low-level wastes.

Mr. LONG. Not to my knowledge.

Mr. HUGHES. How about high-level wastes?

Mr. LONG. No. As I pointed out in my statement, we don't see in the foreseeable future any countries being inclined or prepared to dispose of high-level wastes in the oceans—and I mean by this the next 8 to 10 years.

Mr. HUGHES. So in effect Japan is the only potential low-level dumper that has not ratified the convention presently.

Mr. LONG. That is right. I would be glad to investigate that. But to my knowledge, that is right.

Mr. HUGHES. Would you do that for us?

Mr. LONG. Yes, sir.

Mr. HUGHES. Thank you.

[The information follows:]

RATIFICATION OF CONVENTION BY JAPAN

As noted in the testimony, four European countries have engaged in dumping low-level radioactive wastes into the ocean in the last few years: the United Kingdom, the Netherlands, Switzerland, and Belgium. Of these, the first two have ratified the London Dumping Convention, while the latter two have signed but not yet ratified.

Japan is the only country which has signed but not ratified the Convention which is a real potential additional dumper of low-level radioactive wastes. Two other countries which might, in the reasonable future, give consideration to dumping low-level radioactive wastes in the ocean would be the Republic of Korea and Italy. We have no evidence that either is seriously considering the possibility, however, and their "potential" for ocean dumping is considered significantly less than Japan's at this point. (Korea has not signed the London Dumping Convention, while Italy has signed but not ratified.)

Mr. BREAUX. The committee will be in recess until the completion of a vote, and come right back.

[Brief recess.]

Mr. BREAUX. The subcommittee will please come to order.

Our next witnesses this afternoon will be Mr. David Deese, from Harvard University, and Dr. Anderson, director of the seabed disposal program at Sandia Laboratories.

We welcome you gentlemen. I have seen you sitting out in the audience while we have been running back and forth to vote. I appreciate your consideration. I doubly appreciate your being so patient.

The committee has your testimony. We would invite you to proceed as you see fit. Welcome to both of you gentlemen.

STATEMENT OF D. R. ANDERSON, DIRECTOR, SEABED DISPOSAL PROGRAM, SANDIA LABORATORY AND DAVID DEESE, HARVARD UNIVERSITY

[The statement follows:]

STATEMENT OF D. R. ANDERSON, SEABED PROGRAMS DIVISION, SANDIA LABORATORIES, ALBUQUERQUE, N. MEX., AND LIVERMORE, CALIF.

Mr. Chairman and Members of the Committee: I am D. R. Anderson of the Seabed Programs Division of the Sandia Laboratories. I am pleased to have the opportunity to participate in the Subcommittee's hearings on Nuclear Waste Disposal in the ocean.

DOE charged Sandia Laboratories with the tasks of assessing the environmental and technical feasibility of isolating high-level waste beneath the deep ocean floor in geologically stable and biologically inactive regions, and of developing a capability to assess other ocean disposal programs, whether national or international. My remarks today will summarize the progress and task status of the Seabed Program.

As background, DOE's mainline plan for the disposal of commercial high-level radioactive waste, including spent fuel, has been to place the material in a stable continental geologic formation at a depth attainable by conventional mining methods.[1] Alternatives to this approach under study by DOE, other federal agencies and other nations include: (1) variations on geologic disposal, including the addition of steps prior to disposal to reduce the volume or change the character of the waste, or the consideration of alternate geologic approaches or locations; or (2) alternatives to the use of geologic formations as barriers between man and the high-level waste. The Seabed Program falls within the first category—it considers the use of geologic units (sediments or rocks) beneath the floor of the oceans.

The program is managed by me and my staff at Sandia Laboratories. Program guidance comes both from the participating scientists and engineers working on the program (Fig. I), and from the Executive Committee of which I am chairman. Funding for this program, which comes from two departments in DOE—Environmental Control Technology (ECT) and Biomedical and Environmental Research (DBER)—was 897 thousand dollars in FY 76, 1.3 million dollars in FY 77, 3.05 million dollars in FY 78 and 3.1 million dollars proposed for FY 79 (Fig. II). I emphasize that the Seabed Program began and still must be considered as an assessment of an alternative, or perhaps complementary option, to the land-based disposal of high-level nuclear waste or spent fuel (Fig. III). It is clear, however, that a complete assessment of all terrestrial disposal options would be seriously deficient if the 70% of the earth's surface covered by ocean were not considered.

The near-term objectives of the Seabed Disposal Program (Phase I—1978-1980) are:

(1) To assess the environmental and technical feasibility of providing isolation of high-level waste or spent fuel in geological formations beneath the floor of the oceans in remote, predictable, climatologically and geologically stable, biologically inactive regions where mineral resources are minimal; and

(2) To develop and maintain a capability to assess ocean disposal programs developed by other nations (Fig. IV).

If nothing is found during Phase I of the program which would eliminate it from further consideration, Phase II (1980-1985) will assess the engineering aspects of emplacement of HLW or spent fuel into the chosen geologic units beneath the ocean floor. Again, if nothing is identified during Phase II which eliminates the concept, Phase III (designed to demonstrate the capabilities of the Seabed concept through semi-routine emplacement) will be initiated and will continue through 1995 (Fig. V).

The individual components of this program are coordinated into a systems engineering package (Fig. VI) which would provide the information needed to deal with the waste from the time it leaves the reprocessing or repackaging plant until it is safely disposed of. The information derived from the characterization of the natural barriers is to be coupled with the process requirements to safely emplace the waste in the geologic formation of interest (sediments). Included in this systems engineering package but not currently being addressed in detail are: emplacement processes, transportation processes, risk/safety analyses, economic analyses, sociopolitical analyses, and the conceptual design of the handling and emplacement facility. Also, at this time, no funds from the program are being used to characterize the rock barrier beneath the ocean floor sediments, although recent data from the Deep Sea Drilling Project support our emphasis on the sedimentary units.

During FY 1978, the following portions of the detailed assessment of the vertical consistency of deep-ocean sediments recovered by long corers will be completed: initial assessment of the radionuclide (sorption) retention properties of red clay and calcareous sediments for selected radionuclides; development of mass transport, fluid dynamics and heat transfer codes; development of static and dynamic hole closure analyses; and continued characterization of deep-sea and bottom-dwelling biologic communities to determine biological effects, and possible concentration and transport mechanisms in case of accidental release at the sea floor. During FY 1979, the oceanographic investigations will continue to focus on present and past rates of natural processes on and beneath the ocean floor, and on the potential impact that waste emplacement could have on these processes. These investigations will include: (a) the development of models for ion transport, dynamic emplacement and physical

[1] National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future—Vol. 2 Program Implementation, ERDA-76-1, ERDA, pg. 238, 1976.

oceanographic transport; (b) the development of models of pathways and rates of biological transfer of radionuclides from sediments to the water column; (c) preliminary development of remote techniques and sampling programs to assess the horizontal continuity of different biological communities; (d) completion of the sorption studies on red clay sediments for solutions of both single and multiple ions in both batch and column configurations; (e) initial assessment of the sorption properties of siliceous and hemipelagic sediments for solutions of single ions in seawater; (f) continued development of an in-situ heat transfer experiment involving near-surface sediments at water depths of more than 5000 meters in the deep ocean; (g) continued assessment of the vertical and deep horizontal consistency of sediment properties in the North Pacific mid-plate/mid-gyre (MPG)—I study area; (h) initial identification of canister/waste/sediment interactions, with special emphasis on environmental, physical and chemical changes that could be produced by the heat and radiation from HLW or spent fuel; and (i) initial assessment of concepts for waste emplacement within the sediments with emphasis on penetrometer emplacement.

Some of the significant near-term milestones are identified in Figure VII.

The first five years' efforts were intended to accomplish two essential initial goals: (1) identify a suitable ocean floor regime (if any) for further study as a disposal alternative, and (2) plan the oceanographic and effects investigations required to fully understand the generic area and the likely results of disposal in such an area.

Some of the scientific highlights to date include the identification of geologically stable, remote areas, (Fig. VIII) which have no significant present or future biological, or mineral resources (Fig. IX). A comparison of these areas (Fig. X) suggests that the regions in the centers of the large crustal plates and large oceanic gyres are most likely to contain good disposal sites. Other regions, such as fracture zones, trenches or great river deltas, have been suggested because they offer the hope of fast burial by natural processes. We have downgraded such areas, however, because they are tectonically or otherwise unstable, or because sedimentation is not predictable, either vertically or horizontally. The "mid-plate, mid-gyre" regions are large, and our results in the North Pacific show that the sediments are uniform and predictable over distances of at least tens of kilometers. We have identified similar areas in the North Atlantic on which we will begin core sampling in 1978.

Our philosophy has been to treat the disposal question as a multiple barrier assessment problem (Fig. XI) where we first assess the capability of the geologic formation to contain the waste without the perturbations caused by man's intrusion (radionuclide movement in the natural state) (Fig. XII). If and when an adequate barrier sequence is identified in the natural state, then the degrading influences of the foreign chemical ions, the heat, the radiation and the mechanical emplacement of the canister will be assessed. If the barrier sequence is still found to be adequate, then the engineering emplacement studies will be initiated (Fig. XIII).

Thus far in our assessment of the natural barriers we have ruled out the water column and the Benthic Boundary layer from further consideration as major barriers for the long time containment of radionuclides.

We have focused our attention on the waste form and canister for short-term containment and on the sediments for long-term containment. Our data thus far suggest that the normal slow diffusion of waste elements through the highly impermeable deep-sea clay is reduced more than a thousandfold by the sorptive properties of the clay. Similarly, the low permeability of the clay strongly inhibits thermal convection of the pore waters. Our mathematical predictions (for which we plan In-Situ Verification Tests (ISHTE)) suggest that the heat from a waste canister will produce a maximum vertical displacement of pore water which is very small compared to the sediment thickness. These preliminary results from the sorption and thermal-migration studies are very encouraging, but they require further validation. The next most important questions which still need to be resolved center around the changes in chemical and mechanical behavior of the sediment. Two areas of concern are: (1) the effect of waste canister on the rate of movement of radionuclides through the sediment due either to chemical or mechanical changes; and (2) the capacity of the plastic sediment to flow and regain its original strength, permeability, and sorption properties after emplacement of a canister. Although it is too early in the development of the program to seriously address the problem of waste emplacement (sufficient laboratory and field scientific data have not been collected to make a selecion of method) the emplacement concepts to be considered are the penetrometer, the weighted probe, the trencher and drilled holes (Fig. XIII). With modification, all of the above concepts are within current engineering technology. Some attractive possibilities of the Seabed option are;

(1) Remoteness from man's present and future activities;

(2) High confinement capability and uniformity of certain ocean sediments;

(3) Large heat-sink capability of the oceans;
(4) Large volume of diluent material in case of an uncontrolled release;
(5) Potential international solution to the radioactive waste disposal problem and possible assistance in addressing nuclear prolifieration problems.
(6) Large areas of potentially useful sediments from which to select disposal sites.
Potential unattractive features are:
(1) Monitoring and retrieval techniques have not yet been demonstrated;
(2) Emplacement techniques have not yet been demonstrated;
(3) Special handling and vessel facilities would be required;
(4) The implementation of the Seabed Disposal concept may be contrary to existing international laws and agreements.

The Seabed Program has international implications both for its potential contribution to solving the waste management problem worldwide, and because of the sensitivities and restrictions associated with international law and the politics of any activities that might pollute the world's oceans. These implications are addressed in the Program by participation in joint international programs, by contributions to conferences, by discussions of international policies affecting the seas, and by close liaison with international organizations such as NEA, IAEA, and IEA which deal both with the ocean, and with nuclear and nonnuclear wastes. More specifically, an International Seabed Working Group has been organized as a Subgroup of the Subcommittee on Radioactive Waste Management under the auspices of the Nuclear Energy Agency of OECD. The Subgroup has been in existence for two years. Its membership includes the U.S., UK, France, Japan and Canada. The Seabed Working Group is further divided into seven Task Groups (Fig. XIV). Each country has, or soon will have, an individual serving on each of the Task Groups. The goals of the Task Groups are: (1) to encourage coordination of relevant research between nations, and to facilitate the exchange of data; (2) to develop cooperative R and D programs between the member nations; (3) to share important facilities, such as research ships and equipment; and (4) to provide a mechanisms for the exchange of testing procedures and samples.

To complete the record, I would like to submit the following additional documentation:

(1) W. P. Bishop and C. D. Holister. "Seabed Disposal—Where to Look", Nuclear Technology, Vol. 24, 1974.
(2) D. R. Anderson and others. "Release Pathways for Deep Seabed Disposal of Radioactive Wastes", IAEA Symposium Proceedings, IAEA-SM-198/34, 1975.
(3) "Oceanus", special Seabed Disposal issue, Vol. 20, no. 1, 1977.
(4) D. M. Talbert, Seabed Disposal Program, Annual Reports, January-December, 1975, 1976, Sand 76-0256 and Sand 77-1270, 1976, 1977.
(5) D. R. Anderson and others, "Report to the Radioactive Waste Management Committee on the First International Workshop on Seabed Disposal of High-Level Wastes, Woods Hole, Massachusetts, February 16-20, 1976", Sand 76-0224, 1976.

In conclusion Mr. Chairman, though we remain cautious, and emphasize that our role is assessment and not advocacy, our studies to date have not identified any technical or environmental reasons to suggest that high-level waste or spent fuel cannot successfully be emplaced in stable sedimentary formations beneath the abyssal floor of the deep oceans.

PROGRAM PARTICIPANTS

C. D. Hollister - WHOI*	Geology
V. T. Bowen - WHOI	Radiochemistry
P. Rhines - WHOI	Physical Oceanography
R. R. Hessler - SIO	Benthic Biology
J. McGowan - SIO	Water Column Biology
A. Yayanos - SIO*	Microbiology
K. Smith - SIO	Biology
T. E. Ewart - UW	Ocean Instrumentation
D. E. Hayes - LDGO	Geophysics
A. J. Silva - URI	Geotechnical Properties
G. R. Heath - URI*	Geochemistry
K. Keil - UNM	Geology
I. C. Bupp - H. U.	Economics
A. Robinson - H. U.	Physical Oceanography
D. A. Deese - H. U.	Legal/Political Aspects
G. Boyer - DOE/ECD	Program Management
H. Hamilton - DOE/DBER	Program Management
K. Bryan - P. U.	Fluid Dynamics
D. R. Anderson - SLA*	Program Management
D. M. Talbert - SLA*	Systems Analysis
W. P. Schimmel - SLA	Heat Transfer
C. E. Hickox - SLA	Heat Transfer
C. M. Percival - SLA	Mechanical Engineer
J. L. Krumhansl - SLA	Hydrothermal Geochemistry
P. R. Dawson - SLA	Mechanics
E. Erickson - SLA	Chemistry
J. W. Braithwaite - SLA	Metallurgy

* Executive Committee

ASSESSMENT OF OCEAN BED DISPOSAL

Support from ECT and DBER

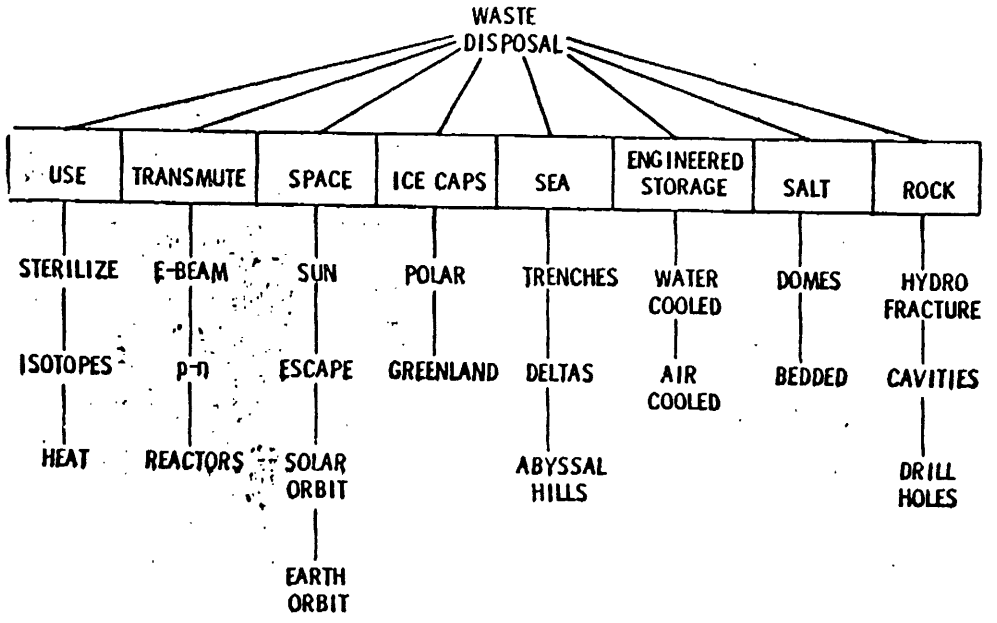
(THOUSANDS OF DOLLARS)

FY 1974	FY 1975	FY 1976	FY 1977	FY 1978	PROPOSED FY 1979
$1,500 A/	$ 260	$ 897	$1,300	$3,050	$3,100

A/ OFFICE OF NAVAL RESEARCH/SANDIA LABS

5-8-78

WASTE DISPOSAL OPTIONS



ASSESSMENT OF OCEANBED DISPOSAL

PHASE 1

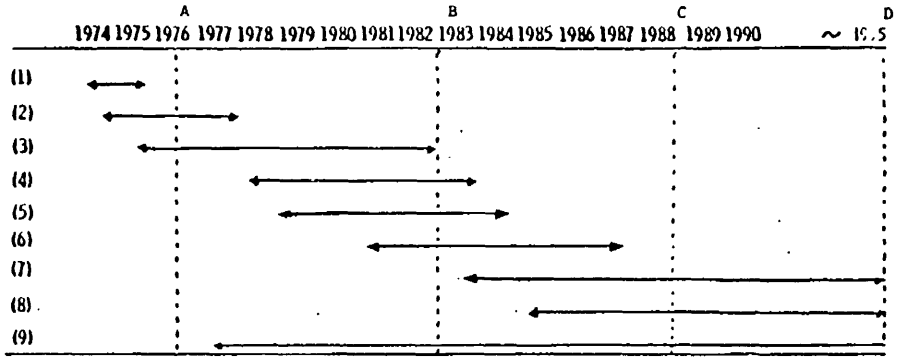
1975 - 1980- 1983

(A) ASSESS THE ENVIRONMENTAL AND TECHNICAL FEASIBILITY OF STORING RADIOACTIVE WASTES BENEATH THE DEEP OCEAN FLOOR IN GEOLOGICALLY STABLE AND BIOLOGICALLY INACTIVE AREAS.

1986

(B) DEVELOP AND MAINTAIN CAPABILITY FOR ASSESSING OTHER NATIONS OCEAN DISPOSAL PROGRAMS

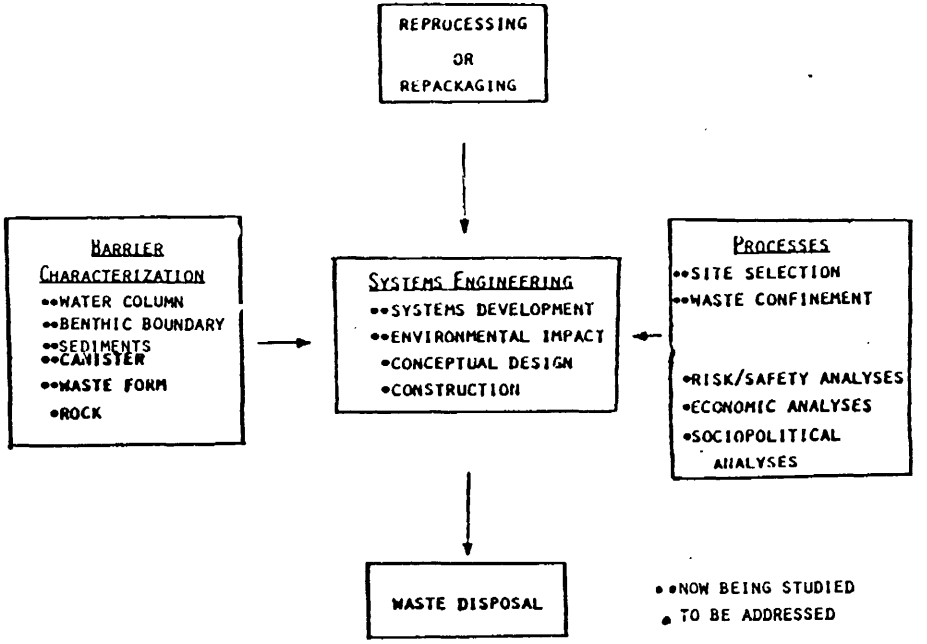
TIMETABLE FOR ACCOMPLISHMENTS



(1) DEVELOP SITE SELECTION CRITERIA
(2) SELECT GENERIC STUDY SITES
(3) IDENTIFY AND QUANTIFY ION MIGRATION BARRIERS
(4) DEVELOP PREDICTABILITY CRITERIA
(5) DEVELOP ENGINEERING EMPLACEMENT SYSTEM
(6) TEST SYSTEM
(7) ASSESS SAFETY AND ENVIRONMENTAL IMPACT
(8) DEVELOP PRODUCTION FACILITIES
(9) DEVELOP AN ASSESSMENT CAPABILITY FOR FOREIGN DISPOSAL OPTIONS

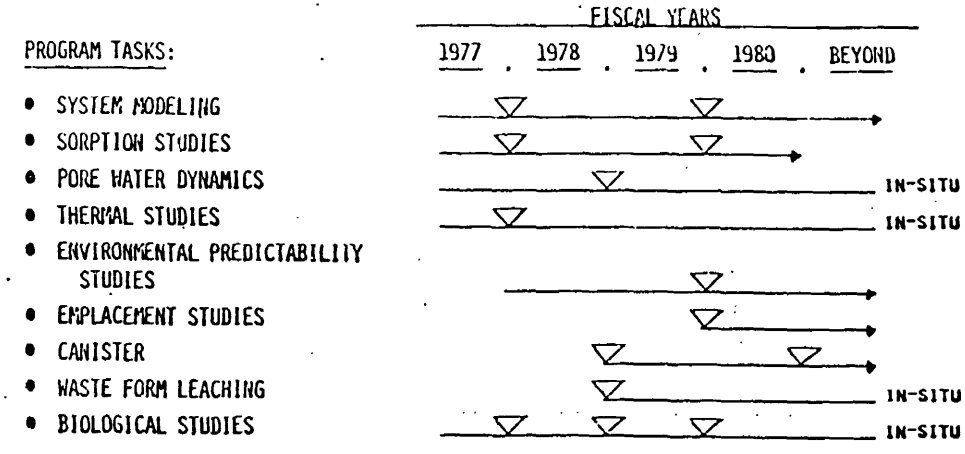
A FEASIBILITY ASSESSMENT FROM HISTORICAL FIELD DATA
B FEASIBILITY ASSESSMENT FROM NEW FIELD SCIENCE AND INITIAL LAB SCIENCE DATA
C FEASIBILITY ASSESSMENT FROM LAB SCIENCE AND INITIAL ENGINEERING DATA
D FINAL FEASIBILITY ASSESSMENT FROM A DEMONSTRATION FACILITY AND INITIAL SAFETY AND ENVIRONMENTAL EFFECTS

THE SYSTEM



33-546 O • 78 • 18

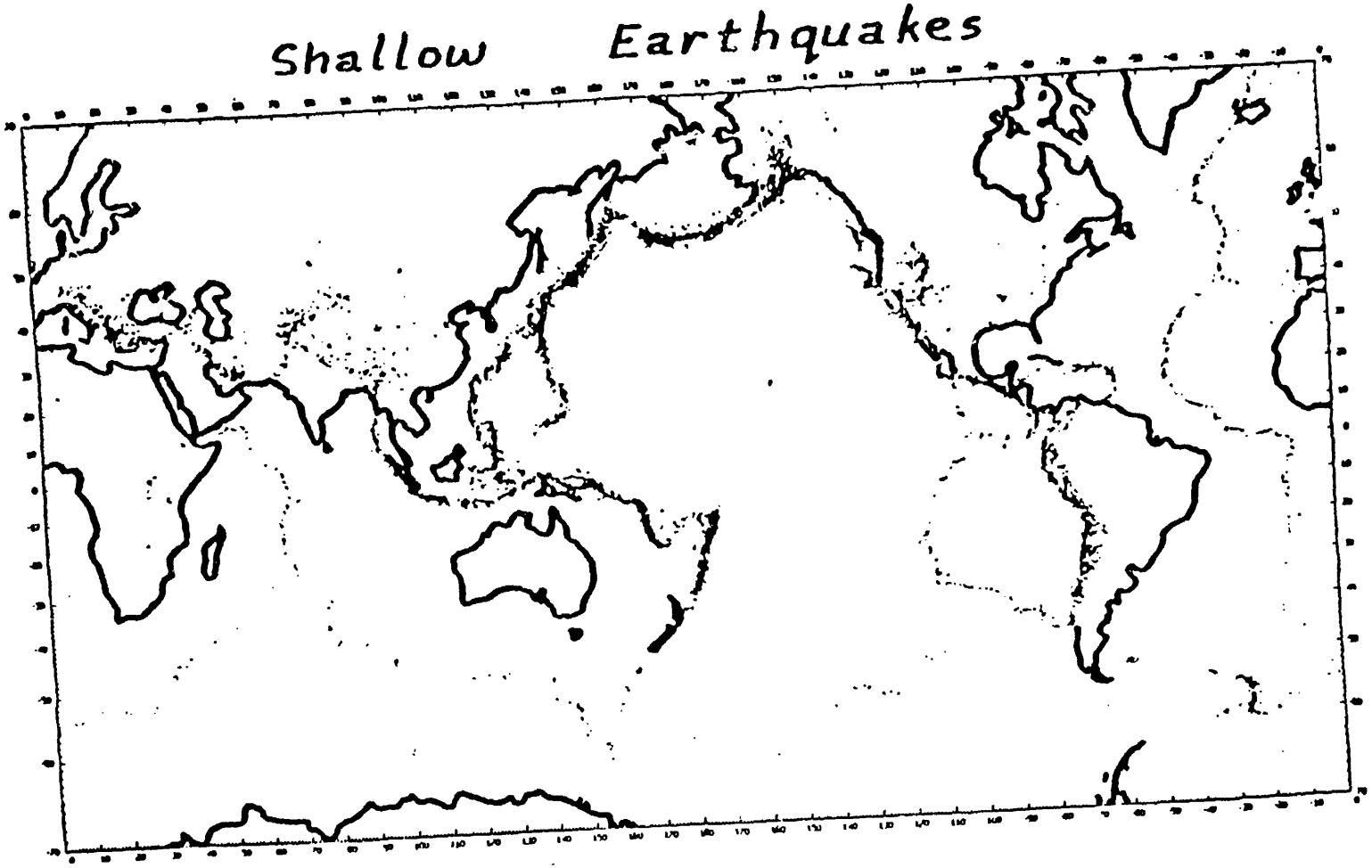
ASSESSMENT OF OCEAN BED DISPOSAL



▽ SIGNIFICANT MILESTONES

→ CONTINUED INVESTIGATION

11-10-77



Worldwide distribution of shallow epicenters (1961-1967; depth between 0 and 100 km) (after Barazangi and Dorman, 1969)

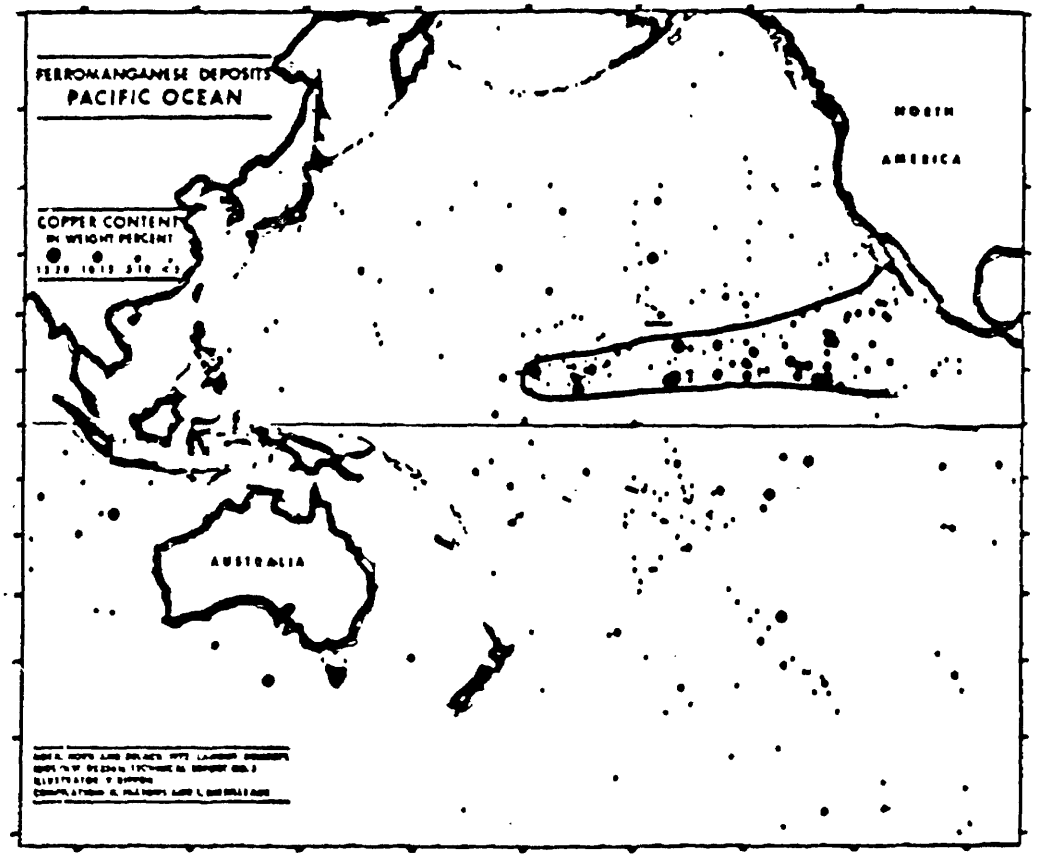
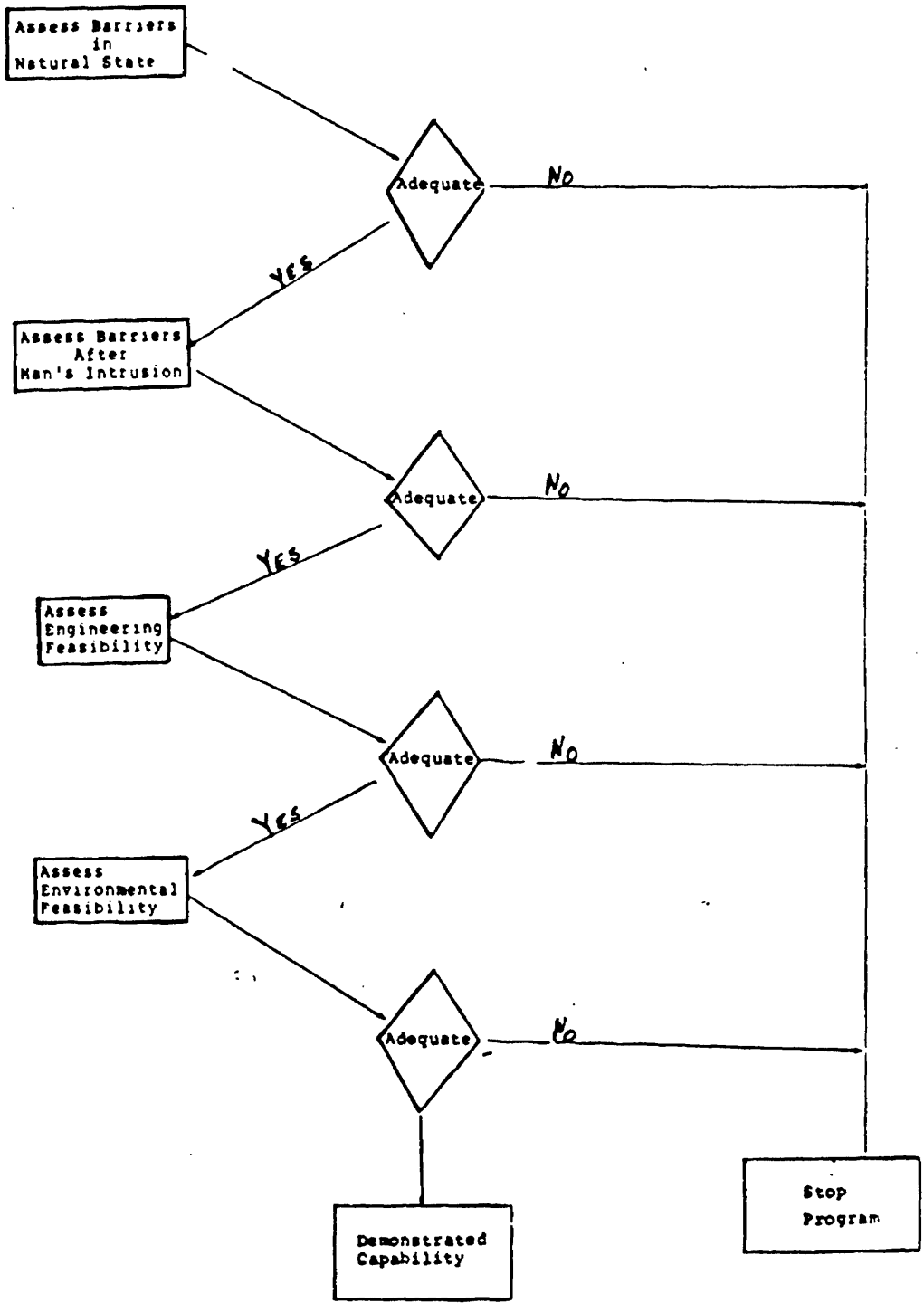


Figure 2. Copper content of ferromanganese deposits of the Pacific Ocean. Chemical analyses reveal a broad band of nodules rich in copper south of the Hawaiian Islands.

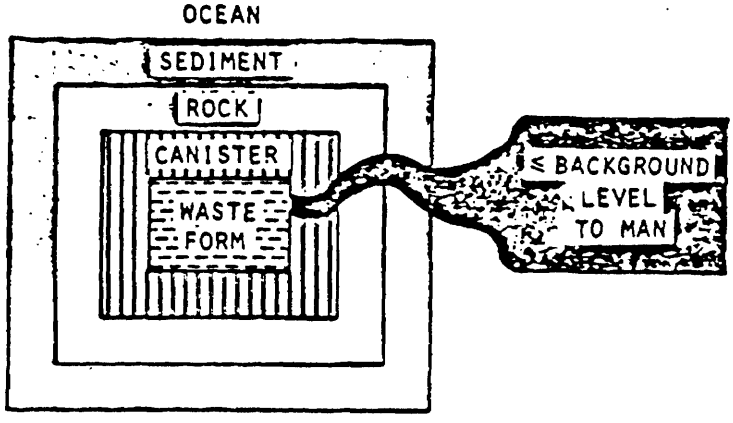
COMPARISON OF THE MAJOR OCEANIC REGIMES

		STABILITY	RESOURCES	AREA km x 10^6	INTERNATIONAL	ACCESSIBILITY	SEDIMENT THICKNESS km	PRODUCTIVITY	RANKING
MID-OCEANIC RIDGE	FRACTURE ZONE	LOW-HIGH	LOW	SMALL	YES	LOW-VERY LOW	0-2	HIGH TO LOW	2
	FLANKS	HIGH	VERY LOW	LARGE	YES	LOW-VERY LOW	0.5-1		
	CREST	LOW	LOW	SMALL	YES	MEDIUM-HIGH	0-0.1		
	RIFT VALLEY	VERY LOW	LOW	SMALL	YES	MEDIUM	0		
CONTINENTAL MARGIN	SHELF	VERY LOW	VERY HIGH	15-25	NO	VERY HIGH	2-20	HIGH	
	SLOPE	VERY LOW	MEDIUM	15-25	NO	MEDIUM	2-20	MEDIUM	
	RISE	MEDIUM	MEDIUM	20	BOTH	LOW	5-10	LOW	
	DELTA AND FANS	VERY LOW	HIGH	5-10	BOTH	MEDIUM	5-10	HIGH	
OCEAN BASIN FLOORS	SEAMOUNTS	VERY LOW	LOW	10	YES	VERY HIGH	0-0.5		
	TRENCHES	VERY LOW	VERY LOW	6	BOTH	VERY LOW	1-5	MEDIUM	
	ABYSSAL HILLS (MID-PLATE)	HIGH	VERY LOW	130	YES	VERY LOW	0.1-0.3	VERY LOW	1
	ABYSSAL PLAINS	LOW	MEDIUM	10-20	BOTH	VERY LOW	0.5-2	VERY LOW	

Technical Barrier Logic and Decision Diagram



MULTIPLE BARRIER CONCEPT - SEABED DISPOSAL PROGRAM



$T_{CONTAINMENT} \geq X \times 10^6$ YEARS (GOAL)

$= T_{WASTE\ FORM} + T_{CANISTER} + T_{ROCK} + T_{SEDIMENT} + T_{OCEAN}$

$T_{WASTE\ FORM} = 10^3$ TO 10^X YR WHERE "X" = F(1/SOLUBILITY)

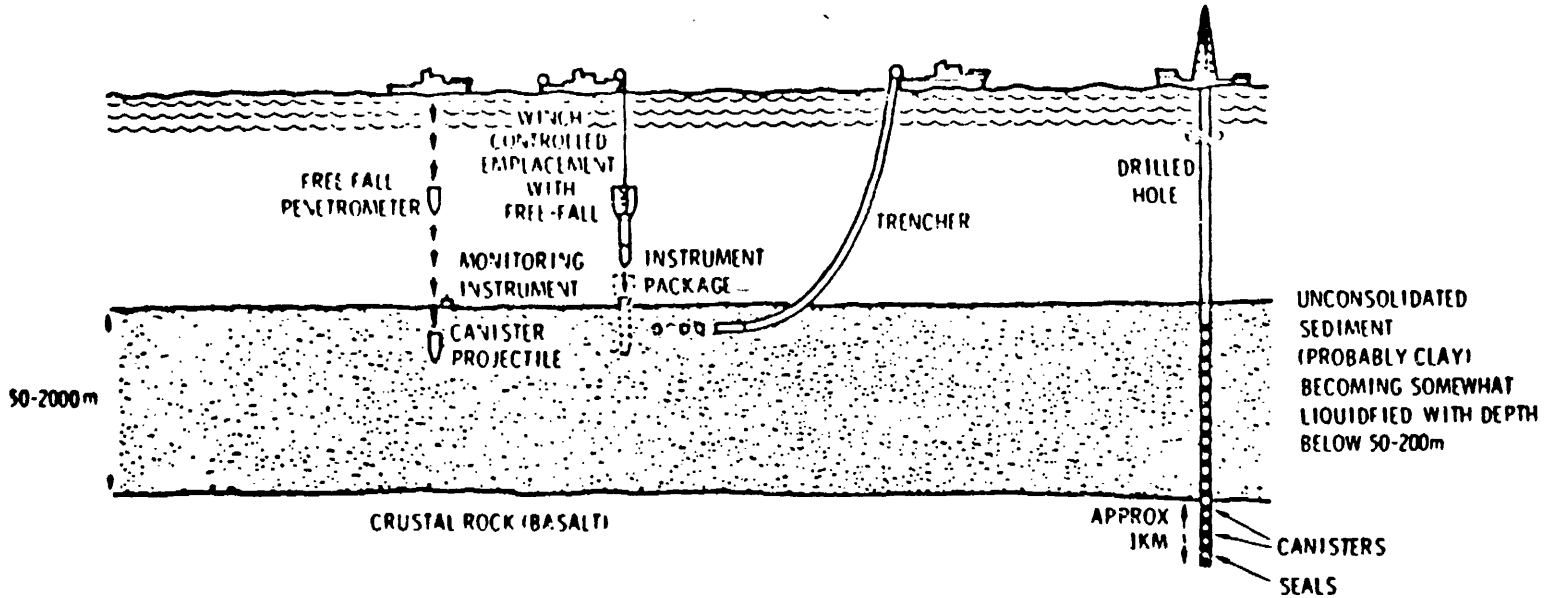
$T_{CANISTER} = 10^2$ TO 10^3 YR

$T_{ROCK} = 10^?$ YR (BULK PERMEABILITY DUE TO THERMAL-CONTRACTION FRACTURES UNKNOWN)

$T_{SEDIMENT} = 10^6$ YR/100 M (PURE DIFFUSION)

10^{13} YR/100 M (TH SORPTION + DIFFUSION)

$T_{OCEAN} = 10^2$ TO 10^3 YR (LESS IF BIOLOGICAL SHORT CIRCUIT)



SHUTTLE VESSEL REQUIRED	NO	NO	YES	YES
TECHNICAL STATUS	STATE OF THE ART	STATE OF THE ART	REQUIRES SOME DEVELOPMENT	STATE OF THE ART

SUB- SEABED EMPLACEMENT CONCEPTS - SOLIDIFIED HIGH-LEVEL RADIOACTIVE WASTES

FIGURE 1

NEA-RADIOACTIVE WASTE MANAGEMENT COMMITTEE

SEABED WORKING GROUP

75% work done by U.S.

CANADA	G. VILKS
JAPAN	H. HOTTA
FRANCE	A. BARBREAU
UK	K.D.B. JOHNSON
US	D. GLENN BOYER
NEA	F. GERA

TASK GROUP	CANADA	JAPAN	FRANCE	UK	US
PHYSICAL OCEAN	NEEDLER	HOTTA*	MADELAIN	HILL	ROBINSON
CANISTER	-	EMURA	GRALL	CORBET	MAGNANI
WASTE FORM	-	-	POTTIER	MARPLES	JOHNSTONE/KRUMHANSL
BIOLOGY	MILLS	HOTTA*	BELOT	HOLDEN	YAYANOS
SEDIMENT & ROCK	WANGERSKI	HOTTA*	SALLE	LEWIS	HEATH
SITE CRITERIA	KEEN/PIPER	HOTTA	BARBREAU	LAUGHTON	HOLLISTER
SYSTEM ANALYSIS	-	HOTTA*	DE MARSILY	WEBB	TALBERT

* ACTING CAPACITY

FEBRUARY 6, 1978

Dr. ANDERSON. Thank you, Mr. Chairman.

I am D. R. Anderson of the seabed program division of Sandia Laboratories. I am pleased to have the opportunity to participate in the subcommittee's hearings on nuclear waste disposal in the ocean.

In 1974 DOE charged Sandia Laboratory with the task of assisting the environmental and technical feasibility of isolating high-level wastes on the deep ocean floor in geologically stable and biologically inactive regions, and of developing a capability to assess other ocean disposal programs, whether national or international.

The basic concept at this point in time is for emplacement of the radioactive wastes well within the blanket of deep ocean sediments which are stable and have accumulated over millions of years and are in the process of becoming sedimentary rock.

Such a protective blanket might provide isolation of the wastes. However, the feasibility of the concept of seabed emplacement of radioactive wastes needs to be established.

The program, as you indicated, is managed by me and my staff at Sandia Laboratories. Program guidance comes both from the participating scientists and engineers working on the program viewgraph I, and from the executive committee of which I am chairman.

For clarification of the viewgraph, WHOI is Woods Hole Oceanographic Institute. SIO, Scripps Institute of Oceanography. UW is University of Washington; Lamont Dougherty Geologic Observatories, LDGO; URI, University of Rhode Island; UNM, University of New Mexico. HU is Harvard University. PU is Princeton University. SLA stands for Sandia Laboratories.

I would also like to point out that in the case of the ocean scientists, to keep them independent in their assessment, yet involved in the program to a greater degree than a consultant, we have attempted to keep their level of support at approximately 30 percent—enough so they can contribute, but small enough so that they are not financially dependent on the program and if they see a real problem with the seabed program, they can feel that they stand up and say: "Hey, it is a crazy program and we ought to turn it off."

The funding for this program, which comes from two departments of DOE, is shown in the next slide.

I won't dwell on that. You can pick it up from the testimony, if you wish.

I would like again to emphasize that the seabed program began and still must be considered as an assessment of an alternative or perhaps a complementary option to the land-based disposal of high nuclear waste or spent fuel.

From the next slide I would like to point out that when we were tasked with the problem of looking at seabed disposal, DOE, then AEC, was carrying out a preliminary assessment of all disposal options and some use options.

My task, as you might realize, was to look at that part of the earth covered by water, which is approximately 70 percent of the total surface area of the Earth. It is obvious that DOE wold have

been remiss if they had not considered that portion as well as geologic formations on land.

The near-term objectives of the seabed disposal program are shown in the next slide.

They are to assess the environmental and technical feasibility of providing isolation of high-level waste or spent fuel in geological formations beneath the floor of the oceans in remote, predictable, climatologically and geographically stable, biologically inactive regions where mineral resources are minimal; and second, to develop and maintain a capability of assessing ocean disposal programs developed by other nations.

I would like to stop here and correct a mistake in my viewgraph and the testimony. The second date should be 1983 rather than 1980. We are in the process of changing the final assessment time from 1990 to 1995 due to a change in funding projections. This dictates a slip of 2 and 3 years in the intermediate assessment dates, from 1980 to 1983, and from 1985 to 1988.

In our study, if nothing is found during phase I of the program which would eliminate it from further consideration, phase II will assess the engineering aspects of emplacement of high-level wastes or spent fuel into the chosen geologic units beneath the ocean floor.

In the next viewgraph, the three phases are identified along with a task and time schedule.

Again, if nothing is identified during phase II which eliminates the concept, phase III, which is to demonstrate the capabilities of seabed concept through routine emplacement, will be initiated and will continue through 1995.

The individual components of this program are coordinated into a systems engineering package, which would provide the guidance needed to deal with the waste from the time it leaves the reprocessing or repackaging plant until it is safely disposed of.

The information derived from the characterizaton—phase I—of the natural barriers is to be coupled with the process requirements to safely emplace the waste in the geologic formation of interest—sediments—phase II.

Included in this systems engineering package but not currently being addressed in detail are emplacement processes, transportation processes, risk/safety analyses, economic analyses, sociopolitical analyses, and the conceptual design of the handling and emplacement facilites.

Also, at this time, no funds from the program are being used to characterize the rock barrier beneath the ocean floor sediments, although recent data from the deep sea drilling project support our emphasis on the sedimentary units.

In the first 5 years of the study [part of phase I] we were attempting to accomplish two essential goals: The first was, to identify a suitable ocean floor regime or regimes for further study. The second was to plan the oceanographic effects and investigation required to fully understand the natural processes within the area and the changes in the processes if high-level waste or spent fuel was placed there.

Some of the scientific highlights to date include the identification of geologically stable, remote areas, which have no significant present or future biological or mineral resources.

The next viewgraph shows a cross section of the Earth, depicting the areas where there is high and low tectonic activity. High activity would be expected in the trench, on your left, and on the midocean ridge, on your right

The crustal section in between, whether it be continental or oceanic, has lower tectonic activity.

On the next slide, which is a map of the Earth, are drawn the oceanic fracture zones [lines] and the recorded earthquakes epicenters [dots]. High tectonic activity occurs around the edges of the plates, while within the plates themselves everything is relatively quiet.

The next viewgraph depicts the movement of the ocean and continental plates as a function of time. The shaded areas indicate the positions of the plates many millions of years ago.

The dark colored areas indicate where the plates are now. The arrows indicate the directions the plates are moving and the number beside the arrow—which is very hard to read in most cases—indicates the rate—in inches—that the plate is moving per year. From this and other information, predictions can be made on future plate movements and the geologic stability of sections of the ocean crust.

Another important site selection criteria is climatic stability. The program scientists have identified the midgyre areas as the most climatically stable areas upon our globe. The term midgyre area needs to be defined.

A gyre is the clockwise or counterclockwise rotation of the surface waters of the oceans in the Northern and Southern Hemispheres. The next viewgraph indicates the location of the five major gyres—North and South Atlantic, North and South Pacific, and South Indian Oceans.

The next viewgraph shows the areas of high surface biologic activity which we think also controls the amount of biologic activity beneath.

High biological activity—a resource—is found along the continental margins, and low biological activity is found in the centers of the gyres.

The only mineral resource known in these deep oceans is the manganese nodule. The next viewgraph shows where the high concentration of manganese nodules are found. Within in the manganese nodule itself, the manganese and iron are not the most important elements. It is the nickel and the copper that the nodule contains. The oblong area just north of the equator in the Eastern Pacific is the area where the manganese nodules contain relative large percentages of copper and nickel.

The next slide is used to demonstrate to those unfamiliar with the extent of the oceans just how large and remote they are.

The State of New Mexico is superimposed over our North Pacific study area.

From these and other criteria, we have focused on three areas to carry out additional study. These areas are indicated on the far right in the rank order on the next viewgraph.

They are midplate areas, overlain by surface gyres, the flanks of ridges overlain by surface gyres, and the distillate ends of abysal planes overlain by surface gyres.

We have considered other regions such as fracture zones, trenches, large river deltas, because they offer hope of fast burial by natural processes. But we have downgraded such areas because of the sedimentation not being predictable, and tectonic instability.

The regions we are focusing upon are large, and the results in the North Pacific show the sediments are uniform and predictable over distances of at least tens of kilometers.

We have identified similar areas in the North Atlantic where we will begin coring in 1978.

Our philosophy in identifing and understanding the radionuclide movement back to man has been first to assess the capability of the geologic formation to contain the waste without the perturbations caused by man. Then, if an adequate barrier sequence is identified in the natural state, the degrading influences of the change by mans, involvement in the form of foreign chemical ions, the heat, the radiation and the mechanical emplacement of the canister will be assessed.

If the barrier sequence is still found to be adequate, then the emplacement activities can be initiated.

Thus far in our assessment of the natural barriers we have ruled out the water column and the Benthic Boundary layer from further consideration as major barriers for the long time containment of radionuclides.

We are currently focusing our attention on the waste form and canister for short-term containment and on the sediments for long-term containment. Our data thus far suggest, that the normal slow diffusion of waste elements through the highly impermeable deep sea clay is reduced more than a thousandfold by the sorptive properties of the clay.

Similarly, the low permeability of the clay strongly inhibits thermal convection of the pore waters. Our mathematical predictions, for which we plan in situ verification tests, suggest that the heat from a waste canister will produce a maximum vertical displacement of pore water which is very small compared to the sediment thickness.

These preliminary results from the sorption and thermal-migration studies are very encouraging, but they require further validation. The next most important questions which still need to be resolved center around the changes in chemical and mechanical behavior of the sediment.

Two areas of concern are:

One: The effect of waste and canister on the rate of movement of radionuclides through the sediment duc to either chemical or mechanical changes; and

Two: The capacity of the plastic sediment to flow and regain its original strength, permeability and sorptive properties after emplacement of a canister.

Although it is too early in the development of the program to seriously address the problem of waste emplacement—sufficient laboratory and field scientific data have not been collected to make a selection of method—the emplacement concepts to be considered are the penetrometer, the weighted probe, the trencher and drilled holes.

With modification, all of the above concepts are within current engineering technology.

The seabed program has international implications both for its potential contribution to solving the waste management problem worldwide, and because of the sensitivities and restrictions associated with international law and the politics of any activities that might pollute the world's oceans.

These implications are addressed in the program by participation in joint international programs, by contributions to conferences, by discussions of international policies affecting the seas, and by close liaison with international organizations such as NEA, IAEA, and IEA, which deal both with the ocean, and with nuclear and nonnuclear wastes.

More specifically, an international seabed working group has been organized as a subgroup of the Subcommittee on Radioactive Waste Management under the auspices of the Nuclear Energy Agency of OECD.

The subgroup has been in existence for 2 years. Its membership includes the United States, United Kingdom, France, Japan, and Canada. The seabed working group is further divided into seven task groups.

Each country has, or soon will have, an individual serving on each of the task groups. The goals of the task groups are:

One: To encourage coordination of relevant research between nations, and to facilitate the exchange of data;

Two: To develop cooperative R. & D. programs between the member nations;

Three: To share important facilities, such as research ships and equipment; and

Four: To provide a mechanism for the exchange of testing procedures and samples.

To complete the record, I would like to submit additional documents.

In conclusion, Mr. Chairman, though we remain cautious, and emphasize that our role is assessment and not advocacy, our studies to date have not identified any technical or environmental reasons to suggest that high-level waste or spent fuel cannot successfully be emplaced in stable sedimentary formations beneath the abyssal floor of the deep oceans.

Thank you, Mr. Chairman.

Mr. BREAUX. Thank you very much.

I do have some questions. I am trying to determine whether I should proceed.

Dr. Deese, it is the last vote of the evening. But it is another recorded vote. Perhaps I can go there now, catch the vote, and come right back.

[Brief recess.]

Mr. BREAUX. The subcommittee will please be in order.

Dr. Deese, we are sorry for the interruption. We welcome your testimony.

STATEMENT OF DAVID A. DEESE, RESEARCH FELLOW, PROGRAM FOR SCIENCE AND INTERNATIONAL AFFAIRS, HARVARD UNIVERSITY

Dr. DEESE. Thank you, Mr. Chairman. I will try to both be brief and to summarize. I will summarize my statement and hit some of the topics where I have a different viewpoint from those presented today.

Mr. BREAUX. Your entire statement will be made a part of the record at this point.

[The statement follows:]

STATEMENT OF DAVID A. DEESE, RESEARCH FELLOW, PROGRAM FOR SCIENCE AND INTERNATIONAL AFFAIRS, HARVARD UNIVERSITY

Mr. Chairman and Members of the Subcommittee: I am David A. Deese, a Research Fellow at Harvard University's Program for Science and International Affairs. The Program brings together scholars and professionals concerned with the interactions of science and technology with specific international problems. It operates under a funding provided by the Ford Foundation. On July 1 of this year, the Program will become the Center for Science and International Affairs—the first permanent research center in the John F. Kennedy School of Government. The research conducted is integrative in character and draws upon the natural, social, and behavioral sciences. No classified research is done and no restrictions are accepted on the publication or dissemination of any materials produced by the research staff. Prior to joining this research insitiution, I was a Marine Policy and Ocean Management Fellow at the Woods Hole Oceanographic Institution.

My interest in radioactive waste disposal at sea springs from my training and experience in international law and organization, international economics, and international politics. For the past three years I have devoted a portion of my efforts to investigating the legal, political, and organizational implications of nuclear energy and radioactive waste management, including radioactive waste disposal at sea. Much of what I will say here today is explained in greater detail in a book entitled Nuclear Power and Radioactive Waste: A Sub-Seabed Disposal Option?, which will be available from Lexington Books on June 8, 1978.

An impressive array of recent scientific and technological advances in many fields, including that of nuclear energy, have introduced paradoxically not only a higher standard of living but also a series of associated difficulties which resist solution. Highest perhaps on the list of recently highlighted problems is how to deal with the radioactive wastes which accompany all civilian and military uses of nuclear energy. Disposal of radioactive wastes, in particular, is tightly enmeshed with highly sensitive national and international energy and security policies. Unless at least one feasible disposal option for high-level radioactive waste and spent nuclear reactor fuel can be conclusively demonstrated by those nations committed to the use of nuclear energy, it is unlikely that a convincing rationale can ever be developed to show that nuclear power should be relied upon to supply significantly more energy in the 1980s and 1990s. Furthermore, until most nations with nuclear energy programs acknowledge and at least a few nations solve the waste disposal problem it will be even more difficult to forge strong international control over the sensitive parts of the nuclear fuel cycle, especially through multilateral fuel cycle facilities. As long as such international control is lacking, we face increasing danger in the uncontrolled spread of nuclear weapons-making capabilities. It is to science and technology, at least in part, that we turn to provide solutions for the problems they create.

The radioactive waste disposal programs of most countries are still focused on investigation of land-based geologic formations as possible containment media for radioactive wastes. Important discoveries in geological oceanography and amazing advances in ocean engineering over the past decade have, however, led several countries to investigate another promising possibility for geologic disposal of radioactive waste—isolation within the deep seabed, or sub-seabed disposal. Beyond the various technical advantages and disadvantages involved, use of the international seabed for radioactive waste disposal raises a multitude of social, economic, political, legal, institutional, and ethical issues. It is these issues that I would like to address.

Implementation of radioactive waste disposal in the deep seabed in 1990 or 1995 is far enough off to warrant caution in all statements, i.e., many aspects of the social, legal, and political situation could change significantly. There is, however, strong

reason to do legal and political research now in order to identify important problems and guide development in the interim.

Early reactions to sub-seabed disposal range from assertions that any country should be permitted to use the deep seabed for waste disposal to the conviction that under no circumstances should use of the international seabed for radioactive waste disposal be permitted. Detailed—though still preliminary—study of the sub-seabed disposal concept reveals a complex and still evolving picture. While almost everyone reacts negatively at first to use of the abyss for radioactive waste disposal, and almost everyone confuses the very distinct concepts of disposal in the oceans or on the seabed and disposal in the seabed, it is not yet at all clear whether legal and political obstacles to such use of the seabed could be surmounted.

While use of the oceans for high-level waste disposal in a dilution and dispersal mode does not appear to be reasonable under any possible circumstances, the implementation of low-level radioactive waste disposal in a containment and isolation mode in the ocean could be possible in the 1980s. While there are many similarities here with the issues raised by sub-seabed disposal of high-level wastes, when dealing with very low-level wastes the legal, political and institutional problems are less complex.

SUMMARY OF REPORTED SEA DUMPING OF RADIOACTIVE WASTE

Country/organization and period	Number of containers or tonnes dumped[1]		Activity dumped (curies)
	Containers		
United States:			
1946–60	76,201		93,690
1961	4,087		275
1962	[2]6,120		478
1963	129		9
1964	114		20
1965	24		5
1966	43		105
1967	12		62
1968	0		0
1969	[3]26		26
1970	2		3
Total, 1946–70	86,758		94,673
United Kingdom, 1951–66			45,000
NEA, 1967–76	113,870		293,880
	Tonnes	Alpha actinides (curies)	Beta-gamma (curies)
1967	10,840	250	7,600
1969	9,180	500	22,000
1971	3,970	630	11,200
1972	4,130	680	21,600
1973	4,350	740	12,600
1974	2,270	420	100,000
1975	4,460	780	60,500
1976	6,670	880	53,500
Total	45,870	4,880	289,000

[1]A reference container is a 200-l drum.
[2]Between 1950 and 1962, 52,011 containers were dumped in the Pacific (14,550 curies) and 33,928 in the Atlantic (79,443 curies).
[3]Between 1963 and 1969, 276 containers were dumped in the Pacific (185 curies) and 185 in the Atlantic (40 curies).

Source: IAEA, 1977; or David A. Deese, "Nuclear Power and Radioactive Waste," p. 50.

NATIONAL LEGAL ISSUES

After many years as a major contributor to the pollution of the marine environment, the United States has now taken a principal role in the protection of that

environment. This new interest took root in 1970, when CEQ forwarded its report to President Nixon,(*1*) which served as the basis for national legislation and international proposals on the prevention of marine pollution by dumping. One important result was the U.S. Marine Protection, Research, and Sanctuaries Act of October 23, 1972 (the Ocean Dumping Act).(*2*)

The definition of dumping included in this act is "a disposition of material," and "material" specifically includes radioactive substances. In order to avoid conflict with useful federal programs, one of the activities excluded from the act's definition of dumping is "the intentional placement of any device in ocean waters or on or in the submerged land beneath such waters, *for a purpose other than disposal,* when such * * * placement is otherwise regulated by Federal or State law or *occurs pursuant to an authorized Federal or State Program."(3)*

Since the placement of radioactive wastes into the submerged land, or seabed, for disposal is not identified in the exclusion, it must be construed to be included in the act's definition of dumping.(*4*) This means that sub-seabed disposal, even when carried out through a DOE program, is dumping under United States law.

The act prohibits the dumping of any material into ocean waters without a permit from EPA.(*5*) Even so, although EPA has the specific authority under the act to isue permits for the dumping of low- and medium-level radioactive wastes, it has no similar control over high-level wastes "for which no permit may be issued."(*6*) The act also bans the transport of high-level radioactive wastes for dumping at sea.(*7*) High-level wastes were among those substances considered by Congress to "pose a hazard of unknown but substantial dimensions."(*8*) The implementation of sub-seabed disposal is thus banned under the act and any such activity beyond the pilot plant stage would require explicit legislative action by Congress.

Congress established a goal of conducting research and "studies for the purpose of determining means of minimizing or ending all dumping of materials within five years of the effective date * * *" of the act;(*9*) this came due in October 1977. Since sub-seabed disposal is a form of dumping and the intent is to minimize all dumping (EPA interprets the intent to be strict regulation rather than elimination of dumping),(*10*) it could be difficult for even a federal agency to obtain an EPA permit for sub-seabed disposal of low- or medium-level radioactive wastes. Furthermore, Congress could be very hesitant to amend the act to allow sub-seabed disposal of high-level wastes.(*11*)

Conducting a major R & D program on a concept which could not now be implemented under United States law raises a key issue. Should the United States be seriously pursuing this disposal option, given existing legal constraints? Congress can, of course, authorize R & D without committing itself to enacting a program that the R & D will not support. Therefore, a continued ban on sub-seabed disposal is consistent with completion of the necessary R & D for a future program.

From a social and political viewpoint, there may be some advantages to having a legal ban on this high-level waste disposal option while it is under development. If the public and the federal government eventually support the use of sub-seabed disposal, then the required adjustments could be made as final decisions on the program were formulated. Implementation would require open and explicit public, congressional, and executive decisions. This cautious approach also provides a clear indication to other nations of American "wait and see" intentions.

It is also important to remember that we may not want to rule out any serious potential solution at this point in time since we have not yet solved the radioactive waste disposal problem. Furthermore, disposal options involving geologic formations under land also face important legal/political problems, especially the overarching issue of federal-state jurisdiction for regulating nuclear energy and radioactive waste management.

In the area of ocean dumping where EPA has specific authority, under the Ocean Dumping Act, over radioactive waste disposal, it apparently claims to have primary authority as well. "Ocean disposal and deep bed ocean emplacement of radioactive wastes are * * * areas in which EPA is involved and has primary regulatory authority * * *."(*12*) Although EPA's authority under the act is exclusive and it has established a major ocean dumping permit program,(*13*) it is not clear, especially for sub-seabed disposal of high-level wastes, that EPA would have primary regulatory authority; NRC would also be required to license any sub-seabed disposal of non-low-level radioactive materials. In any case, precise jurisdictional arrangement for EPA and NRC should be established early in order to avoid major interagency competition.

The Department of Energy is responsible, under the National Environment Policy Act (NEPA) of 1969, for the detailed environmental assessment of "every recommendation or report on proposals for legislation and other major actions significantly

33-546 O - 78 - 19

affecting the quality of the human enviornment." NEPA also provides that, in preparing these assessments, the federal agencies must "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences * * *."(*14*) For American R & D programs, the final Council on Environmental Quality (CEQ) guidelines on preparing environmental impact statements (EIS's)(*15*) require the timing of EIS's to be "late enough in the development process to contain meaningful information, but early enough so that this information can practically serve as input in the decision-making process."(*16*)

Waste disposal operations licensed or contracted for by the federal government and the associated standard setting are generally considered to be "major actions" under NEPA. In such cases, a combination of various court decisions and sets of federal agency regulations have established detailed procedural requirements for EISs and public participation.

Although generic EISs on the DOE management and NRC regulatory programs for radioactive waste are clearly necessary, the necessity for an EIS on the EPA regulatory program is uncertain as of this writing. The importance of the site characteristics of high-level waste disposal repositories and the long-term and controversial commitment made at each location would indicate the necessity for separate evaluations of each site by both DOE and NRC. Once the preliminary impact statement has been completed, both CEQ and EPA have specific review and recommendation authority. CEQ, which receives a copy of all statements, makes recommendations to the President after reviewing and appraising the federal program in light of NEPA policy.(*17*) The EPA administrator receives all statements which apply to his duties, in this case the generally applicable environmental radiation criteria and standards, and reports all unsatisfactory aspectds to CEQ.(*18*) EPA also has a rating program for all EISs that it reviews which influences future executive branch and congressional support of a program, as well as any applicable court rulings.

NEPA also requires that the federal agency considering a major action consult with, and obtain comments from, federal and federal-state agencies with specific expertise or jurisdiction in the area.(*19*) As identified in the CEQ guidelines, under the categories of Water (marine pollution), Radiation, or Hazardous Substances (transportation and handling), the following major agencies (beyond CEQ, EPA, and NRC) would probably review DOE's Sub-Seabed Disposal Program:

Department of Commerce; Department of Defense; Department of Health, Education, and Welfare; Department of the Interior; Department of Transportation; National Aeronautics and Space Administration.

According to the CEQ guidelines, the Department of State must be formally consulted when a proposed major action will have significantl international environmental effects.(*20*)

CEQ has issued a policy statement and draft regulations requiring that significant effects outside the United States be considered in impact statements.(*21*) Therefore, despite the disagreement among executive agencies over the exact nature of these regulations, DOE, NRC, and EPA should plan to do one or more EISs on the international implications of United States participation in a sub-seabed disposal program. These implications will include all significant environmental effects in the deep seabed, on the high seas, and in foreign countries.

The Ocean Dumping Act of 1972 bans sub-seabed disposal of high-level radioactive wastes and strictly regulates other radioactive substances. Implementation of a sub-seabed disposal program for non-high-level wastes is now possible under EPA's ocean disposal permit program. Sub-seabed disposal of high-level wastes (or any other final disposal program) would, however, require a complete review through NEPA; major public participation; compliance with EPA general radiation standards and NRC licensing criteria; and compliance with all NRC, DOE, DOT, and Coast Guard transportation rules. In addition, it would require the approval of some ocean disposal program, presumably involving EPA and NRC. Since sub-seabed disposal would be conducted in international areas, it would avoid many of the national, state, regional, and local complications raised by land-based disposal options. At the same time, it would introduce various international complications and opportunities.

Though now inadequate for the implementation of sub-seabed disposal, the United States regulatory posture is under development in several related areas. Increased regulatory input will be required for the development of an acceptable sub-seabed disposal option, but no immediate legislative action should be necessary. A crucial objective should be the avoidance of confusion and competition among the various agencies and congressional committees involved in development and regulation. Strong leadership from some organization, such as the applicable office of the

Department of Energy or an interagency committee will be important from the outset of any regulatory development process for sub-seabed disposal.

It is still too early to predict how adaptable these controls would or should be to new scientific and technical development. In this area, decisions should depend largely upon the extent of regional and international management and control which is developed to oversee the international sub-seabed program. United States legal restrictions provide assurance of a full public debate prior to any natioal participation in the implementation of a sub-seabed disposal program.

INTERNATIONAL LEGAL ISSUES

The London convention on ocean dumping was developed in a series of four intergovernmental meetings in 1971 and 1972 and a conference in October and November 1972.(*15*) With fifteen ratifications or accessions, it entered into force on August 30, 1975; as of early 1978, thirty-five countries had ratified or acceded to the convention, including the United States, the Soviet Union, France, Britain, Canada, Norway, Sweden, Panama, Spain, and Mexico. A number of other countries, such as Japan, seem to be in the process of ratification. At an informal meeting of the parties (December 1975), the Intergovernmental Maritime Consultative Organization (IMCO) was designated as the formal secretariat for the convention. Some countries also wanted the United Nations Environment Program (UNEP) to have a formal role.

The pivotal parts of the convention are its Annexes. Annex I to the London convention, which covers all materials prohibited from dumping by Article 4(1)(a), includes:

"High-level radioactive wastes or other high-level radioactive matter, defined on public health, biological or other grounds by the competent international body in this field, at present the International Atomic Energy Agency, as unsuitable for dumping at sea."

The Spanish and Portugese concern over European radioactive waste dumping in Iberian areas of the Atlantic Ocean led to the coverage of non-high-level wastes and the requirement that dumping zones be studied prior to use. Without the proposed Spanish amendment, only high-level radioactive materials would have been included.

Annex 2, which includes materials requiring a special permit for dumping from the national authority, covers a all radioactive wastes not included in Annex 1 and calls for full consideration of the recommendations of "the competent international body in this field, at present the International Atomic Energy Agency."

Important guidelines for issuing dumping permits are outlined in Annex 3. Sections A and B require detailed listings of the characteristics of the wastes to be dumped, and the proposed dumping site, respectively,(*23*) and Section C includes the General Considerations and Conditions:

1. Possible effects on amenities * * *
2. Possible effects on marine life * * *
3. Possible effects on other uses of the sea * * *
4. The practical availability of alternative land-based methods of treatment to render the matter less harmful for dumping at sea.(*24*)

The London convention (Article 3) defines dumping as "any deliberate disposal at sea of wastes * * * from vessels * * * at sea" (emphasis added). In this context, there are at least two interpretations of the first at sea:

1. It refers to the location of the disposing party; i.e., any disposal from vessels that are at sea constitutes dumping, regardless of whether there is any possibility of the wastes eventually reaching the water (thus sub-seabed disposal would be dumping).
2. It refers to the final location of the wastes themselves; i.e., any disposal from vessels resulting in the discharge of wastes, whether containerized or not, into the water and/or onto the seabed constitutes dumping (sub-seabed disposal would not be dumping).(*25*)

Whether or not a technically acceptable radioactive waste isolation system within the seabed is defined as "dumping" thus depends on how nations interpret the London convention.

The London convention assigned the following tasks to the IAEA: (1) defining high-level radioactive material unsuitable for dumping at sea, and (2) establishing recommendations to be considered by states party to the convention when issuing special permits for dumping other radioactive matrial.

The first draft of the IAEA definition, since superseded, included the following comment on sub-seabed disposal of wastes:

"Certain methods of radioactive waste disposal, although not feasible at this time, may eventually be developed technically to the point of proposing the long-term isolation of wastes by emplacement beneath the seabed. Such methods should be evaluated as variations of deep geological burial on land and are excluded from the scope of this document because they will not contribute to the radioactivity of the seabed."(*26*)

The IAEA tasks, started in early 1973, were provisionally completed in 1974. The agency's provisional definition and recommendations were endorsed by the board of governors (September 1974) and determined to be legally binding by the first consultative meeting of the parties to the London convention (September 1976). However, because they were based upon a scientifically unrealistic, and probably misleading, oceanographic model, they were immediately scheduled for a complete review process.(*27*)

Although this review started in early 1975, the Advisory Group on the Development of a Generalized Oceanographic Model Related to the Dumping of Radioactive Waste at Sea could not agree upon a new scientific framework. There was consensus that the model and safety factors which formed part of the basis for the IAEA provisional definition and recommendations were inadequate, but the basic unresolved question remains a matter of two conflicting philosophies: "dilution and dispersal" of the wastes, which has been the basis of most past practice and regulation; and "isolation and containment" of the wastes from the biosphere, which has recently gained support as the only answer for wastes with very persistent, toxic, and transportable elements, such as plutonium.(*28*)

A series of three advisory group meetings in 1976–77 developed a revised oceanographic basis for the IAEA definition and recommendations on radioactive waste disposal at sea.(*29*) The oceanographic basis was developed with several disposal methods in mind. These included depositing waste containers on the seabed, within the seabed sediments, or beneath the sediments. A radiological dose assessment panel then completed the part of the task dealing with radiological protection. The final technical and political advisory group meeting was held in late 1977. The formal definition of high-level waste unsuitable for dumping is due to be submitted to the IAEA board of governors and the London convention parties in 1978.

The parties to the London convention monitor and influence the revision process through their annual meetings and the permanent secretariat at the Intergovernmental Maritime Consultative Organization (IMCO). At their first consultative meeting, Agenda item 10, concerning the definition and recommendations of IAEA concerning radioactive wastes and other matters, proved to be the most important, time-consuming, and difficult issue.(*30*) In addition to United States protests, objections were raised by Canada, Portugal, Denmark, and Sweden to the IAEA provisional definition and recommendations. Despite stated preferences for avoiding all nuclear waste dumping, these countries recognized that some nations have no other existing disposal option. Consequently, some dumping could be continued, but only after the establishment of strong prior notification and consultation procedures which would insure full consideration of all possible land-based alternatives.

Two major steps were taken by the parties: first, they noted, and formally requested circulation and improvement of, IAEA's provisional definition and recommendations; second, they requested the secretariat (IMCO), in cooperation with IAEA, OECD, and other international organizations, to study and report on notification and prior consultation procedures for radioactive waste dumping.

The Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development was established in 1957 with a role which now overlaps those of EURATOM and IAEA, including standardizing national laws, formulating regional regulations, and executing joint radioactive waste disposal projects.(*31*) Although NEA has been more successful than EURATOM in some of its joint efforts and recommended practices, its formal regulatory role has thus far been restricted to innocuous areas of radiological protection, such as emissions from watch dials, in which it cooperates with IAEA and the International Commission on Radiological Protection (ICRP). Traditionally, it has been devoted to the promotion of technical development in nuclear energy, with little capability or willingness to become involved in the politically controversial task of regulating nuclear energy.

NEA's role in the European radioactive waste dumping operations has been manipulated by participating countries and strongly criticized by nonparticipants. However, this situation may be changing. There is now an agreement establishing NEA as an international consultation and surveillance mechanism for ocean dumping of radioactive waste.(*32*) This structure could become an important part of, or model for, similar arrangements on a broader international level.

The agreement establishes NEA in a role supplementing that of IAEA and London convention guidelines, as the regulatory mechanism charged with ensuring the safety of all members' sea disposal of radioactive waste. With the exception of ordering member nations to comply, all the basic powers granted to EURATOM are vested in NEA. Although this agreement covers all future dumping operations by ratifying OECD members, there are some crucial deficiencies. First, instead of using the London convention and IAEA guidelines as strict minimum requirements, NEA regulations and national actions only take these agreements "into account." Second, the notification and consultation procedure includes only participating countries, and it is not legally binding, Third, if the procedures are to meet minimum international standards of conduct, there must be formal and direct roles for IAEA, and perhaps even UNEP. This is not simply a regional arrangement; the twenty participating OECD members include countries worldwide. Finally, the general agreement should require prior arrangements for responsibility and liability for all aspects of the operations, including environmental pollution.

The law of the sea, with certain qualifications, provides some important developed and developing rules and regulations for sub-seabed disposal. Although existing treaty law also offers some useful provisions, of equal importance is the groundwork it has established for states to initiate diplomatic correspondence and develop general international law concerning protection of the marine environment. With the exception of the early IAEA work done in response to the High Seas Convention of 1958, none of these efforts on marine pollution control distinguishes between low- and high-level nuclear wastes. In fact, radioactive wastes are usually included under the general categories of toxic, persistent, or hazardous materials.

With respect to definitions of pollution, principles for seabed use, and the Informal Composite Negotiating Text (ICNT) (the most recent document from the law of the sea negotiations), a crucial question is whether or not sub-seabed disposal will significantly restrict other uses of the deep seabed. The increasing national and international assertion of pollution prevention rights to control areas of and activities on the high seas indicates that unilateral sub-seabed disposal could be protested as an unacceptable form of international seabed appropriation. The acceptability of a multilateral sub-seabed disposal program would depend, in part, on how many and which countries and international organizations were involved and what form of regulatory and operational institution could be established. While the ICNT provides a general basis for international regulation and state control of sub-seabed disposal, in its present form there is little regulatory authority for any International Seabed Authority.(*33*)

NATIONAL POLITICAL ISSUES

An important issue which requires much more detailed discussion in the United States is that of retrievability for high-level radioactive waste and/or spent fuel disposal systems. While there is a consensus that full retrieability of the materials is essential during the initial operating period, opinions vary as to the optimal degree of retrievability beyond the first few years. The important points that longer term retrievability probably:

(1) Detracts from the integrity of containment systems; and
(2) Decreases the independence of the system from man and institutions

are reflected in the general conclusion of a recent EPA document that "retrievable disposal systems should be avoided."(*34*) Strong opposing arguments can, however, be made that retrievability is a desirable, if not crucial criterion for evaluating disposal options since it allows future generations both to correct our errors and to take advantage of progress in science and technology.

I would like to mention three among the many other political issues affecting sub-seabed disposal. First, the only way that sub-seabed disposal could ever be accepted in the United States and abroad is through wide public understanding of the difference between past dumping into the oceans and the future possibility of containment in the seabed. If sub-seabed disposal is not perceived as another of the various geologic disposal options, it is difficult to envision any possibility of implementation.

Next is the procedural issue of how the sub-seabed program is managed. It is essential that the R & D program be conducted in a completely open manner; that constant interchange be maintained with all involved executive offices, congressional committees, public interest groups, and other research institutions; that frequent peer reviews and other assessments be held by DOE, NRC, NAS, OTA, etc.; and that the principal investigators be encouraged to explain their research publicly on a regular basis while scrupulously avoiding any image of advocacy and maintaining the respect of their professional peers.

The final issue is the need to establish roles and relationships for the many organizations which are now, or soon will be involved. The management and oversight of sub-seabed disposal affects activities with at least international, energy, environmental, oceans, transport, and security aspects. As a result, strong leadership will soon be required to clarify and coordinate the roles of not only many governmental agencies and committees but also industrial organizations and academic institutions. An outgrowth of the President's Interagency Nuclear Waste Management Task Force, perhaps under the lead of OSTP, and a parallel body for Congress, possibly coordinated by this subcommittee, might best accomplish this task.

INTERNATIONAL POLITICAL ISSUES

In addition to the political issues raised on the national level, which also apply internationally, I will mention four examples of issues which are largely international in character. First, the progress of the NEA-sponsored multilateral R & D program in achieving significant joint results on sub-seabed disposal is important to acceptance and/or participation by other governments and international organizations. Second, sub-seabed disposal must continue to be reviewed and criticized by the leading oceanographers and nuclear scientists worldwide. Next, the attitudes of, and possible participation by the countries opposed to ocean dumping of low-level radioactive wastes, e.g., Canada, Sweden, Portugal, and Denmark, are particularly important. Soviet attitudes are also crucial, especially in terms of achieving required action by the IAEA.

Finally, while difficult to assess on an overall basis, the attitudes of the less-developed countries toward sub-seabed disposal will be influenced by at least three factors:

(1) They will be very wary of any perceived threat to the deep seabed, or "common heritage," especially associated resources, e.g., manganese nodules;

(2) Many will be interested in the prospect of addressing the radioactive waste disposal problem in the context of strong desires to allow wider use of nuclear energy; and

(3) They will respond heavily on the basis of when and how they are notified of and allowed to participate in the R & D program.

THE POLITICAL PRESSURES ON SUB-SEABED DISPOSAL: SUMMARY

At this time, national and international policies are clearly inadequate to implement a rational sub-seabed disposal program for radioactive waste. Research on nuclear waste disposal possibilities is far enough advanced to justify at least a serious attempt at the delineation of policy priorities and decision criteria. Even in the United States, however, there are few policy makers who comprehend the waste disposal problem in general, let alone possess a balanced understanding of each disposal possibility.

At least in the United States, waste management is acknowledged as a serious problem having major social and political implications. This is not the case, however, in many countries and in some international organizations. Governments and related international agencies should, therefore, be preparing to evaluate radioactive waste disposal options on the basis of carefully established priorities and criteria. Priorities should, for example, be assigned to:

1. The long-term development of nuclear energy relative to alternative energy sources, based on factors that include radioactive waste management;
2. The attention to be accorded to waste management in comparison with other parts of the nuclear production process.

Criteria for evaluating waste disposal options must include the following:

Technical

1. Environmental predictability (geologic stability—aseismic, unfractured, and unaffected by future glacial upheaval, as based upon a long history of stability);
2. High absorption and low transmission or dispersal rates of radionuclides by surrounding geologic media;
3. Very low probability of intrusion into the surrounding media by groundwater;
4. High resistance of media to local heat sources;
5. Minimal disturbance of natural media by waste emplacement technique.

Social

1. Very low existing and future resource potential;
2. Maximum physical isolation from unintentional and intentional human intrusion;

3. Minimal or no active security or management requirements over the long term (including resistance to changes in political systems);

4. Resistance to or isolation from effects of potential warfare;

5. Minimal socioeconomic costs, such as risks associated with transport and handling operations.

Governments must politically evaluate sub-seabed disposal in the context of all available possibilities for managing nuclear wastes. Countries will offer real support only if sub-seabed disposal is considered necessary for national wastes, industries, or other clear interests. It would be preferable, however, to have comparative evaluation follow careful individual assessment of all possible disposal options.

Assuming technical feasibility, it is still too early to determine the political feasibility of burying high-level wastes within the deep seabed. Although early foreign and international political responses will influence United States policy, the most important initial decisions must come from the United States. Whether or not American support of sub-seabed disposal will, in turn, influence many other nations will depend upon future events in law-of-the-sea, general nuclear policy, and nuclear nonproliferation efforts. Pending the development of national and international policy on whether, where, and for how long spent nuclear fuel will be stored and/or reprocessed, it is possible to state only that sub-seabed disposal does not seem to be ruled out—for now—on political grounds.

Undoubtedly, this is an area of scientific and technological development where the final decision, as well as many of the interim ones, must be based upon policy considerations. At a minimum, careful and comprehensive political management is required; prevention, through policy and law, could also prove necessary. If decisions are made, by default or otherwise, to keep the sub-seabed option open, early consultations with a large number of governments and agencies will be essential. If such consultation is neglected, the result may well be a sub-seabed disposal option that is technically acceptable but politically unworkable. The political response itself will be largely determined by the extent to which appropriate institutional arrangements are available as development progresses.

As long as countries continue serious research and development on the sub-seabed disposal concept, a significant component of their efforts must be devoted to research on the associated social, economic, political, legal, institutional and ethical considerations. With the passing of time it becomes clearer that it is these considerations that will ultimately determine the fate of potential radioactive waste disposal options, future energy alternatives, and many other scientific and technological developments. It is crucial to maintain a reasonable balance in the progress of the technical and non-technical research efforts in these areas since policy-makers must have sufficient information not only to modify, or perhaps even to cease research and development on concepts (or specific applications thereof) appearing to be socially harmful, but also to keep open the possibility of implementing programs which may meet major social needs.

SOCIAL SCIENTIFIC RESEARCH PROGRAM FOR SUB-SEABED DISPOSAL

The future research program for sub-seabed disposal is designed to:

(1) Continue investigation of controlling international political trends and implications, including the interaction with the international nuclear weapons proliferation and radioactive waste management problems;

(2) Conduct more comprehensive and detailed international legal and organizational research, with emphasis on the London convention of 1972, associated IAEA activities, and the ongoing United Nations law of the sea negotiations;

(3) Proceed beyond the initial economic analyses of the costs of radioactive waste management as compared to those of the fuel cycle and the overall investments in nuclear energy to early cost estimates for sub-seabed disposal, as based on rough engineering cost estimates; attempt to establish an estimated range of costs for sub-seabed disposal as compared to other disposal options; and

(4) Encourage the establishment of parallel social scientific research efforts in Japan, France, Canada, the United Kingdom, Sweden, and West Germany, and in the IAEA, NEA, and United Nations Environment Program.

REFERENCES

(1) CEQ, Ocean Dumping: A National Policy, A report to the President (Washington: CEQ, 1970).

(2) 33 U.S.C. 1401 et seq. (Supp. IV, 1974); hereinafter referred to as the Ocean Dumping Act.

(3) 33 U.S.C. 1402(f). Emphasis added.

(4) On the other hand, this exclusion may be understood to exempt an experimental high-level radioactive waste disposal project from the act's definition of dumping if small quantities of waste were emplaced in the deep seabed strictly for testing and in a retrievable form.

(5) 33 U.S.C. 1411. This changes the previous legislative situation, under which the old AEC had exercised complete control over the dumping of radioactive waste; this was done on a case-by-case basis through its licensing procedures. Atomic Energy Act, as amended, 42 U.S.C. 2011.

(6) 33 U.S.C. 1412(a) (Supp. IV, 1974).

(7) 33 U.S.C. 1413(a) (Supp. IV, 1974); although the United States act is not geographically limited, it skirts the still controversial law-of-the-sea question of jurisdiction over foreign-flat vessels on the high seas by regulating all transportation from the United States, as well as all transportation from all locations by United States vessels, aircraft, or agencies.

(8) U.S., Congress, House, H.R. Rep. No. 361, 92d Cong., 1st Sess., 1971, p. 13.

(9) 33 U.S.C. 1443 (Supp. IV, 1974).

(10) "It is our interpretation of the statute that it is the intent of the Congress that, with the exception of the prohibited materials, ocean dumping should not be banned, but should be strictly regulated . . . ." (U.S., Congress, Senate, Committee on Commerce, Hearings on the Marine Protection, Research and Sanctuaries Act of 1972 before the Subcommittee on Oceans and Atmosphere, 94th Cong., 1st Sess., ser. 32, 1975, p. 29).

(11) Some congressional hearings have already dealt directly with DOE's Sub-Seabed Disposal Program. For example, see, generally, U.S., Congress, House, Committee on Interior and Insular Affairs, Radiological Contamination of the Oceans, oversight hearings before the Subcommittee on Energy and the Environment, 94th Cong., 2d Sess., ser. 94-69, 1976. Because of the continuing competition among congressional committees over energy-related responsibilities, the question of exactly which committees would be involved with a sub-seabed disposal program is still unresolved. It is clear that the following committees could play important roles:

A. Energy/environment responsibilities

1. House:

a. Science and Technology (Subcommittee on Fossil Fuels and Nuclear Energy Research, Development and Demonstration)

b. Interior and Insular Affairs (Subcommittee on Energy and the Environment)

c. Government Operations (Subcommittee on Environment, Energy, and Natural Resources)

2. Senate:

a. Energy and Natural Resources (Subcommittee on Energy Research and Development)

b. Environment and Public Works (Subcommittee on Nuclear Regulation)

c. Commerce, Science, and Transportation

B. Foreign relations/ocean responsibilities

1. House:

a. International relations

b. Merchant Marine and Fisheries

2. Senate:

a. Foreign Relations (Subcommittee on Oceans and International Environment)

b. Commerce, Science, and Transportation

The jurisdiction of these committees will change over time if the program moves into the demonstration and implementation stages. To date, responses to sub-seabed disposal have been neutral, essentially the "wait and see" attitude of the Environment Office in the Department of State.

(12) EPA, Program Statement, p. 14.

(13) See 38 Fed. Reg. 28609 (1973), for the final EPA regulations governing the ocean dumping permit program.

(14) 42 U.S.C. 4332(2)(A) and (C)(1970).

(15) 40 Fed. Reg. 16813 (1975).

(16) 40 C.F.R. 1500.6(d) (2); this guideline is originally from *Scientists' Institute for Public Information* v. *Atomic Energy Commission* (481 F. 2d 1079 (D.C. Cir. 1973)).

(17) 42 U.S.C. 4332(2)(C)(1970).

(18) Sec. 309 of the Clean Air Act, as amended (42 U.S.C. 1857h-7); and Sec. 1500.9(b) of the CEQ guidelines.

(19) 42 U.S.C. 4332(2)(C).

(20) Within the Department of State, both the Bureau of Oceans and International Environmental and Scientific Affairs and the Office of the Under Secretary for

Security Assistance will play major roles in any consultation process over subseabed disposal.

(21) CEQ, Council on Environmental Quality Memorandum to U.S. Agencies on Applying the Environmental Impact Statement Rquirement to Environmental Impacts Abroad (September 24, 1976); in ILM 15 (1976): 1426.

(22) The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, December 29, 1972; in force August 30, 1975; in ILM 11 (1972); 1291 (hereafter cited as the London convention). For detailed background of the London convention, see A.S.I.L., "The Question of an Ocean Dumping Convention," Studies in Transnational Legal Policy, No. 2 (Washington, D.C.: A.S.I.L., 1972); U.S., Congress, House, H.R. Rep. No. 586, 90th Cong., 1st Sess., 1972, p. 3; and U.S., Congress, Senate, S. Rep. No. 726, 92d Cong., 2d Sess., 1974, p.3. There were no formal conference proceedings, but there is a set of documents available; see Documents of the Final Drafting Conference for the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, London, 1972. See also the unpublished master's thesis of J. Morgan, "The Ocean Dumping Convention" (International Legal Studies, Harvard Law School, Cambridge, Mass., 1973). The conference was attended by 80 nations; 27 signed the final document on December 29, 1972.

(23) Section B requires consideration of "* * * whether an adequate scientific basis exists for assessing the consequences of such dumping * * *."

(24) Article 14 of the London convention provides for meetings of the parties to review continually the implementation and the possible need for updating of the convention. Consultative meetings are to be held at least once every two years; special meetings occur "at anytime on the request of two-thirds of the Parties." Amendments to the annexes are self-executing to the extent that once they are approved, based on scientific and technical considerations, by two-thirds of those states present at a consultative meeting, they enter into force for all parties within 100 days unless a negative declaration is filed for individual states.

(25) The first possibility means that any disposal from a ship, even if the waste is launched into space or emplanted in the seabed, is dumping. This is the most inclusive definition of the terms and the way in which United States environmental legislation has often been interpreted. The second interpretation, which accords with the "into the oceans" meaning, is evident in almost all international work in this area since 1956, in most existing national dumping legislation, and in the Oslo Convention of 1972.

(26) IAEA, GOV/1622, Appendix p. 7, September 3, 1973; in IAEA Doc. Pl-540 (1976), p. 81.

(27) The original model was apparently created to justify ongoing British radioactive waste disposal practices, without input from the national oceanographic community.

(28) Dr. V.T. Bowen, a United States expert at the February 1975 meeting, appended an individual contribution, noting that recent studies of transport and resuspension of actinides like plutonium and americium, as well as many unanswered questions about effects on waters and biologic communities, call for a complete reassessment of any model which indicates that millions of tons per year of radioactive waste can be safely dumped into the deep ocean. See also, NAS, Assessing Potential Ocean Pollutants (Washington: NAS, 1975) p. 45.

Unfortunately, the work of this group, which has vital implications for the international regulation of future site selection, disposal, and monitoring of radioactive waste in the marine environment, was embroiled in political considerations, especially strong commitments of certain Nuclear Energy Agency member states and the OECD to the asserted safety of past practice. This put the IAEA in a very awkward position and temporarily broke down its capability to execute fully its responsibilities under the London convention. This is based on a series of observations and interviews held by this author at international conferences and meetings during 1975-1977.

(29) IAEA, the Revision of the Oceanographic Basis of the IAEA Provisional Definition and Recommendations Concerning High-Level Radioactive Waste Unsuitable for Dumping at Sea, AG-141 (Vienna: IAEA, April 1977).

(30) See R. McManus, "Report of the U.S. Delegation to the First Consultative Meeting of the Parties to the London Convention," to the Secretary of State, Washington, D.C., 1976 (mimeographed).

(31) NEA was the European NEA (ENEA) until Japan joined in 1972; it is legally, but not financially, autonomous from the OECD, although some operational activities have separate budgets, with about 47 staff members. While EURATOM includes

only France, the Federal Republic of Germany, Italy, and the three Benelux nations, as of 1976 NEA had 23 member states, including the United States.

(32) The council of the OECD adopted the Decision of July 22, 1977 establishing a "Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Wastes." It applies to all sea dumping by the 20 member countries which have adopted it; of the four which abstained in the vote, Japan intends to join, and Australia, Austria, and New Zealand do not.

(33) See David A. Deese, Nuclear Power and Radioactive Waste; A Sub-Seabed Disposal Option? (Lexington, Mass.: Lexington Books, June 1978), pp. 92-97.

(34) U.S. EPA, Considerations of Environmental Protection Criteria for Radioactive Waste (Wash., D.C.: EPA, February 1978), p. 45.

Mr. DEESE. Mr. Chairman, I am a research fellow at Harvard University's program for science and international affairs. The program brings together scholars and professionals concerned with the interactions of science and technology with specific international problems. It operates under funding provided by the Ford Foundation. On July 1 of this year the program will become the Center for Science and International Affairs, the first permanent research center in the John F. Kennedy School of Government.

The research conducted is integrative in character and draws upon the natural, social, and behavioral sciences. No classified research is done and no restrictions are accepted on the publication or dissemination of any materials produced by the research staff.

Prior to joining this research institution, I was a marine policy and ocean management fellow at the Woods Hole Oceanographic Institution.

My interest in radioactive waste disposal at sea springs from my training and experience in international law and organization, international economics and international politics. For the past 3 years I have investigated the legal, political, and organizational implications of nuclear energy and radioactive waste management, including radioactive waste disposal at sea. Much of what I will say today is explained in greater detail in a book entitled "Nuclear Power and Radioactive Waste: A Sub-Seabed Disposal Option?" which will be available on June 8 of this year.

As a footnote, there has been some discussion of the differences between low- and high-level wastes and some discussion of the differences between disposal in the oceans and within the seabed. For further clarification, it would be good here to note again, that we are talking about two different things. That there is a very different concept of past dumping into the oceans of low-level wastes, and the concept that DOE is investigating which is not at all into the oceans, and ultimately would involve high-level wastes, if it proved out.

An impressive array of recent scientific and technological advances in many fields, including that of nuclear energy, have introduced, paradoxically, not only a higher standard of living, but also a series of associated difficulties which resist solution. Highest, perhaps, on the list of recently highlighted problems is how to deal with the radioactive wastes which accompany all civilian and military uses of nuclear energy.

Disposal of radioactive wastes, in particular, is tightly enmeshed with highly sensitive national and international energy and security policies. Unless at least one feasible disposal option for high-level radioactive waste and spent nuclear reactor fuel can be conclusively demonstrated by those nations committed to the use of

nuclear energy, it is unlikely that a convincing rationale can ever be developed to show that nuclear power should be relied upon to supply significantly more energy in the 1980's and 1990's.

Furthermore, until most nations with nuclear energy programs acknowledge, and at least a few nations solve, the waste disposal problem it will be even more difficult to forge strong international control over the sensitive parts of the nuclear fuel cycle, especially through multilateral fuel cycle facilities. As long as such international control is lacking, we face increasing danger in the uncontrolled spread of nuclear weapons-making capabilities. We turn, in part, to science and technology to provide solutions for the problems they themselves create.

The radioactive waste disposal programs of most countries are still focused on investigation of land-based geologic formations as possible containment media for radioactive waste. With respect to subseabed disposal, it is clear that beyond the various technical advantages and disadvantages involved, use of the international seabed for radioactive waste disposal raises a multitude of social, economic, political, legal, institutional and ethical issues. These are the issues that I will address.

Implementation of radioactive waste disposal in the deep seabed in 1990 or 1995 is far enough off to warrant caution in all statements; that is, many aspects of the social, legal, and political situation could change significantly. There is, however, strong reason to do legal and political research now in order to identify important problems and guide development in the interim.

If you look at the range of initial responses to the idea of subseabed disposal of high-level radioactive wastes, you will find people who believe that such use of the deep seabed is clearly possible. Other people will say it is impossible under any circumstances.

It is clear to me that while most people react negatively at first to use of the abyss for radioactive waste disposal, almost everyone I have encountered is, on initial impression, confusing the very distinct concepts of disposal in the oceans or on the seabed, and the idea of disposal in the seabed. It is not at all clear that the legal obstacles either are, or are not, possible to surmount in this context.

While use of the oceans for high-level waste disposal in a dilution and dispersal mode does not appear to be reasonable under any possible circumstances—and I don't think there are any countries who are pushing this in any way, with the possible exception of the British—the implementation of low-level radioactive waste disposal in a containment and isolation mode in the ocean could be possible in the 1980's. We have heard from the EPA about some of the aspects of that. Although there are many similarities with the issues raised by low-level radioactive waste dumping—either in a dilution and dispersal mode or a containment mode—and those raised by subseabed disposal of high-level wastes, it is also clear, when we are dealing with very low-level wastes, that the problem is a somewhat different order of magnitude from the political and legal point of view. Even so, low-level radioactive waste disposal in the oceans remains a very serious problem technically.

In terms of the national legal issues, I point out, on page 5 of my statement, a table that pulls together the different pieces of information that have been given by other people today. It is a table the IAEA did for an advisory working group meeting in 1976, and then printed in 1977. Perhaps the only important thing that has not been pointed out is the NEA, which started to do the "joint dumping operations" in 1967, was what some would describe as a cover for continuing British dumping. Others would describe these NEA-sponsored operations as being a multilateral exercise that was led at first to a large degree by the British. But in any case, most of the wastes that have been dumped since 1967 and that continue to be dumped are from the United Kingdom.

In terms of the U.S. Marine Protection, Research and Sanctuaries Act of 1972, frequently called the Ocean Dumping Act, I think it is important to note that by reverse legal reasoning, an exemption to the definition of dumping, which is "The intentional placement of any device in ocean waters or on or in the submerged land beneath such waters for a purpose other than disposal, when such * * * placement is otherwise regulated by Federal or State law or occurs pursuant to an authorized Federal or State program.* * *" bans the implementation of subseabed disposal of high-level wastes. We must also look at what the Congress had in mind in 1972, what the EPA is doing now, and what the Congress perhaps wants to do from here into the future.

Congress established a goal of conducting research and "studies for the purpose of determining means of minimizing or ending all dumping of materials within 5 years of the effective date.* * *" This, of course, was due in October 1977. Since subseabed disposal is a form of dumping under U.S. law, at least, and the intent is to minimize all dumping—although there is some disagreement here between what EPA says the intent of the act is and what some of the congressional committees have said, it could be difficult even for a Federal agency, to obtain an EPA permit for subseabed disposal of low- or medium-level wastes. Furthermore, Congress could be very hesitant to change the legislation and allow the EPA to issue a permit.

The issue is important to think about. Should we be conducting an R. & D. program, or at least a feasibility assessment program, on a concept which could not be implemented now under existing national law? One can answer that, I think, either way. Nevertheless, Congress can authorize R. & D. without committing itself to enacting a program that the R. & D. will not support.

From a social and political point of view, there may be some advantages to having a legal ban on this high-level waste disposal option while it is under development. If the public and the Federal Government eventually support the use of subseabed disposal, then the required adjustments could be made as final decisions on the program are formulated.

That type of approach could provide a clear indication to other nations of America's wait-and-see intentions in this area. Clearly, we do not want to rule out any serious potential solution at this point in time if we believe, or if Congress believes, we have not yet adequately addressed the radioactive waste disposal problem. Fur-

thermore, disposal options involving geological formations under land also face formidible political and legal barriers.

I will skip over the question of what EPA and NRC authority is in this area. But, it is important to point out that it appears under other legislation before and since the 1972 Ocean Dumping Act that both the NRC and the EPA would be required to issue permits or license a subseabed disposal program.

With respect to the National Environmental Policy Act of 1969, while the executive agencies disagree over the exact nature of the requirements that will be imposed in order to assess under separate environmental impact statements, activities carried on outside of the United States, there is some agreement that separate environmental impact statements will be required for activities in the open ocean. This is what this program must plan on and is planning on, although I am obviously not speaking now for DOE. But I think that is the way that the program is being designed.

In summary, the Ocean Dumping Act of 1972 bans subseabed disposal of radioactive wastes and strictly regulates other radioactive substances. Implementation of a subseabed disposal program for non-high-level wastes is now possible under EPA's ocean disposal permit program, or depending on how you interpret their comments from this morning, it could soon be possible.

Subseabed disposal of high-level wastes would require complete review through NEPA, major public participation, compliance with EPA's general radiation standards and NRC licensing criteria and compliance with all NRC, DOE, DOT, and Coast Guard transportation rules. Additionally, I believe effective radioactive waste management would require involvement of both EPA and NRC in an ocean disposal program.

Since subseabed disposal would be conducted in international areas, it would avoid many of the national, State, regional, and local complications raised by land-based disposal options. At the same time it would introduce various international complications and opportunities.

On the international side, two of the countries participating in the NEA dumping operations each summer, Belgium and Switzerland, are not parties to the London Dumping Convention of 1972. At this time they are bound in some sense under the NEA's rules, through which the NEA has become a multilateral surveillance and consultation mechanism. However, a number of the problems with this mechanism have already been pointed out, and I think there are some other problems.

The pivotal parts of the London Convention are clearly the annexes. It has already been made clear today that annex I is the element that assigns the International Atomic Energy Agency the responsibility for defining what specifically high-level radioactive waste is which should not be dumped at sea, and making explicit recommendations as to what can be dumped at sea and how it should be done. Annex III outlines the guidelines for how national dumping permits are to be issued.

The important point about these guidelines has already been made by the chairman at one point today. To reiterate, although these guidelines are new, they are much stricter than what we have had in the past; yet, even though the country that is imple-

menting its ratification of the London Convention may eventually have a strong national law, it is still up to the individual country to carry it out and to enforce it. There is no intention of establishing any form of international enforcement in this specific treaty.

On page 14 of my statement with respect to the London Convention definition of dumping, it is clear that there are two possible interpretations of what this sea dumping of wastes from vessels at sea could mean. On the other hand, I don't think that it is necessary, or even very prudent, at this time to become bogged down in technical legal discussions of what that definition does or does not say.

The important thing—and this intention is conveyed largely by statement of the Department of State—is to note that there is enough ambiguity to allow the United States to give the London Dumping Convention an interpretation which bans seabed disposal in the interim while we conduct R. & D. on it. Then if we decide—"we" being the Government, and whatever portion of public participation would be involved—to implement subseabed disposal, we can work multilaterally through the IAEA and through the NEA to adopt the necessary convention or changes that would be required to use subseabed disposal.

In terms of the process that the IAEA has carried out in defining these recommendations and in convening these meetings of oceanographic experts to redefine the oceanic model, we have come a long way from the initial model in 1975. The most important point, probably, that has been made, largely with the help of the United States, is that there is no single oceanographic model that can define the processes that are most important. We need to know the effects on the marine environment and what the pathways are back to man. What has been offered in the place of a comprehensive model is a set of calculations, the best estimates from the leading oceanographic experts from a number of countries. Although there remain some definite disagreements now between different experts that were convened to establish this definition, still we have come a long way. If this definition is accepted and submitted to the Board of Governors of the IAEA in June of this year, and then to the London Convention parties in October, we will have a useful document in place.

The other thing that has not been mentioned in any detail on the legal side is the law of the sea. Most important, perhaps, are the definition of marine pollution, the principles for seabed use, and the informal composite negotiating text, which is the most recent document from the ongoing United Nations law of the sea negoiations. A crucial question is whether or not subseabed disposal will significantly restrict other uses of the deep seabed. The increasing national and international assertion of pollution prevention rights to control areas of, and activities on, the high seas indicates that unilateral subseabed disposal could be protested as an unacceptable form of international seabed appropriations. The acceptability of a multilateral subseabed disposal program would depend on how many and which countries and international organizations were involved and what form of regulatory and operational institution could be established.

While the informal composite negotiating text provides a general basis for international regulation and state control of subseabed disposal, in its present form there is little regulatory authority for the International Seabed Authority which would be set up if an international treaty is implemented.

In terms of the political reactions, especially on the national level, I would just point out that I have given a list on page 23 of my statement of what I think are some of the most important criteria for evaluating any radioactive waste disposal option. On the technical side I have listed five, and on the social side I have listed five. This may start off toward figuring out how one would go about assessing these comparatively.

Finally, it is important to point out that the future research program for subseabed disposal should aim at the following four objectives: First: Continue investigation of controlling international political trends and implications, including interaction with the international nuclear weapons proliferation and radioactive waste management programs; second: Conduct more comprehensive and detailed international and legal organizational research; third: Proceed beyond the initial economic analyses of the costs of radioactive waste management to more specific cost estimates for subseabed disposal; and fourth: Encourage the establishment of parallel efforts along these lines in Japan, France, Canada, the United Kingdom, Sweden, West Germany, and in the related international organizations.

Thank you, Mr. Chairman.

Mr. BREAUX. Thank you, Mr. Deese, very much.

Dr. Anderson, I compliment you on the extent of the research project. It looks very extensive and seems like it is very well planned. But I am concerned with the timetable of your work schedule. It goes through 1983, is that correct?

Dr. ANDERSON. The next assessment gate is in 1983.

Mr. BREAUX. Well, considering the framework by which you are operating, I get the distinct impression that DOE has already made some decisions to the effect that the seabed alternative is not something that should be very active at this time. It seems like they are making that decision before your study is really completed.

Dr. ANDERSON. The seabed program has from the beginning been considered as an alternative to land-based programs rather than a competitor. The decision to move it ahead or move it back has at this time not been made.

Mr. BREAUX. Well, apparently DOE is allocating about 3 percent of its alternative nuclear waste disposal research budget to studying the seabed disposal alternative. That means 97 percent of their budget is going somewhere else. My question is, are we adequately considering the seabed as an alternative, considering the relatively small amount of money being allocated for the project?

Dr. ANDERSON. When the guidelines for the land-based programs were focused on 1980, our goal was to arrive at a demonstration in 1990 (if we passed through the feasibility gates that we had set up for ourselves). Even then the program was not in competition. Due to a lower than anticipated funding we have had to refocus on 1995

rather than 1990 for the demonstration. But likewise the land-based geologic program has slipped schedule.

Mr. BREAUX. In other words, you interpret your mission to be one that would consider the seabed disposal as an alternative to land-based disposal.

Dr. ANDERSON. That is correct.

Mr. BREAUX. This seems to imply that they have already made a decision in favor of land-based disposal as the first line of disposal. However, they still will look at other alternatives in case there might be a better means of disposal.

Dr. ANDERSON. That is the way I perceived the U.S. position.

M. BREAUX. What happens when you finish the first phase of your study? What if you conclude at that point we should not go forward any further; that your information indicates that seabed disposal is not a good alternative compared to land-based disposal, and we terminate our research on the seabed disposal? What happens to the other countries that are considering seabed disposal? Are they apt to continue their research programs? Or do you think they would cease their programs?

Dr. ANDERSON. No, I do not believe they would cease their programs. And I would not advocate we stop our program either. Just cease the portion which was addressing the development of a repository but continue with the portion that develops and maintains the capability for assessing other options put forth by other nations.

Mr. BREAUX. What kind of interaction do you have with other nations as far as your research project is concerned? Are you working with scientists from other countries?

Dr. ANDERSON. Yes. If you remember the last viewgraph, the French, English, Japanese, and Canadians are working together in the individual task groups of the seabed working group to do ocean and laboratory scientific research.

Mr. BREAUX. Can you tell us approximately the percentage of the research under the NEA seabed working group that is conducted by the United States?

Dr. ANDERSON. At this time I would estimate about 75 percent. The other countries are tooling up, if I may use the terminology, and I think in the years to come will be contributing in a major way. But at this point in time, their contribution is small and their attitudes are changing; for example, at our first international workshop, the French attended and indicated they would participate from a scientific standpoint, but they were very opposed to the concept from a political standpoint. At the second workshop their opinion was, "We think we would like to beome involved." And after the third meeting, they were in there in force, and not only were they in force from a scientific standpoint, but their country is putting dollars into their ocean program.

Mr. BREAUX. What other countries, other than the French, are doing seabed disposal research?

Dr. ANDERSON. England. Japan is carrying out oceanic low-level waste disposal research. Some of the study areas are very applicable to studies of our seabed program. For example, the biologic bypasses radio nuclide transport paths and the water column movements.

Mr. BREAUX. Dr. Deese, I asked Mr. Long, when he testified, about the interpretation of the London convention as prohibiting the high-level waste disposal. It seems like you have a slight difference of opinion as far as whether the London convention actually establishes an absolute prohibition of any high-level waste disposal in the seabeds. Would you care to elaborate on your opinion?

Dr. DEESE. I can see how you would see a possible conflict. I agree to about the 80-percent level with what was given in written testimony by the Department of State, except that it was stated in a confusing way. If from their point of view subseabed disposal appears to pose a threat to the marine environment, they are saying they would interpret it as being banned by the convention. I would call that a kind of a policy implied legal definition. From a strictly legal point of view right now, from the point of view of an international lawyer trying to read those words and figure out what they mean, it is very difficult because the people who wrote them did not know at the time that the concept of subseabed disposal would come along several years later.

Quite frankly, it could go either way. However, I agree with the Department of State position for the time being that the United States should interpret it as being banned, if it poses a threat to the marine environment.

Mr. BREAUX. What about the discussion we had about the definition of high-level waste, EPA versus IAEA? Is that a problem area?

Mr. DEESE. It is not what I would call a first order problem, but it remains an important problem. There has been too much certainty implied in the various pieces of testimony that have been given, because this issue is very confused. Our whole proceeding today has reflected a confusion that exists, I think, in almost everybody's mind in this area. Not only is the United States unclear as to what low-, medium-, and high-level radioactive wastes really are or should be, but all the other countries involved use different or somewhat different systems.

There is an effort to somehow standardize these. There is a standardized set of definitions that the IAEA has promulgated, but they have not been adopted uniformly. Nor should we expect to ever have that kind of clarity.

As to the specific relevance of it in this context, high-level waste is defined officially by the United States as the first level aqueous extraction from the reprocessing operation. That is clearly out of date now. What we need is an updating of the definition of high-level waste by the individual agencies with whatever congressional action is necessary. These agencies need to consider more specifically the differences between their definitions and the way most of the other leading nuclear nations define high-level wastes. They must also look more carefully at what all the implications are.

I think it is perhaps more important than we realize.

Mr. BREAUX. Thank you.

Dr. Anderson, on your project, are you looking, or is anyone in your scientific group looking, at the considerations of the effect of low-level nuclear wastes or high-level wastes on the marine environment or the seabed? We had this discussion this morning about the fact that some of the low-level wastes that we had been dumping have leaked, some of the cannisters had broken open. But I

33-546 O - 78 - 20

don't think I got any kind of a clear answer as to whether that had any effect on the marine environment. Is someone considering that?

Dr. ANDERSON. The answer is yes, we are considering it. The answer also is at this time we do not have any answers for you.

Mr. BREAUX. What do we have to do to find those answers? We ocean dumped low-level waste over a fairly long period. That has been discontinued. Now we have cannisters that have caused us some problems. What else do we need, other than to assess whether it has caused any problems for the marine environment?

Dr. ANDERSON. I think monitoring an existing dump site can give you a very large amount of information. Probably also monitoring a dumpsite cannot give you the information on the environmental effects on a biological community. The reason is that by law, the amount of radionuclides in the low-level waste was low. After many years of decay the level is even lower. In order to observe any changes, either the activity—quantity of radionuclide—or the rate of species turnover or both must be increased in order to get a reasonable assessment of the damage that could occur.

Dr. Naushkin has been sampling the Pacific dumpsite. At this point in time his conclusion is that there have been no detrimental effects.

Mr. BREAUX. There are no dump sites that are currently being monitored apparently at the present time other than the instance that you just cited.

Dr. ANDERSON. The monitoring activity by the NEA for the deep ocean site is just beginning. But the English have been monitoring the outflow of radionuclides from their reprocessing plant into the Irish Sea for tens of years and have answers to some of the effects on the biology and the environment effects in the shallow water regimes. I think in some cases the shallow water data we can extrapolate to the deep. We are in the process of collecting that data. But again, our program was to first identify if we had a set of barriers that were adequate and then, after identification of those barriers, to look at such things as biological bypasses, physical bypasses, and environmental impact.

The program is just beginning to address these problems.

Mr. BREAUX. Is your project also studying the problems associated with transporting nuclear wastes from wherever they are being generated to the potential dumpsite?

Dr. ANDERSON. Again, yes, we have it in our plan. But until we identify that we do have a barrier, we did not want to spend any appreciable amount of our precious dollars on the second phase, transportation, but rather to spend it on the ocean science. We are beginning at a very low-level to address the transportation problem. We plan on building on land transport knowledge that is available and developing the sea transport program from dockside, to the site, and down into the sedimentary geologic formation.

Mr. BREAUX. Thank you.

Dr. Deese, do you see any problem with the fact that NEA is assuming a role of promoting nuclear technology and yet it is also the group that is primarily responsible for regulating low-level waste disposal? It looks like the group promoting it is also the group regulating the disposal of it.

Mr. DEESE. That is very true. It is a fair statement. The real questions are: What are the implications of that? How important is it for the quality of the regulation that they do? I have some misgivings about the past record which is particularly important with respect to a country's perceptions of how good the NEA is and what the quality of work is that they are doing.

The new legal framework is imposing some more qualitatively and quantitatively effective guidelines. On the other hand, there are still some serious problems. It is still essentially dumping operations conducted by individual nations with an NEA inspector who in some cases can catch things and in other cases cannot.

Mr. BREAUX. What about the monitoring itself? I have heard some comments that monitoring by the Europeans is not very extensive.

Mr. DEESE. I think that has been a point of unclear statements all day long. The waste was originally dumped starting in 1967 without any thought of monitoring it. It was based on an oceanic model that was oceanographically naive, misleading, and not done by oceanographers. The result was: Out of sight, out of mind. Since then they have been forced into a situation where they are monitoring the dumpsite at least individually. West Germany is doing some important work in this area, and the British are now being forced to think about it also.

Mr. BREAUX. Dr. Anderson, is the deep seabed drilling project under the National Science Foundation, a project you are working with or receiving any information?

Dr. ANDERSON. Yes, I am. We receive all of the publications. Dr. Hollister, one of the individuals on the program, is deeply involved in the DSDP, and we acquire all of their data. However, we are not at this time addressing in any detail the rock formations below. We just look at their data, make what assessments we can, and draw some very, very preliminary conclusions from it. The conclusion at this point in time, that we have drawn from the DSDP work, is that upper meters of the basaltic crust below the sediments are very fractured and probably are not adequate as a repository or as a medium in which to put the high-level wastes. Obviously, though, the DSDP has not drilled deeply into the basalt and therefore we have no data about the deep geologic structure of the basalt.

Mr. BREAUX. Gentlemen, the committee thanks you very much. This day's hearing is just the beginning of an assessment by this committee of the effects on the marine environment of the possible disposal of nuclear wastes in the oceans. We have also requested an assessment by the Office of Technology Assessment, which we are currently awaiting.

We appreciate very much your presentation and your testimony. It has been most helpful.

With that, the Subcommittee on Oceanography will stand adjourned until the call of the Chair.

[Whereupon, at 4:10 p.m., the subcommittee adjourned, subject to call of the Chair.]

NUCLEAR WASTE DISPOSAL

TUESDAY, JULY 11, 1978

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
SUBCOMMITTEE ON OCEANOGRAPHY,
Washington, D.C.

The subcommittee met, pursuant to notice, in room 2253, Rayburn House Office Building, commencing at 10:30 a.m., before the Honorable John Breaux (chairman of the subcommittee) presiding.

Present: Representatives Breaux, Pritchard, and Forsythe.

Staff present: Wayne Smith, majority counsel; Ted Kronmiller, majority counsel; Curtis L. Marshall, professional staff, minority; and Norma Moses, clerk.

Mr. BREAUX. The Subcommittee on Oceanography will please be in order.

On May 15, 1978, the Subcommittee on Oceanography convened hearings on the subject of radioactive waste disposal in the oceans and the seabed. During the course of the hearings, several witnesses indicated that the effects of radiological pollution in the marine environment were not fully understood.

This fact, if true, concerns me. The United States and many other countries around the world are initiating stepped-up nuclear power generation programs. The Department of Energy has estimated that the quantities of nuclear waste in this country will increase by a factor of 30 by the end of this century. Additionally, the amounts of nuclear wastes being generated by foreign countries are estimated to increase by a factor of 24 by the year 2000.

The United States and several member countries of the Organization for Economic Cooperation and Development, (OECD), are actively researching the option of placing nuclear wastes in the seabed. In addition, a group of European countries are currently disposing low-level radioactive wastes by dumping into the ocean.

Considering the growing stockpiles of nuclear wastes in this country and around the world, the increasing interest in utilizing the seabed as a disposal medium for such wastes, and the fact that countries are currently dumping low-level wastes into the ocean, it is of critical importance that the full consequences of radiological pollution in the oceans and its effect on the marine environment are fully understood.

Certain wastes generated from the nuclear fuel cycle remain highly radioactive for hundreds, and even thousands, of years. If the dumping of low-level radioactive wastes is allowed to continue without appropriate safeguards to insure that the marine environment and man are afforded necessary protection, we might find

ourselves faced with a mistake that we will have to live with for many generations.

Today we will hear from the lead agency in the Federal Government with respect to ocean matters, the National Oceanic and Atmospheric Administration—NOAA. I am very interested to have their assessment of how the United States and other countries are approaching this issue.

In addition, I would like to find out what NOAA is doing with respect to research concerning the effects of radioactive contamination in the marine environment.

Today we will also be hearing from one environmental group, the Center for Law and Social Policy, that will also be representing the International Institute for Environment and Development.

As our first witness this morning I would like to welcome Dr. Ferris Webster, Assistant Administrator for Research and Development, of the National Oceanic and Atmospheric Administration.

Dr. Webster, we welcome you. Are you still acting——

Dr. WEBSTER. That's a mistake, sir. I'm not "acting". [Laughter.] This is for real.

Mr. BREAUX. This is for real. OK.

STATEMENT OF DR. FERRIS WEBSTER, ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ACCOMPANIED BY SAMUEL BLEICHER, DIRECTOR, OFFICE OF OCEAN MANAGEMENT, NOAA

Dr. WEBSTER. Mr. Chairman, I was sworn in last month as the Assistant Administrator for Research and Development of the National Oceanic and Atmospheric Administration. With me this morning is Mr. Sam Bleicher, the Director of NOAA's Office of Ocean Management.

Mr. BREAUX. Before you start, Dr. Webster, I would like to submit for the record an opening statement by Congressman Pritchard, and it will be a part of the opening comments.

[The following was received for the record:]

STATEMENT OF HON. JOEL PRITCHARD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Before we get started with the testimony, I would just like to highlight a trend which I find somewhat disturbing. First of all, there does not currently exist satisfactory technology to contain nuclear waste which will be produced in substantially greater quantities in the future. Although a number of alternatives have been put forth, and disposal in salt domes currently appears most likely, there may emerge many political problems with this form of disposal.

In addition, many European countries, as well as Japan, are rapidly increasing their dependence upon nuclear power as a source of energy. Many of these countries do not have natural geological formations which are as stable as salt dome geology.

As a result of these factors, it is becoming increasingly important to thoroughly examine the important research questions which need to be asked to be able to evaluate the future prospect of disposal of nuclear waste in the marine environment. This does not mean that we favor marine disposal of nuclear waste, but rather, if there is any likelihood that marine disposal will occur due to growing opposition of other forms of disposal, then we need a better information base upon which to judge the relative safety of marine disposal. Primarily, this involves further research regarding the geological stability in proposed areas for disposal, containment and transport technology research, as well as further chemical research regarding possible transmission of radionuclides in the marine food chain.

Hopefully, Dr. Webster will provide further insight in some of these extremely important areas of research.

Dr. WEBSTER. Thank you, Mr. Chairman.

I would like to point out that Mr. Bleicher is the representative of the Department of Commerce on the Interagency Review Group on Nuclear Waste Management, which I will be speaking of in a moment.

I am pleased to have been invited to testify before you this morning, and rather than read my testimony, I would like to summarize the testimony.

Mr. BREAUX. Without objection, your complete statement will be made a part of the record.

Dr. WEBSTER. Thank you, Mr. Chairman.

[The following was received for the record:]

STATEMENT OF FERRIS WEBSTER, ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Mr. Chairman, Members of the Committee, and observers: I am pleased to have been invited to testify before you on nuclear waste disposal in the marine environment. It is a subject that merits intensive study and a problem that demands a comprehensive and sound national policy. Activities that are ongoing both in the domestic and international arenas are reaching major decision points beyond which it will be difficult to retreat—or reverse the consequences.

The Nuclear Waste Management Task Force has been established by the President to study comprehensively all the options for nuclear waste disposal, including disposal in the marine environment. The Department of Commerce is a member of the Task Force and NOAA will be a participant. The findings of the Task Force and the Administration's recommendations for nuclear waste disposal should be available this October.

NOAA is particularly concerned that an adequate technical base is available to assist in making decisions on the initiation of seabed disposal. At present, our knowledge of the deep ocean floor is limited. This is due in great part to its remoteness and great size and the high costs involved in its study. Present information, though meager, reveals no scientific or technical reason to abandon the seabed disposal option for radioactive waste. I must emphasize that we endorse only the full investigation of the feasibility of the disposal of radioactive waste in the seabed. There are questions that must be addressed for a sound assessment of the total problem to be made.

In my remarks, I will identify some of the elements (domestic and international) that should be considered in developing a national policy, discuss some of the scientific and technical problems that should be considered, and summarize NOAA's activities in this field.

POLICY ELEMENTS

At present, there appear to be a number of considerations that should be taken into account in the development of a national policy: (a) retrievability of storage containers, (b) integrity of canisters, (c) disposal in stable areas, (d) requirement of waste "registration", and (e) understanding of physical and chemical problems. I would like to stress, however, that these factors are presently undergoing examination by the Nuclear Waste Management Task Force and the relative importance of these factors has not yet been fully assessed.

Retrievability

Our limited understanding of the deep ocean environment and technology require caution in the development of different modes of long-term seabed disposal. Though we should consider the feasibility of using the seabed as a permanent respository for radioactive waste, until our knowledge and technology are more advanced, alternatives that are revokable may need to be emphasized.

Integrity of Canisters

To prevent leakage, it is critical that the integrity of radioactive waste canisters be maintained. Appropriate monitoring and inspection programs may be needed to

ensure retrieval prior to any leakage. Research into marine corrosion at great depths could better assure that we can estimate canister lifetimes.

Disposal in Stable Areas

Canister disposal should be made in stable regions of the ocean floor. The current leading approach to seabed disposal is the emplacement of waste in midplate areas of the deep seabed. This idea assumes that regions in the middle of lithospheric plates have been and will be uniformly affected by geologic processes and that the site will undergo little or no environmental disturbance over the next million years.

Another proposal that has received some attention is the disposal of radioactive waste in the canyon-like fracture zones of the ocean floor. This idea assumes that waste would be contained due to the topographic relief. Relatively rapid burial of the wastes would occur due to sedimentation. This concept requires an investigation of geologic stability, since earthquake activity can occur along small segments of fracture zones that cross the axis of an oceanic ridge, although continuous seismic activity is not evident along much of these fracture zones.

Waste Disposal "Registration"

Since the longevity of harmful levels of activity of radioactive waste is significant, consideration should be given to what institutional arrangements should stipulate concerning dumping of radioactive waste in the seabed. Such information would include the location, amount, content, and physical-chemical characteristics of the waste.

Understanding of Physical and Chemical Problems

I am concerned that adequate scientific and technical knowledge be available before irreversible decisions about seabed disposal are made. Our current understanding of these problems is rudimentary. Efforts like the Department of Energy's Seabed Program are necessary. Investigations of the seafloor configuration and the properties of the surrounding water and sediment are needed. We must establish that the sediment has enough adsorption and low enough permeability so that migration of the waste products which leach into the pore water will take at least a million years to escape to the ocean. The *in situ* physical and dynamic response to emplacement must be studied to determine if the sediments fully close above an emplaced canister. The potential of the sediment for heat dissipation must also be determined.

In addition, we need substantial technology development if retrievable storage of high-level radioactive waste canisters is to be practical. We need to develop technology for emplacement on the ocean floor in a manner which allows for future location, attachment, and retrieval of canisters, while offering interim protection against radionuclide contamination of the ocean.

Disposal in fracture zones also requires the development and testing of appropriate technology.

Other technological areas such as transport ship design and canister handling procedures must also be addressed.

NOAA RESEARCH

Past NOAA R. & D. efforts on the problems of seabed disposal outside of hydrographic surveys have been relatively small. Research on radiation effects on marine organisms was jointly funded by NOAA and AEC for 10 years at our National Marine Fisheries Services laboratory at Beaufort, N.C. This effort was terminated when it was determined that the quantities of fallout radioactivity were less than that required to produce a measurable adverse response in marine organisms under controlled laboratory conditions.

Plutonium isotope concentrations have been measured in the New York Bight region as part of NOAA's Marine EcoSystems Analysis Program. These isotopes were measured in both shellfish and sediments, revealing no potential hazard at this time.

The theory of fracture-zone disposal mentioned earlier was proposed by Karl Turekian of Yale and Peter Rona of our Environmental Research Laboratories. It came from NOAA's Metallogenesis Project in the North Atlantic that was initially funded jointly with ERDA.

There are several efforts that are in the planning stage that are related to problems of seabed disposal. NOAA's Office of Ocean Engineering is working with EPA to develop the means to locate, identify, attach, and retrieve containers on the seafloor and to emplace such containers at precise locations on the seabottom or bottom-resting platforms. The initial activity will be a jointly funded workshop scheduled later this year.

The recently passed P.L. 95-273, the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978, will serve to focus Federal efforts in the area of marine pollution including those related to radionuclides. As part of its planning efforts related to this legislation, NOAA is sponsoring a workshop for the purpose of developing a strong, comprehensive statement of the scientific problems of ocean pollution. In conducting the workshop, the Chairman, Dr. Edward Goldberg, has established eleven working groups to examine ocean pollution problems, one of which is a working group on radioactivity. The results of this workshop will include the identification of research needed to evaulate the feasibility of safely disposing of radioactive waste in the seabed.

In addition to efforts under P.L. 95-273, I have requested an internal evaluation of NOAA resources that can be directed at solving some of the scientific and engineering problems involved in seabed disposal. NOAA possesses broad oceanographic capabilities comprising scientific and engineering expertise, ships and equipment. All of these are necessary elements of a comprehensive investigation of the deep ocean disposal alternative. I intend to discuss with other agencies how these resources can be used to address the problems involved with this alternative.

Activities on both the international and domestic scene are moving to a point where the U.S. must have a national policy on the disposal of radioactive wastes, including possible disposal in the marine environment. Let me summarize some of these activities:

Low-level radioactive waste

(1) Since 1967, the Nuclear Energy Agency (NEA), which is part of the Organization for Economic Cooperation and Development (OECD), has been dumping low-level and intermediate-level radioactive wastes generated by European member nations at a site off the Bay of Biscay. NEA is now encouraging each member state to conduct its own dumping operations under NEA surveillance and standards. In addition to the European nations, Japan is planning to commence dumping in the Pacific beginning next year. The U.S. has been a member of NEA since mid-1976 but has ceased using the oceans for disposal of low-level radioactive waste. With State Department leadership, through an interagency group and an outside advisory committee, the U.S.A. has been working through NEA to develop an ocean dumping policy concerning low- and intermediate-level radioactive wastes.

(2) The International Atomic Energy Agency (IAEA) is preparing recommendations that will govern permits for ocean disposal of low- level and intermediate-level radioactive wastes under the 1972 London Ocean Dumping Convention. Section D of Annex II of the convention states that "In the issue of permits for the dumping of this matter, the Contracting Parties should take full account of the recommendations of the competent international body in this field, at present the International Atomic Energy Agency."

(3) Domestically, land siting of radioactive waste disposal is encountering increased public opposition. Anticipating the need to explore other disposal options, first the Environmental Protection Agency, and now more recently the Nuclear Regulatory Commission have established programs for conducting studies of ocean disposal for low- and intermediate-level radioactive wastes.

High-level radioactive waste

Activities concerning the disposal of high-level radioactive wastes are likewise placing great urgency on the development of a cohesive national policy on seabed disposal even though the Federal Water Pollution Control Act and the Marine Protection, Research, and Sanctuaries Act specifically prohibit the disposal of high-level radioactive waste in the oceans.

(1) The IAEA is charged under the London Ocean Dumping Convention with preparing definitions of what constitutes high-level radioactive matter that is unsuitable for dumping at sea. The definitions will be presented at the Third Consultative Meeting of the Contracting Parties to the Ocean Dumping Convention in London this October. The definitions adopted by the IAEA for the permanent isolation and confinement of high-level radioactive waste in the deep seabed, will stimulate consideration of seafloor disposal options.

(2) Certain provisions of the Nuclear Non-Proliferation Act of 1978 call for uniform policies and international agreements on spent fuel storage and reprocessing. Implementation could lead to international authority over discarded spent fuel and waste disposal. It is almost certain that any international authority would give serious consideration to seabed isolation and confinement possibilities.

(3) Inventories of high-level radioactive waste and spent fuel have accumulated to the point where they are of concern. Consideration of future development of our nuclear power industry must include assessment of all acceptable solutions to the

problem of permanent disposal of radioactive wastes. Previous waste management programs primarily concentrated on siting of commercial and military high-level radioactive waste or discarded spent fuel repositories on land sites in the U.S. However, all potential, feasible options should be investigated and promising alternatives must be carefully evaluated and weighed against land-based alternatives.

These factors underscore the need for a clear national policy if we are to undertake seabed disposal of radioactive waste.

It may prove possible to use the seabed for radioactive waste disposal without harm to that environment; however, such use demands that decisions be made on sound technical information. It is imperative that we develop adequate understanding so that the consequences of our decisions may not injure our descendents.

Thank you, Mr. Chairman. I will be glad to answer any questions.

Dr. WEBSTER. This is an important question, a question which we do not have the luxury of making serious mistakes about, because the mistakes may be with us for hundreds of thousands of years. We, therefore, need to take this question seriously.

As I mentioned a moment ago, the Presidnet has established the Interagency Review Group on Nuclear Waste Management. This review group has been charged with preparing a report on the subject of nuclear waste disposal by October 1. The Department of Commerce is a member of this review group and NOAA will be a major participant in the work of that group. We are looking forward to the results of that task force and evaluating the options on this question, particularly as it relates to disposal in the seabed.

The question of seabed disposal is a very difficult one for an oceanographer to talk about. I would like simply to say that the most important thing right now is that we increase our information base so that we have full knowledge of the options that are available, both technically and scientifically, in disposing of high-level radioactive wastes on the floor of the ocean. We need a technical base. We have limited information at the moment about the sea floor. The sea floor is at great depths, separated by thousands of meters of water, and it is large. We have limited resources at out disposal—which is true of our country and every other one—so we do not know enough yet about the deep sea floor before we can begin disposal.

I would also note that the disposal in the seabed of high-level radioactive waste is now prohibited by legislation. Both the Federal Water Pollution Control Act and the Marine Protection, Research, and Sanctuaries Act of 1972, sometimes known as the Ocean Dumping Act, prohibit the disposal of high-level nuclear waste in the ocean.

I would like to say a word or two about some possible factors that need to be examined and I expect will be examined by the Interagency Review Group on Nuclear Waste Management. These are outlined in my testimony and I would just like to review them.

They are the question of the location of disposal areas—the area that seems to be the most highly favored scientifically these days is that of the most stable areas on the seafloor, stable both geophysically and stable in terms of ocean currents. If we're going to put wastes in the seabed, we want to do it in an area where we can predict as well as possible that there will not be severe tectonic activity and that the effects of the ocean currents are likely to be stable for hundreds of thousands of years.

Mr. PRITCHARD. If I could interrupt, are you saying the most favorable places in the ocean are of this particular type, or the

most favorable place of all for disposal of high-level nuclear wastes now looks like it's in the ocean?

Dr. WEBSTER. I want to be very clear about that. I feel that if we are going to put them in the ocean——

Mr. PRITCHARD. If we're going to put them in the ocean; OK.

Dr. WEBSTER. Yes. Maybe I should back up and make it very clear that I am not arguing in favor of putting wastes in the ocean. I am arguing in favor of fully investigating the options.

Mr. PRITCHARD. And at this point you're not prepared to say that the ocean is a better place for putting nuclear wastes than, say, some place on land; in the salt domes, for instance?

Dr. WEBSTER. No, sir. I don't think we know enough to answer that question.

Mr. PRITCHARD. Will we know it by October 1?

Dr. WEBSTER. No, sir, we will not.

Mr. PRITCHARD. How are we going to have this report by October 1 and have it really guide our country and its nuclear waste management policy if we don't know the facts?

Dr. WEBSTER. I don't think, Mr. Pritchard, we will know the facts until we have done a lot more work on evaluating the floor of the ocean.

I would expect that the Interagency Review Group on Nuclear Waste Management in October will say something like:

> Yes; we agree that the ocean is an option that needs to be kept open, and yes, before we go ahead any further we need to get more information about the stability of the seafloor, about the rate of sedimentation, and about the ocean currents near the bottom.

I expect the task force will say these things. At that point we will not be in a position to say, "Yes; we will dispose of high-level nuclear wastes in the seafloor," but we will be in a position to say, "Yes; it's an option that we need to get more technical information on before we can proceed."

Mr. PRITCHARD. Will their report deal with other aspects as far as land-based disposal alternatives that they ought to get more information on that?

Dr. WEBSTER. Mr. Pritchard, I'm sorry but I can't answer that. Mr. Bleicher is the Department of Commerce representative on that task force.

Mr. BLEICHER. There are several subgroups of the task force. One of them will address alternative disposal locations. The objective is to develop a strategy that is not simply an answer as to how we should dispose of the waste, but to identify ranges of altenatives, to try to decide whether there is a first set of alternatives that should be explored more urgently than other altenatives, for example, to try to decide whether we should be looking at multiple sites or single sites, trying to decide whether we should be looking at land and ocean disposal and space disposal and so on, or whether certain of these are better than others. Ultimately, we are to try to develop a strategy for using our scientific resources and our public awareness resources, if you like—that is, to try to get a consensus in society about what are the more suitable approaches for solving this problem.

Mr. PRITCHARD. What I'm fearful about is that the report will open up more questions than it will supply answers.

Mr. BLEICHER. It may.

Mr. PRITCHARD. If there is large public debate on this issue, maybe that's needed, but I was hopeful we could get past that point.

Mr. BLEICHER. A part of the interagency review group's effort will be a public education effort. There will be hearings in Boston, San Francisco, and Denver later this summer to solicit public input.

I tend to agree with you, that although this effort is aimed at providing input to the October 1 report, that it will in a broader sense generate a much greater public awareness of the overall issue. I don't think the question is going to go away for a long time.

Mr. PRITCHARD. I'm sorry for interrupting, Mr. Chairman.

Mr. BREAUX. Please continue.

Dr. WEBSTER. Thank you, Mr. Chairman.

I was discussing the need to look at the options for location of siting, if we are going to go with the seabed option. This is a question that needs much deeper investigation.

Another option that has been suggested, related to NOAA's program, is that of possibly disposing of high-level nuclear wastes in what are called fracture zones, canyonlike features of the seafloor. It would be important not to put these wastes in areas which were geologically active, but if we can find a fracture zone that is geologically passive, we may have the advantage there of a possibly higher rate of sedimentation and the physiography of the canyon itself might help in trapping the nuclear wastes.

This is a question which has some controversy about it. There is a possibility that the physiography rather than increasing the entrapment of wastes would act as a dynamic enhancer and ocean currents might be stronger in the bottom with even greater scouring.

These are the kinds of questions, though, Mr. Chairman, that need to be examined carefully before we make decisions.

Other kinds of questions are: Do we want to have the option of retrieving wastes? If a few hundred or even thousands of years away we discover that we have made a serious mistake, do we want to have the option of retrieval? We need some investigation of the technology of location, of recovery, and we need to have an understanding of what the options are on specially designed ships for handling such wastes. We haven't done enough on this, and this is again a question that may need further investigation.

We also need to consider the possibility of having some kind of international registration of the location, the amount and type of waste that we're putting down, with the understanding that it's not just an international question but is a question of providing that information for our descendants, so that they know what is out there. You might liken it to the telephone company putting out signs saying: "Buried cables—Do not dig." We want to be sure that our descendants know where this very dangerous material is located.

I would like to make a brief summary of some of the research and development work that is going on in NOAA relating to the question that Mr. Breaux mentioned at the beginning.

In fact, the total research and development going on in NOAA related to seabed disposal has been relatively small. I would like to, however, mention a few programs.

Between 1961 and 1971, at the National Marine Fisheries Center at Beaufort, N.C., work by NOAA in cooperation with the Atomic Energy Commission was carried out on the radiation effects on marine organisms. They looked at crustaceans, mollusks, and fish and studied the effects of radiation on them.

They concluded at the end of this 10-year study, at which time the study was terminated, that the effects needed to produce adverse effects were many times the radiation levels that we actually found in the marine environment. In other words, they did not find significant radiation effects on the marine organisms they investigated with anything like reasonable levels of radionuclides.

We have been carrying out investigations on plutonium isotope levels in shellfish in the New York bight region as part of the marine ecosystems analysis program. Our results to date show no potential hazard.

We have been examining the theory I mentioned previously about possible disposal in fracture zones, an idea put forward by Prof. Karl Turekian of Yale University and Dr. Peter Rona of NOAA's Atlantic Oceanographic and Meteorological Laboratories in Miami. This work has grown out of the NOAA program on metallogenesis in the North Atlantic.

NOAA's Office of Ocean Engineering, in collaboration with the Environmental Protection Agency, is looking at the question that I mentioned a moment ago, of location, attachment, identification, and retrieval of containers that might be used for disposal of wastes. They are planning to hold a workshop later this year on this subject.

The recently enacted Public Law 95-273, the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978, has just gotten underway. This week a workshop is being held on the scientific questions that need to be addressed in the development of a plan.

One of the seven or eight subgroups in this workshop is one on radioactivity. The total workshop is being organized by Prof. Ed Goldberg of the Scripps Institution of Oceanography at the University of California, and the group on radioactivity is being headed up by Bill Templeton of Battelle Northwest. We expect that this group will consider the question of the disposal of radioactive wastes.

We are currently reviewing NOAA resources so that we know what is available to develop a better scientific and engineering response to deal with some of these problems.

Mr. BREAUX. If you will, since we have your testimony submitted for the record in its entirety, and have your summary, if we could just go ahead and get to the questions, it may be helpful in bringing out the other points you wish to make.

Dr. WEBSTER. Very good.

Mr. BREAUX. I pointed out the fact that we are going to have a lot more nuclear wastes generated if our Department of Energy's plans are carried out. This is the direction we seem to be headed, generating more nuclear waste.

Very simply, many people who are for nuclear energy are nevertheless, very concerned about the disposal of wastes. My own district has been looked at very carefully as a potential site for nuclear waste disposal. If I took a poll in my district, I daresay they would not be overenthusiastic about using that area for disposing nuclear waste. No one wants it in his backyard.

One of the reasons why we are having these hearings is to make sure our Government has considered the alternatives, and one of the alternatives is the disposal of nuclear wastes in the ocean. Some of the things I have heard in hearings prior to this one have disturbed me a great deal. For example, when we asked EPA at the last hearing what the environmental effect was of the existing low-level wastes that have been disposed of in the oceans, the answer was, "We don't know." They admit that their duty is to monitor it, but that they have not done the work necessary to determine the effect on the marine environment.

If NOAA is going to be the lead agency in ocean management—and I hope it will, it will have to develop a program to find the answers to this problem.

I am pleased that we have a nuclear waste task force that is apparently going to provide a report.

Do you think NOAA is doing everything that it can on monitoring and coming up with a decision on whether the oceans are an acceptable alternative for nuclear waste disposal?

Dr. WEBSTER. Mr. Chairman, I would have to answer that by saying No, I don't think we're doing all we can do. The question is one of priority and resources and whether this is what we ought to be investigating.

The Department of Energy's seabed disposal program is one that has been going on for a number of years, which in my view is of high quality. The question is what should NOAA be doing that is not duplicative.

Mr. BREAUX. On page 6 of your prepared statement, you say, "Past NOAA R. & D. efforts on the problems of seabed disposal outside of hydrographic surveys have been relatively small." I would hope that would not be a continuing policy. I would hope that R. & D. efforts on seabed disposal would be on the increase and that they would occupy a major segment of the overall research and development that NOAA is doing.

Also, I see the research efforts at Beaufort, N.C. were terminated, when it was determined that the quantities of fallout radioactivity were less than that required to produce a measurable adverse response in marine organisms.

What does that mean in layman's terms? They just did not have enough radioactive material to generate any kind of response on the test mechanisms.

Dr. WEBSTER. Yes. That means when they put up the doses high enough to have an adverse effect on the plant and animal life, that the doses were many times higher than any of the highest radioactive waste levels that we knew of in any of these dumping activities.

Mr. BREAUX. That's assuming all the dumping activities go according to plan?

Dr. WEBSTER. Yes, sir.

Mr. BREAUX. You know, if the canister should burst open, I would imagine it would generate a radioactive level that would be more than enough to have some measurable effect on the test mechanisms.

Dr. WEBSTER. Perhaps I might clarify a couple of points here. The levels they are talking about in the Beaufort study were related to the disposal of low-level nuclear wastes. A number of countries at this time are disposing of low-level nuclear wastes and they are essentially using the ocean as a mechanism for dispersion. That is one way of disposing of wastes.

What I have been talking about mostly in my comment, and in my written testimony, is that of disposal of high-level nuclear wastes, not by using the ocean as a kind of sewer for disposing of it, but of using the seabed and using the sediments of the ocean floor as a way of ensuring that radioactive waste doesn't get out for a million years. That's a completely different way of handling it than by dispersing in the ocean.

I think the Beaufort studies were terminated because they really, in all honesty, were not relevant to the question we're talking about here. It is what is likely to happen with high-level wastes deep in the ocean, in situation where after many—maybe even hundreds of thousands of years—that the radioactivity gets to the point where it might possibly do damage. The studies at Beaufort were terminated, and I think they should have been terminated from that point of view. I like to see our agency terminate programs when they don't seem to be addressing an issue or when they seem to have come up with an answer.

As to starting other programs, Mr. Chairman, which is the point you're raising, I think you are right and it's a question that needs attention.

Mr. BREAUX. I will ask one more question.

On page 7 of your prepared statement, you mention the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978. That is an act that designates NOAA as the lead agency in R. & D. work, as far as ocean pollution is concerned. There are disturbing reports that some other agency in the Government might not agree with that, and is trying to do some amending through the appropriations process to try to say that's really not what the Congress intended. They'll have an awful tough row to hoe on that one.

I think that the new act should give NOAA enough authority to take the bull by the horns and get out there and become the lead agency for research efforts on using the oceans as a nuclear dumping ground or nuclear storage base.

You said you were getting ready to sponsor a workshop as a result of this legistation?

Dr. WEBSTER. Mr. Chairman, yes and no. Yes, the workshop is intended to develop a scientific plan to be responsive to this act. We got going on the workshop being held this week by starting the workshop planning long before the act was passed. We did it under the authority given to NOAA under the "Ocean Dumping Act." We anticipated the act—the Ocean Pollution Act, Public Law 95-273—would likely be passed, and we felt with the short time available and the importance of the problem, we had to get moving.

So we started last spring to organize this workshop that is being held right now.

Mr. BREAUX. I recognize Mr. Forsythe.

Mr. FORSYTHE. Thank you very much, Mr. Chairman. I apologize, but I will have to leave and I do have some questions.

I certainly join you in your concern that NOAA maintain its role in this whole process.

Dr. Webster, you mentioned the issue of retrievability of high-level nuclear wastes. On the basis of a mistake, it seems to me there's another basis for being able to retrieve these materials which is very, very important. We may not be making a mistake and may just discover how we want to use these wastes in the future and, therefore, it should be where we can retrieve it.

Would you agree with that kind of thesis?

Dr. WEBSTER. I'm sorry, Mr. Forsythe, but I'm not able to answer that one.

Mr. FORSYTHE. It's on the basis that we may be able to eventually use these waste materials. Again, through new technology that is developed down the road, we may be throwing away something which could have value in the future. If we were to use, for instance, the deep-ocean canyons and other places where we may not be able to retrieve nuclear wastes. I would agree with your problem as far as long-term safety, but I also think there is another very real reason in support of retrievability which needs to be considered. I would hope our technology is going to enable us to eventually put this in a form where it is inert. I just wanted to make that point.

Dr. WEBSTER. Mr. Forsythe, I think the question of retrievability is a controversial one and not all scientists have looked at the question, or would agree that we want to have that capability.

Mr. FORSYTHE. All the discussion of ocean disposal would really involve the deep seabed and would be outside of territorial waters, wouldn't it?

Dr. WEBSTER. The seabed emplacement, yes, it would.

Mr. FORSYTHE. This really does get us into an international problem, which I think has to be kept very much uppermost in our working toward a resolution of the seabed disposal question.

Dr. WEBSTER. Yes.

Mr. FORSYTHE. Regarding the magnitude of the problem, as I understand it, the energy production at this point in the foreseeable future is still a relatively small part of the problem, but it's still the military nuclear waste that is our major current source of high-level nuclear wastes.

Does that make a difference as to how we try to look at this?

Dr. WEBSTER. I think, Mr. Forsythe, it might make some difference to the domestic political considerations on it, but I think, if we decided to dispose in the ocean, I think the same question would have to be answered, no matter what the source was.

Mr. FORSYTHE. Thank you very much. I appreciate your testimony.

Thank you, Mr. Chairman.

Mr. BREAUX. You're not volunteering the area off your district for disposal? [Laughter.]

Mr. FORSYTHE. After we get the oil out, maybe we can pump it down the oil lines. [Laughter.]

Mr. BREAUX. Mr. Prichard?

Mr. PRITCHARD. It seems that politically, when we get into the issue of ocean disposal, because of the domestic pressures, that is one thing. But, what are countries like the United Kingdom doing with their nuclear wastes now?

Dr. WEBSTER. I am not completely into this, Mr. Pritchard, but my understanding is that they may be involved with dumping low-level wastes in the ocean, simply using the ocean, as I mentioned, for dispersion.

My understanding as to extent of high-level wastes is that they are being stored without disposal. I don't believe any country on Earth, to my knowledge, has found a permanent solution to the question of disposal of high-level wastes.

Mr. PRITCHARD. In the case of countries like England or Japan, where they don't have what seems to be adequate land-based areas for disposal of their nuclear wastes, no matter how feasible and technically possible it would be for them to transport these wastes to some other country and put it wherever it might be—the salt domes or all the different alternatives that have been thought of—it's pretty hard to bring in some of these wastes from other countries, politically, and establish a disposal facility in your country.

So while the ocean may not be the place for a repository, it may still be picked because the alternatives are worse. So those countries that do not have logical land-based areas for disposing of wastes, they're going to have to go to the ocean.

It just seems to me that we're in an area that is tailormade for a lot of demagogs. And it's going to be an increasingly important international question, because it doesn't matter whether we're going to have more nuclear wastes. These other countries, France, Japan, and England where there is a rapidly increasing dependence on nuclear energy, are going to be very important players. So the United States may have some important decisions on these things, but we're not going to be the determining factor any more on whether there's going to be increased nuclear wastes.

Is that a fair statement?

Dr. WEBSTER. We will have to be involved at the international level, even if some other country decides to use the ocean. I would hope we would be in better shape than we are today to know the answers to these questions that have been raised about the best technical means for disposal, and the questions of the impact—if leakage has an impact on the environment.

Mr. PRITCHARD. It seems to me that the land-based disposal alternatives are better. But I see a number of countries which are generating waste that are not going to be able politically to put it in their country. I can just imagine taking all the world's waste and putting it in my district. You know, that's hard to sell. [Laughter.]

Even though the Governor in my State has suggested that our State be a place for storing nuclear waste. It's an amazing statement.

33-546 O - 78 - 21

Well, I guess my concern is that we're really not going to have the answers to this in the near term. Therefore, we are going to delineate the problem a little further.

Dr. WEBSTER. We do not have the answers today. I don't think we're going to have the fianl answer by October 1, no matter what we do. I think we ought to look very carefully at the option of whether we really want to have the answer in the ocean and are we prepared to put the resources into trying to get it.

Mr. BLEICHER. Just let me say a word here about the timing of this, because I think nobody expects to have the answer on October 1.

I think what the task force is aiming at is trying to be able to begin disposing of some of these wastes in the mid-1980's or late 1980's or early 1990's. The effort at this point is to develop as strategy for coming up with the best one or several types of disposal and locations for disposal, to begin the process so that in 10 or 15 years we will be able to dispose of the wastes.

The wastes are going up in a geometric pattern, as was suggested by the opening statement; that is, each plant is producing more every year and we're also building more commercial plants. Also, the military wastes are continuing to be with us.

Of course, for a certain period you can get along with a variety of interim mechanisms, but somewhere between 8 and 15 years from now we have to come up with the beginnings of a permanent answer. This effort is to try to develop a strategy for coming up with some permanent answers.

I don't think anybody expects that we're going to have the solution. We may have a strategy that will lead us to exploring the right options. Even that, of course, is a very difficult thing to agree upon.

Mr. PRITCHARD. In my layman's mind, just so I can get some idea of the magnitued of the problem, what is the amount of waste that is being disposed of today? Is there any way of measuring this—you know, like bigger or smaller than an elephant, or bigger that a breadbox? What do you say when you talk about the amount of waste?

Dr. WEBSTER. I don't think the question is how much in terms of high-level waste. It's not a question of what's being disposed of, because none of it is being disposed of.

Mr. PRITCHARD. Yes, it's being stored, or created, I guess is the word.

Dr. WEBSTER. I have the number in this book in front of me. It's a question of finding it.

Mr. PRITCHARD. What do you mean in terms of numbers?

Dr. WEBSTER. I think it's in terms of curies——

Mr. BLEICHER. There are tons of high-level materials. We can submit the numbers for the record.

Mr. PRITCHARD. In your own mind, for high-level wastes, what are we talking about? Do you have any rough——

Dr. WEBSTER. I think the number I recall reading was 9 million cubic feet of high-level waste that is currently being stored in this country.

Mr. BREAUX. That's bigger than an elephant. [Laughter.]

Mr. PRITCHARD. I rather suspected that.

Dr. WEBSTER. It's a big problem, Mr. Pritchard, and it's going to get worse because the amount is going up geometrically. We're getting more and more every year.

I am not sure of that number, but I do recall reading that.

Mr. BLEICHER. In the statement that Dr. Deutch gave to your committee, his testimony shows commercial wastes.

Dr. WEBSTER. It's 9 million cubic feet of high-level wastes.

The reason the tables are confusing is that it's broken down into military and domestic and civilian. It's when you look at the military one that you find out it's the order of 9 million.

Mr. PRITCHARD. That's in this country?

Dr. WEBSTER. Yes, sir. That's the U.S. radioactive waste. In the way it's packaged now, we have 9 million cubic feet.

Mr. PRITCHARD. Where do we have most of it now?

Dr. WEBSTER. I believe most of it is in tanks, but I couldn't tell you where those tanks are.

Mr. PRITCHARD. There is a commercial storage place——

Dr. WEBSTER. We are also facing a serious problem with these tanks due to age, corrosion, and leakage.

Mr. BLEICHER. Not to make this more depressing, just let me note that no matter where we end up disposing of these wastes, the problem of transporting these wastes and the handling of these wastes in getting them to and from the locations is very serious.

When we talk about ocean disposal and placement in the seafloor, you still have to get the wastes from wherever they are generated on to the ships in conditions that may not always be favorable to human beings, and in a place where you want them on the ocean floor. The technology is going to be difficult for that effort, aside from the geology and the ultimate disposal location, which is what we have been talking mostly about. The engineering of this kind of problem is very serious.

Dr. WEBSTER. We need to be very careful about the transportation, for example.

Mr. PRITCHARD. We're transporting large amounts of this now?

Dr. WEBSTER. No, I'm thinking in terms of the seabed disposal. If you finally go to that option, the sea transportation is important. You can imagine an Amoco *Cadiz* type incident off our shores, without the proper technology developed.

Mr. PRITCHARD. Thank you, Mr. Chairman.

Mr. BREAUX. Thank you, Mr. Pritchard.

When I visited an underground salt dome storage site in Germany, a person there explained to me that transportation was not a problem. They just drove right through the little village, made about 15 turns with a huge truck, and I said, "What do the people think about it?" He said, "Well, they don't know it's nuclear waste." That seemed to solve the problem. They didn't know what was in the truck.

I take it there are now no high-level wastes being disposed of in the oceans, or stored in the oceans?

Dr. WEBSTER. Not to my knowledge.

Mr. BREAUX. But England and Japan are putting low-level wastes in the ocean?

Dr. WEBSTER. Not storage, but disposal of low-level wastes. You dump it, chuck it over the side, and let the ocean take care of it.

Mr. BREAUX. The United States is not in the process of doing anything with low-level radioactive waste disposals in the oceans?

Dr. WEBSTER. No, sir, we are not.

Mr. BREAUX. In your statement on page 2, you talk about the information that you have now, though it's not a great deal, but it has not ruled out or shown any scientific or technical reason to abandon the idea of the seabed as a disposal option for radioactive wastes, and that it is something that is still being considered along with a number of other options, is that correct?

Dr. WEBSTER. Yes, sir. It is now being considered in the task force.

Mr. BREAUX. The thing that gives me some concern is that the Department of Energy testified that, in relation to the total budget on research and development, the amount being spent on the concept of using the ocean as a potential disposal or storage site is very, very small in comparison with the land-based alternative.

I want to make sure seabed disposal gets a fair hearing, because you will have some tremendously horrible political problems when you start going around the country and looking for land-based disposal sites.

I think we are rapidly running out of time in trying to find the answers. We need the answers now, concerning which disposal approach is the favored one.

In your testimony you mention several studies, and it seems that some of them are starting to overlap.

Which agencies are involved in the Nuclear Waste Management Task Force?

Mr. BLEICHER. I don't know if I have a complete list handy, but all Federal departments are involved.

Mr. BREAUX. The Commerce Department, the Nuclear Regulatory Commission, the Department of Energy——

Mr. BLEICHER. Yes, and the State Department. CEQ and the White House are also represented.

Mr. BREAUX. The report of the task force, as you point out, will be due some time in October, and that report really will not provide any answers. I suppose it will discuss the alternatives and the problems——

Mr. BLEICHER. I hope it will do more than just discuss the alternatives. I hope it will come up with a recommended strategy in terms of a series of steps to be taken, both to pursue certain options and to research other options and to identify whether we should go, for example, to land disposal. You might decide to aim for a single site and essentially put all your eggs in that one basket, or you might decide to try to identify three or four sites simultaneously.

These are the kind of questions we are going to try to sort out through this study of alternatives, and try to recommend to the President a series of steps that should be taken.

Mr. BREAUX. What agencies are looking at the question of ocean disposal? Obviously, NOAA is, and you also have EPA involved. Are there others?

Dr. WEBSTER. The Department of Energy has been carrying out a program for a number of years—I believe it's called the seabed

program. It is the only balanced program that has been carried out, and has been for a number of years.

I think you were mentioning, Mr. Chairman, a moment ago about the relative degree of interest in the ocean and on land siting. My understanding is that in fiscal year 1979 the budget in DOE for investigating land siting is $119 million, and the budget for looking at the seabed is $3 million.

Mr. BREAUX. I can understand their lopsided view, but I can't understand NOAA's lopsided view, because NOAA should be primarily and heavily involved in looking at the oceans as a disposal site and the environmental effect on the marine eco-systems. That should be your No. 1 priority, and let DOE look at the land.

I'm critical of them for not looking at the ocean sites as much as they should have been, but there is no excuse for NOAA not being the lead agency in looking at the potential effects on the oceans because the oceans are, after all, your agency's mission. Let someone else look at the land-based alternatives.

Dr. WEBSTER. I'll accept that, Mr. Chairman, but I want to assure you I didn't intend to be critical of DOE——

Mr. BREAUX. I'm critical of DOE.

Dr. WEBSTER. I think they deserve credit, Mr. Chairman, for what they have done.

Mr. BREAUX. I have no problems with what they have done on land-based alternatives. They've done a good job. But I think it is lopsided in not looking more at the oceans as a potential site. But again, if they're going to be lax in that area, then NOAA certainly should be in the forefront of looking at the question of what happens if you use the ocean as a disposal site.

I really have not seen enough work on the ocean alternative in the past. I know both you and Mr. Bleicher are very new in this job and you're not responsible for the omissions of the previous folks in the administration. I am not directing my criticisms at you personally. It's just that I haven't seen a lot that NOAA has done on this issue in the past and we now have an opportunity to correct the problem and I would hope you would move forward very quickly and aggressively in doing that. If you don't someone else will. Frankly, I think that NOAA should do it because the expertise is in your agency.

I would hope you could coordinate this effort. We have got so many different agencies with their hands and feet in the "pie," someone has to take the lead.

I repeat, I think the legislation, S. 1617, the Ocean Pollution Research and Development Act, is enough authorization to give NOAA the responsibility to move forward and come up with some concrete answers on this.

Are there any other questions?

All right, we thank you very much, Dr. Webster and Mr. Bleicher; we appreciate your testimony.

Our next witness will be Mr. Clifton E. Curtis, on behalf of various environmental groups, which, of course, will appear in the record.

Mr. Curtis, we welcome you and ask you to take a seat at the witness table. We have a copy of your testimony, which will be

made a part of our record, and we invite you to proceed as you see fit.

[The following was received for the record:]

STATEMENT OF CLIFTON E. CURTIS, ON BEHALF OF THE ENVIRONMENTAL DEFENSE FUND, FRIENDS OF THE EARTH, NATIONAL AUDUBON SOCIETY, SIERRA CLUB, WILDERNESS SOCIETY, NATIONAL WILDLIFE FEDERATION, THE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT, AND ENVIRONMENTAL POLICY CENTER

I am Clifton E. Curtis of the Center for Law and Social Policy, a public interest law firm located in Washington, D.C. I appreciate the opportunity to appear before you today on behalf of eight environmental groups,[1] the Environmental Defense Fund, Friends of the Earth, National Audubon Society, Sierra Club, Wilderness Society, National Wildlife Federation, the International Institute for Environment and Development and Environmental Policy Center to discuss their concerns with respect to the disposal of radiological wastes in the marine environment. These environmental groups have a combined membership exceeding 2,715,000 persons throughout the United States and abroad. They have had a long history of active interest in the development of sound ocean policies—both nationally and internationally—that provide for effective control of all sources of pollution of the marine environment.

We believe that these hearings represent a valuable contribution to the United State's efforts to formulate sound and rational controls over the disposal of radiological wastes in the oceans. They provide a forum for a current articulation of U.S. policies and program activities—both domestically and in relation to the efforts of other nations and international organizations. The record being developed here enhances the possibilities for effective coordination of the statutory and regulatory responsibilities lodged in such agencies as the Environmental Protection Agency, the Department of Energy, the State Department, the Nuclear Regulatory Commission, the Department of Defense, and the Department of Commerce's National Oceanic and Atmospheric Administration. Additionally, these hearings should assist our public officials in developing the comprehensive and explicit national policy that is a prerequisite to the international pursuit of mutually acceptable approaches to preserving and developing the resources of our oceans. These hearings also provide the Congress with an opportunity to assess the adequacy of existing domestic statutory authority and to strengthen that authority where warranted. Finally, the public airing of this country's efforts in addressing the issues associated with disposal of radiological wastes in the marine environment is essential. Given the national debate which continues over the appropriateness of nuclear technology in meeting our nation's energy needs, the public must be kept fully informed as to matters that affect the viability of continued reliance on that technology, not the least of which is the effort to arrive at long-term solutions to the waste disposal problem.

RADIOLOGICAL WASTE DUMPING IN THE OCEANS

Since June, 1970, the United States has not used the oceans for the waste disposal of any radioactive materials. From 1946 until 1970, however, the United States dumped nearly 95,000 curies[2] of low-level radiological wastes, with 99.5% of that

[1] EDF, whose principal place of business is 475 Park Avenue, New York, N.Y. 10016, has a membership of approximately 45,000 persons and a 700-member Scientists' Advisory Committee, including members residing in 18 foreign countries. FOE, whose principal place of business is 124 Spear Street, San Francisco, C.A. 94105, has a membership of 20,000 persons and is affiliated with "sister organizations" in 12 foreign countries. The National Audubon Society, whose principal place of business is 950 Third Avenue, New York, N.Y. 10022, has a membership of approximately 400,000 persons, including members in more than 100 foreign countries. The Sierra Club, whose principal office is at 530 Bush Street, San Francisco, C.A. 94104, has a membership of approximately 180,000 persons, including persons residing in 67 foreign countries. The Wilderness Society's principal place of business is 1901 Pennsylvania Avenue, N.W., Washington, D.C. 20006. It has a membership of approximately 70,000 people. NWF, whose address is 1412 16th Street, N.W., Washington, D.C. 20036 is composed of associate members and members of State affiliate member organizations, comprising over 2,000,000 persons. IIED is a non-profit organization doing research on selected topics in international environmental problems, with offices in London an Washington, D.C. EPC's principal place of business is 317 Pennsylvania Ave., S.E., Washington, D.C. 20003; it has no members itself but represents coalitions of citizens around the country on energy and natural resource issues.

[2] A curie is a quantity of radioactive material that undergoes 37 billion disintegrations per second, which is equivalent to the radiation intensity of 1 gram of radium.

amount being dumped prior to 1963.[3] The Nuclear Regulatory Commission (through Sheldon Meyers) expressed the opinion that the shift by the U.S. in the 1960's away from ocean dumping to land-based storage sites resulted from (1) international objection to sea disposal on environmental grounds, (2) a change in the then AEC's disposal philosophy from dispersion to containment, and (3) because the commercial industry found land burial more attractive.

Outside of the United States, the United Kingdom dumped approximately 45,000 curies of low-level radioactive wastes into the oceans from 1951 through 1966, and from 1967-1977 the Nuclear Energy Agency has supervised the ocean dumping at one site of more than 300,000 curies of low-level radioactive wastes coming from seven European countries.[4]

According to Department of Energy's calculations, the projected quantities[5] of the United State's commercial and military wastes that will have been produced by the year 2000 will be approximately 500 million cubic feet of low-level wastes and 129 million cubic feet of transuranic wastes, with insufficient data available to project the quantities of high-level wastes. By adding the projected U.S. quantities of spent fuel generation that will have occurred by the year 2000 (i.e., almost 100,000 metric tons of heavy metal and 1,281 thousand cubic feet of fuel containing a high curie quantity in relation to its weight and volume) which will have to be stored or reprocessed, it is evident—even excluding any worldwide projections—that long term solutions must be found for managing our nuclear wastes. The United States and most other countries currently favor land-based disposal of radiological wastes. Absent highly acceptable land-based repositories, however, the oceans will receive increasing consideration as the primary alternative to land-based geological sites—if for no other reason than their "out of sight, out of mind," limited constituency appeal.

PERTINENT DOMESTIC LEGISLATION

The primary Federal legislation regulating the dumping of radiological waste materials into the oceans is the Marine Protection, Research, and Sanctuaries Act of 1972, 33 U.S.C. 1401 *et seq.* Additionally, the recently enacted National Ocean Pollution Research and Development and Monitoring Planning Act of 1978, 33 U.S.C. 1701, *et seq.*, establishes a program addressing ocean pollution concerns within the National Oceanic and Atmospheric Administration, the Nuclear Non-Proliferation Act of 1978, 22 U.S.C. 3201 *et seq.*, indirectly addresses nuclear waste management matters and the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.*, mandates the consideration of the environmental impacts and alternatives to the disposal of radiological wastes in the marine environment.

The Marine Protection, Research, and Sanctuaries Act ("Ocean Dumping Act") regulates the dumping of all types of materials into any ocean waters from vessels, other floating craft and aircraft, and prevents or strictly limits the dumping (and related transportation) of materials that would "adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities."[6] 33 U.S.C. 1701. Title I of the Ocean Dumping Act is the primary regulatory mechanism of the Act, with provisions for EPA permits for ocean dumping of nondredged waste materials and penalties for violations of permit conditions. Pursuant to Title I, all ocean dumping is prohibited except when authorized by permits. No permits may be granted for dumping any radiological, chemical, or biological warfare agent or *any* high-level-radioactive waste in the ocean or beneath its seabed. Permits for all other materials, including low-level-radioactive wastes, may be granted only upon determination that "such dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." 33 U.S.C. § 1712.

In reviewing and evaluating permit applications for dumping of radiological wastes, among others, the EPA Administrator is required to consider the following:

---

[3] As this Subcommittee has previously noted, Department of Energy records reflect that 61.62 million cubic feet of low-level radioactive waste existed in land burial sites through this country in 1977, as well as approximately 9.5 million cubic feet of high-level wastes stored in tanks.

[4] Belgium, the Netherlands, Switzerland, The United Kingdom, West Germany, France and Italy. Only Belgium, the Netherlands, Switzerland and the U.K. have dumped since 1971, with the U.K. most recently responsible for the largest amounts of radiological waste dumpings.

[5] These projections are based on nuclear growth consistent with the National Energy Plan, and no volume reductions for either low-level or transuranic wastes.

[6] The Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251, et seq. ("FWPCA"), prohibit (except under permit) the discharge of pollutants into ocean waters from land-based outfall structures. Pursuant to FWPCA, the Administrator of EPA is presently promulgating revised detailed guidelines for determining the degradation of the waters of the territorial seas, the contiguous zones, and the oceans, which will include detailed consideration of the effects of such discharges on the marine environment. 33 U.S.C. 1343.

(A) The need for the proposed dumping;

(B) The effect of such duping on human health and welfare, including economic, esthetic, and recreational values;

(C) The effect of such dumping on fisheries resources, plankton, fish, shellfish, wildlife, shore lines and beaches;

(D) The effect of such dumping on marine ecosystems, particularly with respect to: (i) The transfer, concentration, and dispersion of such material and its byproducts through biological, physical, and chemical processes; (ii) Potential changes in marine ecosystem diversity, and stability; and

(iii) Species and community population dynamics.

(E) The persistence and permanence of the effects of the dumping;

(F) The effect of dumping particular volumes and concentrations of such materials:

(G) Appropriate locations and methods of disposal or recycling, including land-based alternatives and probable impact of requiring use of such alternate locations or methods upon considerations affecting the public interest;

(H) The effect on alternate uses of oceans, such as scientific study, fishing, and other living resource exploitation, and non-living resource exploitation;

(I) In designating recommended sites, the Administrator shall utilize wherever feasible locations beyond the edge of the Continental Shelf.

Regulations and criteria pursuant to this section of the Ocean Dumping Act were initially published on October 15, 1973, with the most recently revised regulations and criteria published on January 11, 1977. Pursuant to those regulations, high-level-radioactive wastes are qualitiatively defined as:

"* * * the aqueous waste resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated waste from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuels or irradiated fuel from nuclear power reactors." 40 C.F.R. § 227.30.

Consistent with the statutory mandate of the Act, the regulations prohibit the disposal of such high-level-radioactive wastes (40 C.F.R. § 227.5(a)), and require that all other radioactive materials must be packaged or containerized to prevent their dispersion or dilution in ocean waters (40 C.F.R. § 227.7(b)).

Turning to the Nuclear Non-Proliferation Act of 1978, the primary thrust of that legislation is to increase the effectiveness of international safeguards and controls on peaceful nuclear explosive devices. In pursuing those objectives, the President is authorized and urged to negotiate with other nations and international organizations, such as IAEA, with a view toward the timely establishment of repositories for spent fuel and related arrangements (22 U.S.C. § 3223(a) (4) and (5)). Through such efforts the United States could influence the manner in which nuclear wastes are disposed.

With the enactment of the National Ocean Pollution Research and Development and Monitoring Planning Act ("Ocean Pollution Research Act" or "OPRA") on May 8, 1978, Congress has attempted to rectify various problems associated with achieving a comprehensive ocean pollution research program. As the legislative history of the Act points out:

"Under Title II of the [Ocean Dumping Act], the Secretary of Commerce is directed to initiate a comprehensive program and continuing program of research with respect to the possible long-range effects of ocean pollution. However, no funds have ever been expended for this kind of program. Instead, a number of projects undertaken by several Federal agencies are listed as the "comprehensive program" in an annual report by the Secretary. And as the Office of Technology Assessment report indicates, there is little coordination among these agencies. Consequently, neglect and unnecessary duplication has resulted." *Congressional Record,* S. 13507 (August 3, 1977).

The purpose of OPRA is to end this situation by designating NOAA to serve as the lead agency in achieving a more coordinated effort within the federal government to address the serious problems for the marine environment caused by ocean pollution. Hopefully, NOAA's efforts in this regard will accord priority consideration and attention to radioactive waste dumping research.

Interwoven with the responsibilities imposed by each of the above laws are the requirements contained in the National Environmental Policy Act ("NEPA") compelling federal agencies to analyze and give serious consideration to environmental factors in making policy choices. The requirements of Section 102(2)(c) of NEPA (42 U.S.C. 4332(2)(c)) that all major actions significantly affecting the quality of the human environment be accompanied by a detailed environmental impact statement ("EIS") has in practice turned out to be the most effective of these procedures. In

light of judicial interpretations of NEPA,[7] nuclear waste disposal operations represent major federal actions which "warrant the most searching scrutiny under NEPA."[8] The Department of Energy's current efforts to prepare a generic drafts EIS on nuclear waste disposal, discussed below, evidences the federal government's agreement with the necessity of preparing at least a generic EIS, though the adequacy of that statement remains to be determined.

LONDON DUMPING CONVENTION[9]

In the fall of 1972, representatives from over 80 nations attended an international conference in London, England to discuss the prohibition and/or control of dumping hazardous materials into the oceans. Those meetings culminated in the International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter ("London Dumping Convention"). The Convention was signed by the United States on December 29, 1972, and ratified by the Senate on August 3, 1973.[10] The Convention became effective in August, 1975, and to date 38 countries have ratified or acceded to it.

The Convention, which is designed to regulate dumping of radiological and other wastes, is the primary structure through which the United States is presently pursuing an effective international understanding. Article I of the Convention directs the "Contracting Parties [to] * * * take all practicable steps to prevent the pollution of the sea by dumping of wastes * * *." In a similar vein, Article II provides that the "Contracting Parties shall * * * take effective measures individually, according to their scientific, technical and economic capabilities, and collectively, to prevent marine pollution caused by dumping and shall harmonize their policies in this regard." In relation to the other major current international collaborative effort in this area involving the United States, the United Nations Conference on the Law of the Sea, Article XIII of the Convention provides that "nothing in this Convention shall prejudice the codification and development of the law of the sea by the United Nations Conference * * * nor the present or future claims and legal views of any State concerning the law of the sea * * *."

Pursuant to Article IV and Annex I of the Convention, the parties thereto are prohibited under most circumstances from dumping certain materials, including high-level radioactive wastes. Annex II of the Convention covers all other radioactive wastes not included within Annex I, allowing their dumping only under special permits, with the added understanding that the "Contracting Parties should take full account of the recommendations of the IAEA" in seeking such permits. The IAEA has also been given the responsibility for defining "high-level" radioactive wastes in relation to Annex I of the Convention. The IAEA's recent recommended revision to that definition, discussed more fully below in the context of our recommendations to this Subcommittee, is based on immediate release and dispersion rates of the radioactive material, taking no account of the isolation and containment philosophy in U.S. law.

RADIOLOGICAL WASTE OCEAN RESEARCH ACTIVITIES

Representatives from the various federal agencies responsible for the United States research effort in relation to ocean dumping of radiological wastes (including research on seabed emplacement) have appeared before this Subcommittee. Of the

---

[7] See *NRDC v. NRC* ("Vermont Yankee"), 547 F. 2d 633 (D.C. Cir. 1976), rev'd and remanded on other grounds, 98 S.Ct. 1197 (April 3, 1978); and *Scientist's Institute for Public Information v. AEC* ("SIPI"), 451 F. 2d 1079 (D.C. Cir., 1973).

[8] *SIPI, supra* at 1098.

[9] Predating the London Dumping Convention, the United States is a party to the 1958 High Seas Convention, which contains provisions bearing on disposal of radioactive waste at sea. Most importantly, Article 25 of that Convention states:

(1) Every State shall take measures to prevent pollution of the seas from the dumping of radioactive waste, taking into account any standards and regulations which may be formulated by the competent international organizations.

(2) All States shall co-operate with the competent international organization in taking measures for the prevention of pollution of the seas or air space above, resulting from any activities with radioactive materials or other harmful agents.

[10] Following the United States ratification of the Convention, the Ocean Dumping Act was amended to provide that "To the extent that he may do so without relaxing the requiremnts of the [Ocean Dumping Act], the Administrator, in establishing or revising such criteria, shall apply the standards and criteria binding upon the United States under the Convention, including its Annexes." 33 U.S.C. § 1412.

various agencies, to date EPA appears to be the only agency which has engaged in any substantive research in this area. We commend the EPA for its survey efforts, beginning in 1974, in relation to previously used dumpsites at 900m, 2800m and 3800m depths. Its successful efforts using manned and unmanned submersibles to survey deepsea radioactive waste disposal sites, including retrieval of dumpsite containers and core sediments, underscores the need to substantiate hypothesized release and transport events in the deep oceans by actual studies of past dumpsites *before* the U.S. gives any serious consideration to the use of the ocean or its seabeds as disposal sites.

However, it is obvious that EPA, and especially the DOE, NRC and NOAA have barely begun to address the many outstanding questions pertinent to using the ocean floor or its seabed for disposal of radioactive wastes. We believe it would be a useful addition to this hearing record to request each of those agencies to specify, in much greater detail than their previously prepared comments reflect, (1) the nature of the research, studies and/or other projects they are handling, including a listing of the offices or divisions and the supervisory personnel responsible for such activities, (2) the levels of funding for past projects and projected funding for those same or future projects, (3) any preliminary conclusions that have been reached, (4) the recipients of any past and present government contract awards, as well as the amount of the contract and projected future contract costs in relation to existing contracts, (5) the specific statutory authorities from which the agency is receiving its funding to carry out such research, studies and projects, and (6) their best estimates as to additional research which they believe is necessary and the budgetary and personnel requirements for that research.

In relation to EPA's past survey studies, it would be worthwhile to have EPA analyze those surveys and to make recommendations, where feasible. In this same vein, we understand that NOAA has been involved in non-nuclear waste studies and research since 1973, part of which has been reported in their *Baseline Report of Environmental Conditions in Deepwater Dumpsite 106* (3 volumes, 1977). Apparently this dumpsite is very close to a radioactive dumpsite. The Subcommittee should inquire whether any of NOAA's studies gathered information on the radioactive site, and what recommendations, if any, NOAA could make that would add to the information base involving radioactive waste disposal.

As early as 1959, and again in 1961, the National Academy of Sciences-National Research Council published reports on radioactive waste disposal into the Atlantic, Gulf and Pacific coastal waters.[11] The Subcommittee should ask for any followup studies by the NAS or by other federal agencies that have been undertaken since then to assess the validity and currency of the analyses and data contained therein.

At the international level, it appears that few studies have been done to date that would assist the United States in its efforts to assess the benefits and disadvantages of ocean dumping of radiological wastes. Since 1967 the Nuclear Energy Agency of the OECD has been supervising the dumping of radiological wastes by eight European countries at a N.E. Atlantic site. Apparently no substantive analyses have been made regarding the effects of those radiological wastes on the surrounding marine environment. It would seem prudent for the United States to press for internationally sponsored detailed monitoring and other studies of that site, or perhaps to independently monitor and study the site, prior to committing substantial sums of money and resources in surveying potentially attractive *future* sites for ocean disposal of radioactive wastes. In this regard, we have been advised that the NEA, in what limited analyses it has undertaken, is relying on an indequate model for the evaluation of the deep ocean disposal of radioactive wastes that was prepared in 1973 by Messrs. Webb and Morley. What efforts has the United States taken to press NEA to revise its evaluation model? And finally, what efforts has the U.S. taken to seek harmonization of NEA's evaluation model and research activities with similar modeling and research activities by other international bodies, such as the IAEA?

Given the many unanswered questions in relation to the research and studies that have been done, or should be done in the next several years in relation to ocean disposal of radioactive wastes, it would be premature for the environmental groups to go on record at this time in opposition to or support of particular proposals.

NATIONAL WASTE MANAGEMENT POLICY

The Department of Energy (through Messrs. Deutsch and Liverman) has advised this Subcommittee in general terms of the findings of its Intraagency Task Force

[11] *Radioactive Waste Disposal into Atlantic and Gulf Coastal Waters*, NAS-NRC Publication 655 (1959); *Disposal of Low-Level Radioactive Waste into Pacific Coastal Waters*, NAS-NRC Publication 985 (1961).

Report on Nuclear Waste Management, and has outlined generally the proposed work plan of the Interagency Task Force which was recently established by the President. The published Report, and the findings and recommendations of the Interagency Task Force which are to be submitted to President Carter by October 1, 1978, should assist the United States in establishing a process through which future research priorities on radiological waste management can subsequently be determined. Environmental groups look forward to having substantive and substantial input into the Interagency Task Force's work efforts.

While we agree with the President's desire to produce a national waste management policy, given the research to date we believe that any Presidential statement on this subject for the near term should be limited to a skeletal outline of the process that will be required to formulate such policies. One major contribution to describing such a process—and moving towards national policies—must obviously be the NEPA Section 102(2)(C) analyses which are presently being prepared by the DOE and other federal agencies in their generic environmental impact statement on commercially generated waste management. We understand that the draft EIS is presently undergoing substantial revision. Whatever those revisions may be, upon release that EIS will be subjected to thorough public scrutiny. In these regards, we agree with the DOE's Interagency Task Force finding that "[t]he NEPA process is an essential part of the nuclear waste management program and DOE efforts in this regard must be strengthened." (Report, p. 3).

NRC/EPA REGULATORY ROLES

In the testimony presented to this Subcommittee by the NRC (through Sheldon Meyers), the recommendation was made that the EPA should set forth the criteria for all forms of nuclear waste disposal, but that the NRC should actually promulgate and administer the rules and regulations for carrying out any ocean dumping of radiological wastes. We believe that the authority for regulating the ocean dumping of such wastes should be retained within EPA. EPA, and not NRC, possesses the independent capability to best determine the appropriateness of permitting radiological waste disposal within the marine environment. Unencumbered with the responsibility to regulate the use of nuclear technologies and with the pressures that surround its further development, the EPA, on behalf of the Federal Government, can best weigh the benefits and disadvantages of ocean waste disposal from an environmental perspective.

THIRD CONSULTATIVE MEETING OF THE LONDON DUMPING CONVENTION

On behalf of the environmental groups listed above, the International Project of the Center for Law and Social Policy, the National Wildlife Federation and the International Institute for Environment and Development have been participants in the regular Advisory Committee meetings that have been periodically held in relation to the United States participation in the London Dumping Convention. In general, the environmental groups support the positions which the U.S. has recently presented to the Convention's Board of Governors and which will be the subject of negotiations at the Third Consultative Meetings in October, 1978.

We believe the United States has played an important and constructive role in the progress IAEA has made with respect to (1) affirming the importance of packaging as a waste isolation and containment system to reduce releases of radioactivity to the oceans, (2) stressing the importance of environmental monitoring to assess and validate assumptions on deepsea radionuclide transport, immobilization, and potential environmental effects, and (3) resolving the problem of the minimum acceptable disposal depth for dumping packaged, solidified wastes by establishing a total prohibition on dumping such waste in waters of less than 4000 meters depth.

We agree with the U.S. position that IAEA's provisional definition and recommendations on high-level wastes do not adequately incorporate the philosophy of waste isolation and containment into its existing quantitative definition which is based on a dilution and dispersal release rate philosophy. We believe that the qualitative definition of high-level wastes established under the Ocean Dumping Act (as quoted *supra* at p. 7) should be added to the IAEA's quantitative definition. [12] Additionally, we support the U.S. efforts to press the IAEA to establish a work plan for developing a specific limit on the number of acceptable dumpsites.

---

[12] Even prior to the EPA's adoption of that qualitative definition in its guidelines and criteria (40 C.F.R. § 227.30), and prior to the U.S. ratification of the Convention, the U.S. advised the Convention that until an internationally acceptable definition of high-level radioactive wastes was negotiated under IAEA auspices, the U.S. intended to govern its activities on the basis of that qualitative definition. Senate Document, 93rd Congress, 1st Session, Exec. C., p. 46 (1973).

At the Convention's Third Meeting this coming October, we urge the U.S. to propose increased activities on ocean dumping of radiological wastes by other signatories to the Convention. Recommendations to jointly sponsor with other countries various IAEA studies and projects would benefit the U.S. efforts to arrive at a fully informed and well reasoned decision as to whether our oceans should be used for radiological waste dumping (including seabed emplacement). We would also encourage the United States to send an adequately staffed delegation to the October meetings, to ensure that each of the U.S. proposals be given adequate attention. At some of the recent IAEA sessions, we understand that a single EPA scientist was given the impossible task of representing U.S. interests, both in plenary and various working committees.

CONCLUSION

The oceans, covering nearly three-fourths of the world's surface, occupy a critical role in maintaining a livable environment. National and international policies that determine the manner in which we seek to protect, preserve, develop and utilize our vital marine resources must be the product of comprehensive research activities. We must move cautiously, and with full public participation, as we develop those national policies. Regarding radioactive waste that might be dumped on or beneath the ocean floor, the necessary research activities have barely begun. Given the extremely hazardous nature or radioactive wastes, their disposal into our oceans is fraught with potentially irreparable consequences. Absent *convincing* research that such adverse consequences will not occur, the current U.S. policy (dating back to 1970) that prohibits the use of the oceans for the dumping of radiological wastes must be maintained.

This concludes my prepared statement. I will be happy to answer any questions you may have. Thank you.

STATEMENT OF CLIFTON E. CURTIS, ON BEHALF OF THE ENVIRONMENTAL DEFENSE FUND, FRIENDS OF THE EARTH, NATIONAL AUDUBON SOCIETY, SIERRA CLUB, WILDERNESS SOCIETY, NATIONAL WILDLIFE FEDERATION, THE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT, AND THE ENVIRONMENTAL POLICY CENTER

Mr. CURTIS. Thank you, Chairman Breaux and Congressman Pritchard. I think the best way for me to proceed is to summarize in part, but also to quote from my testimony with respect to particular portions.

I would like to list all of those groups on whose behalf I am appearing here today: The Environmental Defense Fund, Friends of the Earth, National Audubon Society, Sierra Club, the Wilderness Society, National Wildife Federation, the International Institute for Environment and Development—a representative from that organization, Bob Stein, I believe was asked to testify and was unable to appear, so they asked us to appear on their behalf—and finally, the Environmental Policy Center.

These environmental groups have a combined membership in excess of 2,715,000 persons, and have had a long history of active interest in the development of sound ocean policies, both nationally and internationally.

I have set forth a few reasons why we believe that these hearings are important at this time, and would like to briefly list those reasons.

First, the hearings which this subcommittee has convened provide a forum for a current articulation of U.S. policies and program activities, both domestically and in relation to the efforts of other nations and international organizations.

This record enhances the possibilities for effective coordination of the statutory and regulatory responsibilities lodged in EPA, DOE,

State Department, the Department of Defense, Commerce's NOAA, and the Nuclear Regulatory Commission.

Additionally, these hearings should assist our public officials in developing the comprehensive and explicit national policy—which relates to one of the questions you put forward in your request that the center testify at these hearings—which is a prerequisite to the international pursuit of mutually acceptable approaches to preserving and developing the resources of our oceans.

These hearings also provide the Congress with an opportunity to assess the adequacy of existing domestic statutory authority and to strengthen that authority where warranted.

Finally, and obviously of great concern to the environmental groups, the public airing of this country's efforts in addressing the issues associated with disposal of radiological wastes in the marine environment is essential. Given the national debate which continues over the appropriateness of nuclear technology in meeting our Nation's energy needs, the public must be kept fully informed as to matters that affect the viability of continued reliance on that technology, not the least of which is the effort to arrive at long-term solutions to the waste disposal problem.

In my prepared testimony there is a section that attempts to summarize the factual situation with respect to radiological waste dumping. Given the questions that both you, Chairman Breaux, and Congressman Pritchard raised in trying to get a handle on the amount of such wastes, I would like to briefly run through that portion of the testimony.

Substantial parts of the information that I gathered comes from the Department of Energy, tables 1 through 4, which were attached to John Deutch's testimony on May 15, as well as some IAEA figures that were current through 1977 for worldwide disposal of radiological wastes.

Since June 1970 the United States has not used the oceans for the waste disposal of any radioactive materials, high- or low-level wastes. From 1946 until 1970, however, the United States dumped nearly 95,000 curies of low-level radiological wastes. Of that amount, approximately 99.5 percent was dumped in the period 1946 through 1962.

Outside of the United States, the United Kingdom dumped approximately 45,000 curies of low-level radioactive wastes during the period 1951 through 1966. And then, beginning in 1967, the Nuclear Energy Agency of the OECD supervised the dumping of approximately 300,000 curies of low-level radioactive wastes coming from seven European countries, which I have listed in a footnote on page 4 of my prepared testimony. Of those countries the United Kingdom is presently the one dumping the largest quantities of low-level wastes.

According to DOE calculations, the projected quantities of U.S. commercial and military wastes that will have been produced by the year 2000 will be approximately 500 billion cubic feet of low-level wastes and 129 million cubic feet of transuranic wastes. They were unable to make specific predictions beyond the year 1985 as to high-level radioactive wastes.

By adding to that the quantities of spent fuel generation which are predicted through the year 2000—that is, almost 100,000 metric

tons of heavy metal and 1,281,000 cubic feet of spent fuel. In relation to weight and volume, those spent fuel figures have a much higher potential adverse effect because of the heat problem and the release rate of their radioactive elements.

Given these figures, it is evident, even excluding the worldwide projections, that long-term solutions must be found for managing our nuclear wastes. The United States and most other countries currently favor land-based disposal of radiological wastes. Absent highly acceptable land-based repositories, however, the oceans will receive increasing consideration as the primary alternative to land-based geological sites—if for no other reason than their out-of-sight, out-of-mind limited constituency appeal.

In my prepared testimony I have set forth the pertinent domestic legislative authority. Obviously, the primary piece of legislation is the Marine Protection, Research and Sanctuaries Act of 1972, and I won't describe that in detail since obviously the subcommittee is familiar with that legislation and received testimony at the May 15 hearing concerning it.

In addition to the MPRSA, the Nuclear Non-Proliferation Act of 1978 does address indirectly the issue of waste management by indicating that the President shall negotiate with nations and international organizations and that one of those negotiating efforts shall address the issue of waste management. In that sense the Nuclear Non-Proliferation Act provides the opportunity to address this problem.

The recently passed National Ocean Pollution, Research and Development, and Monitoring Planning Act of 1978, which I have shorthanded to the Ocean Pollution Research Act—or OPRA—just for the convenience of my testimony, has attempted to rectify certain problems associated with achieving a comprehensive ocean pollution program.

I would refer you, and will quote from, a statement on page 8 of my testimony that I think is pertinent to the problem concerning NOAA's lead role, which is mandated under this OPRA legislation. Contained in the legislative history in the Congressional Record in discussing the Senate Tanker Safety Act, which this legislation was initially included in, are the remarks that:

> Under title II of the Ocean Dumping Act, the Secretary of Commerce is directed to initiate a comprehensive program and continuing program of research with respect to the possible long-range effects of ocean pollution. However, no funds have ever been expended for this kind of program. Instead, a number of projects undertaken by several Federal agencies are listed as the "comprehensive program" in an annual report by the Secretary. And as the OTA report indicates, there is little coordination among these agencies. Consequently, neglect and unnecessary duplication has resulted.

I have also set forth certain references to the National Environmental Policy Act of 1969 and have quoted from pertinent portions of the London Dumping Convention, the main international treatise under which this country is seeking international accord in the area of radiological waste dumping.

Turning then to the portion of my prepared testimony which deals with radiological waste ocean research activities, representatives from the various Federal agencies responsible for the U.S. research effort in relation to ocean dumping of radiological wastes—including research on seabed emplacement—have ap-

peared before this subcommittee. Of the various agencies, to date EPA appears to be the only agency which has engaged in any substantive research in this area. We commend the EPA for its survey efforts, beginning in 1974, in relation to previously used dumpsites at the 900-, 2,800-, and 3,800-meter depths.

Its successful efforts in using manned and unmanned submersibles to survey deep sea radioactive waste disposal sites, including retrieval of containers and core sediments, underscores the need to substantiate hypothesized release and transport events in the deep oceans by actual studies of past dumpsites before the United States gives any serious consideration to the use of the ocean or its seabeds as disposal sites.

However, it is obvious that EPA, and especially DOE, NRC, and NOAA, have barely begun to address the many outstanding questions pertinent to the use of the ocean floor or its seabed for disposal of radioactive wastes.

We believe it would be a useful addition to this hearing record and of assistance to NOAA, in getting up speed under the OPRA legislation, to specify and require that each agency specify in much greater detail than their previously prepared comments reflect: First, the nature of the research, studies, and/or other projects they are handling, including a listing of the offices or divisions and the supervisory personnel responsible for such activities; second, the levels of funding for past projects and projected future projects; third, any preliminary conclusions that they have arrived at in the studies done to date; fourth, the recipients of any past and present Government contract awards, as well as the amount of the contract and projected future contract costs in relation to existing contracts; fifth, the specific statutory authorities under which these research efforts are being done; and sixth, their best estimates as to the additional research which they believe is necessary and the budgetary and personnel requirements for that research.

Our concern with wanting to have this kind of information is to try to bring together in one place a comprehensive listing of what has happened within the Federal Government. I think the efforts of this subcommittee in bringing before it the representatives of the various agencies has been a contribution to that effort, but I don't think it has been sufficiently detailed in the testimony which you have received.

In relation to EPA's past survey studies, it would be worthwhile to have EPA analyze those surveys and to make recommendations, where feasible. I think that is one of the concerns that was apparent in EPA's response to your question, Chairman Breaux, on May 15, about the effect on the marine environment of the radiological wastes at some of these past-used dumpsites. They don't know. They have done some monitoring and factual data-gathering in relation to the dumpsite surveys, but they have not done any followthrough analysis of just what that data means in terms of the effects.

Similarly, NOAA has been involved in nonnuclear waste studies and research since 1973, part of which has been reported in their Baseline Report of Environmental Conditions in Deepwater Dumpsite 106. This dumpsite is apparently very close to a radioactive dumpsite that has been used in the past.

I think this subcommittee should inquire whether any of NOAA's studies gathered information on the radioactive site, and what recommendations, if any, NOAA could make that would add to the information base involving radioactive waste disposal.

As early as 1959, and again in 1961, the NAS's National Research Council published reports on radioactive waste disposal into the Atlantic, the gulf, and the Pacific coastal waters. The subcommittee should ask for any followup studies by NAS or other Federal agencies that have been undertaken since then to assess the validity and currency of the analyses and data contained therein.

At the international level it appears that very few studies have been done to date that would assist the United States in its efforts to assess the benefits and disadvantages of ocean disposal of radiological wastes.

Since 1967 the NEA, as I indicated earlier, has been supervising the dumping of low-level radiological wastes at a site off England, but apparently no substantive analyses have been made regarding the wastes that have been dumped at that site. It would seem prudent for the United States to press for internationally sponsored detailed monitoring and other studies of that site, or perhaps to independently monitor that site, and then to rely on that information before proceeding to assess the attractiveness of future sites for ocean disposal.

In this regard, we have been advised that the NEA, in the limited analysis it has undertaken, is relying on an inadequate model for the evaluation of the deep ocean disposal of radioactive wastes that was prepared in 1973 by Messrs. Webb and Morley. We are concerned as to what efforts the United States has taken to press NEA to revise its evaluation model, and finally we are concerned as to what efforts has the United States taken to seek harmonization of NEA's evaluation model with similar modeling and research activities by other international bodies such as the IAEA.

Given the many unanswered questions in relation to the research and studies that have been done, or should be done, it would be premature for the environmental groups to go on record at this time in opposition to or support of particular proposals.

Next in my prepared testimony I address the issue of the national waste management policy as it affects the subject matter of this subcommittee's hearings.

The Department of Energy advised this subcommittee in general terms of the findings of its intraagency task force report on nuclear waste management, and has outlined generally the proposed work plan of the interagency task force recently established. Dr. Webster and Sam Bleicher also submitted information today for the record concerning the interagency task force efforts.

The published report and the findings of the interagency task force should assist the United States in establishing a process through which future research priorities on radiological waste management can subsequently be determined. The environmental groups look forward to having an opportunity to have substantive input into that task force's efforts.

While we agree with the President's desire to produce a national waste management policy, given the research to date, we believe

that any Presidential statements on this subject for the near term should be limited to a skeletal outline of the process that will be required to formulate such policies.

One major contribution to describing such a process, and moving toward national policies, must obviously be the NEPA section 102(2)(C) analysis EIS statement which is being prepared presently by DOE in relation to commercial waste management. We understand that this draft EIS is presently undergoing substantial revision, the first draft having had major problems.

Whatever those revisions may be, obviously upon its release that EIS will be subjected to thorough public scrutiny. In that regard, we thoroughly agree with the DOE's intra-agency task force finding that "the NEPA process is an essential part of the nuclear waste management program and DOE efforts in this regard must be strengthened."

At the May 15 hearings, Sheldon Meyers, of the Nuclear Regulatory Commission, in response to questions that were asked and also in his prepared testimony, made the recommendation that the EPA should set forth the criteria for all forms of nuclear waste disposal, but that the NRC should actually promulgate and administer the rules and regulations for carrying out any ocean dumping of radiological wastes.

We, the environmental groups, believe that the authority for regulating the ocean dumping of such wastes should be retained within EPA. EPA, and not NRC, possesses the independent capability to best determine the appropriateness of permitting radiological waste disposal within the marine environment.

Unencumbered with the responsibility to regulate the use of nuclear technologies and with the pressures that surround its further development, the EPA, on behalf of the Federal Government, can best weigh the benefits and disadvantages of ocean waste disposal from an environmental perspective.

The final portion of my prepared testimony addresses certain concerns which we have in relation to the upcoming third consultative meeting of the London Dumping Convention, to be held in October. I don't believe it's necessary to go through and specify specifically what those recommendations are, but they are set forth in my prepared testimony.

One concern which I will emphasize, though, is our interest in seeing an adequately staffed delegation at the sessions in October, given the representations that have been made that in some of the past sessions the staffing was inadequate, such that the United States was placed in the position of having to make decisions of which plenary or committee sessions it would attend, rather than having a full staff complement there that could cover all of those meetings.

In conclusion, the oceans, covering nearly three-fourths of the world's surface, occupy a critical role in maintaining a livable environment. National and international policies that determine the manner in which we seek to protect, preserve, develop and utilize our vital marine resources must be the product of comprehensive research activities.

We must move cautiously, and with full public participation, as we develop those national policies.

33-546 O - 78 - 22

Regarding radioactive waste that might be dumped on or beneath the ocean floor, the necessary research activities have barely begun. Given the extremely hazardous nature of radioactive wastes, their disposal into our oceans is fraught with potentially irreparable consequences. Absent convincing research that such adverse consequences will not occur, the current U.S. policy that prohibits the use of the oceans for the dumping of radiological wastes must be maintained.

That concludes my prepared statement. I would be happy to answer any questions that you might have, Mr. Chairman.

Mr. BREAUX. Thank you very much, Mr. Curtis, for your testimony. I want to commend you on your prepared statement. It was very, very extensive and represents a very good summary of where we are on disposal at this stage and of the various Federal laws that are on the books.

You indicate a preference for EPA being the lead agency for regulating the disposal of nuclear wastes.

I really have no problem with their involvement, so long as NOAA, the oceans agency, has the lead on this ocean issue. I really don't think EPA has the trained personnel or the ships and equipment necessary to do a really good job of monitoring ocean disposal and ocean placement of nuclear wastes. I think NOAA should be the lead agency, because of its expertise, ships, and equipment.

Mr. CURTIS. Under the recently passed legislation it's very possible that NOAA would come up to speed on that, but I don't think NOAA has been involved in any extensive research in the past dealing with radiological wastes aspects of the ocean.

One of our reasons for supporting the retention of that regulatory authority in EPA is the fact——

Mr. BREAUX. I don't think anyone has carried out extensive research. You say NOAA has not, but I don't think anybody else has, either.

Mr. CURTIS. EPA has done its survey monitoring, which is very limited—and Bob Dyer of EPA would concede that, that it has been limited.

Mr. BREAUX. As I pointed out earlier, at our last hearings, when I asked the question about the effect on the marine environment, EPA said it did not know.

After the hearings, they sent out a minisubmarine to pick up some of the canisters, to do some checking on the effect on the marine environment. I am sure it was just a coincidence.

Mr. CURTIS. I think that had been planned for some time.

It was interesting. I spoke with one of the EPA officials who was on that trip. I think they came back around July 4 and they did successfully retrieve some canisters at the 3,800-meter depth and were able to retrieve some core sediment samples and have sent out to Woodshole the canisters involved for a more thorough analysis.

Mr. BREAUX. I guess your recommendation is based on the past record, which is meager. Really, in all the agencies, I don't think they have done enough.

It would be a waste of resources to bring EPA up to speed with the manpower, ships, and equipment to become a lead R. & D. agency for the oceans. I don't think we should be moving in that

direction but, rather, we should be seeing to it that NOAA fulfills the task they are charged with.

Do you have an opinion from the people for whom you are speaking on what is at best a difficult issue, the choice between disposal on land-based areas or in ocean are s? I know we would like not to have to dispose of these wastes anywhere, but as long as we're faced with this difficult choice, do they have a preference?

Mr. CURTIS. I think the only answer the environmental groups would be willing to give to a question like that at this time is they cannot make that kind of judgment, that the research data is not there yet to allow us to support, for example, seabed emplacement, if it were permitted—which it's not under the Ocean Dumping Act. There really is not enough information to make that type of cut and to indicate that type of preference.

Mr. BREAUX. Is there any indication the task force report will shed additional light to be able to make the choice?

Mr. CURTIS. I don't believe it will, from what I've heard. I think, just from my testimony, that you would sense I don't believe it would. I think the interagency task force, at most, should be trying to describe the process and trying to push NOAA and the other Federal agencies involved to again bring in that research data, so that within the near term we can have some of that data to make those initial priority choices, such as whether we should allocate more than 5 percent in looking at seabed emplacement, or less, or whether we should turn more to some of the geological formations.

I don't see that the interagency task force is going to be that helpful in setting those kinds of priorities for the research.

Mr. BREAUX. While you mention that the U.S. law prohibits the dumping of either low-level or high-level radioactive wastes in our oceans, other countries like Japan and Great Britain, are presently dumping low-level wastes.

Mr. CURTIS. We only statutorily prohibit high-level radioactive wastes from being dumped in the oceans.

Mr. BREAUX. Yes, high-level. I'm sorry.

We have apparently a definition problem in the London Dumping Convention concerning what constitutes high-level wastes. You mentioned that and referred to it in your statement.

How is that working out as far as you're concerned? Are we coming up with an acceptable definition? They go back in session when?

Mr. CURTIS. The October session will be the point where that is fully negotiated amongst the 38 contracting parties to the London Dumping Convention.

As we indicate in the testimony that I presented, we do support the U.S. efforts to bring that qualitative definition into account for defining high-level radioactive wastes. Coupled with the kind of quantitative release and dispersal rate definition that IAEA is presently relying on, I think that a mixture of the two definitions would be adequate. We are saying this recognizing that there is dumping going on under the NEA supervision by some of the European countries; and as long as it does continue, we would like to see stringently set standards that would incorporate the qualitative definition that is contained in our Ocean Dumping Act.

Beyond that, I'm not sure that I can precisely say whether or not that definition is acceptable. We won't know for another few months just where the IAEA is going to come down.

Mr. BREAUX. What is the responsible international agency? The NEA?

Mr. CURTIS. It's the NEA, Nuclear Energy Agency of OECD, that is supervising most of the waste dumping that is occurring off the England coast, though the IAEA has the regulatory authority to administer various provisions of the London Dumping Convention.

Mr. BREAUX. When you say "supervising", are they doing any research on the effects of dumping, or just keeping an account of what is being dumped?

Mr. CURTIS. My understanding is that there is some NEA person aboard the ship at the time of dumping, but there is no monitoring being done of that dumping.

Mr. BREAUX. Shouldn't someone be looking at the effect on the marine environment?

Mr. CURTIS. Yes.

Mr. BREAUX. To your knowledge, no one is doing it?

Mr. CURTIS. That's correct, and that's one of the concerns we raised, that the United States, we feel, should push much more strongly in going to these October sessions, to try to get some joint research going at the international level—even if it means contracting parties jointly contributing in funding that type of research, so that there is some effective monitoring of the effects on the marine environment.

You have that dumpsite that dates back to the early sixties, I think, the one they are presently dumping in under NEA supervision, and there are several other sites where they could go down and do the kind of work that EPA has done.

Mr. BREAUX. Mr. Pritchard.

Mr. PRITCHARD. When you look at these different agencies, and your position that you want to put this work in EPA, is it because you have some question about the competency of the other agencies, or their commitment or their attitude, or is it just a matter of skill?

Mr. CURTIS. Under the existing domestic legislation, the Ocean Dumping Act, that regulatory authority already is lodged in EPA. So it's not a position or our saying let's put it there. It's there, and it was because——

Mr. PRITCHARD. Let's say you want it to remain there.

Mr. CURTIS. Based on what we heard on May 15 by the NRC, we don't feel they have the independence that EPA does in relation to looking at the environmental issues without being weighted down by nuclear issues that are also within NRC's responsibility.

We would prefer to see EPA handling that regulatory authority. Whether NOAA should take an increased role in that regard I think is an open question today. The new legislation may put them in a position 6 months or a year from now to be the more effective agency for handling that regulation. That remains to be seen.

Mr. PRITCHARD. So you would stay with EPA because of their independence? I'm trying to search for the reason why you want it there.

Mr. CURTIS. I think, as I indicated in my testimony, EPA possesses a greater independence in assessing the environmental impacts and alternatives. While we're not saying NRC can't do environmental assessments, we feel there is that independence that rests with the Environmental Protection Agency under its statutory mandate.

Mr. PRITCHARD. You're fearful that if this gets under NOAA or someone else there isn't that independence?

Mr. CURTIS. I think the fear is more in relation to the NRC, just in terms of their not having a track record in the past as far as research involving the environmental impacts of radiological wastes on the marine environment. Of those two agencies, EPA at least has some track record in that regard.

As to NOAA, that remains to be seen, whether or not they might in the future be the better agency to handle that.

Mr. PRITCHARD. Well, we are trying to search here for who is the logical one, and I'm just trying to get down to what we should be looking for in terms of agency capabilities and what are the basic motives for your recommendations here. Is it competency, is it skill, is it past record, is it their independence, is it the fear of outside influence? You know, just where is it?

Mr. CURTIS. I am not impugning the competency of NRC. I think it's more the independency that is where I come down——

Mr. PRITCHARD. You rely heavily on the fear of the agency not being independent?

Mr. CURTIS. That's correct.

Mr. PRITCHARD. Thank you, Mr. Chairman.

Mr. BREAUX. Thank you, Mr. Pritchard.

One of the problems is that the President's budget has not requested any money under the Ocean Pollution Research and Development Act, and existing funds are not nearly adequate.

I think the legislation we have passed, 1617, clearly indicates it is the intention of Congress that, in ocean-related matters, NOAA becomes the agency responsible for doing the research and development. EPA is good on the land-based alternatives. But I think we are bound by an act of Congress to assure that NOAA has the ability to do the work.

As I understand it, your preference is really EPA over NRC. Your preference is clear in that regard?

Mr. CURTIS. That's correct, and that is subject to change. Honestly, we're not locked into that. If NOAA comes up to speed, that may be the place to logically have it.

Mr. BREAUX. This committee very much appreciates, Mr. Curtis, your testimony on behalf of the various groups that you represent here today. It was a very good presentation, and very helpful, particularly some of your suggestions about getting additional information in regard to the specifics on research and development and what each agency has done.

With that, the subcommittee will be in recess. This concludes our hearings, at least this stage of the hearings on nuclear waste disposal.

The subcommittee will stand adjourned until further call of the Chair.

[The following was submitted for the record:]

RESPONSE TO SUBCOMMITTEE QUESTIONS BY THE ENVIRONMENTAL PROTECTION AGENCY

Question 1. (a). In the course of your testimony, you stated that the definition of high-level waste as expressed in EPA's Ocean Dumping Regulations is essentially the same as IAEA's recently proposed definition. Both Dr. Deese and Mr. Dyer seemed to share an opinion different from yours.

Answer. Dr. Rowe stands corrected. EPA's Ocean Dumping Rules and Regulations qualitatively define high-level radioactive waste as follows:

"High-level radioactive waste means the aqueous waste resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated waste from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuels or irradiated fuel from nuclear power reactors."

IAEA's proposed definition (for the high-level radioactive wastes that are disallowed for ocean dumping) quantifies the limiting radioactivity per tonne from alpha and from beta/gamma emitters; sets additional limitations on Radium 226, Polonium 210, and Tritium; factors in half-lives; an the entire definition is based on limited quantities of such wastes dumped at a single site.

In comparison, the U.S. definition is a qualitative description based on the source of the wastes, while the IAEA definition sets specific activity limits in curies/tonne. These IAEA limits correspond roughly to the specific activities in the U.S. high end of "low-level" wastes, and in all "intermediate level" wastes.

Perhaps more important than definitional limitations, the IAEA ocean disposal recommendations allow long-term dispersion and dilution of dumped radioactive wastes, while the United States objective is for isolation and containment until the wastes have decayed to innocuous levels. Thus, while the format of the two definitions differ, and while the IAEA specific activities are lower than those in the U.S. definition, the U.S. policy of containment is believed to result in less long-term impact to the marine environment than that which could accrue from the materials in the IAEA definition. The United States is working to make long-term containment an international objective.

Question 1. (b). Would you recommend that EPA modify its current definition of high-level waste to be more quantitative? Discuss the merits of a quantitative definition *vis-a-vis* a qualitative definition. In your answer discuss the problem regarding EPA's current qualitative definition brought out by the statement of Mr. Sheldon Meyers:

"Since there is no reprocessing, it is difficult to come to grips with the spent fuel issue. For example, one can dispose of spent fuel without calling it a waste".

Answer. The high-level radioactive waste definition in the EPA Ocean Dumping Rules and Definitions is the old AEC definition with "or irradiated fuel from nuclear power reactors" added to it. The AEC definition is still in use by NRC in conjunction with its authority to regulate land disposal of "special, source and byproduct" material from commercial nuclear facilities. Historically, the AEC, then ERDA, and now DOE have had use for such a qualitative definition in the disposal of wastes from Government facilities and from defense applications, such as nuclear ships. However, since its formation in 1970, EPA has not authorized the ocean disposal of *any* radioactive wastes, and has not even considered ocean disposal of wastes approaching the limitations set by either the IAEA or United States definition of high-level wastes.

In considering the merits of a quantitative definition vis-a-vis a qualitative one, the additional work and interagency coordination needed to develop and reach national agreement on a rigorous, detailed quantitative definition of "high-level" radioactivity concentrations does not appear warranted for application to ocean disposal at this time. While such a quantitative definition tentatively may be useful for land disposal of high-level wastes, we will not have a firm recommendation until next autumn, after we have completed our study and our proposed high-level waste standards. In setting such standards, we will make clear the materials to which they apply. It will then be up to the regulatory agencies to establish regulations for categorizing radioactive waste as to its chemical content, specific activity, matrix form, packaging, method of disposal and the type of repository to which it should be sent for disposal.

With respect to Mr. Sheldon Meyers' statement, the qualitative definition in EPA's Ocean Dumping Rules and Regulations specifically includes spent fuel (as waste prohibited from ocean disposal). Perhaps Mr. Meyers' statement referred to storage prior to permanent disposal.

Question 2. What is the respective statutory authority of EPA and NRC over all aspects concerned with the ocean disposal and sea-bed disposal of both high and low-level wastes? Be as specific as possible in your answer.

Answer. The basis of EPA's regulatory authority for the disposal of nuclear wastes in the ocean is the Marine Protection, Research, and Sanctuaries Act of 1972, as amended. This law pertains to the ocean disposal of all materials, including low-level radioactive materials. The Act specifically prohibits the ocean dumping of high-level radioactive wastes; as well as other materials, such as those used or produced for radiological, chemical or biological warfare.

To carry out this law and several other authorities assigned to EPA by the President's Reorganization Plan of 1970, EPA is preparing environmental criteria for the disposal of all categories of radioactive wastes, is preparing generally applicable environmental standards for the disposal of high-level wastes, and will prepare such standards for land and ocean disposal of low-level radioactive wastes in the future as deemed necessary to protect the environment adequately. In regulating ocean disposal of low-level wastes under the Ocean Dumping Act, EPA will review ocean dumping permits, will prescribe waste preparation and packaging requirements, will select and/or approve ocean disposal sites, and will set standards for the methods to be used to deposit low-level radioactive wastes on, in, or under the ocean bottom.

The NRC regulates the land-based disposal of commercially-generated low-level radioactive wastes under the Atomic Energy Act of 1954, as amended. The NRC also believes that the ocean disposal of such wastes requires an NRC license, in addition to a permit from EPA. In any event, since there appears to be no major conflict between the obligations of the two agencies, EPA takes no formal position on the question. EPA is, however, inclined to view Section 106(a) of the Act as posing a significant challenge to the validity of NRC's belief.

Question 3. From which legislative authorities is EPA receiving funds to carry out its radioactive waste disposal in the oceans studies? How much money has been spent by EPA to study this issue in the last five years? What is the projected EPA budget for such research for FY 1979 and FY 1980?

Answer. While EPA as a whole has many broad legislative authorities and sources of funds which apply to the overall national problem of environmental protecton, the primary authority for such funds, specifically for ocean disposal studies, is the Marine Protection, Research and Sanctuaries Act of 1972, as amended. However, no budget appropriations have been specifically designated for sea disposal of low-level radioactive wastes. Consequently, the funding of studies accomplished to date has come largely from EPA programs and general operating funds based on a need for technical information, criteria, guidance, and standards concerning radioactive waste management and ocean disposal.

During the past five years, EPA has spent about $75,000 per year for in-house personnel and overhead expenses related to ocean disposal studies concerning radioactive wastes. In addition, the program has received $385,000 in FY 1978 overtarget funds and a total of about $915,000 of funds from other EPA offices during the past five years.

The projected budget for such research in FY 1979 is $75,000 for in-house personnel expenses and overheads, and zero dollars for contracts. However, for FY '79, about $500,000 of overtarget funds are expected to be made available for developing standards. In FY '80, if the EPA resources for radiation protection remain at the FY '79 level, we would anticipate applying two additional in-house man years of effort and about $600,000 in contract funds for technical support needed to develop ocean disposal standards and regulations.

Question 4. Describe in detail any research projects carried out or sponsored by EPA to study the effects of radioactive contaminants on the marine environment.

Answer. The principal research projects carried out or sponsored by EPA to study the effect of radioactive contaminants on the marine environment have been a series of ocean surveys carried out each year since 1974 in the vicinity of sites in the Atlantic and in the Pacific used for ocean disposal of radioactive wastes during the 1940's, 50's and 60's.

In addition, samples of fish and plants have been retrieved and analyzed for presence of radioactivity. To date such samples have not indicated levels significantly above what would be expected from weapons test fallout and natural radioactivity in the oceans. Further, EPA has assessed reports on radioactivity uptake in grasses and other vegetation in estuarine areas (important as marine life breeding areas). To date some radioactivity uptake has been observed, but again, at about levels to be expected from fallout and natural background. Also, in the 1977 and 1978 ocean surveys, we have collected two species of starfish which we are now examining to determine whether they are suitable for evaluating biological effects, and are developing karyotyping techniques for the assessment of potential genetic effects.

A report summarizing the 1974 and 1975 ocean surveys is in the process of being prepared for printing. Primarily, the procedures discussed in this report were used to locate radioactive waste drums that have been on the ocean bottom for 15 to 20 years, and to obtain, analyze and evaluate any radioactivity found in samples of the ocean bottom taken at various distances from such drums. Copies of this report will furnished to the Committee as soon as received (now estimated as August 1978). Additional reports will be forthcoming and will be furnished to the Committee concerning our ocean surveys conducted in 1976, 1977, and 1978.

Question 5. Describe the current packaging methods used by European countries for the disposal of low-level radioactive wastes in the oceans.

Answer. The current state of the art of packaging of radioactive waste for deep sea burial is established by practices of the European community. The Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development has published guidelines for packaging of wastes for sea burial which cover the design, manufacture, assembly, handling and transport of the packages. This document is titled "Guidelines for Sea Disposal Packages of Radioactive Waste," NEA, Paris, November 1974. The packaging is to be designed to assure adequate containment of the waste during handling and transport until the end of the disposal operations. The package should have adequate shielding to allow safe handling during all phases of the operation. The package and any inner containers should have a specific gravity of not less than 1.2 to assure sinking to the seabed. Also the package should have adequate strength to maintain its structure, or have a pressure equalization system to assure that the packaging will retain its contents for an undefined period of time after reaching the seabed.

The guidelines describe two general types of packages, a monolithic design and a multistage design. In the monolithic design the waste is incorporated into a solid mass with no significant voids. The monolithic block provides a rigid inner structure which strengthens and supports the packaging during handling, transport, and immersion. An example of this is waste mixed with concrete or bitumen, and cast into a steel drum without any significant internal voids. The solidified block acts as an incompressible support for the drum wall and heads. The multistage design has a multicomponent assembly and may contain significant internal voids which require a pressure-equalization system to prevent implosion and structural failure of the packaging during submergence to deep depths. An example of this is compacted, contaminated trash bundles placed in a concrete liner in a steel drum containing a penetration and a check valve to allow pressure equalization as the package is submerged. The packaging is the steel drum and the concrete liner serves as shielding but does not necessarily provide adequate structural support for the drum during submersion. A monolithic package needing additional shielding can be placed in a concrete overpack (or a concrete-lined steel overpack), converting it into a multistage design.

The NEA guidelines have recommendations for construction as well as radiation levels, surface contamination limits, criticality control, weight limitations and markings. The United Kindom also has many packaging designs approved by NEA for use in sea disposal.

Response by the Nuclear Regulatory Commission to Questions of the Subcommittee

Question 1. Do you feel that the U.S. should have a more explicit regulatory policy for the ocean disposal of nuclear wastes than it currently has?

Answer. Current U.S. regulatory policy regarding the ocean disposal of nuclear wastes is derived from the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA); and that policy is fairly explicit. The question which now should be addressed is whether or not that policy continues to be appropriate. Reasearch to date, while not conclusive, is resulting in increasing interest in the use of seabed emplacement as a viable option for containment of high-level wastes. For this approach to be implemented, for future generations of disposal sites if not for the initial ones, MPRSA would have to be changed.

With regard to low-level waste, we should note that one aspect of NRC's program is the assessment of potential alternatives to shallow land burial. Thus far the study has concluded that ocean disposal is one of the alternatives which will be further evaluated for technical, economic, environmental and social merit. In this connection, the impact on the marine environment or the potential hazard (if any) from past ocean dumping will be among the factors to be assessed.

If ocean disposal proves to be a viable alternative, the 1972 Act and the standards development programs and resources in the Nuclear Regulatory Commission and

Environmental Protection Agency should be reviewed to determine whether the current regulatory policy ought to be modified.

Question 2. Should the U.S. establish a quantitative definition, along the lines of what has been proposed by the IAEA, for what constitutes high-level radioactive waste?

Answer. The NRC has a program which will provide us with the ability to classify all radioactive wastes according to the type and duration of confinement required for their safe disposal. A report on this waste classification effort will be published for public comment very shortly. Early next year we expect to propose a definition of waste classes based on disposal requirements. The classification system will include quantitative definitions of the kinds of wastes for which different disposal requirements are needed. This would be analogous to the IAEA's effort to provide a quantitative definition of those wastes not suitable for ocean dumping. The U.S. has been participating in the effort and given the current status of knowledge the definition is acceptable. However, we feel that programs should be actively pursued to provide further analysis of the impacts of ocean dumping and the definition should be revised thereafter if appropriate.

Question 3. On page 11 of your prepared testimony you mentioned that "If ocean dumping is found to have several significant advantages over shallow land burial and other alternatives, it is expected that a study may be funded to develop criteria for waste performance and site suitability and to identify potential environmental impacts." How does this work relate to EPA's (and any overlap), over the ocean disposal or seabed disposal of both high and low-level radioactive waste.

Answer. The Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, require the NRC to protect the public health and safety by regulating the possession and use of defined classes or radioactive materials. With regard to ocean disposal of low-level waste, therefore, the NRC would regulate activities that generate radioactive wastes and the form and packaging of wastes for transport and would license persons to receive and possess wastes for eventual disposal. The EPA under provisions of MPRSA has the authority to issue permits for ocean disposal of low-level radioactive wastes and is required to develop criteria directed at protection of the marine environment.

Our interest in ocean disposal technology, arises out of our Atomic Energy Act and NEPA responsibilities related to land burial or alternative disposal techniques. If ocean disposal were to be regarded as a viable option, this could affect our licensing of onshore burial activities and the development of certain criteria, but under existing law we would not develop regulatory standards or procedures for ocean disposal operation itself.

The same considerations would apply to seabed emplacement of low-level wastes as are discussed above with respect to ocean disposal. For high-level wastes, however, the situation is somewhat different since under present law neither ocean disposal nor seabed emplacement is allowed and, accordingly, neither NRC nor EPA would exercise direct licensing and regulatory authority.

In short, in the licensing of ocean disposal operations themselves, there is no overlap in the authorities of the two agencies. However, in exercising their authorities, both agencies are required to examine alternative disposal methods and thereby to develop their independent technical understanding of those methods. In this there is considerable overlap.

Statement of Rear Adm. N. Sonenshein, USN (Ret.) on Behalf of Global Marine Development Inc.

I am Rear Admiral Nathan Sonenshein, USN (Ret.) During my naval service I served as an Engineering Duty Officer and devoted my energies to the design, construction and maintenance of Navy ships and craft. Since my retirement from the U.S. Navy in November 1974, I have been Assistant to the President of Global Marine Development Inc. (GMDI). This is and engineering organization based in Newport Beach, California that deals in ocean hardware applications and advanced marine systems such as ocean thermal energy conversion, marine biomass farms, for growing kelp as a raw material for generating methane gas, ship incineration of chemical wastes such as chlorinated hydrocarbons, and deep mining. GMDI is a wholly owned subsidiary of Global Marine Inc. (GMI) of Los Angeles, Calif. Global Marine pioneered in the development of offshore exploratory drilling techniques in the search for hydrocarbons; it currently owns and operates 12 drilling units under contract to major oil companies.

One of the Global Marine ships is *Glomar Challenger*, which has been employed exclusively by the National Science Foundation for some 11 years as a deep sea

coring ship. Her achievements in advancing our knowledge of the nature and dynamics of the earth's ocean crust is almost legendary in the international geologic community. Global Marine also designed, supervised the construction of and operated *Glomar Explorer* for the U.S. Government. The capabilities of this ship in performing work on the deep ocean floor are at the leading edge of the state of the art of ocean engineering. As your Subcommittee is aware, the National Science Foundation is seeking support for a plan to convert *Glomar Explorer* into a more capable replacement for *Glomar Challenger* in 1981. Such a conversion would make available a scientific tool for exploring the continental margins with a coring ship fitted with a deep sea riser, and enhance our knowledge of important energy and mineral resources.

As a matter of fact, it was because of *Glomar Explorer* that we became keenly interested in seabed disposal of radioactive wastes. During 1975 and 1976, when the National Advisory Committee on Oceans and Atmosphere (NACOA) and others were advocating utilization of this national asset rather than scrapping her as some had suggested, we advanced the concept of using her unique capabilities for seabed disposal. The Record of the Hearing on Radioactive Waste Disposal Problems [1] contains a description of the ideas we were presenting at that time to use *Glomar Explorer* for seabed disposal and retrieval. Unfortunately, these suggestions were not accepted, and the ship was inactivated in February 1977. We are all pleased indeed that we could charter the ship recently from the U.S. Government for use as a test platform for an ocean mining system developed by a private consortium, and are now in the process of activating her in a West Coast shipyard for tests that are expected to extend through the summer of 1979. I would like to make clear at this point, however, that our current thinking about seabed disposal of radioactive waste is not coupled exclusively to *Glomar Explorer;* other ships could be utilized for such operations.

Subsequently, we have maintained a close watch over developments in the disposal of high and low-level wastes. We try to read all papers generated on the subject of radioactive waste disposal in all its facets—legal, scientific, environmental, technical and the like. We try to maintain liaison through office visits and direct communications with key personnel in DOE and EPA as well as supporting organizations such as Sandia Laboratories and Wood's Hole Institution of Oceanography. Further, we have advanced to DOE and EPA several technical suggestions for their programs in high and low-level waste disposal in the seabed. Finally, through our membership on the Subcommittee on Radioactive Waste of the Atomic Industrial Forum we have tried to contribute to the solution of the national problem of radioactive waste disposal.

From our studies and participation in workshops and conferences, we have become ever more strongly convinced of the efficacy and safety of the ocean bed disposal option. In fact, three years of DOE scientific investigations have lead to the conclusion that "no technological reasons have been presented that would preclude the possibility of successful disposal of high-level nuclear wastes into submarine geologic media." [2] Similarly, EPA surveys since 1974 of former ocean dumping sites off the East and West Coasts indicate excellent potential for seabed emplacement of low-level wastes in canisters that would overcome the plaguing difficulties being encountered in land burial sites. As a result of its surveys, EPA has reached two basic conclusions:

"(1) Techniques formerly used to package the radioactive wastes for ocean disposal were, in general, not adequate to insure that the wastes would remain isolated from the surrounding environment.

"(2) If ocean disposal of low-level radioactive wastes were to commence in the future, the technology currently exists to precisely monitor a deep ocean site to detect the possible release and movement of selected radionuclides and to recover waste packages disposed at depths up to 2800 m." [3]

Reflecting on EPA's results and having studied many aspects of the subject in some detail, we conclude that ocean disposal of low-level wastes could be developed in the near future into an environmentally acceptable option. With appropriate emphasis and priority, ocean disposal sites on each coast for low-level wastes could become a reality in a few years.

---

[1] Hearings on Radioactive Waste Disposal Problems before a Subcommittee of the Committee on Government Operations, House of Representatives, 94th Congress, Second Session; 17 September 1976; pg. 324 et seq.

[2] "Seabed Disposal Program, Annual Report—Part I; Jan.-Dec. 1976"; Sandia Laboratories, Oct. 1977; pg. 7.

[3] "Ocean Dumping in the United States—1977"—Fifth Annual Report of the EPA on Administration of Title I, Marine Protection, Research and Sanctuaries Act of 1972 as amended; March 1977, pg. 47.

Yet, both promising programs—DOE's seabed disposal for high-level wastes and EPA's program for ocean disposal of low-level wastes—suffer from low departmental priorities as reflected in meager funding levels. We are not privy to detailed fiscal data for these programs, but it appears to us that DOE applies to the seabed disposal alternative less than 5% of the funds allocated to terrestrial geologic disposal. Despite heavy funding, the land program has already slipped from 1985 to 1988 at the earliest for activation of the first operating repository;[4] and strong opposition from states, counties and cities under consideration for such sites together with technical uncertainties presage further delays.

In addition, DOE's series approach to seabed disposal assessment—(a) determine environmental feasibility, (b) assess engineering feasibility and (c) provide demonstrations of concept—necessarily involves a long time for accomplishment, probably 20 years at the current rate. Earlier attention to ocean engineering aspects in parallel with environmental feasibility work would strengthen both and advance the total effort more effectively. In the same vein, funding support in EPA for low-level waste disposal site surveys and engineering development of new emplacement techniques does not appear to enjoy line item status, and is being carried forward literally on a shoe string with inadequate staff, funding or engineering support.

When one considers that radioactive waste disposal of high-level wastes is now the most critical item in the nuclear fuel cycle, the wisdom of concentrating the waste program at one site and in one geologic method, as recommended in (4) is questionable. Although high priority should be maintained for the preferred site, alternative sites and geologic media should be evaluated concurrently. Conversely, the number of alternatives should be reduced to a manageable few. Among these, DOE's program for assessing ocean bed disposal merits substantially increased support because of the results already achieved. Also, EPA's program for developing criteria for issuance of permits for ocean disposal of low-level waste merits stronger budgetary recognition and support. Both programs offer great potential for coping with waste disposal problems that represent major obstacles to the nation's safe use of nuclear power.

We understand that the Congressional Office of Technology Assessment is considering undertaking a comprehensive review of all aspects of ocean disposal of radioactive wastes. We would strongly support such an effort, and would be pleased to assist therein as practicable. Such a study should provide to all concerned an objective appraisal of all facets of this complex issue—scientific, legal, technical, environmental, social and fiscal. It should also make available to the Congress a basis for evaluating the relative priorities now being accorded to the high and low-level waste ocean disposal programs.

[Organisation for Economic Co-Operation and Development Press Release, Paris, July 22, 1977]

OECD Reinforces International Surveillance of Sea Dumping of Radioactive Waste

The OECD Council today adopted a Decision establishing a *multilateral consultation and surveillance mechanism for sea dumping of radioactive waste,* in which 20 countries will participate. This mechanism has the objective of reinforcing international co-operation and surveillance in relation to the disposal of radioactive waste other than highly active waste, the dumping of which is in any case prohibited. It will be operated by the OECD Nuclear Energy Agency (NEA).

In view of the difficulties that certain countries have in disposing of their low and medium-level radioactive waste underground, because of unfavourable hydro-geological and geographical conditions, it is likely that sea disposal of packaged solid low and medium-level radioactive waste in deep water remote from coastlines will continue in the future.

This disposal method is currently governed by strict international rules under the 1972 "London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter", which entered into force on 30th August 1975[1] and which covers all types of pollutants, chemical as well as radioactive. As regards radioactive waste, the Convention has entrusted the International Atomic Energy Agency (IAEA) with the task of defining those radioactive wastes which are unsuitable for dumping at sea and of recommending to national authorities the require-

---

[4] "Report of Task Force for Review of Nuclear Waste Management"; U.S. Dept. of Energy, Director of Energy Research; dtd. Feb. 1978.

[1] This Convention has been ratified by 32 countries so far, including 10 OECD Member countries. Other Member countries intend to follow suit in the near future. The Secretariat of the London Convention is provided by the International Maritime Consultative Organisation (IMCO).

ments to be fulfilled when authorising and regulating the dumping at sea of radioactive wastes which do not fall within this definition. The experience acquired by NEA during the last ten years has been made available for this purpose to the IAEA, which has already promulgated Provisional Recommendations and has taken steps to keep these under continuing review.

The new OECD multilateral mechanism, which supplements these provisions, provides notably for:

The establishment and regular up-dating by the OECD, with the co-operation of IAEA, of *standards, guidelines and recommendations,* to be applied by participating countries dumping waste at sea;

A consultation system among participating countries regarding the conditions applicable to these operations;

Intrnational surveillance by an NEA representative of operations authorised by the competent national authorities;

Reports to the OECD Steering Committee for Nuclear Energy on the operations carried out.

Background Note

INFORMATION ON THE ROLE OF THE OECD IN THE INTERNATIONAL SURVEILLANCE OF SEA DUMPING OF RADIOACTIVE WASTE

Individual countries began radioactive waste disposal operations in the Atlantic and Pacific Oceans some thirty years ago. In 1965, the Agency (then the European Nuclear Energy Agency) conducted a study aimed at developing safe and economic methods for such operations and at providing practical demonstrations by organising joint operations. Following this study a scientific risk assessment was carried out, international specifications were adopted for the containers to be used for packaging waste and the ships used for transporting and dumping it at sea, and procedures agreed for conducting and supervising operations under satisfactory conditions with regard to safety and to protection of man and the environment.

On the basis of these results, NEA has provided a framework in most years since 1967, for the organisation of dumping operations in the Atlantic Ocean[2]. These have involved the participation of a total of eight European countries[3]. Waste disposed of originated mainly from nuclear research centres but small quantities of waste from nuclear power stations were also included in these operations in later years. In all cases the waste was of relatively low activity, the main radionuclides consisting of tritium (over 50%) and various mixtures of activation products and beta-gamma fission products, as well as small quantities of alpha-emitting trans-uranium elements. Three dumping areas have been used since 1967 following recommendations of an international group of experts. The area used from 1971 to 1976 was represented by a circle of 35 nautical miles radius at a distance of about 1,000 Km. from European coasts and at a depth of about 4,500 m.

For these operations NEA has, on the one hand, provided technical and legal assistance in their organisation and, on the other hand, has exercised, in the absence of any specific legal framework, international surveillance on a purely voluntary basis. As a result of NEA action, OECD countries are, in general, no longer conducting dumping operations on a purely national basis. This meets the wish of the countries which are in principle opposed to radioactive waste disposal at sea that such disposal be subject to international supervision.

The Role of NEA within the new mechanism in connection with sea disposal operations organised by OECD countries will consist mainly in helping to prepare, improve and update rules for such operations, and in exercising international surveillance.

[From the Environmental News, Wednesday, Aug. 24, 1977]

EPA TO STUDY RADIOACTIVITY RELEASES IN PACIFIC DEEPSEA DUMPSITE

The 110 foot research vessel Velero IV is scheduled to leave San Francisco Harbor on Saturday, August 27, for a disused radioactive waste dumpsite 50 miles to the southwest in the Pacific Ocean near the Farallon Islands. The depth of this site varies between 3,000 and 5,500 feet. For nine days the fourteen scientists on board

[2] A report on all aspects of these operations was published by the OECD in 1968 under the title "Radioactive Waste Disposal Operation into the Atlantic—1967".

[3] Belgium, Federal Republic of Germany, France, Italy, Netherlands, Sweden, Switzerland and the United Kingdom.

will be taking samples of ocean sediment, water, and marine life to determine the extent of contamination in and around the dumpsite by plutonium leaking from drums on the ocean bottom.

Dr. William D. Rowe, EPA Deputy Assistant Administrator for Radiation Programs, said that two preliminary surveys by EPA in 1974 and 1975 have already established that some of the more than 45,000 drums dumped in the area between 1946 and 1965 are leaking low-levels of plutonium.

"Based upon our survey results to date," Rowe said, "we do not believe that the plutonium already released into the dumpsite poses a hazard either to man or the marine environment. However, we need to conduct a more intensive study of this area to determine where the radioactive materials may be moving." This survey is part of a comprehensive EPA program to study the effects of past dumping of radioactive waste. The total program also includes surveys, using a manned submersible, of disused deepsea radioactive waste dumpsites in the Atlantic Ocean off the Maryland-Delaware coast.

The EPA scientist who will direct the survey on board the Velero IV will be Robert S. Dyer, an oceanographer/radioecologist in the Agency's Office of Radiation Programs. Others involved in the shipboard survey will be scientists from the University of California, University of Washington, State University of New York, California State University, Scripps Institution of Oceanography, Smithsonian Institution, and California Academy of Sciences.

The radioactive waste disposal site surveys are being conducted pursuant to the Marine Protection, Research, and Sanctuaries Act of 1972 (Pub. L. 92-532). This Act requires that EPA set regulations for controlling ocean disposal of low-level radioactive wastes and other waste materials.

On July 26, 1976, the House Subcommittee on Energy and the Environment held a hearing in Washington, D.C. on EPA's preliminary findings at the Atlantic and Pacific dumpsites. A second hearing on the plutonium leakage at the Pacific dumpsite was conducted on September 17 in San Francisco by the House Subcommittee on Conservation, Energy, and Natural Resources. There is a continuing interest in the results of these EPA investigations to provide assurance that public health will be protected.

Problems to be addressed in the present survey include: (1) the pathways by which plutonium and other radioactive materials may move from the site; (2) the direction and extent of this movement; and (3) whether the released radioactive materials, which may be taken up by the plants and animals in the ocean, can be transferred through the food chain to man.

The results of this West Coast assessment survey will provide an important step towards determining the fate of released radioactive materials disposed in the past, and will assist in defining the problems that must be resolved before any future disposal of radioactive wastes could occur.

[From the Environmental News, Friday, Oct. 14, 1977]

EPA To Use Manned Submersible To Study Pacific Deepsea Radioactive Waste Dumpsite

A manned research submersible, the Pisces VI, will be used by the Environmental Protection Agency to make detailed observations on the condition of radioactive waste drums at a disused radioactive waste dumpsite near the Farallon Islands, 50 miles southwest of San Francisco, California.

The 220-foot research ship Pandora, operated by the Canadian Department of Fisheries and the Environment, will transport the Pisces VI from Vancouver, British Columbia, to Fishermans' Wharf at San Francisco where it will join the 110-foot research ship Velero IV on October 17 for a seven-day study at the dumpsite.

Radioactive waste drums will be examined at two sites with depths of 3,000 and 5,500 feet. One drum from each site will be selected for recovery. A similar method of recovery was successfully utilized by EPA in 1976 in retrieving an 80-gallon waste drum from a depth of 9,300 feet at the Atlantic radioactive waste dumpsite off the Maryland-Delaware coast.

The present study will also continue the water, sediment, and biota sampling program initiated in August 1977 using the research ship Velero IV at the Pacific dumpsite to determine the extent of contamination in and around the dumpsite due to leakage from the drums.

The 1977 survey is part of a comprehensive EPA program to study the effects of past dumping of radioactive waste and is being conducted under the Marine Protection, Research, and Sanctuaries Act of 1972 (PL 92-532). This Act requires that EPA

set regulations controlling ocean disposal of all materials including low-level radioactive wastes. High-level radioactive wastes are probhibited from disposal in the ocean.

On July 26, 1976, the House Subcommittee on Energy and the Environment held a hearing in Washington, D.C. on EPA's preliminary findings at the Atlantic and Pacific dumpsites. A second hearing on the plutonium leakage at the Pacific dumpsite was conducted on September 17 in San Francisco by the House Subcommittee on Environment, Energy, and Natural Resources. Dr. William D. Rowe, EPA Deputy Assistant Administrator for Radiation Programs, testified at the California hearing that two preliminary surveys by EPA in 1974 and 1975 have already established that some of the more than 45,000 drums dumped in the area between 1946 and 1965 are leaking low-levels of plutonium.

Commenting on the planned study, EPA Administrator Douglas M. Costle said, "The results of the earlier surveys do not indicate that the plutonium already released poses a hazard either to man or the marine environment. But there is a need to determine the fate of the released radioactive materials. The investigation of the Pisces VI should give us essential information on how much plutonium has leaked, where it is going, and whether there are effects on marine life."

The present survey program will be under the direction of Robert S. Dyer, an oceanographer/radioecologist in the EPA's Office of Radiation Programs. Dyer will be aboard the Pandora and will dive in the Pisces VI to locate and recover the radioactive waste drums. Davis S. Smith, also of the Office of Radiation Programs, will be project coordinator aboard the R/V Velero IV. At-sea scientific and technical support for this program will come from both government, university, and private sectors and includes: Brookhaven National Laboratory of the Department of Energy, Environmental Protection Service of the Canadian Department of Fisheries and the Environment (DFE), Ocean and Aquatic Science Office of DFE, Naval Civil Engineering Laboratory, Smithsonian Institution, Woods Hole Oceanographic Institution, International Hydrodynamics Company Ltd., Interstate Electronics Corporation, University of Washington, University of Southern California, State University of New York, California Academy of Sciences, California State University, Lamont-Doherty Geological Observatory of Columbia University, University of California at Santa Barbara, Global Marine Development Invorporated, and the University of California at Santa Cruz.

Problems to be addressed in the present study include:

1. Biological pathways by which plutonium and other radioactive materials could be transported through the food chain to man.

EPA will conduct seabed, midwater, and surface trawls to identify potential food chain organisms in the site.

2. Physical transport mechanisms by which radioactive materials could be moved.

EPA will put a series of meters around the site to determine both the speed and direction of water current and whether the currents would be strong enough to move contaminated sediments.

3. Extent to which sediment might trap and immobilize radioactive materials released from the drums.

EPA will conduct precise coring operations using the manned submersible in a 360-degree sector around the two drums selected for recovery to determine the radionuclide concentration at measured distances from the drums. In addition, a sediment basin near the Pioneer Seamount (a nearby underwater mountain) will be examined to evaluate this area both as a sediment trap and as a sediment barrier to prevent movement of released radioactive materials.

4. Resistance to corrosion and degradation of packaging materials over long periods of immersion in the deepsea.

EPA will retrieve the radioactive waste drums to determine the metal corrosion rate and concrete degradation and leach rates.

The results of this West Coast assessment survey will provide an important step towards determining the fate of released radioactive materials disposed in the past, and will assist in defining the problems that must be resolved before any future disposal of radioactive wastes could occur.

[From Woods Hole Notes, vol. 8, No. 3, October 1976]

Alvin Participates in Retrieval of Radioactive Waste Container

Alvin participated this summer in a study that reflects the growing environmental and energy concerns about nuclear wastes. The sub facilitated the recovery for the Environmental Protection Agency (EPA) of a low-level radioactive waste con-

tainer that had lain in 2,800 meters (9,240 feet) of water for some 15 years. Robert Dyer, an oceanographer in the EPA Office of Radiation Programs, was Chief Scientist. Last year *Alvin* surveyed the dumpsite, a disused munitions dumping area some 120 miles east of the Maryland-Delaware border. Analysis of samples taken then showed that, although there were traces of cesium-137 there, the area was a safe place to work. About 14,000 drums of such radioactive materials as wiping cloths, coveralls, and dead experimental animals had been dumped in the area between 1946 and 1970. Dyer had chosen a particular container for recovery from photographs he had taken last year from *Alvin*. (Some 4,500 photographs taken by surface-towed cameras in 1961 for the Atomic Energy Commission located no containers, although about 10,000 had been dumped by then.)

Cliff Winget, Research Specialist in the Deep Submergence Engineering Operations group, was in charge of engineering design for the recovery project. It wasn't clear from the design records on the 80-gallon disposal drums what their end strength might be, so a bridle was designed by Winget and Research Associate Barrie Walden to fall net-fashion over the concrete-filled metal drum and distribute the lifting weight. *Alvin's* mission was to locate the container, secure the bridle, and then attach a tie line from the bridle to a lift line so the container could be taken aboard escort vessel *Cape Henlopen* (University of Delaware) for delivery to Brookhaven National Laboratory on Long Island. Using Loran C navigation, the site of last year's investigations was quickly found, and then *Alvin's* precise transponder navigation net, developed by Research Specialist Skip Marquet, was set for the rest of the operation. *Alvin* found the chosen drum within an hour (and discovered her own tracks from last year, as well). The lift line was equipped with a transponder so *Henlopen* could be navigated by radio from *Lulu* to within 100 meters (330 feet) of *Alvin* and the drum.

All hands wore radiation detector film badges during the operations, and the sub was carefully monitored before and after the dives by a health physicist from EPA's Eastern Environmental Radiation Facility. No dangerous radiation was detected at any time.

Dyer described the urgency of this work in a recent paper which said, "With increased competing demands for a decreasing amount of available land, several nations are looking towards the oceans to solve their low-level radioactive waste disposal problem." Dyer is in contact with nuclear scientists and officials in many other countries and Dr. Akahito Ito of the Japanese Atomic Energy Research Institute was a participant on this cruise and made one dive.

THE NUCLEAR REGULATORY COMMISSION LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT PROGRAM

September 1977

Manuscript Completed: September 1977
Date Published: October 1977

Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

THE NRC LOW-LEVEL WASTE MANAGEMENT PROGRAM
INTRODUCTION

Since its inception nearly two years ago, the NRC has recognized that the safe management of nuclear waste is one of the pivotal issues affecting the future role of nuclear power. We also recognize that this is a common objective of the several Federal agencies having jurisdictional or programmatic interests in nuclear waste management. While NRC responsibilities are in the area of regulation, we are working closely with other agencies in scoping and scheduling activities to provide a sound overall national program for managing nuclear wastes. The Commission's overall nuclear waste management program has been described previously. This paper focuses on the NRC program for management of low-level radioactive wastes which are disposed of in commercial burial grounds.

Preliminary schedules and critical inter-relationships for the elements of the NRC low-level waste program are shown in Figures E-1 through E-5. The program elements can be assigned to seven categories which are discussed in the sections below:

- general program and policy development
- standards development for shallow-land burial
- standards development for alternative disposal methods
- regulation development
- development of analytical models and staff review procedures
- development of regulatory guides

33-546 O - 78 - 23

The program elements are shown only in sufficient detail in the figures to provide an overview of the program. These efforts will provide the necessary tools for applicants to prepare license applications and for NRC to evaluate the submission and make uniform and timely licensing decisions.

GENERAL PROGRAM AND POLICY ELEMENTS

The schedule for development of the general elements of the low-level waste management program is outlined in Figure E-1. The principal activities in the general program are described below.

Acceptable Risk

Two studies are presently underway to attempt to quantify acceptable risk for accidental releases from nuclear waste management operations. The studies are designed to lead to development of acceptable risk criteria which can be used to formulate regulations and/or policy statements governing disposal of nuclear wastes. Lawrence Livermore Laboratories (LLL) will coordinate their activities with the National Council on Radiation Protection (NCRP) study and with EPA's program for developing General Environmental Radiation Standards. LLL will report their findings to the NRC along with a technical basis for any recommendations in late 1977.

Classification of Wastes

Criteria to classify wastes according to the degree of confinement necessary to ensure decay of the wastes to some acceptable low-risk level are being developed. These criteria will indicate the type of waste suitable for shallow land burial and for the alternatives to burial. We plan to publish proposed classification criteria for public comment in the Spring of 1978.

Alternatives to Shallow Land Burial

A study to identify and evaluate alternatives to shallow land burial which provide greater confidence in performance or which have economic and environmental advantages is planned. This effort will guide the Commission in developing a comprehensive regulatory structure for low-level waste disposal. All possible methods which have been identified or proposed for radioactive waste disposal will be screened. Based on the screening, viable alternatives will be further evaluated for technical, economic, environmental and social merit. The study is expected to yield results in approximately one year.

Regulatory Authority and Federal/State Roles

An NRC Task Force study (NUREG-0217) published in March 1977 recommended increased Federal control over low-level waste disposal. The staff believes that a number of unresolved questions need to be resolved before making a final decision on this recommendation. The staff will continue to analyze the remaining open issues and will identify in due course the actions and resources required for full implementation

Environmental Survey on LLW Disposal

A comprehensive survey of the environmental impacts of low-level waste disposal will be performed. This survey will summarize the individual environmental impact assessments/appraisals that are developed in support of individual rule changes and will summarize information on environmental impacts and costs developed in studies of shallow land burial and alternative disposal methods. This study will be completed in FY 80.

SPECIFIC PROGRAM ELEMENTS

The low-level waste management program has been established to develop regulations and to provide licensing capability for disposal of low-level radioactive wastes. Specific elements of the program are discussed below.

Standards Development for Shallow-Land Burial

Virtually no NRC standards or regulations setting forth performance criteria for low-level waste disposal currently exist, and licensing reviews are conducted on a case-by-case basis. Such licensing procedures are adequate for the short term and priority attention is being given to the longer term when the quantity of waste to be managed will be greater and licensing demand will increase. Plans for developing such criteria for shallow-land burial (Figure E-2) are discussed below. Table E-1 lists contractors, NRC office funding levels, and periods of performance for all the supporting projects. The following standards are being developed.

Solids Performance and Waste Acceptance - To provide the information needed to develop solids performance and waste acceptance criteria by the end of FY 1979, two contractual efforts are underway and a third is planned. Concurrent efforts to provide a supporting rationale, analyses and data for a draft environmental impact statement (EIS) are planned. The criteria and draft EIS will subsequently be integrated into shallow land burial regulations and supporting EIS's.

A study of the properties of radioactive wastes and containers is being conducted a Brookhaven National Laboratory (BNL) under a contract with the Office of Nuclear Regulatory Research (RES). The purpose of this program is to develop information on the physical and chemical characteristics of low-level wastes which can be used to assess the safety of land burial operations, interim storage and transportation of these materials. Utilizing existing information or actual measurements, the project will summarize the physical and chemical characteristics of solidified low-level waste products as a function of time, storage environment and other factors. Information on the interaction of such wastes with the storage environment, characteristics of containers, and the stability and resistance of such materials to heat and radiation will be included. A second study under a contract with RES is underway at the University of Maryland to review non-fuel cycle wastes.

The purpose of this project is to provide definitive data on the sources, characteristics, volumes and treatment methods for wastes arising in the medical/academic sector. Questionaires have been sent to approximately 600 universities with and without active nuclear medicine programs. These institutions are felt to comprise the major source of waste volumes. Detailed surveys will be conducted in Washington, Baltimore, New York and Boston covering small hospitals, large institutions, commercial and government biological research organizations and smaller universities to provide detail to the overall survey. Projections of the expected increases in waste volumes will be made.

A third study to characterize the chemical toxicity of low-level wastes is planned. The purpose of this project is to determine the relative chemical and radiological toxicities of low-level waste in order to define the important considerations for operational, monitoring and long-term care requirements for disposal sites. Available information on the chemical toxicity of low-level wastes will be collected and a method/rationale for determining relative chemical and radiological toxicities will be developed. Requirements to address the chemical hazards associated with low-level waste disposal will be recommended.

Site Suitability - In developing site suitability criteria, technical assistance from the Office of Nuclear Reactor Regulation (NRR) and data base studies at existing sites will be utilized.

The USGS is conducting a study of existing commercial burial sites to develop geologic and hydrologic criteria for evaluating waste burial sites and to develop predictive waste transport models for buried wastes. USGS has already initiated sampling programs at two burial sites and plans to initiate studies at additional sites in the near future. NRC is assisting USGS in this program by providing analytical services for samples obtained by USGS. BNL is performing the analyses under contract to RES. This program is aimed at determining the processes and underlying principles controlling radioactive waste migration through soil. Both laboratory experiments, using materials and solutions collected at the different burial sites, and comprehensive field investigations are being conducted. The results of this study will be used in the NRC's assessment of present burial practices. The NRC, in cooperation with USGS and EPA, is initiating studies with agencies of the States of New York and Kentucky to model radionuclide migration at the West Valley and Maxey Flats sites. Negotiations have begun to conduct similar studies at the two remaining Eastern sites. These studies are intended to support our efforts to develop analytical models to predict site performance and in the

development of siting criteria. These studies are being funded by RES and we are obtaining technical support from NRR.

Site Design - The field data and analysis projects just described will provide the major information base for site design criteria. Input from ERDA technology development will also be included. Technical support in the geotechnical disciplines is being provided by NRR.

Operation - The information base for development of criteria for site operation includes the technical findings and analyses associated with site suitability and design since the three are inter-related. Technical support being provided by NRR will include operational aspects concerned with the site characteristics and optimum design.

Additional requirements should derive from work planned as an expansion of an OSD study which is already underway. This study is concerned with the safety and cost related to decommissioning nuclear fuel cycle facilities. The study is being performed by Battelle Northwest Laboratories (BNWL) and will include criteria for operating, monitoring, decommissioning, long-term care and funding of low-level waste disposal sites. Record-keeping requirements including inventory data, acquisition/storage methods and quality assurance will be defined. Criteria for formulating and implementing environmental

monitoring programs at disposal sites will be developed. Decommissioning and long-term care criteria will be identified. Finally, financial arrangements such as terms of leases, perpetual-care funds, contingency reserves and financial responsibilities will be incorporated into criteria for evaluating and regulating disposal sites.

Monitoring - Criteria for the design and conduct of environmental monitoring programs are needed. All phases of site activities must be covered, i.e., pre-operational, operational, decontamination and decommissioning, and post-operational. Requirements will derive from both short and long-term considerations. The field data and analysis studies at the Eastern sites will provide data and analytical methods for designing and assessing monitoring programs in humid climates. Work being done under contract to ERDA is addressing arid sites. NRR is providing technical assistance. The planned OSD study described earlier will provide additional input.

Post-Operational Maintenance and Funding Requirements - Criteria for these aspects are the primary focus of the OSD decommissioning study. NRR technical support in developing siting, design, and operational criteria will also be employed in developing these post-operational requirements.

Standards Development for Alternative Disposal Methods.

The need for standards for alternative disposal methods is based on the assumption that one or more viable alternatives will be identified in the study described earlier. At least one and probably several acceptable alternatives are expected to result from the comprehensive study planned. Figure E-3 outlines development of criteria following the same approach used for SLB. Similar aspects are considered and concurrent efforts to generate criteria and supporting information and analysis for input into supporting EIS's are planned. No data base studies have been identified at this time. In fact, the fiscal 1980 timetable for completion assumes that no significant or time consuming research will be needed to develop criteria and that the alternatives will be similar enough to current disposal techniques to utilize the experience and knowledge gained in SLB or other disposal efforts. Since availability of technology is one of the evaluation parameters in determining feasibility of alternatives, these assumptions are not unreasonable. Specific plans for short-term data development, modeling, and other analyses will be factored in after the results of the alternatives study are available. A decision on whether generic criteria for any method or whether criteria for each individual method are needed will be made based on the study results.

Regulation Development

Three major regulation development efforts are planned as shown on Figure E-4. Regulations for shallow-land burial, for alternative disposal

methods, and for establishing Federal/State roles will provide the regulatory authority needed to establish criteria, requirements, and control. NMSS efforts are being coordinated with OSD so that they have early input into our programs and that the necessary information is developed to support the staff position in rulemaking hearings.

Assessment Methodologies

The LLWB staff is developing licensing review methodologies, including both predictive models and review procedures, to aid in LLW licensing and review actions. Development and validation of these models will be one of the products of the field studies being conducted at the existing burial sites.

One of the more important analytical tools being developed is a model for predicting waste disposal needs through the year 2000. The purpose of this project is to develop models for periodic independent projections of volumes, radioactivity and actinide mass of all nuclear wastes to be generated on a regional basis through the year 2000 and for estimating waste disposal costs. These will be utilized in decisions on the timing and location of proposed disposal sites and evaluations of environmental impacts.

Existing projections models will be re-evaluated and parameters of these will be subjected to sensitivity analyses. Based on these, a model for

making periodic projections as the significant parameters change will be developed. In addition, a method for estimating costs f packaging, shipping, and storage/disposal per unit volume of waste will be developed. This study is scheduled to be completed in July 1979.

Review Procedures

The staff is developing the tools needed to systematically review license applications to achieve a uniform, comprehensive evaluation. Documents providing guidance to applicants on the format and contents of the Safety Analysis Reports and Environmental Reports are planned, and documented acceptance criteria and review procedures are being developed. These procedures will save effort both on the part of applicants and the NRC staff, and will illuminate the review process, thereby allowing increased public participation.

Regulatory Guides

The criteria we are developing in the low level waste program will be incorporated into a comprehensive series of Regulatory Guides covering all aspects of waste management. The guides will be useful to applicants, to the NRC staff, to Agreement State personnel, and to other Federal Agencies. Guides are planned on siting, design, operation, monitoring, decommissioning and funding for long term care for various types of low level waste disposal facilities.

Reassessment of Existing Sites

In its report on Federal/State roles in regulation of commercial low-level radioactive waste burial grounds, the Task Force concluded that the States had adequately protected the public health and safety, and found no compelling health and safety reason for reassertion of Federal control at the time of the study. The Task Force's recommendations were based on broad policy considerations, whereas its finding concerning health and safety were based on a general assessment of the sites as presently regulated and operated. The Task Force did not attempt to make conclusions concerning possible future problems. The Task Force did not have available to it a comprehensive set of standards and criteria by which to judge the performance of a burial site. Development of such criteria is one objective of this program plan. Analytical models for evaluating site performance are being developed as part of the low-level waste management program, and these models will be verified, in part, by studies at the existing sites. In the meantime, a series of possible corrective actions, ranging from improved trench cap designs to complete exhumation, will be evaluated and the associated costs determined. It is at that time, with performance criteria in place, evaluation models developed, and possible corrective measures and costs identified, that decisions regarding existing sites can be made. As new criteria are developed, we will evaluate their impact on the existing sites on a case-by-case basis.

Uranium Mill Tailings

A study underway at Argonne National Laboratories (ANL) is directed toward the management of uranium mill tailings. The study will lead to the publication of a Generic Environmental Impact Statement (GEIS) on the Management of Mill Tailings and is expected to lead to the formulation of NRC regulations in this area. A possible outcome from this effort would be a Commission request for additional statutory authority to increase its effectiveness in regulating the management of mill tailings, e.g., to require the licensing of tailings piles at decommissioned mills to ensure adequate post-operational stabilization. The GEIS on mill tailings has the following principal objectives:

- To assess the environmental impacts of uranium milling including an evaluation of the local, regional and national impacts on both a short and long-term basis
- To provide information on which to determine the need for additional regulatory requirements for uranium mills with the emphasis on the waste management of mill tailings
- To support any rule making and/or modifications of statutory authorities which may be determined to be necessary by the Commission.

Preparation of the GEIS is in progress. The present schedule calls for issuance of a draft statement in August 1978 and the final statement in February 1979.

A proposed scope and outline for the GEIS was published for public comment on March 14, 1977. A progress report on the GEIS was sent to the Commission in July, 1977. The staff has also developed a research program to provide data for the GEIS and associated rule making activities. In a study begun in June through RES, ANL is conducting field studies at a number of operating mills to provide reliable effluent release data for use in the GEIS. These field studies, being conducted jointly with EPA, will provide information that will permit prediction of radiological releases from the mill and from tailings piles at different sites and under varying conditions.

NMSS is also initiating a study with Oak Ridge National Laboratory to develop transport models for radon-222 to be used in assessing environmental impacts of tailings piles in the GEIS.

It is not yet possible to define the extent of the standards development efforts which will flow out of the mill tailings program studies described above. Major factors influencing the standards development efforts are State and Federal licensing roles and the potential necessity for Congressional action to modify NRC statutory authority. Preliminary LLWB staff plans would incorporate mill tailings management standards.

Decommissioning of Nuclear Facilities

A preliminary schedule for development of decommissioning regulations has been prepared. As an initial step in the development of decommissioning regulations, the staff is in the process of defining technical support programs needed to provide an adequate data base for impending policy decisions. Studies of light water nuclear reactors, fuel reprocessing plants, uranium milling facilities, mixed oxide and uranium oxide fuel fabrication facilities, and uranium conversion facilities are underway and/or scheduled to begin at Pacific Northwest Laboratories (PNL). Additional studies directed at decommissioning waste management facilities are being considered.

The PNL decommissioning studies are being funded by the NRC Office of Standards Development. Each study includes: (1) characteristics of the plant and site; (2) acceptable decontamination levels; (3) radiation exposure to the workers and the general public; (4) a cost/benefit analysis; and (5) identification of research and development needs. The individual facility studies are scheduled for completion in FY 78, FY 79, and FY 80. Tentative LLWB staff plans call for the publication of a proposed regulation on decommissioning early in 1981.

Radioactive Gases

NMSS has requested RES to initiate a program to develop a data base for regulating captured radioactive gases produced from the nuclear fuel cycle. Specific results from the study will include: (1) a comparison of costs and risks associated with alternate technologies for storing or disposing of ^{85}Kr, ^{129}I, ^{14}C and ^{3}H; (2) performance criteria for the physical form in which ^{85}Kr, ^{129}I, ^{14}C and ^{3}H should be stored or disposed; and (3) general facility performance requirements for storage or disposal of ^{85}Kr, ^{129}I, ^{14}C, and ^{3}H, i.e., need for repository disposal techniques.

COORDINATION OF THE LOW-LEVEL WASTE MANAGEMENT PROGRAM

The NRC Low-Level Waste Management Program is a complex plan which involves input from other offices within NRC, coordination with other Federal agencies, and input from industry, the States and the public. These aspects of the program are discussed below.

Intra-Agency Coordination

The LLW Management Program makes extensive use of resources within NRC to achieve early results. The Office of Nuclear Regulatory Research (RES) is

33-546 O - 78 - 24

conducting studies on waste and container properties and field studies at existing burial sites in support of our criteria development. We are being provided technical assistance in planning and evaluating the geotechnical aspects of these studies by the Office of Nuclear Reactor Regulation (NRR). NRR is also providing assistance to us in reviewing the geotechnical aspects of license applications and will act as consultants to us in development of regulatory guides on siting, design, operation and monitoring of disposal facilities. NRR also acts as our consultant on waste quantities, waste form performance criteria, and dose assessment models.

The Office of Standards Development (SD) is supporting our efforts on decommissioning through their technical assistance contracts with PNL. SD is also providing assistance in the framing of our technical requirements into regulations and regulatory guides and will direct the staff's rule-making activities. Through their activities related to ANSI standards, they also provide industry input to our program.

The Office of State Programs (SP) is an important element of our program through which we provide technical assistance to the States and obtain State input into our standards and criteria development activities. SP

will also help maintain a consistent national program through their oversite of Agreement State programs for compatability with the developing NRC waste management program.

The Office of the Executive Legal Director (ELD) provides legal assistance in the development of legislation and regulations that result from our criteria development efforts.

Inter-Agency Coordination

Several Federal agencies have interests or responsibilities in the field of low-level waste disposal. The following sections briefly summarize our inter-agency coordination.

Environmental Protection Agency (EPA) - The staff is participating in a working group convened by the EPA to develop General Environmental Radiation Standards. The scope and form of the standards have not yet been defined. Arrangements for non-WMP staff technical support from within the NRC and from LLL to the WMP representative have been made. The staff is assisting the EPA in preparing U.S. policy regarding the ocean disposal of radioactive wastes. The U.S. policy will address IAEA proposals which are forthcoming in 1977 on this subject.

U.S. Geological Survey - As described above, the USGS is participating with us in field studies at the existing burial sites and in developing models and siting criteria that will be used by us in the development of standards and criteria for shallow land burial. It is anticipated that the USGS will provide licensing review consultation to the LLWB staff regarding the licensing of waste disposal facilities.

ERDA - The ERDA Steering Committee on Land Burial solicited NRC input into "The ERDA Plan to Develop a Technology for the Shallow Land Burial of Solid Low-Level Radioactive Waste" dated June 1976. The Committee also sends progress reports, and we expect to have input for annual updates of the plan. The ERDA program plan is designed to develop a technology which specifies combinations of site characteristics, waste treatment, site operating practices, and long-term stabilization techniques that minimizes associated risks. Cost analyses will also be performed. Information from studies and evaluation of ERDA sites is also provided to NRC staff.

LLW Working Group - An informal interagency working group was established in February 1976, to coordinate the efforts of Federal agencies and the States in responding to the GAO recommendations on low-level waste burial grounds. The recommendations contained in the January 12, 1976, report to Congress involve the programs and responsibilities

of a number of agencies. Representatives on the working group are from NRC, ERDA, USGS, EPA and the States. The group meets approximately quarterly and has agreed on procedures for exchanging information concerning their respective programs.

Input from the Public

Public comments were solicited and received on NUREG-0217 by publishing the body of the report in the Federal Register and distributing copies to interested parties such as NRDC. The staff analysis summarizing the comments on NUREG-0217 and this description of the NRC low-level waste program will be published in the Federal Register. We will continue to publish in the Federal Register, participate in conferences and meetings, and explore additional mechanisms to obtain public input on programmatic issues.

The public regularly participates in proposed rulemaking activities and hearings on licensing cases. Public review of regulatory guides is routine practice. Further public input comes from public review and comments on draft EIS's. EIS's for proposed rules and NRC licensing actions are important elements of the program.

Coordination with States

We have coordinated closely with the States and have received valuable input in developing our preliminary program plan. Implementation of the plan requires that State input and coordination continue. Comments were solicited and received during the development of NUREG-0217 as well as

when the document was published. We plan to inform all the State governors of the status of the NRC low-level waste management program. Officials in States where sites are located were visited by the NRC Task Force and were a vital source of input to NUREG-0217.

Additional interaction with the States will continue. One means is NRC technical assistance efforts on licensing matters. In some cases the States are the contractor for site studies being planned. Additional early technical input will be solicited from the States in the development of standards. The mechanisms for State input vary from review by experienced individuals to collective actions through the Conference of Radiation Control Program Directors. The Conference and annual State meetings are mechanisms for informing the States and receiving input and comments. The States also participate in the rulemaking and regulatory guide development processes.

Input from Industry

Industry will have the opportunity to formally comment on proposed regulations, regulatory guides, and environmental statements, and to participate in public hearings through the mechanisms provided in 10 CFR Parts 2 and 51. However, input from the nuclear industry is provided by a number of other methods. We participate as members of ANSI standards committees drafting standards on the solidification and packaging of radioactive wastes. LLWB members participate as ex officio members on several AIF

Task Forces. The AIF has conducted studies relating to disposal of low-level wastes and decommissioning of reactors, and at present has studies underway concerning migration of radioactive materials from shallow land burial sites, alternatives to shallow land burial, and threshold levels for solid radioactive wastes. We have had discussions with EPRI concerning studies they are funding related to decontamination. Finally, we regularly participate in symposia and meetings conducted by the American Nuclear Society (ANS) to inform the nuclear industry of our waste management programs.

Summary

We believe the priorities for NRC work in low-level waste management as described in this action plan are consistent with the needs of the overall national waste management program. Present licensing procedures and criteria are adequate for the short term, and priority attention is being given to the longer term, when the quantities of waste to be managed will be greater and licensing demand will increase. The plan makes use of expertise within NRC to achieve early results and is coordinated with other Federal agencies having related responsibilities. Recognizing that NRC decisions will affect industry, other governmental jurisdictions, private interest groups, and the public at large, we have developed procedures to involve them in planning our program.

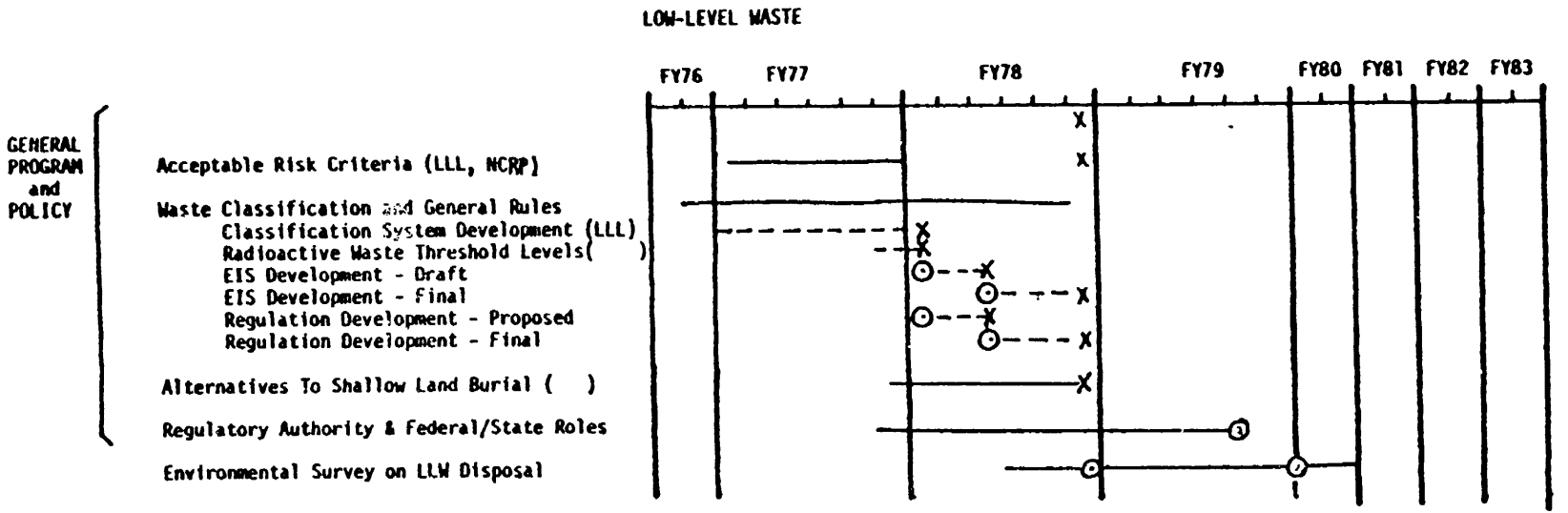


Figure E-1 Schedule for General Program and Policy Development for Low-Level Waste Management.

Key to Symbols:

X, O — numbered: X provides input to indicated element O

X, O — un-numbered: X provides input to element(s) below

_____ Major Task

- - - - - - Subtask

_ _ _ _ _ _ Ongoing

Key to Numbers:

1-Alternatives Policy Results
2-Role/Authority Policy
3-SLB Criteria
4-SLB EIS Input
5-Alternatives Criteria
6-Alternatives EIS Input
7-SLB Framework
8-Alternatives Framework
9-Regulations on Roles

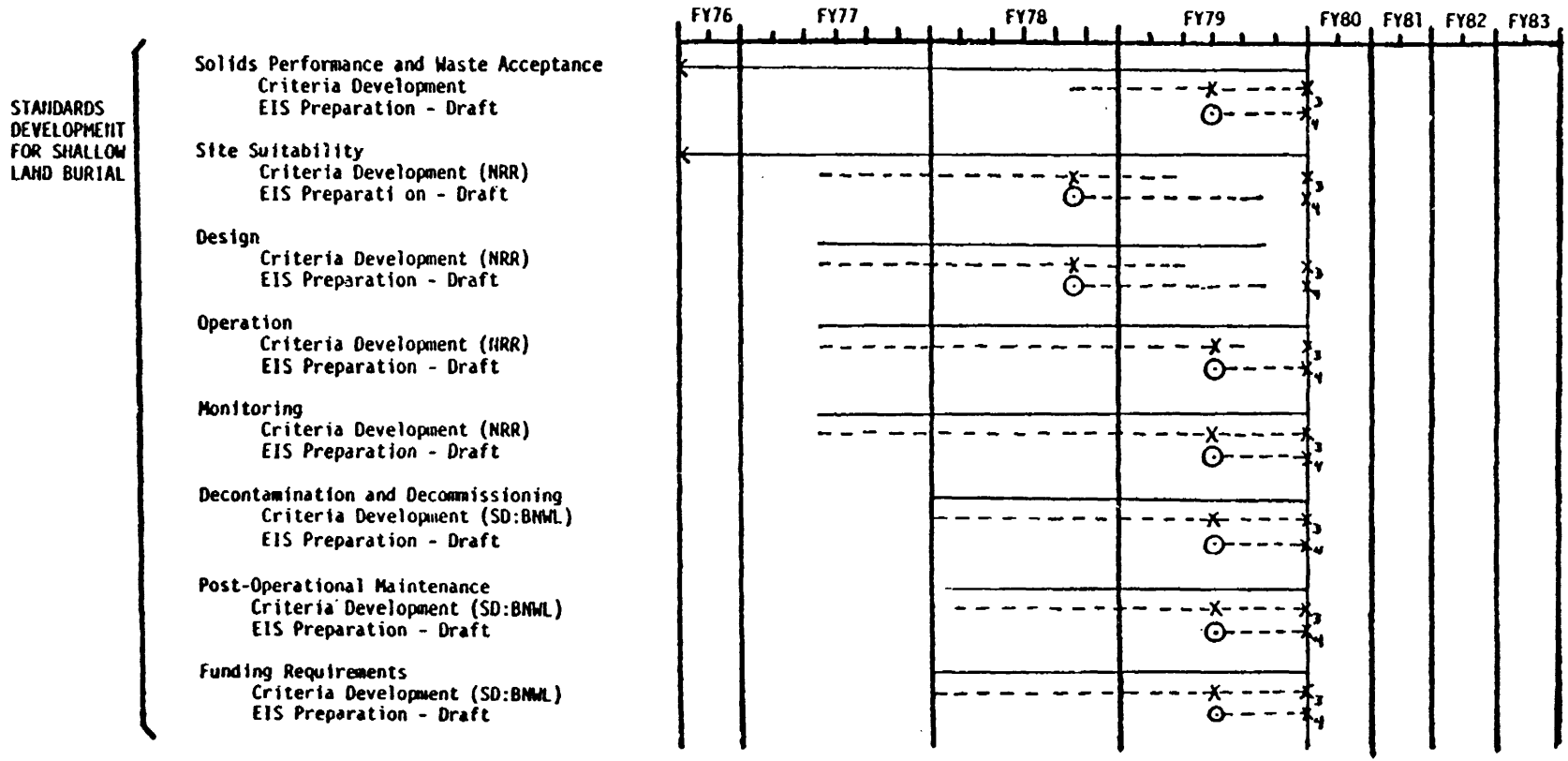


Figure E-2 Schedule for Development of Standards and Criteria for Shallow-land Burial.

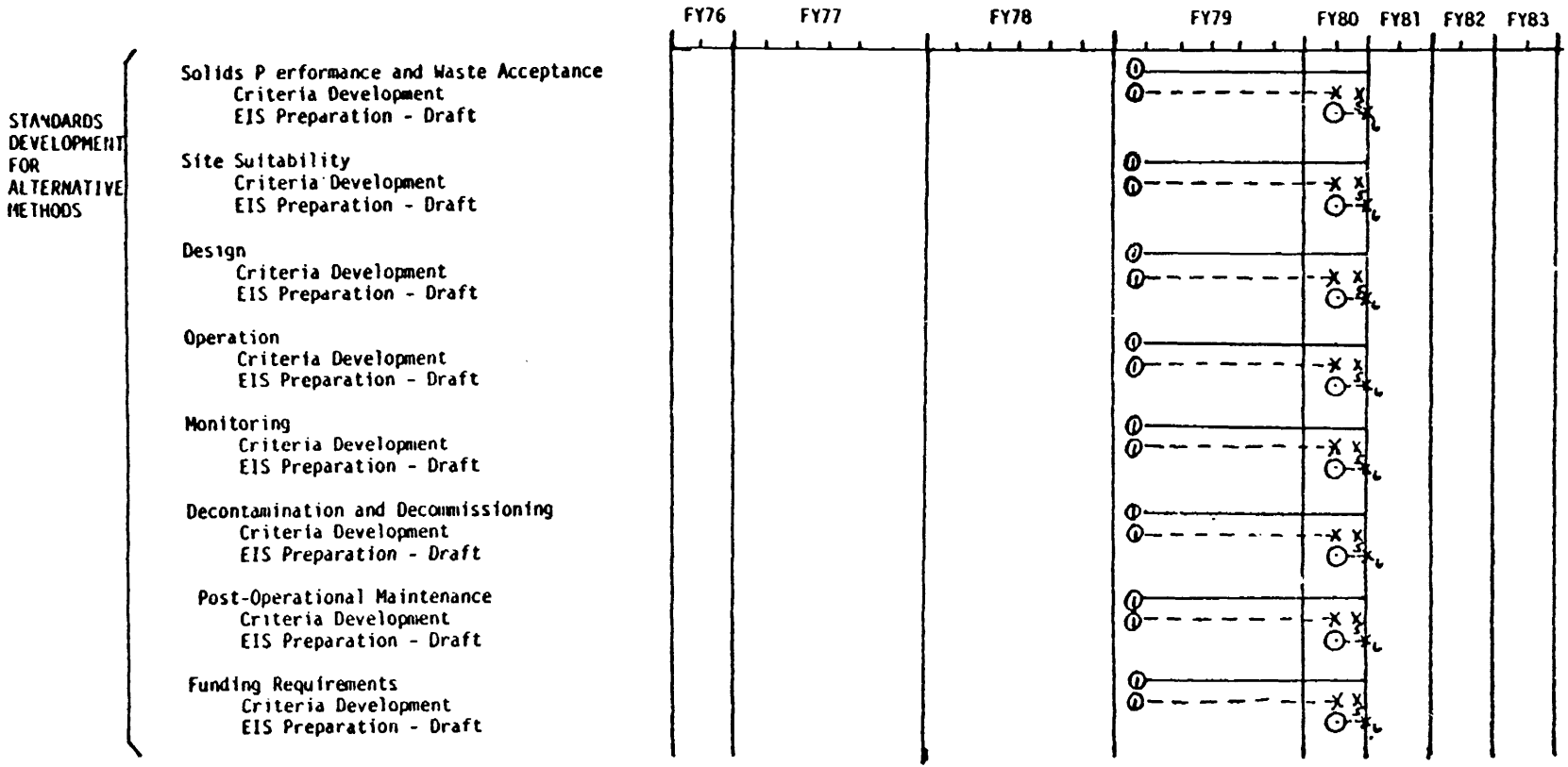


Figure E-3 Schedule for Development of Standards and Criteria for Alternative Low-Level Waste Disposal Methods.

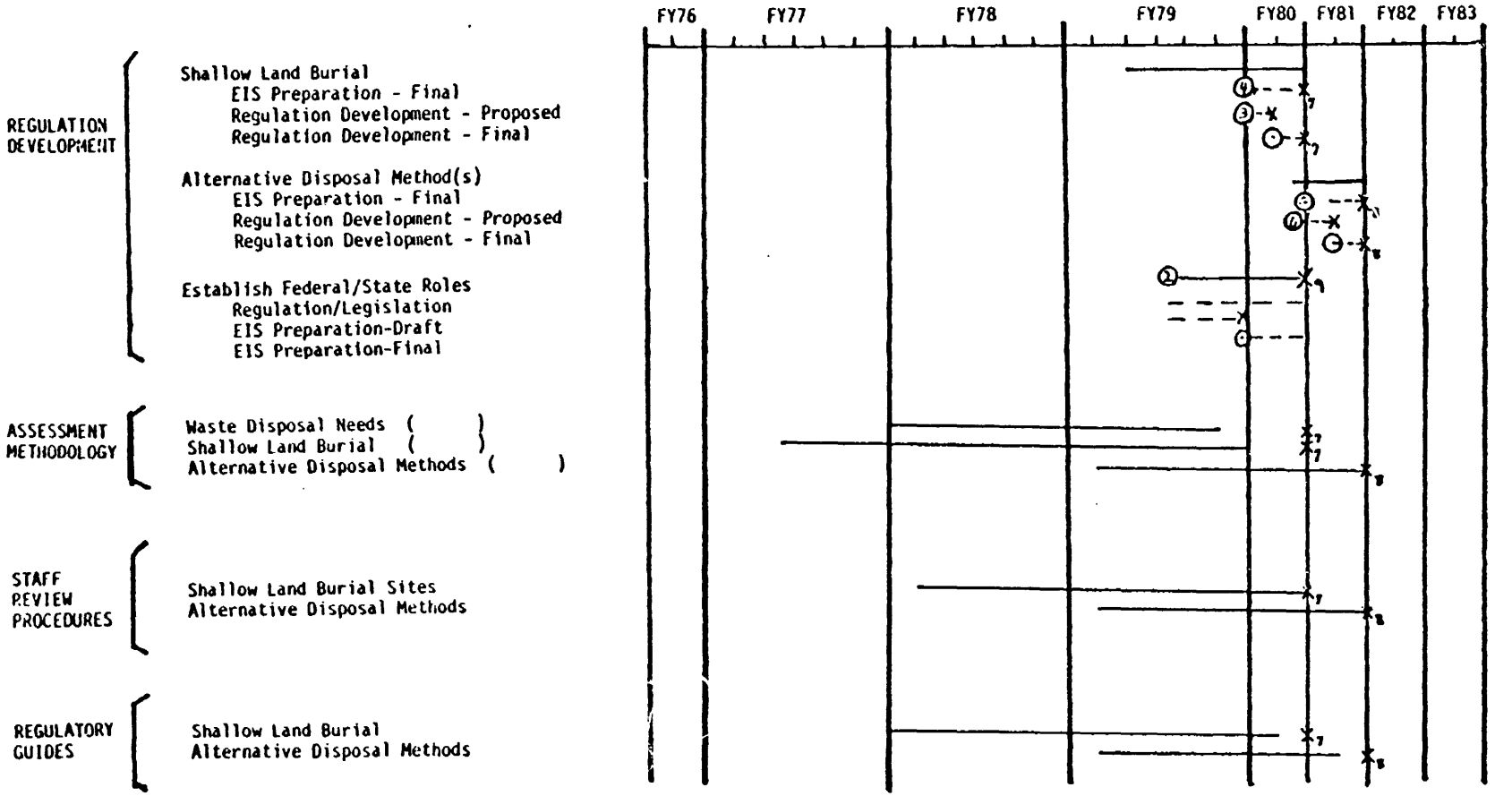


Figure E-4 Schedule for Development of Regulations, Assessment Methodologies Review Procedures and Regulatory Guide for Low-Level Waste Disposal.

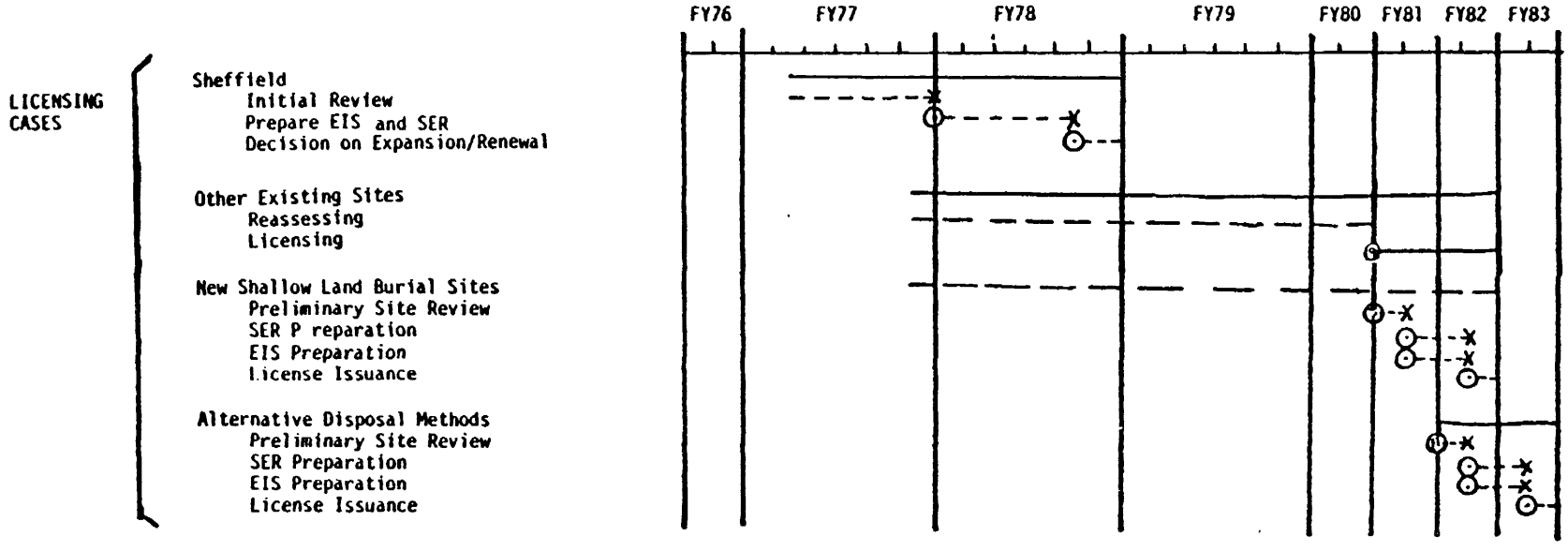


Figure E-5 Schedule of Projected Licensing Actions for Low-Level Waste Disposal Sites

Table E-1: Low-Level Waste Projects

Project	Contractor	NRC Office	Expected Funding ($K) FY-76	FY-77	FY-78	FY-79	Period of Performance
Acceptable Risk Criteria	LLL/NCRP	NMSS	-	172	-	-	11/76 - 10/77
Waste Classification System	LLL	NMSS	80	66	-	-	4/76 - 10/77
Alternative Methods for Disposal	-*	NMSS	-	100	160	-	FY77 - FY78
Properties of Wastes & Containers	BNL	RES	385	370	425	-	FY76 - FY78
Review of Non-Fuel Cycle Wastes	Univ. of Md.	RES	63	70	80	-	FY76 - FY78
Chemical Toxicity of Low-Level Wastes	-*	NMSS	-	6	75	69	9/77 - 10/79
Waste Burial Ground Migration Study	BNL	RES	500	0	375	-*	FY76 - FY80
Field Data and Analysis Projects:							
West Valley Site	NYSGS	RES	-	-*	-*	-	7/77 - 7/78
Maxey Flats/Barnwell/Sheffield	-*	RES	-	-	-*	-*	FY78 - 79
Decommissioning Fuel Cycle Facilities	BNWL(PNL)	SD	150	300	580	560	1/75 - 10/80
Waste Disposal Needs Through Year 2000	-*	NMSS	-	40	70	40	9/77 - 7/79
GEIS On Uranium Mill Tailings	ANL	NMSS	40	370	292	200	4/76 - 2/79
Tailings Research Program	ANL	RES	170	225	300	-	FY76 - FY78
Radon 222 Doses From Tailings	ORNL	NMSS	-	25	100	-	8/77 - 7/78
Radioactive Gases	-*	RES	-	-	380	325	10/77 - 2/81

*Not known at this time

Environmental Surveys of Two Deepsea Radioactive Waste Disposal Sites Using Submersibles*

(By R. S. Dyer, Office of Radiation Programs, U.S. Environmental Protection Agency)

ABSTRACT

This paper discusses the use of the manned submersible ALVIN and the unmanned submersible CURV III to survey disused U.S. radioactive waste dumpsites at depths of 2800 m in the Atlantic ocean and 900 m and 1700 m in the Pacific Ocean.

Data is presented showing the presence of plutonium contamination in sediments collected within a cluster of both intact and breached packages at the 900 m dumpsite area in the Pacific. The level of $^{239,240}Pu$ contamination in surface sediments is shown to be from 2-25 times higher than the maximum expected concentration that could have resulted from weapons testing fallout. Data is also presented confirming the presence of ^{137}Cs contamination in the 2800 m Atlantic dumpsite with concentrations ranging from 3-70 times higher than the maximum expected fallout concentration. Packaging records, photographs of the coring operations, and information written on the waste packages themselves establish a direct relationship between the radioactive waste packages and the contamination in the adjacent sediments.

Mechanisms of vertical redistribution of cesium and plutonium are discussed. Bioturbation is suggested as the most probable factor in the redistribution of plutonium in the 900 m and 1700 m Pacific-Farallons subsites, while leaching from packages and periodic burial of the leached wastes by lateral sediment transport may account for the deep vertical distribution of ^{137}Cs in sediments at the 2800 m Atlantic site. The potential significance of this radionuclide contamination of the dumpsites is discussed in terms of the evidence for possible physical transport of the radioactive material and the presence of edible marine species.

*Presented at the International Symposium on the Management of Radioactive Wastes from the Nuclear Fuel Cycle, International Atomic Energy Agency, Vienna, 22–26 March 1976.

INTRODUCTION

There is a growing interest nationally and internationally in sea disposal as a waste management alternative to land burial of low-level nuclear wastes. With increased competing demands for a decreasing amount of available land, several nations are looking towards the oceans to solve their low-level radioactive waste disposal problem.

In 1946, the United States started ocean dumping of low-level radioactive wastes under licensing authority of the Atomic Energy Commission (AEC). Most of the wastes were dumped between 1946 and 1962. In 1962, AEC contractors turned to land disposal. From 1962 to 1970 there was a phasing out of ocean dumping of radioactive wastes. Three sites received the majority of all wastes dumped.[1] These are detailed in Table I. The radioactive wastes were generally packaged in 55-gallon drums filled with concrete or occasionally other experimental matrices and dumped at depths ranging from 900 m to 3800 m. Two of the sites are located in the Atlantic Ocean off the Maryland-Delaware coast while the other site is located in the Pacific Ocean off San Francisco, California, near the Farallon Islands. The Farallon Islands site contains two subsites at 900 and 1700 m depths. These three major dumpsites received more than 90 percent of the 55-gallon packages and 95 percent of the estimated activity dumped. The Pacific-Farallons site was surveyed twice, once in 1957[5] and again in 1960[6]; the 2800 m Atlantic site was the subject of a 1961 survey.[7] Over 11,000 underwater photographs were taken in these previous Atlantic and Pacific dumpsite surveys but no packaged radioactive wastes were identified. From 1961 to 1974 no further site investigations were conducted. In 1974 the U.S. Environmental Protection Agency (EPA) initiated the surveys which are the subject of this paper

Environmental concern for the ocean dumping of packaged low-level radioactive wastes has again been brought to focus in the United States with the development of two regulatory documents: (1) the 1972 International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, and (2) the U.S. Marine Protection, Research, and Sanctuaries Act of 1972. Both the Convention (now a treaty) and the U.S. legislation prohibit ocean dumping of high-level radioactive wastes. The U.S. Environmental Protection Agency has been designated to administrate the domestic legislation through development of a permit program for controlling ocean dumping of all wastes including nuclear wastes. As a first step in developing effective controls on any ocean dumping of low-level radioactive wastes, and in order to assess the effectiveness of past packaging techniques, it was necessary to determine the fate of radioactive waste packages dumped in deepsea disposal sites in past years and to make preliminary determinations concerning the distribution of any released wastes. This would require a new survey approach if the actual waste packages were to be found and a meaningful radiological survey conducted. This paper describes a survey method using submersibles by which radioactive waste packages have been located and positively identified at the Pacific-Farallons 900 m and 1700 m depths and the Atlantic 2800 m depth. Radioanalytical data from the 900 m and 2800 m surveys is presented confirming the release of low levels of plutonium-238, plutonium-239, 240, and cesium-137 from some of the waste packages. This information is then related to the condition of the radioactive waste packages observed within the 900 m and 2800 m sites and to the general dumpsite characteristics.

SURVEY METHODS

Submersibles

Pacific

An unmanned, tethered, surface-controlled vehicle called the CURV III (Cable-Controlled Underwater Recovery Vehicle) was selected both for the 1974 survey at the Farallon Islands 900 m subsite and the 1975 survey at the Farallon Islands 1700 m subsite. CURV III is operated by the U.S. Naval Undersea Center and is essentially a rectangular metal framework with syntactic foam blocks for balance and buoyancy. CURV III has a depth capability of 2300 meters and is equipped with two movable television cameras with water-corrected lenses and a 35 mm color camera with synchronized strobe. Auxiliary lighting is provided by mercury vapor spotlights. It has a sonar system capable of scanning an area of 120° and detecting 55-gallon radioactive waste drums at 400 m. For these surveys it was fitted with an electronically triggered Shipek sediment grab sampler for bulk samples. The manipulating arm is non-articulated and can rotate 360° through a single plane. The manipulator has interchangeable tools and was used alternately with a claw and a cruciform coring device.

Atlantic

The 2800 m Atlantic dumpsite was surveyed using the manned, untethered submersible ALVIN. ALVIN is operated by the Woods Hole Oceanographic Institution for the U.S. Navy. It carries a crew of three and has a depth capability of 3800 m. It comes equipped with: (1) a CTFM sonar system that can detect 55-gallon radioactive waste containers at a distance of 350 m, (2) two 35 mm color cameras with synchronized strobes, (3) a fixed television-videotape system, (4) thalium iodide and incandescent external lighting systems, (5) an articulated manipulating arm with six degrees of movement, pivotal wrist motion through 360°, and a lift capacity exceeding 25 kilograms, and (6) variable sampling tools for use on the manipulating arm.

Sediment Coring

The Pacific-Farallons sites were sampled using a standard Shipek grab and a cruciform coring device consisting of four polycarbonate core tubes mounted at right angles to one another in a metal frame bolted to the manipulating arm. Each core tube was equipped with a one-way finger closure to prevent sediment loss. Cores were 3.8 cm in diameter x 48 cm deep.

The Atlantic 2800 m site was sampled using polycarbonate core tubes 6 cm in diameter x 35 cm deep. Box core samples were taken using a special Hessler-modified Ekman box corer equipped with a T-handle for use with the submersible manipulator.

Radioanalysis

All sediment samples collected in the Farallon Islands 900 m subsite in 1974 were routinely gamma scanned for ^{137}Cs without chemical separation and analyzed for ^{90}Sr, ^{230}Th, ^{232}Th, ^{234}U, ^{235}U, ^{238}U, ^{226}Ra, ^{238}Pu, and $^{239,240}Pu$. Grab aliquot samples were analyzed on board ship by personnel of the EPA Las Vegas Radiation Facility to make preliminary determinations of the presence of any significant amounts of radionuclide contaminants. All core samples and remainders of grab samples were frozen and brought back to the lab for analysis. The wet, dry, and ash weights of the sediment samples were taken and sample preparation and analyses were conducted by the EPA Environmental Monitoring and Support Laboratory according to standard methods as outlined in the EPA Handbook of Radiochemical Analytical Methods.[8] Plutonium analysis was performed based on procedures developed by Talvitie.[9],[10]

Sediment samples collected in the 2800 m Atlantic dumpsite during the summer of 1975 were also analyzed for ^{90}Sr, ^{137}Cs, ^{230}Th, ^{232}Th, ^{234}U, ^{235}U, ^{238}U, ^{226}Ra, ^{238}Pu, and $^{239,240}Pu$. The cores were sectioned into 5 cm lengths immediately upon being brought to the surface and were analyzed on board ship using a multi-channel analyzer and internal proportional counter to determine if any specific area or group of containers investigated contained significant activity which would warrant further investigation during a subsequent ALVIN dive. Samples were reanalyzed in the laboratory. All shipboard and laboratory radioanalyses were performed by EPA's Eastern Environmental Radiation Facility according to standard analytical techniques.[11] Analysis for ^{137}Cs was performed first on a NaI multichannel gamma analyzer and the more active samples were re-analyzed using a GeLi detector system. No preliminary chemical separation was performed.

Site Selection - First Survey

The Farallon Islands 900 m subsite was selected for the first survey in August, 1974 based upon four inclusive factors: (1) it was the only site used exclusively for dumping radioactive wastes, (2) it was only used from 1951-1953 thereby allowing estimations of the rate of observed effects such as biological fouling, (3) the approximate number of containers and the estimated activity at the time of packaging were documented (Table I), (4) and the depth was only about one-half the maximum operating depth of the CURV III submersible. This would permit a better evaluation of the CURV III's operating capabilities before subjecting it to the greater rigors of the Farallon Islands 1700 m subsite. It should be recognized that while the precise depths and locations of actual radioactive waste packages are casually introduced in this paper, this information was not known prior to these EPA surveys. In fact the largest obstacle to the success of these recent surveys has been the uncertainty regarding just where the radioactive waste packages had actually been dumped.

33-546 O - 78 - 25

RESULTS AND DISCUSSION

Three dumpsite areas have been investigated: (1) the 900 m Pacific-Farallon subsite in 1974, (2) the 1700 m Pacific-Farallon subsite in 1975, and (3) the 2800 m Atlantic site in 1975. Radioanalyses of sediments from the 900 m subsite and preliminary radioanalyses of sediments at the 2800 m location have been completed.

Farallon Islands 900 m Subsite

An EPA Technical Note[12] has been issued presenting both historical and technical information on this survey operation. This operations report includes the coring procedures, at-sea radiation monitoring and analysis program, sample-handling procedures, detailed bathymetric map, operations log, and photographic documentation of the 55-gallon radioactive waste packages.

Six core samples and three Shipek grabs were collected during the 1974 survey. Figure 1 shows the location of all stations investigated. Core and grab samples were collected at Stations 6 and 15 to be used as 'controls'. At Station 13A a large cluster of radioactive waste packages was located consisting of approximately one hundred and fifty 55-gallon drums located in an area 150 m by 300 m. Tables II and III present the results of radioanalyses for ^{238}Pu, $^{239,240}Pu$, and ^{137}Cs in the sediment samples at Stations 13A, 15, and 6. No ^{90}Sr contamination was found at the 900 m dumpsite.

Radioactive Contamination

The results of three independent analyses are presented in Columns A through C of Tables II and III. Column A presents the initial EPA results, Column B gives the results of the crosscheck analyses on the same vertical 20 cm core splits or replicate Shipek grab aliquots, while Column C presents more detailed analyses of the other one-half of the vertical split using chemical separation techniques and larger sample sizes. The radiochemical methods for plutonium analyses employed in Table II are comparable: Column A analyses are based on a modified Talvitie[10] method, Column B analyses employ a modified method of Chu[13], and Column C analyses follow the method of Livingston, Mann, and Bowen.[14] The method of solubilizing plutonium in sediment varies between Columns A-B, and Column C. Column C values are based on initially leaching the plutonium from the sediments with strong acid while Columns A and B employ a total sample dissolution method. However, since plutonium escaping from radioactive waste packages in the ocean would be expected to be finely divided, then both acid leaching and total dissolution of a sediment sample should yield similar results. That this is the case is substantiated by the close comparison of ^{238}Pu and $^{239,240}Pu$ values in all three columns (A-C) for Core No. 134274 of Table II.

It is clearly evident in Table II that both ^{238}Pu and $^{239,240}Pu$ have been released from the radioactive waste containers found in Station 13A. Average fallout values for $^{239,240}Pu$ in sediments in the 35°-40°N latitude at depths of 700 m to 1300 m vary between 4.5 and 18 pCi/kg dry weight in the

top 0-5 cm of sediment, and 0.5-7 pCi/kg dry weight in the 5-10 cm core section.[15] In Table II, the $^{239,240}Pu$ values in one Shipek grab sample (No. 134277) and in the top 10 cm of one core (No. 134274) clearly exceed the upper limit of the expected range of fallout values by greater than an order of magnitude. The $^{238}Pu/^{239,240}Pu$ is also significantly elevated above the expected range of 0.05-0.08. These findings are not totally unexpected when we consider Joseph's statement in a 1957 report that an estimated 30 curies of long-lived alpha activity was dumped off San Francisco, California, between 1946 and 1953.[2]

It is interesting to note that effectively all the ^{238}Pu and $^{239,240}Pu$ contamination in the cores at Station 13A was restricted to the top 10 cm of sediment. This is similar to observations made on the vertical fallout distribution of $^{239,240}Pu$ in both shallow and deepwater sediments.[16],[17] But the core with the highest plutonium contamination (No. 134274) exhibited higher ^{238}Pu and $^{239,240}Pu$ concentrations in the 5-10 cm section. This suggests the possibility that the plutonium release may have occurred many years before, perhaps immediately following the initial implosion or pressure-deformation of the package. Redistribution of the plutonium is probably taking place both downward and back towards the sediment surface, but again it is strikingly limited to the top 0-10 cm of sediment. It should also be assumed that a sharp vertical concentration gradient exists down the 5-10 cm section of Core No. 134274 to account for the 1-2 orders of magnitude decrease between the 5-10 cm and 10-15 cm sections. It is doubtful that the estimated sedimentation rate of 1.6 cm per 100 years[18] in this subsite area could significantly alter the vertical distribution that has been observed in Core No. 134274. However, there is good initial evidence suggesting that bioturbation could act as a plutonium distribution mechanism in these sediments. Preliminary examination of the sediment grabs indicates high biological activity especially in terms of the polychaete infaunal population and fecal pellet density in the top section of sediment. In addition, photographic documentation indicates an extensive epifaunal assemblage. Quantitative data from both the 900 m and 1700 m subsites is being compiled.

One other plutonium redistribution factor should be considered -- the physical burial of the material by sediment flow or slumping down steep grades. Station 13A was located towards the upper side of a 100 m rise and the entire 900 m site was characterized by small hills of 50 m to 100 m relief. Direct observation using the TV system on the CURV III submersible indicated that sediment was moving downslope and building up slightly around some containers on steeper areas of the slope. Lastly there is some evidence of plutonium sediment penetration beyond 10 cm in Core 134274 but it is reasonable to surmise that this may also be the result of slight physical contamination during extrusion of the core or slight disruption of the core and porewater content across the 10 cm interface during freezing and thawing.

The core and grab samples at Station 13A were all collected near visibly imploded containers within a fairly restricted survey area. However, only two samples showed significantly elevated ^{238}Pu and $^{239,240}Pu$ concentrations; while three other samples had moderately elevated $^{239,240}Pu$ values. On a very preliminary basis this could suggest that the transport of the plutonium in this site is fairly well localized. As a contradiction, however, Core No. 134270 at Station 15 and the Shipek grab at Station 6 both exhibited an elevated $^{239,240}Pu$ concentration; Station 15 is 3.2 km SE of Station 13A and Station 6 is approximately 4.2 km SE of Station 13A. No radioactive waste packages were sighted either visually or on sonar at Station 15 or Station 6 yet the $^{239,240}Pu$ contamination is present. It appears that this is a separate source of plutonium contamination since the $^{238}Pu/^{239,240}Pu$ at these stations is significantly different from the plutonium-contaminated cores at Station 13A; and Core No. 134270 at Station 15 is also contaminated with ^{137}Cs (Table III). None of the sediment samples collected at Station 13A showed ^{137}Cs concentrations which exceeded fallout. The average fallout ^{137}Cs concentration in the sediments at this latitude and depth is 9-77 pCi per kg dry weight in the 0-5 cm sediment section, and 2-23 pCi per kg dry weight in the 5-10 cm sediment section.[15] The ^{137}Cs and $^{239,240}Pu$ concentrations in the top 0-10 cm of Core No. 134270 exceed the expected fallout range, but the $^{238}Pu/^{239,240}Pu$ ratio is in the expected fallout range at 0.07. Two possible alternatives are suggested for the source of this contamination -- this is either a very low-level manifestation of transport of radioactive contamination from an area other than at Station 13A, or perhaps it is a localized fallout phenomenon from, for example, rainout from a Nevada weapons test.[19]

Currents

The potential for movement of plutonium or cesium from a deepwater dumpsite is generally related to the presence of strong physical transport processes such as currents which can move the sediment material binding these radionuclides. Very few measurements of currents in any deep-ocean radioactive waste dumpsites have been made. One of the few was conducted by Kautsky[20] in 1966 and 1968 in the Iberian abyssal plain of the northeast Atlantic Ocean where horizontal current speeds were measured at a depth of 5300 m near the site of the Nuclear Energy Agency (NEA)-sponsored ocean dumping operations. The length of time the current measurements were made is not specified but during most of the period the currents were below 1-2 cm/s, seldom exceeded 4-5 cm/s and reached a maximum of 10 cm/s for short periods of time.

No current measurements were made during the 1974 EPA survey at the Farallon Islands 900 m subsite. During the 1975 survey at the 1700 m Farallons subsite four current meters were emplaced 2 m off the bottom in a square 1.6 km apart around an area of sighted radioactive waste packages centered at 37°38'N, 123°18'W. The current meters were developed at Scripps Institute of Oceanography and utilized a potentiometric compass for directional reference and a Savonius rotor with a sensitivity of 0.5 cm/s for velocity determinations.[21] The current meters were emplaced on August 21, 1[illegible] and recovered twenty-seven days later. Figure 2 presents the vector plot minus tidal effect of the water movement past the meter for the twenty-seven day

record at 37°38.5'N, 123°18.0'W. The transport is clearly north with a mean direction of 004° at a velocity of 1.33 cm/sec. The highest speed recorded was 16.5 cm/sec during a half-hour period. The water generally moved east-west during the tidal period at 4-8 cm/sec with excursions of about one km. Although this current record was taken about 14 km west of the 900 m subsite, it still gives a good indication of the likelihood of a low-velocity directional water flow through the 900 m dumpsite area with occasional higher velocity movement capable of transporting finer surface sediment materials. However, such complexing factors as seasonal variation accompanied by up-welling, and turbulence caused by the more irregular topography at the 900 m subsite must be considered when looking at net directional water transport beyond a period of a few months.

Packaging

All of the packages examined in the 900 m Farallon Islands subsite were 55-gallon mild-steel drums which had lain there for 21-23 years. All of the steel drums sighted exhibited some surface corrosion but probing with the CURV III manipulator indicated that the metal was still sound. There were no signs of scouring of the metal such as might be expected from turbidity currents. Some of the packages were rolled over by the CURV III to expose the metal surface which had been in contact with the sediment. Although the underside of the metal containers was coated with a black sulfide layer, indicative of anoxic conditions, the metal tested firm. All of the packages examined, except one, were either filled with concrete or had 15-30 cm concrete plugs. None of the packages examined showed evidence of a pressure equalization device. Consequently, the most common failure mode was hydrostatic implosion in the center of the package where the radioactive wastes had been compressed. Compression in the center of a 55-gallon drum would tend to splay the metal outward at the end of the package creating a gap between the concrete cap and the chime of the drum. This would then provide a direct pathway between the package contents and the surrounding water. The range of conditions of the barrels examined at the 900 m subsite is shown in twenty color photographs contained in the EPA survey operations report.(12)

One 55-gallon drum was visibly breached and did not appear to be capped with concrete at the top or bottom. The metal container was brittle and broke off easily and the corrosion appeared to have occurred both externally and from within. Close examination of the interior of the package(12) revealed what appeared to be a tar liner with most of the waste contents dissolved away. One possibility as to the nature of this package comes from an examination of early packaging techniques. Constant experimentation with radioactive waste solidification materials was conducted during the early 1950's. One of the packaging methods consisted of solidifying a liquid radioactive waste of pH 5-12 with a gelling agent such as fibrous $CaSO_4$-gel or a corn-starch gel packaged within a tar-lined 55-gallon drum. The tar liner served not only to protect the metal container from the potentially corrosive action of the wastes but to keep the gel from sweating when in contact with air. These gels were soluble when immersed in water for extended periods. The breached radioactive waste package examined in this recent

survey could approximate the possible fate of a package prepared in the above manner, especially if the contents dissolved away exposing both sides of the metal to corrosive attack by seawater. This corrosion could also be accelerated by early failure of the tar liner thus exposing the metal to potentially corrosive action by the waste itself.

Biota

Biological variety in the 900 m subsite was quite high although no comprehensive characterization of the species present was attempted. The presence of the sable fish Anoplopoma fimbria is noted as this is a commercially important demersal food fish caught off the California coast at depths up to 800 m. Another fish commonly seen around the radioactive waste packages was the deepsea sole, Embassichthys bathybius. This is not commercially important but is occasionally caught by trawling. Since it is usually caught when the flesh is in the jellied condition (high liquid, low protein induced by spawning), it is not generally eaten.[22]

One other interesting biological observation was noted. Some of the containers at the 900 m site were seen to have many large white vasiform sponges attached, growing to a height of 1 m. The sponges are in the class Hexactinellida and are a new undescribed genus.[23] It is interesting to speculate on the relative contribution the secretions from sessile fouling biota, such as a sponge with a large holdfast attachment area, might have on the ultimate breach of a metal container.

Atlantic 2800 m Dumpsite Survey

This radioactive waste dumpsite is centered at 38°30'N, 72°06'W and occupies an area of 256 km^2. It is approximately 15 km SE of an actively-used industrial waste dumpsite (Deepwater Dumpsite 106) which has been the subject of extensive baseline studies during the past two years.[24] Because of the proximity of the two sites, much of the oceanographic data which has been collected for the industrial waste dumpsite is applicable to both sites.

During the period July 25-27, 1975, three dives in the deep submersible ALVIN were conducted in the 2800 m radioactive waste dumpsite. The purpose was to locate radioactive waste packages, document the condition of the containers and the type of packaging used, and take sediment samples around the packages to determine whether they had released any radioactivity and, if so, what isotopes were released. The survey was confined to the NW quadrant of the dumpsite since there was not enough time to survey the entire dumpsite area and since this was the area of the shortest direct route from the ship loading-dock used for the past disposals. The NW quadrant is characterized by large boulders, a rocky ridge, and munitions. This made sonar scanning for the

radioactive waste packages difficult since they were masked by the terrain and gave the same sonar signal return as a munitions package. Eventually ten packages were located. All but one were 80-gallon drums rather than the 55-gallon drums reportedly dumped at this site. The packages were formed by welding approximately one-half of a 55-gallon drum to the end of another 55-gallon drum to increase its length. The packages were clearly labeled, according to the requirements at that time, to indicate the most hazardous isotope, the cubic volume of wastes, the dose rate at the package surface and at one meter at the time of packaging, and the package number. None of the packages seen in this site had recorded dose rates higher than 35 mR per hour at the surface of the package.

A series of 7 tube cores and 3 box cores were collected near the sighted packages and an additional 10 cores were collected in the immediate vicinity and up to a distance of 20 kilometers from the area. Not all of the analyses of the tube core and box core sections have been completed but Table IV presents the radioanalytical results of those cores which exhibited the highest shipboard activity or those cores which might have been expected to show contamination because of their very close proximity to the waste packages.

Radioactive Contamination

Table IV clearly demonstrates the presence of ^{137}Cs contamination in three sediment cores at this site. The contamination varies between 3-70 times the maximum expected ^{137}Cs concentration that could result from weapons testing fallout at this latitude and depth of water. The ^{137}Cs fallout concentration ranges between 30-70 pCi per kilogram dry weight in the top 0-5 cm of sediment and 4-25 pCi per kilogram dry weight in the 5-10 cm section.[15] Two of the three contaminated sediment samples were collected adjacent to breached containers (see data in Table IV for Core No. 585/T-2 and 585/B-2). Although analyses of all sediment samples have not yet been completed, this data strongly suggests that the ^{137}Cs sediment contamination is attributable to a failure point in the packaging, or leaching from the concrete matrix. No evidence was seen of hydrostatic implosion in any of the packages. There is good evidence, deduced from identifying information on the concrete caps of the packages, that leaching may be the source of contamination in at least two of the packages where there was either no sign of direct package failure (Core No. 584/T-3), or the failure point was visible only in the concrete cap (Core No. 585/T-2). The general absence of macrofaunal fouling on the concrete caps allowed us to decipher the information on the caps which indicated that in all cases ^{60}Co was the most hazardous isotope in the package. However, only ^{137}Cs contamination was detected in any of the cores analyzed. Subsequently it was determined that the barrels contained demineralizer resins from research and prototype reactors. These resins were encapsulated in a stainless steel tube and the resulting container was too long to be packaged in a 55-gallon drum hence an 80-gallon drum was fabricated. It was also a practice to occasionally slurry the concrete packaging material with low-level radioactive waste liquids, many of which contained ^{137}Cs. Thus, the ^{137}Cs contamination detected in the sediment samples would not have necessarily arisen from breaching of the encapsulated wastes but could have been released by continuous leachin

from the concrete in contact with the seawater. The possibility of long-term leaching from the waste packages coupled with our direct observations suggesting horizontal sediment transport would then explain the relatively deep penetration of ^{137}Cs into the sediments -- that is, the contaminated surface sediment is periodically buried by translocated sediment which in turn is contaminated by the continued leaching.

Figure 3 illustrates the precise nature of the coring operations. In this case ^{137}Cs contamination was found in the tube core sample to a sediment depth of more than 7.5 cm although no ^{137}Cs was found in the box core. The lack of ^{137}Cs contamination in the box core may be related to the fact that the box core pressure release flaps performed improperly during this dive. This resulted in core washout during the submersible ALVIN recovery in choppy seas, a problem rectified before the third and last ALVIN dive. With the exception of ^{137}Cs, no other radioactive contaminants have been detected to date in cores from the 2800 m dumpsite.

Currents

Most of the packages examined were deeply buried in the sediment and the sediment was scoured out along the sides of the package and piled up at the ends. Since the sedimentation rate is low in this region at approximately 0.5-3 cm per 100 years[25] and since the radioactive waste packages have only lain on the bottom for approximately fifteen years, then the sediment buildup cannot be attributed to direct deposition. However, this sediment buildup pattern would occur if there was a strong current capable of horizontal sediment transport and scour.

An experimental dye-string current meter array for use with the ALVIN manipulator was tested in the dumpsite area. The dye exhibited strong directional flow in a SSW direction from a height of ten cm to 3 m above the sediment surface, with slightly faster dye movement at the top of the array. Deep current measurements north and east of this 2800 m dumpsite have exhibited strong contour currents with measured flow rates of 10 to 22 cm/sec in a west to southwest direction.[26],[27] These currents are strong enough to erode and transport sediment. This 2800 m radioactive waste dumpsite is at the top of the continental rise and would be expected to show the presence of the south and west moving current flow. The potential for shoreward transport of surface contaminated sediments from the radioactive waste dumpsite warrants further attention.

Benthic Fish

Trawls were conducted around the four perimeters of the radioactive waste dumpsite in May, 1974. The results are reported in detail in a baseline studies report,[24] but the most significant observation was that the numerical abundance and biomass of fishes sharply decreases below 2200 m in the general areas of the radioactive waste and industrial waste dumpsites. The predominant fish caught in the 1974 trawls and seen in the July, 1975 ALVIN dives in the radioactive waste dumpsite was Nematonurus (Coryphaenoides) armatus which is closely relat-

to the shallower-water commercial species Coryphaenoides rupestris. Nematonurus armatus is an edible fish but has not yet been commercially exploited since it lives in water deeper than the present trawling capabilities of the major world fishery fleets.

An interesting observation was made during the ALVIN dives regarding the feeding habits of Nematonurus armatus. These fish were often seen rooting in the sediments adjacent to the radioactive waste packages. This would not be unexpected since the packages attract deposit and filter feeders which serve as food for this benthic fish. However, the continual rooting and feeding action in contaminated sediments around the radioactive waste packages could significantly mix and redistribute the radionuclides over many years, a possible method of bioturbation on a larger scale.

CONCLUSIONS

Surveys of deepsea radioactive waste disposal sites are feasible using both manned and unmanned submersibles. The unique capability of submersibles to obtain precisely-positioned and photographically documented sediment samples near breached and intact containers has been demonstrated. This has enabled us to relate the ^{238}Pu and $^{239,240}Pu$ contamination in the Pacific-Farallons 900 m dumpsite and the ^{137}Cs contamination in the 2800 m Atlantic dumpsite directly to the presence of radioactive waste packages. Although the presence of these radioactive waste dumpsite contaminants has not yet been translated into any health risks to man or to the marine environment, it underscores the need to substantiate hypothesized release and transport events in the deep-ocean by actual in-situ studies before ocean dumping of radioactive wastes becomes more widespread.

Few current measurements have been taken around deepsea radioactive waste dumpsites, but our preliminary evidence indicates the presence of weak but directional currents in the 1700 m Pacific subsite and stronger currents in the deeper 2800 m Atlantic site. The long-term directionality and speed of currents in a dumpsite area should be known before any extensive use of a site is envisioned.

The biological abundance and diversity in the 900 m site was high. The presence of the commercially-exploited sablefish in the 900 m Pacific site, in an area contiguous to a fishing zone, should exclude this site from any further consideration as a radioactive waste dumpsite.

The extensive hydrostatic implosion of containers observed at the 900 m and 1700 m Pacific-Farallons subsites indicates a definite need for pressure equalization devices on radioactive waste packages destined for deepsea disposal. The waste packages should be filled as homogeneously as possible with a rigid matrix material such as concrete, and any remaining air voids must be pressure equalized during descent to the sea floor. The mild-steel containers examined

all sites had immersion times ranging from 13-23 years with considerable evidence of surface corrosion and blistering, especially at the 2800 m site. So far, however, none of these containers show signs of having been breached solely from external corrosive forces. For those countries advocating a policy of continued containment rather than dispersion and dilution of the dumped radioactive materials after they reach the sea floor, information is needed on corrosion rates of various metals in deepsea high-pressure conditions. Since the metal sheath significantly reduces the surface area of the matrix exposed to the leaching effects of seawater, the advantages of using more corrosion resistant alloys should be considered, especially for packaged longer-lived radioisotopes.

In all deepsea monitoring and survey operations conducted to date, the analytical results have been compared to the background or fallout concentrations of particular nuclides. However, these baseline fallout values often vary over an order of magnitude. More data is needed on baseline levels of radionuclides in a geographical area around a dumpsite if meaningful estimates are to be made of gradual buildup and movement of any radioactive materials released from the dumpsite.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the support of the National Oceanic and Atmospheric Administration, Woods Hole Oceanographic Institution, the operations teams for the submersibles ALVIN and CURV III, and the many individuals in the Water and Radiation Program Offices of EPA who had the fortitude and vision to support this program through many stormy seas.

REFERENCES

(1) LUEDECKE, A.R., "Disposal of radioactive wastes into the Atlantic Ocean and the Gulf of Mexico", Industrial Radioactive Waste Disposal Hearings Before the Joint Committee on Atomic Energy, 5, Washington, D.C. (1959).

(2) JOSEPH, A.B., A Summary to December 1956 of United States Sea Disposal Operations, WASH-734, U.S. Atomic Energy Commission, Washington, D.C. (1957).

(3) JOSEPH, A.B., GUSTAFSON, P.F., RUSSELL, I.R., SCHUERT, E.A., VOLCHOK, H.L., TAMPLIN, A., "Sources of radioactivity and their characteristics", Ch. 2, Radioactivity in the Marine Environment, National Academy of Sciences, Washington, D.C. (1971).

(4) Ocean Dumping -- A National Policy. A report to the President prepared by the Council on Environmental Quality, U.S. Govt. Printing Office, Washington, D.C. (1970).

(5) FAUGHN, J.L., FOLSOM, T.R., JENNINGS, F.D., MARTIN, DeC., MILLER, I.E., WISNER, R.L., Radiological Survey of the California Disposal Areas, University of California, Scripps Institution of Oceanography, (1957).

(6) Pneumodynamics Corporation, Survey of Radioactive Waste Disposal Sites, USAEC Doc. No. TID-13665 (1961).

(7) JONES, EDMUND L., Special Report on Waste Disposal Program, U.S. Coast and Geodetic Survey Project 10,000-827 under contract to U.S. Atomic Energy Commission, Washington, D.C. (1961).

(8) Handbook of Radiochemical Analytical Methods, (JOHNS, F.B., Ed.), EPA-680/4 Las Vegas, (1975).

(9) TALVITIE, N.A., Radiochemical determination of plutonium in environmental and biological samples by ion exchange, Anal. Chem. 43 13 (1971) 1827.

(10) TALVITIE, N.A., Electrodeposition of actinides for alpha spectrometric determination, Anal. Chem. 44 2 (1972) 280.

(11) Procedures for Radiochemical Analysis at the Eastern Environmental Radiation Facility, (STRONG, A.B., Ed.), U.S. Environmental Protection Agency, Montgomery, (Draft, Unpublished).

(12) A Survey of the Farallon Islands 500-Fathom Radioactive Waste Disposal Site--Operations Report, U.S. Environmental Protection Agency, Rep. ORP-75-1, Washington, D.C. (1975).

(13) CHU, N., Plutonium determination in soil by leaching and ion exchange separation, Anal, Chem. 43 3 (1971) 449.

(14) LIVINGSTON, H.D., MANN, D.R., BOWEN, V.T., "Analytical procedures for transuranic elements in sea water and marine sediments", Analytical Methods in Oceanography, Am. Chem. Soc., Advances in Chemistry (1975).

(15) BOWEN, V.T., Personal communication (1976).

(16) NOSHKIN, V.E., Ecological aspects of plutonium dissemination in aquatic environments, Health Physics 22 (1972) 537.

(17) LA BEYRIE, L.D., LIVINGSTON, H.D., BOWEN, V.T., "Comparison of the distributions in marine sediments of the fallout derived nuclides ^{55}Fe and $^{239,240}Pu$: A new approach to the chemistry of environmental radionuclides", Transuranium Nuclides in the Environment, IAEA, Vienna (1975) in press.

(18) UCHUPI, E., EMERY, K.O., Continental slope between San Francisco, California and Cedros Island, Mexico, Deep-Sea Res. 10 (1963) 397.

(19) Fallout from Nuclear Weapons Tests, Hearings Before the Joint Committee on Atomic Energy, 3, Wash., D.C. (1959).

(20) WALDEN, H., WEICHART, G., KAUTSKY, H., Aus der meereskundlichen Forschung, Naturwissenschaften 59 (1972) 19.

(21) ISAACS, J.D., et al., Near-bottom currents measured in 4 kilometers depth off the Baja California coast, J. Geophys. Res. 71 18 (1966) 4297.

(22) JOW, T., Personal communication (1975).

(23) BAKUS, G.J., Personal communication (1975).

(24) May 1974 Baseline Investigation of Deepwater Dumpsite 106, U.S. Department of Commerce and U.S. Environmental Protection Agency (1975).

(25) EMERY, K.O., UCHUPI, E., Western North Atlantic Ocean: Topography, Rocks, Structure, Water, Life, and Sediments, AAPG Memoir 17 (1972) 417.

(26) VOLKMANN, G., Deep current observations in the Western North Atlantic Deep-Sea Res. 9 (1962) 493.

(27) ZIMMERMAN, H.R., Bottom currents on the New England continental rise, J. Geophys. Res. 76 24 (1971) 5865.

FIGURE CAPTIONS

Figure 1. Stations investigated at Farallon Islands 900 m radioactive waste dumpsite.

Figure 2. 27-day current meter record at the Farallon Islands 1700 m radioactive waste dumpsite.

Figure 3. Radioactive waste package investigated at the Atlantic 2800 m dumpsite. (Note the capability for precise positioning of the tube core and box core relative to the radioactive waste package.)

TABLE I. Primary U.S. Radioactive Waste Dumpsites[2],[3],[4]

Site	Coordinates	Depth (m)	Distance from Land (km)	Years Dumpsite Used	Estimated No. of 55-Gallon Drums Dumped	Estimated Activity in Drums at Time of Packaging (Ci)
Atlantic	38°30'N 72°06'W	2800	190	1951-56 1959-62	14,300	41,400[a]
Atlantic[b]	37°50'N 70°35'W	3800	320	1957-1959	14,500	2,100
Pacific						
Farallon Island (Subsite A)	37°38'N 123°08'W	900	60	1951-1953	3,500	1,100
Farallon Island (Subsite B)	37°37'N	1700	77	1946-1950 1954-1965	44,000	13,400

[a]This does not include the pressure vessel of the N/S Seawolf reactor with an estimated induced activity of 33,000 Ci.

[b]This site has not yet been investigated by the Environmental Protection Agency.

TABLE II. ^{238}Pu and $^{239,240}Pu$ in Sediment at Farallon Islands 900 m Radioactive Waste Dumpsite

(pCi/Kg Dry Weight)

Core No.	Sample Identification	Core Section (cm)	^{238}Pu A[a]	^{238}Pu B[b]	^{238}Pu C[c]	$^{239,240}Pu$ A	$^{239,240}Pu$ B	$^{239,240}Pu$ C	$^{238}Pu/^{239,240}Pu$ A	$^{238}Pu/^{239,240}Pu$ B	$^{238}Pu/^{239,240}Pu$ C
134273	Station 13A[d] 37°38'N 123°08'W 28 August 1974 Depth = 920 m	0-5	<4.3	0±1[e]	3.8±0.9	26±3	23±3	46±4	---	---	0.08±0.02
		5-10			Lost			---			---
		10-15	<2.5	0±3	---	<4.2	0±3	0.9±0.2	---	---	---
		15-20			---			0.5±0.1			---
134274	Station 13A[d] 37°38'N 123°08'W 28 August 1974 Depth = 920 m	0-5	140±7	160±6	146±14	360±14	447±13	482±48	0.39±0.02	0.36±0.01	0.30±0.04
		5-10			225±23			532±77			0.42±0.06
		10-15	3.8±1.8	2.2±2.2	2±0.4	8.8±2.5	6.5±2.6	4.0±0.5	0.43±0.24	0.34±0.36	0.50±0.12
		15-20			---			1.4±0.4			---
134277 Shipek Grab	Station 13A[d] 37°38'N 123°08'W 28 August 1974 Depth = 920 m	0-15	13±2	10±1	123±12	330±11	357±6	397±40	0.04±0.006	0.05±0.004	0.31±0.04
134271	Station 13A[d] 37°38' 123°08'W 28 August 1974 Depth = 920 m	0-10	<28*	4.1±1.2	NA[f]	66±17*	55±4	NA	---	0.07±0.02	---
		10-20	<39*	0.0±1.4	NA	32±14*	7.4±2.3	NA	---	---	---
134272	Station 13A[d] 37°38'N 123°08'W 28 August 1974 Depth = 920 m	0-10	<39*	2.7±2.7	NA	91±20*	50±5	NA	---	---	---
		10-20	<21*	0.0±1.4	NA	<31*	1.4±1.4	NA	---	---	---

TABLE II. (Cont.)

(pCi/Kg Dry Weight)

Core No.	Sample Identification	Core Section (cm)	^{238}Pu A[a]	^{238}Pu B[b]	^{238}Pu C[c]	$^{239,240}Pu$ A	$^{239,240}Pu$ B	$^{239,240}Pu$ C	$^{238}Pu/^{239,240}Pu$ A	$^{238}Pu/^{239,240}Pu$ B	$^{238}Pu/^{239,240}Pu$ C
134270	Station 15 37°36'N 123°06'W 27 August 1974 Depth = 929 m	0-5	<26*	NA	5.9±2.0	67±14*	NA	80±9	---	---	0.07±0.03
		5-10			2.2±0.5			62±4			0.04±0.01
		10-15	<29*	NA	---	63±22*	NA	15±4	---	---	---
		15-20			---			0.6±0.3			---
134269	Station 15 37°36'N 123°06'W 27 August 1974 Depth = 929 m	0-10	<29*	0.0±3.6	NA	29±12*	0.0±3.6	NA	---	---	---
		10-20	<21*	NA	NA	32±14*	NA	NA	---	---	---
134276 Shipek Grab	Station 15 37°36'N 123°06'W 27 August 1974 Depth = 929 m	0-15	<28*	NA	NA	53±14*	NA	NA	---	---	---
134275 Shipek Grab	Station 6 37°36'N 123°05'W 26 August 1974 Depth = 945 m	0-15	<19*	NA	1.4±0.1	55±11*	NA	38.9±1.4	---	---	0.04±0.003

[a] Environmental Monitoring and Support Laboratory, EPA

[b] LFE Environmental Analysis Laboratories

[c] Woods Hole Oceanographic Institution

[d] The five sediment samples at Station 13A were taken at different locations among a cluster of about 150 radioactive waste packages occupying an area approximately 150m x 300m.

[e] Counting error for all samples ± 1σ

[f] NA - Not analyzed

* Analysis of 1g sediment sample; all other Pu analyses on 10g sample (B) or 40-50g sample (C)

TABLE III. ^{137}Cs in Sediment at the Farallon Islands 900 m Radioactive Waste Dumpsite

Core No.	Sample Identification	Core Section (cm)	^{137}Cs (pCi/Kg Dry Weight) A	B	C
134273	Station 13A 37°38'N 123°08'W 28 August 1974 Depth = 920 m	0-5	ND[a]	NA	49±8
		5-10			6±15
		10-15	ND	NA	7±4
		15-20			1±4
134274	(Same as above)	0-5	ND	0.0±180	18±7
		5-10			5±5
		10-15	ND	0.0±135	1±3
		15-20			-2±3
134277 Shipek Grab	(Same as above)	0-15	ND	0.0±90	29±2
134271	(Same as above)	0-10	ND	0.0±135	NA
		10-20	ND	0.0±90	NA
134272	(Same as above)	0-10	ND	0.0±90	NA
		10-20	ND	0.0±45	NA
134270	Station 15 37°36'N 123°06'W 27 August 1974 Depth = 929 m	0-5	ND	NA	110±10
		5-10			77±8
		10-15	ND	NA	6±8
		15-20			-1.4±9.1
134269	(Same as above)	0-10	ND	0.0±90	NA
		10-20	ND	NA	NA
134276 Shipek Grab	(Same as above)	0-15	120±50	NA	NA
134275	Station 6 37°36'N 123°05'W 26 August 1974 Depth = 945 m	0-15	ND	NA	41±3

[a]ND - Not detected.

Note: footnotes (a) - (f) of Table II also apply to Table III.

TABLE IV. ^{137}Cs in Sediment at the Atlantic 2800 m Radioactive Waste Dumpsite

(pCi/Kg Dry Weight)

Core No.	Sample Identification	Location of Core Relative to Radioactive Waste Package	Core Section (cm)	^{137}Cs [a,b]
S84/T-3	ALVIN Dive S84	5 cm from concrete cap where	0.0- 0.5	<100
	38°-30.7'N	metal-concrete junction of	0.5- 7.5	500±50
	72°-09.4'W	package interfaces with the	7.5-15	200±50
	26 July 1975	sediment (Fig. 3).		
	Depth = 2829 m			
S84/T-4	ALVIN Dive S84	60 m NW of the package where	0- 7.5	<100
	38°-30.7'N	core S84/T-3 taken.	7.5-12.5	<100
	72°-09.4'W		12.5-17.5	<100
	26 July 1975		17.5-22.5	<100
	Depth = 2828 m			
S85/T-1	ALVIN Dive S85	5 cm from concrete cap where	0-7	<100
	38°-30.2'N	metal-concrete junction of	7-12	<100
	72°-09.4'W	package interfaces with the	12-15	<100
	27 July 1975	sediment. Package appears intact.		
	Depth = 2819 m			
S85/T-2	ALVIN Dive S85	Core taken 5 cm from package	0- 0.5	2500±100
	38°-30.2'N	in sediment directly below	0.5-5	4800±100
	72°-09.4'W	visible crack in concrete cap.	5-8	1600±100
	27 July 1975		8-15	1100±100
	Depth = 2822 m		15-20	<100
S85/T-5	ALVIN Dive S85	10 cm from concrete cap.	0- 7.5	<100
	38°-30.25'N		7.5-15	<100
	72°-09.45'W		15-20	<100
	27 July 1975		20-25	<100
	Depth = 2827 m			
S85/B-2 Core liner #1	ALVIN Dive S85	Opposite end of above package;	0-5	210±50
	38°-30.25'N	this end has metal cap which	5-8	120±50
	72°-09.45'W	appears to have corroded through.		
	27 July 1975	Core taken 10 cm from metal cap.		
	Depth = 2827 m			

[a]Analyses performed by Eastern Environmental Radiation Facility, EPA

[b]counting error = ± 1 σ

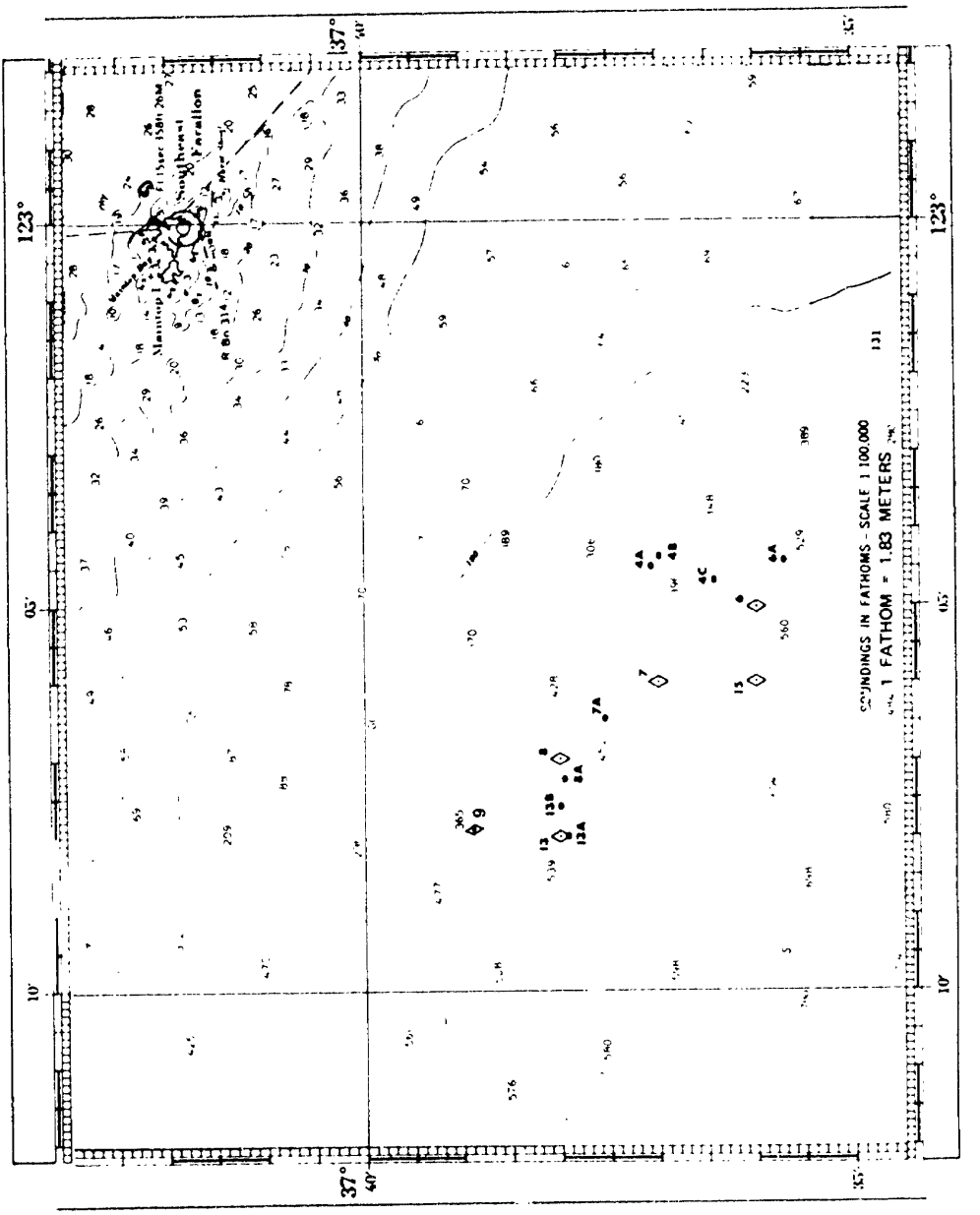


FIG. 1. Stations Investigated at Farallon Islands 900 m. Radioactive Waste Dumpsite

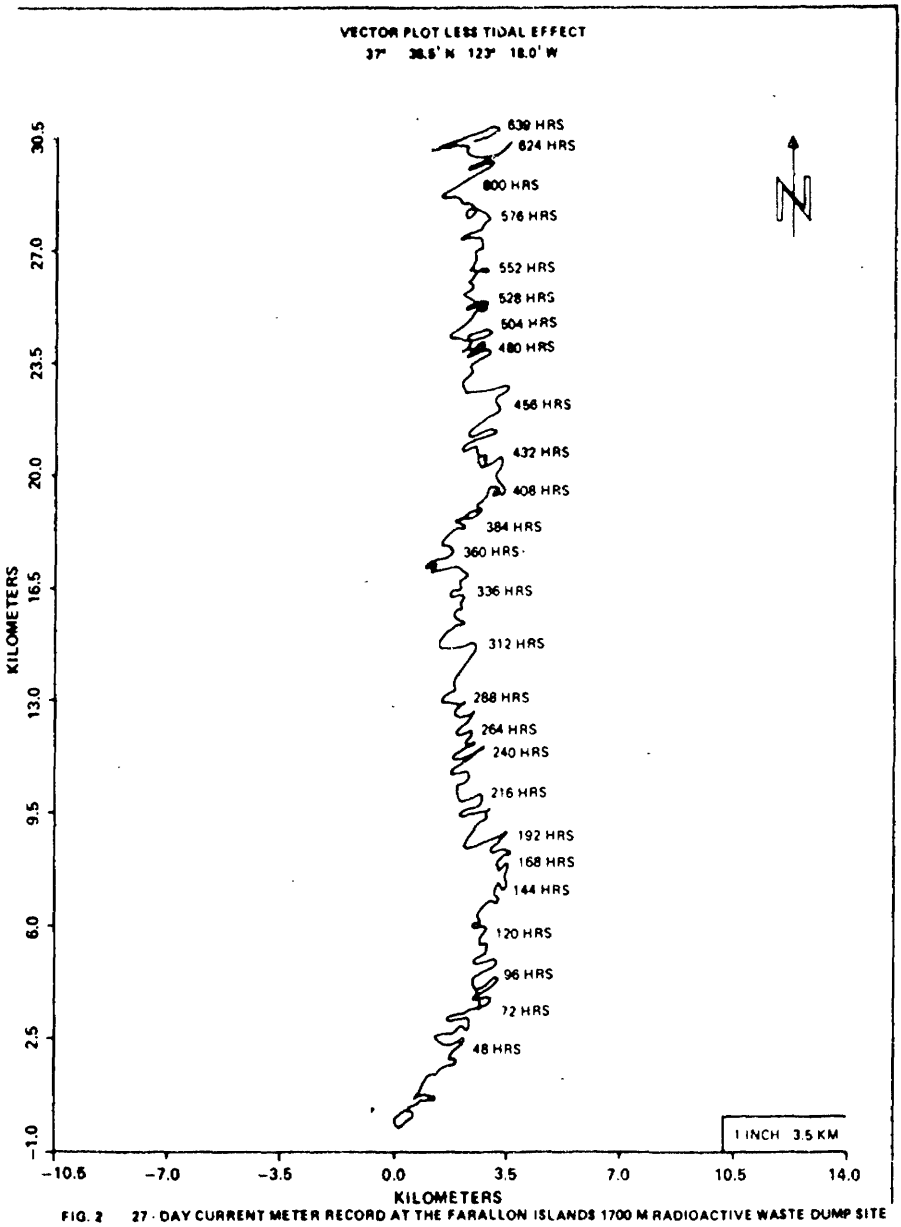


FIG. 2 27 - DAY CURRENT METER RECORD AT THE FARALLON ISLANDS 1700 M RADIOACTIVE WASTE DUMP SITE

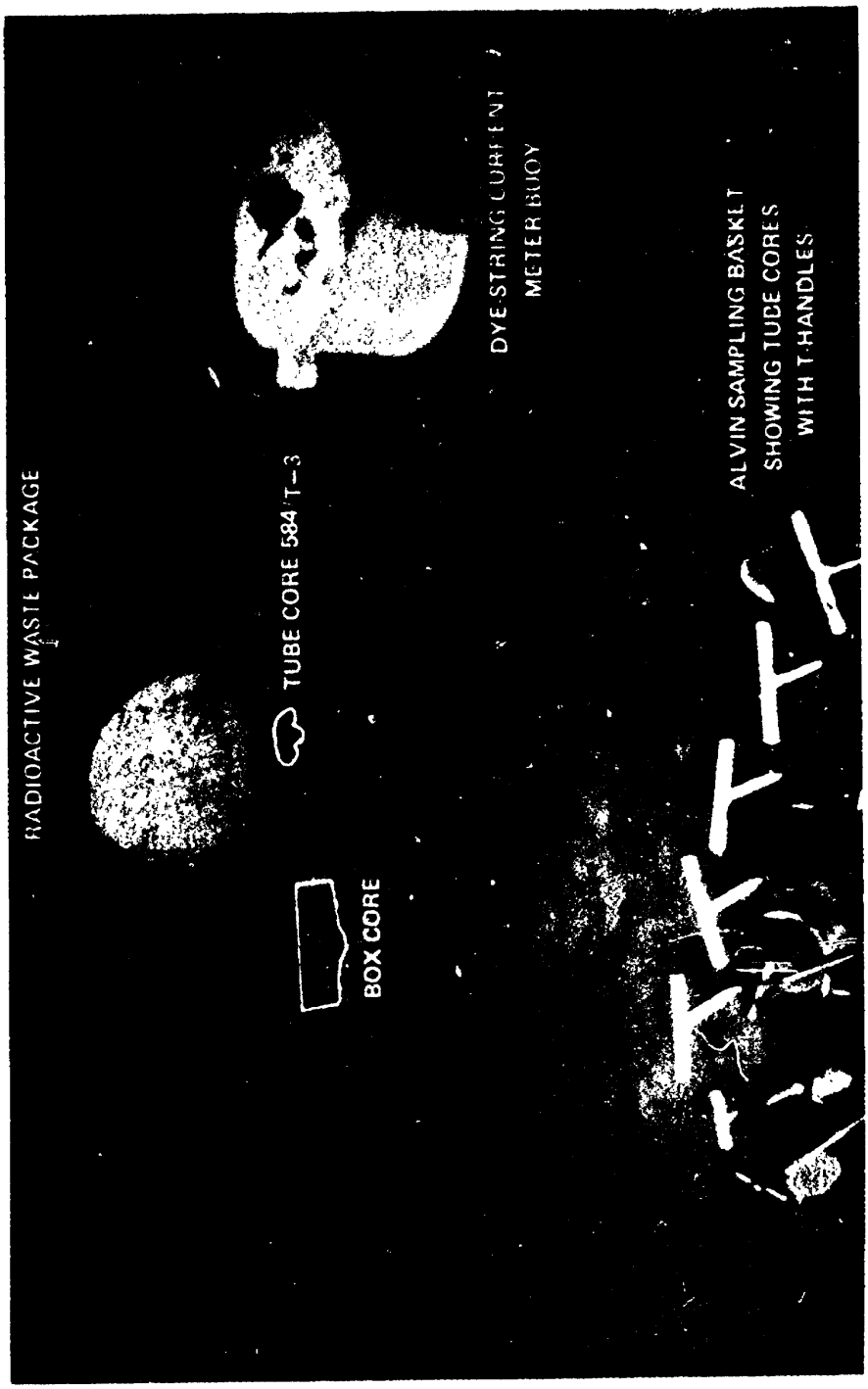


Figure 3. Radioactive waste package investigated at the Atlantic 2800m dumpsite [Note the capability for precise positioning of tube core and box core relative to the radioactive waste package.]

[Whereupon, at 11:50 a.m., the Subcommittee on Oceanography was adjourned, subject to the call of the Chair.]

MARINE SANCTUARIES

MONDAY, JULY 24, 1978

HOUSE OF REPRESENTATIVES,
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
SUBCOMMITTEE ON OCEANOGRAPHY,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:45 a.m., in room 1334, Longworth House Office Building, Hon. John Breaux (chairman of the subcommittee) presiding.

Present: Representatives Breaux, Hughes, Akaka, and Forsythe.

Mr. BREAUX. On February 1, 1978, the Subcommittees on Oceanography and Fisheries and Wildlife convened hearings to consider the authorization of funds to be appropriated to the Marine Protection, Research and Sanctuaries Act of 1972. Those hearings focused in significant part on the implementation of title III, Marine Sanctuaries. From the testimony on that subject, it was clear that two important questions had to be answered:

Does title III, and the way in which it is being implemented, adequately provide for a balance of the competing interests in development of resources and protection of the environment?

Is the regulatory authority provided by title III and the additional level of bureaucracy which it implies justified by the incremental benefit to the environment which might be achieved by the establishment of marine sanctuaries?

Subsequent hearings on the subject have left these questions unanswered. In fact, statements by NOAA officials and others before the Senate Committee on Commerce, Science, and Transportation, and in public meetings in California, have contributed to the uncertainty of the situation.

This state of affairs cannot be allowed to persist. An ambitious program to designate sanctuaries is now being implemented by NOAA. Marine areas under active consideration for designation as sanctuaries are of considerable importance to the Nation. Those areas are said to have significant environmental value. They also contain known and potential oil and gas reserves needed to help meet our growing energy requirements as well as valuable fisheries resources and marine transportation corridors which are all important ocean uses. Any marine sanctuaries program must accommodate these conflicting uses in a balanced and sensible way. The Congress and the public have a right to expect no less.

Today we will hear testimony which represents the spectrum of public opinion on this important matter. We will also hear from the Federal agency which is responsible for implementing title III. Testimony received today will, I hope, play an important part in

answering the major questions presented by the marine sanctuaries program.

Mr. BREAUX. Do you have any comments, Mr. Forsythe?

Mr. FORSYTHE. No; thank you, Mr. Chairman.

Mr. BREAUX. Our first witness is Mr. Sam Bleicher.

We have a copy of your prepared statement. You may proceed as you see fit.

STATEMENT OF SAM BLEICHER, DIRECTOR, OFFICE OF OCEAN MANAGEMENT, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. BLEICHER. Thank you, Mr. Chairman.

Let me read my statement into the record quickly and then we can proceed with questions.

I appreciate the opportunity to report to this subcommittee on the current status of the marine sanctuaries program.

With me are several members of my staff and the NOAA general counsel, Eldon Greenberg, in case you have specific questions they can help me with.

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 authorizes the Secretary of Commerce to designate and manage areas of the ocean for the purpose of preserving or restoring their conservation, recreational, ecological, or esthetic values. Responsibility for this program was delegated to the Office of Ocean Management in November 1977.

I last testified before this subcommittee about this program on February 1, 1978, on the reauthorization of title III. The House and Senate hearings in February and March 1978, and the subsequent committee markups of title III, revealed significant variations in opinion about the scope and character of the marine sanctuaries program. Although two marine sanctuaries—the U.S.S. *Monitor* site off North Carolina and the Key Largo, Fla., coral reef—had been designated in 1975, the national marine sanctuary program had not been adequately defined. Its overall size and focus were undetermined, and the program objectives as well as criteria and procedures for establishing sanctuaries needed clarification. Moreover, public understanding of the program and its goals was minimal.

In response to these circumstances, the Office of Ocean Management has taken a number of steps over the last 6 months to initiate a public dialog on the program, describe program objectives, and explain the criteria we propose to utilize in identifying and designating marine sanctuaries.

As part of this process, we consulted with interested congressional committees on amendments to the Marine Sanctuaries Act, which will clarify the legal effect of designating a sanctuary and the procedures to be followed in so doing.

Our primary focus has been to improve communications with people in the areas likely to be affected by the program. Office representatives have met with a wide range of groups affected by or interested in marine sanctuaries in order to improve our own understanding of their concerns and to explain the program's legal framework and procedures. Informal meetings have been held with

interested officials and individuals in Alaska, California, Florida, Hawaii, Massachusetts, Texas, and the Virgin Islands.

We have met with representatives of several Federal and State agencies, the American Petroleum Institute, Western Oil & Gas Association, environmentalists, and recreational groups, among others. In addition we have given particular attention to the fishing community through meetings with the Marine Fisheries Advisory Committee, the Regional Fishery Management Council chairpersons, and staffs of some of the councils, which have improved our mutual understanding of the benefits and impacts of the marine sanctuaries program on fishing activities.

Simultaneously, the Office of Ocean Management has continued work toward the designation of additional sanctuaries. Public workshops were held on possible sanctuaries at the Flower Garden Banks in the Gulf of Mexico, Looe Key Coral Reef off Florida, and five areas off California—San Diego, the Tanner and Cortes Banks, Santa Barbara, Monterey Bay, and Point Reyes-Farallon Islands.

A white paper on the Flower Garden Banks was issued for public comment on June 30, 1978. White papers will be forthcoming later this summer on the five possible California sanctuary sites. These white papers describe the boundaries of the proposed sanctuary, the nature of the resources to be protected within the sanctuary, existing or potential threats to these resources, and management approaches considered appropriate for each sanctuary. Our experience so far reinforces our expectation that each sanctuary area is different in terms of the resources being protected and the nature of the steps needed to protect them.

Finally, the two existing sanctuaries have received considerable attention in an effort to operate them effectively. In the Key Largo Coral Reef Marine Sanctuary, a request for proposals has been issued for a biological inventory and an assessment of reef conditions. A coral growth and geological history is being conducted in August by the U.S. Geological Survey. A pamphlet to educate visitors about the beauty and delicacy of the reef has been prepared and distributed. Enforcement coordination between the State of Florida, the Coast Guard, and the Office of Ocean Management was improved. An application to build an artificial reef in the Key Largo Coral Reef Marine Sanctuary was evaluated and denied.

With regard to the U.S.S. *Monitor* Marine Sanctuary, we are evaluating the results of a summer 1977 research cruise at the *Monitor* site. In March 1978, the North Carolina Division of Archives and History cosponsored with us a national conference on the future of the *Monitor*.

Mr. Chairman, this completes my summary of the marine sanctuaries program. Title III is unique among the statutes governing ocean activities and its implementation raises both practical and philosophical questions. NOAA hopes to work with you in making it a useful tool in pursuing our national objectives in the oceans. I will be pleased to answer any questions you may have. Thank you.

Mr. BREAUX. Thank you very much, Mr. Bleicher. We appreciate your testimony.

One of the problems we are having is the balancing question—the balancing of interests in the way an area is going to be used. If you are going to decide where marine transportation will be al-

lowed in an area or commercial fishing or sport fishing or any oil and gas development compatible with the purpose of a sanctuary, you have to have a balance. To do that, you must have a certain set of criteria in which you balance the different interests.

I have not seen criteria that I think are adequate. I do not think the regulations are adequate in addressing the different interests.

What we are looking for is some predictability, some flow, so we can assess whether an area is going to be used as a sanctuary or whether an activity will be compatible. I do not think we have had adequate criteria. I address my question to you: Do you think the criteria are adequate to make those decisions you have to make?

Mr. BLEICHER. I frankly do not think that there is a way to specify in national legislation, or necessarily even in national regulations, the kind of information that will give you what you are seeking. Our experience has been so far that in looking at the various areas we have under consideration, the areas are really quite different. In some areas very restrictive regulations may be necessary to protect the resources and in other areas many of the uses that formerly took place or are planned can continue to take place.

For that reason we have tried to take a methodical approach of going through a rather elaborate procedure starting with this white paper process, which really precedes any rulemaking process. After we gather information we try to set out our understanding of what the resource is that needs to be protected, what the character of it is, whether it is a coral reef or a fisheries resource or a kelpbed in one case we have the *Monitor,* which is an archeological artifact; and in each case try to set out the character of this resource and what kinds of things are threatened.

In some cases there may be serious threats and in other cases not. In setting these out in the white paper, in each case we think we can generate the kind of discussion—such as we have in the Flower Garden Banks case—that is useful to us and to other agencies in trying to determine how the particular area can be used and what activities are compatible or incompatible.

Let me just comment that in trying to look at the question of criteria I have been looking briefly at some of the other laws that we have, such as the Wildlife Refuge Act and the regulations of the National Park Service for the monuments in the Santa Barbara area. I find much the same kind of approach. They simply talk in the statutes about controlling activities that are compatible with the resources that are to be protected and then leave it to case-by-case determination.

That does not mean I am going to make the decision by myself. It is an elaborate process that involves formal consultation with other agencies and involves ultimately the approval of the President. We have hearings on the environmental impact statement, input from local organizations and private interests, and we have found from our experience with the Flower Garden Banks white paper that only when we start putting down ideas about a concrete case can we get any kind of practical discussion about what is appropriate in the area.

Mr. BREAUX. Mr. Bleicher, my question is: Exactly what is the situation in the sanctuary where there are large potentials for oil and gas development?

Mr. BLEICHER. In the hearings before Senator Hollings I did state that I felt in some cases oil and gas development is compatible with a sanctuary and that oil and gas development might take place in some or all of the sanctuaries. Senator Hollings was very unhappy with that idea. In fact, we have been counseled not to take any final decision on that subject and we have not at this particular point.

Mr. BREAUX. The reason I brought it up is that Senator Hollings asked you and I quote, "can you give me a distinctive area where you would allow oil and gas development?" You replied: "I am not sure there are any."

Mr. BLEICHER. I am sorry, if I made that specific statement. I guess I should say that I did not have a specific area in mind then but now I do. Now I can point to the Flower Garden Banks where our current white paper proposal is that oil and gas development will be allowed within the sanctuary, although some other kinds of activities will be regulated a larger distance from the coral reefs themselves. So the one proposal that we have prepared in the form of a white paper is a proposal that includes oil and gas development in the sanctuary.

Mr. BREAUX. So with respect to the hearings before Senator Hollings on that particular point, it really should not be construed that you were saying that oil and gas development could not be allowed in a marine sanctuary area?

Mr. BLEICHER. No, it should not. If there was a specific reference to that, it was a mistake on my part. The overall impact of the testimony, I think, with respect to the Beaufort Sea was we were looking at the possibility that oil and gas development would be allowed in sanctuaries. In each case the locations, et cetera, are going to depend on the impact on the resource in question. In some cases it is coral and in some cases it is whales. It is going to make a difference what area is affected.

Mr. BREAUX. In your February testimony you stated that two California sites were to be considered to protect "esthetic values." In April, at the Monterey workshop, Commander Johnson stated that oil and gas platforms could be considered to be inconsistent with esthetic values, and that oil and gas development in sanctuaries could be ruled out on that basis. That gives me extreme difficulty, if that is really the position of NOAA. What, again, is your position?

Could oil and gas development be ruled out on that basis? That gives me some problems, because I know in Louisiana it is very difficult for anybody on shore to see platforms. Is that a guiding principle that needed oil and gas development could be stopped because it is, perhaps, not too nice to look at platforms?

Mr. BLEICHER. Let me go back a step on that. In a case like Flower Garden Banks, the esthetic values, insofar as they are at stake, are undersea coral primarily visible to scuba divers and useful for other reasons. The primary focus in that case is the protection of a marine habitat and a number of species related to that habitat in that area, not esthetics. It seems to me extraordi-

nary that esthetic values would rule out gas development in that area.

In California—I frankly do not remember the reference to the two sanctuaries for esthetic values—but let me describe where we are. There are five areas that we have concluded are worthy of full-dress consideration for sanctuaries. That does not mean they will be made sanctuaries or even that we will propose making them sanctuaries in a formal way, but we have decided they are sufficiently important and are deserving of white papers at this time.

Of those, only one really has a substantial recreational and esthetic component, and that is the San Diego proposal. That proposal has esthetics as a more dominant feature than marine habitat as such. I would not say even in that case the esthetics is the ruling factor. On the contrary, I think when you hear from the comprehensive planning organization from that area you will see they have a very practical concern about the tourist industry in that area and the uses they make of the waters offshore of San Diego that have a very substantial economic value—a tourist industry in the neighborhood of a billion dollars a year and involves some 50,000 to 100,000 jobs. They are concerned about those circumstances, a use of the ocean for recreational purposes that they feel is every bit as valuable, if not more valuable, than the oil and gas development.

Mr. BREAUX. I do have some problems with what you wrote and stated in various fora or the way it is being interpreted. I do not think the Congress intended that, for esthetic reasons alone, we would rope off an area and say it is a sanctuary without a careful balancing of other uses of that area.

But the Senate has taken the position that they are very concerned about the whole question of establishing marine sanctuaries for the purpose of esthetics alone. The issue is going to be coming back to the House and we are going to have to make a decision. That is why I am asking you the question, because apparently from some of the feelings of some of the people on your staff, that is reason enough to rope off an area and say we are not going to consider any development whatsoever.

I would hope that is not the direction in which your peogram is headed.

Mr. BLEICHER. I think you have illustrated the difficulty of trying to make statements in the abstract about how this act will be applied. I do not think there are any areas we have under consideration where esthetics alone is the dominant concern without a very substantial balancing of economic interests and values in the area in question. I certainly would not expect that we would have that kind of a sanctuary created. Certainly not without an extensive public consideration of that question and opportunity for everyone to be heard on the subject.

Mr. BREAUX. I do not want to take anything you have said out of context, and that is why I am allowing you the opportunity to respond to questions. If there is more to be said, I want to hear it. Again, on February 1 in testimony before this committee you said, "Two California sites are being considered to protect esthetic values."

How large are the California sites that are being considered?

Mr. BLEICHER. I guess all I can say is I have learned a great deal about California since I made that statement and I wish I could say I never made it. There are no two specific California sites that we are currently pursuing. There are five areas and they range in size from——

Mr. Breaux. How large are the Santa Barbara and San Diego sites?

Mr. BLEICHER. Santa Barbara is something over 1,000 nautical square miles, about 1,200 or 1,300. The San Diego area, which was not nominated by the Comprehensive Planning Organization of San Diego, is some 7,600 square miles, but only a small portion of that is intended to be set aside with special regulations to protect the recreational and esthetic value which would interfere with oil and gas development. So we have a very large area nominated but only a smaller area that would be affected by these regulations.

Mr. BREAUX. The entire 7 or 8 thousand square miles would be the sanctuary?

Mr. BLEICHER. That is their proposal, yes, sir. Now I might say it overlaps with other proposals from Santa Barbara County, for example.

Mr. BREAUX. Do you have any problems with that proposal?

Mr. BLEICHER. We are preparing a white paper on the subject which will propose a wide range of options. That is the largest option. The smallest option is less than 10 percent of that size, and there are some options in between that we will be considering that are intermediate in size.

Mr. BREAUX. As I understand the law in setting out a particular area, one of the things you have to do is coordinate with other agencies. What coordination have you begun for areas we are talking about this morning?

Mr. BLEICHER. In the case of Flower Garden Banks we had a variety of informal conversations on a regular basis, as we were putting together our white paper, to try to learn how they are regulating the area and how they might regulate it in the future. Also, we had a great deal of contact with EPA which has become concerned about sediment discharges from oil drilling operations in that area.

We have also spoken with the Department of Energy on the subject, informally again. These are all informal sort of back and forth conversations about what they are doing in this area.

We also held just last Thursday a meeting of all of the agencies with whom we are required to consult, and with the Department of Energy, whom we are not required to consult, to talk about the Flower Garden white paper. At that meeting there was substantial discussion of every aspect of the white paper and the proposals. We went over the regulations and the provisions of the paper page by page, line by line, and discussed the questions that are involved. So there has been very substantial consultation on the Flower Garden white paper. There will be additional information submitted by the Department of Interior and EPA in response to issues that arose at the meeting.

Mr. BREAUX. You will be receiving a specific proposal or comments from each of the departments that is concerned with the Flower Garden Banks?

Mr. BLEICHER. Yes, we will. Not only receiving material at a technical level, but NOAA has written to the secretaries of these other departments asking for their formal comments on the proposal, and we hope to get those presumably sometime next month.

Mr. BREAUX. What does the Coast Guard tell you regarding the Flower Garden Banks area as regards shipping traffic?

Mr. BLEICHER. They of course raise the question of the extent to which we have authority to regulate shipping at that distance from shore, and we discussed the limitation. The statute, of course, limits us to actions and regulations which are consistent with international law, and the question of to what extent we can regulate in that area is one about which our general counsel is spending substantial time trying to generate a thorough and well-developed legal opinion.

Mr. BREAUX. What does the Coast Guard say about it?

Mr. BLEICHER. The Coast Guard represenative at this meeting simply said that it is an important question. I might note that the Coast Guard, under the House version of S. 682, would be regulating lightering in some of the same areas, so they are concerned about the same question in terms of the extent to which they will have legal authority to carry out the mandate. So a lot of careful attention will have to be given to the question.

Of course we are not going to try to exercise legal authority we do not have and we will try to reach some kind of a conclusion about the extent to which we can regulate in that area. As I say, there is the same problem with the provisions in the pending legislation about lightering, for example, which will be regulated in the Gulf of Mexico. It is an issue that both we and the Coast Guard are going to face.

Mr. BREAUX. Mr. Forsythe.

Mr. FORSYTHE. Thank you, Mr. Chairman. I would like to go right on with that on international law as to where we do stand. It seems to me that we as a nation do not regulate anything beyond the 3 miles, at least in most of the States. We, of course, now have a 200-mile fishery protective zone, we have insofar as mineral resources jurisdiction on the continental shelf under recognized international law. But when it would come to anything in the way of regulating navigation beyond 3 miles, I would not know where you would find authority to move into that area.

I would understand that your counsel is working in this area but at this point you apparently are moving beyond those matters that I have related. Would I be correct in making that statement?

Mr. BLEICHER. Yes, I think you would be. There is no question that we are on the frontier of the scope of the legal authority of the United States to regulate offshore activities. I think that with respect to regulating the marine resources in that area, of course, the coral is recognized as a fish under the Fisheries and Conservation Management Act.

Mr. FORSYTHE. The coral is recognized——

Mr. BLEICHER. It is an animal; yes, sir, and certain types are referred to by name in the definitions. We are exploring the question of whether all corals are covered, but certainly some kinds are covered by name.

Insofar as this is a marine resource it is certainly referred to in that way. The Bureau of Land Management has long claimed jurisdiction over coral on the basis it is a natural resource affixed to the shelf. In the same way they can exploit or protect the oil and gas resources, they are in a position to lease or not lease or protect or license the taking of coral. Insofar as this is a marine resource, I do not think we would have a great deal of difficulty at that level.

With respect to the vessel traffic, you are right. The question is much more complex. My understanding of the law, and although I am a lawyer I claim only a layman's knowledge of this area——

Mr. FORSYTHE. That makes us equal.

Mr. BLEICHER [continuing]. Is that while we cannot control innocent passage as such, we certainly can control the activities of vessels insofar as they are coming to the U.S. ports and condition entry on the U.S. ports upon compliance with a variety of regulations. This would be as true in this case as it would be in the case of the lightering regulations that the Coast Guard is being asked to write, or regulations on tanker safety, and so on.

The ideal way to deal with a problem like this—I think this is the important point—is by some international understanding. In fact, the Marine Sanctuaries Act directs the Secretary of State to negotiate international agreements as necessary to carry out the terms of the act. Nobody has ever asked the Secretary of State to do that, but we hope to pursue that once we have sanctuaries established.

Mr. FORSYTHE. Do you see anything in the Marine Sanctuaries Act that authorizes you to move other than those provisions that authorize other agencies to move? Is that spelled out in the Marine Sanctuaries Act?

Mr. BLEICHER. Only by negative implication of the statement that whatever is done under the Marine Sanctuaries Act must be consistent with generally recognized principles of international law. At the time the act was adopted there was a great deal of discussion in the Congress about the legality of regulations at this distance from shore, and in fact because of the great interest in the law of the sea negotiations at that time there was some concern that the law might be interfering with the law of the sea negotiations.

I think there is less concern of that kind now because there is general understanding in the world community about a 200-mile exclusive economic zone. Even though that has not been formalized in any kind of treaty, I do not think there is quite the same concern about reaching out 200 miles, as we are talking about doing in vessel regulations and have done with the fisheries.

Mr. FORSYTHE. Just one other. You referred a number of times in your comments to defining the resource. I gather basically at least that is totally aimed at an environmental resource, a resource having to do with the phrase you use in your opening statement as to the purpose of the act—preserving or restoring their conservation, recreational, ecological and esthetic values. Would I be fair in saying that apparently in the act it might have been an oversight not to have included in there the resource values of the ocean as

one of the factors to be considered in determining the sanctuary——

Mr. BLEICHER. My reading——

Mr. FORSYTHE [continuing].Or has that been more balanced?

Mr. BLEICHER. I am not sure that you can say it that way. The way the act is structured, it is a positive protective act. The Sanctuaries Act of course is only part of a national program. It is not a program to manage the oceans. It is a program to come at the ocean environment from the opposite direction that the resource development statutes come at it. The Outer Continental Shelf Lands Act approaches it from: let's find the oil and gas resources and make provision for their development. This act comes from the opposite direction. It is saying: Let's find the natural environmental areas and archaeological values and other kinds of nonresource exploitation values that need to be protected. Let's identify those areas and see which of those areas should be protected.

In an ultimate sense the balancing takes place on two levels. One is in the content of the regulations when we try to see what kinds of activities are compatible with the proposed sanctuary. The ultimate level is whether we create a sanctuary at all.

Mr. FORSYTHE. I might point out the amendments we are currently involved with on the Outer Continental Shelf Lands Act endorse the heavy NEPA involvement, which is, of course, highly important. It seems to me somehow or other we have to put our whole act together.

Thank you very much. I have a colleague who I know has a time problem.

Mr. BREAUX. Thank you, Mr. Forsythe.

I recognize our colleague who is not on our committee but, he is always over here dropping by and watching out for things that affect his area.

STATEMENT OF HON. ROBERT J. LAGOMARSINO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. LAGOMARSINO. I appreciate your allowing me to proceed at this time because I do have another commitment. I have a very short statement and then I will ask leave to extend and revise my statement later if I see the need.

Mr. Chairman and members of the committee, as one who was privileged at one time to serve on this committee and who still serves on the Interior Committee, and I might say as one who was the author of legislation that created a 3-mile oil sanctuary around all the Santa Barbara channel islands, the largest oil sanctuary ever created—for which I received very little credit at the time, incidentally—I am well aware of the need for a comprehensive national ocean policy and the need to periodically review such legislation, not only the legislation you are considering but other legislation as well.

At the present time, Mr. Chairman, I have a bill pending before another subcommittee of this committee relating to tanker traffic in the Santa Barbara Channel. As you know, I have worked with you and with the full committee chairman and others on the committee on the OCS Act, and we are working at the present time legislatively, and nonlegislatively, to protect the Santa Barbara

Channel Islands. As a matter of fact, a very interesting thing has happened just this month with regard to the larger and most resource-laden island, Santa Cruz, where the nature conservancy has exercised an option to acquire that property over a period of time.

There is no question in my mind that this legislation can have a far-reaching effect. With that in mind, I am very pleased that the committee will have the opportunity to hear later from Mr. Patrick Heffernan, a marine consultant working for the Santa Barbara County Board of Supervisors, and one of my constituents, Mr. Stephen Boyle, from Santa Barbara.

As one of the primary areas being nominated for sanctuary status in an area in which natural resources including both marine wildlife and oil and gas, the Santa Barbara Channel serves as a good case study for this committee to consider today in all of its ramifications. I think you have all of the resources that we have been talking about earlier this morning and all of the problems, and we have all of the interrelationships between natural resource use and natural resource preservation.

So, in the interests of providing as much time as possible for such consideration by the committee, I will simply ask, Mr. Chairman and Mr. Forsythe, that you very carefully consider the testimony you will be hearing from these two gentlemen and that I might be allowed to submit any further testimony for the record.

Mr. BREAUX. Thank you.

Mr. Bleicher, as far as San Diego and Santa Barbara are concerned, I take it one of the reasons or criteria for a sanctuary is concern for marine life. I am wondering what additional assistance to protection of marine life sanctuaries would provide over what we already have covered by the Endangered Species Act and other laws.

Mr. BLEICHER. The answer to that question really is an extension of what I was saying to Congressman Forsythe. This is the only piece of legislation of a positive character that allows us to identify areas that need intensive and careful management to protect the whole marine ecosystem within the area. Just as we have national parks and national wildlife refuges and national monuments, we have the Marine Sanctuaries Act, which is destined to meet all of these needs.

First, there is a general comment I would like to make that once we do create a marine sanctuary we have made a positive and presumably relatively permanent commitment to protecting certain kinds of resources and resource values within the area. This is a geographically focused concern which we would follow with appropriate management studies and biological evaluations and enforcement efforts to make sure that in fact this area gets the kind of protection it deserves.

With respect to the specific statutes you mentioned, there are small differences, some of them very important. The Marine Mammal Protection Act does not specifically provide for habitat protection provisions. It only provides for protection of the animals themselves and therefore does not allow us to make sure that the environment in which these animals live will be in a shape and condition that will permit them to continue to be viable.

33-546 O - 78 - 27

The Endangered Species Act, as I understand the legislation—and I must confess I am not an expert on this act—provides only for the control of other Federal Government activities in the area in question and does not allow direct regulation of private activities which I think are important in this area. I am not positive that is the case. In any case, each of those focuses only on specific creatures and specific, rather small areas or potentially small areas. In fact, the endangered species habitat protection provisions have been used rarely, if at all, in the marine environment, so we do not really know much about how that will work to accomplish the objectives we are talking about here.

I guess the fundamental point, the reason we are looking at certain areas, is that they are really extraordinary in their marine ecosystem characteristics and it is the interrelations of the plants, the animals, the fish, the mollusks and the crustaceans that comprise a whole ecosystem and that has to be preserved as a whole. It is very difficult to preserve one creature without preserving the others.

It seems to me the broad answer to your question is that this statute is designed to take positive steps to meet those kind of needs, and none of these other statutes are really focused that way.

Mr. BREAUX. Look at the Flower Garden Banks as an example. BLM regulates any disposal of waste as a result of any offshore leasing that is going on in that area under existing statutes. The Coast Guard would already regulate shipping, to the extent that anyone has jurisdiction over it in that area. I think coral would also be regulated. I am not sure that we do not have already some statutes in existence that would cover most of the things we are talking about in that area. I am just trying to figure out, have we created anything that is going to allow us to do anything more than we already have the legal authority to do.

Mr. BLEICHER. There are two kinds of answers. One is that there are some gaps. With respect to protecting the coral on Flower Garden Banks, we are concerned about making arrangements for anchoring so that anchors do not destroy the coral. Divers have to have their dive boat anchored on the reef somehow, otherwise their lives are physically jeopardized. At the same time, anchor damage to coral is one of the major sources to damage to coral and one of the major sources of damage at the Flower Garden Banks. Our approach is to write specific regulations that require anchoring in sandy areas. We try to address that problem in a very practical way, to direct people to the right solutions, not simply to say, BLM regulations already say you are not allowed to destroy coral. That does not give guidance to somebody who is trying to figure out how to anchor a boat.

Second, once we designate this area as a marine sanctuary, we may be able to take some positive steps after we get appropriations. We have talked to the Coast Guard about the possibility of putting in a mooring buoy so a boat would be able to tie up to something without anchoring. We do not know how much that will cost, so I have not made any commitments as to whether we would do that, but it is certainly something we would like to explore.

Mr. BREAUX. I have fished on the banks a number of times. I notice one of your proposals would be to prevent any spearfishing. I was wondering why.

Mr. BLEICHER. We spent a great deal of time talking about that in the office. The concern is that certain kinds of fish would be speared, smaller fish are not, and if you take too many of certain kinds of fish and none of others, you have dramatically changed the ecosystem because the fish for which they are the predators suddenly grow and you get an important change in the balance.

Mr. BREAUX. You do that every time you fish, whether it is with a net or whatever.

Mr. BLEICHER. It has to do with the quantity of fishing and the type. Mr. Breaux. You cannot possibly be arguing that spearfishing is endangering the resources in the area. I do not think we have 50 trips in a year for spearfishing.

Mr. BLEICHER. That is true, and some kinds of fish are really not endemic to the reef, do not live only in that particular area, and spearfishing those fish would not be at all a threat. Of course you are right, there is hook-and-line fishing which takes the same kind of fish. The question is the extent to which these fish are taken and the degree to which we would have a change and threat to the ecosystem. If we can get some statistical information that indicates the levels of taking——

Mr. BREAUX. What are we trying to protect, the coral reefs or the fish that swim around them? I thought the idea was to protect the coral reef from being destroyed by anchoring? What does that have to do with the fish that swim around the reef?

Mr. BLEICHER. I wish I were a biologist at this point. Let me suggest another kind of example in connection with this.

Mr. BREAUX. You should have someone who is a biologist.

Mr. BLEICHER. We do.

To come back to the point of the preservation of the ecosystem, the sea urchins eat the holdfast points of the kelp beds and if you have an increase in sea urchins, you have a destruction of kelp beds. What eats the sea urchins? Other creatures whose presence depends on water quality. You find there are important interrelationships between the kinds of plant and animal life in the area, and we need information to determine whether the concern in this area will require us to control spearfishing as much as proposed in the white paper.

Mr. BREAUX. I fail to see the need to regulate fishing per se in the Flower Garden Banks, because I do not see how that is going to affect the coral reefs.

Mr. BLEICHER. I do not know if that is the case. I will——

Mr. BREAUX. Shouldn't someone within the shop know that before we make an area that large a marine sanctuary and prohibit sport fishing?

Mr. BLEICHER. I hope that the answer to that question does not go to whether it should be a marine sanctuary. I think it does go to a question as to whether the regulations should prohibit spearfishing. That was the purpose of the white paper, to get this kind of information.

I can only say this is the whole point of the process we are following. When we have met in Houston with many of these scuba

divers last December the issue of spearfishing was mentioned in general terms and no information was forthcoming. Now that the white paper has been issued and people have focused on this specific issue, we will do the necessary in-house analysis and we will get the information, I think, from the scuba divers. There is not going to be any decision on this question for many months. Our expectation is that if we go as quickly as possible we might be able to designate the Flower Garden Banks sometime next spring. It is this process that elicits the kind of information we need to make decisions on.

Mr. FORSYTHE. On this question of fishing, what is your relationship with the Regional Council that is obligated under FCMA to do the regulating of whatever fish are involved? Aren't you moving into their specific mandate if you are even discussing this? Isn't that a matter for the Regional Fisheries Council?

Mr. BLEICHER. I have met with them to talk about these issues. I think they recognize that some areas that are of great importance as a coherent ecosystem because of the interest in plant life, marine mammals or seabirds, are of only a marginal interest from a fisheries standpoint. They have the clear authority to regulate coral, for example.

But in fact no council has begun to regulate coral and only one effort is underway, a joint effort between the South Atlantic and Gulf Coast Councils to begin to study the question of regulating coral. Their primary focus is on the question of regulating commercial and recreational fishing, the large quantities, the large economic impacts. It is not so much that they don't have authority, any more than it is that BLM doesn't have some authority or that EPA doesn't regulate waste discharges. It is again that they are not focusing positively on these areas of special ecological value.

That is the point of the marine sanctuary program. We have an overlap with the councils and a lot of other agencies. We have taken the step in dealings with the councils, and you will find it in the white paper, that the edible commercial fish will not be controlled under the marine sanctuary regulation. They will be controlled only by the council. The councils by and large have been happy with that particular provision.

Mr. FORSYTHE. I am not arguing with that, but they are silent on whether the marine sanctuary program should regulate fish other than the commercial and recreational fish. In other words, they have acceded to an interest now being at least discussed, if not shown, that so far as those regulations going to these other areas——

Mr. BLEICHER. Well, I think the council members, many of whom are fishermen themselves, recognize that in the long run protection of the living marine environment is in their interest.

Mr. FORSYTHE. That is not the debate I am trying to raise.

Mr. BLEICHER. I don't think they have made a decision. I don't think they look at it as a question of once and for all. I think they are trying to evaluate the questions as they come along. When the Texas Shrimp Fishermen's Council endorses the Flower Garden Marine Sanctuary, they are not going to object.

In some areas we have controversies. In the case of the Looe Key proposal, they were upset and asked us not to do anything until we

studied all the reefs in that area. We have held off on our decision for that reason. In each case the reaction is different. In the west coast the councils seem to be much more relaxed about the issue. No one is going to endorse anything until they have a pretty good idea of what we are proposing.

Mr. FORSYTHE. You don't have the shelf disappearing on the West Coast very fast so you don't have much of that activity going on that you would get involved in. You have a totally different subsurface situation. In the Gulf you have a shelf of great magnitude which, of course, would also be true to a lesser extent on the east coast generally because their shelf does kind of roughly parallel the 200-mile fishery zone. So you have different situations.

Mr. BLEICHER. I would say that I did just last week go to the meeting of the Pacific Fisheries Management Council. I talked to them only very briefly because they had an extensive agenda. Some of them bothered to come and talk to me afterwards. Some were concerned about precisely the question you are raising.

When I talked to them about the procedures we were going to follow, they said they were satisified at this point and they would have to see what our regulations actually said.

Mr. FORSYTHE. Thank you, Mr. Chairman.

Mr. BREAUX. If you drew a line from the Fog Horn Banks due north, you would probably include over 90 percent of the Flower Garden Banks off the coast of Louisiana. I have heard you mention meetings in Texas and in Houston, but I have not heard Louisiana mentioned. This is my congressional district so you have heard from me.

What about other comments from the State of Louisiana? Are they lax in not providing comments or have you had meetings with commercial or sport fishermen down there?

Mr. BLEICHER. So far as I know, no contacts have been initiated from Louisiana to us other than your own interest in the subject. We have sent the Flower Garden paper to the Governor of Louisiana as well as the Governor of Texas for comments. We notified the Governor's office and the Louisiana Coastal Zone Agency about this proposal and that this paper was coming. We have not heard back from them yet. I assume we will. But it is no longer referred to as a Texas Flower Garden in our documentation.

Mr. BREAUX. I hope not. Most of them are off Louisiana, although it was proposed, I understand, by Texas representatives.

Mr. BLEICHER. Yes. I should mention we recently held a briefing for representatives of the Senators from both Louisiana and Texas about the Flower Garden Banks.

Mr. BREAUX. What role do the coastal States play? Suppose Texas and Louisiana said they didn't agree with the proposal and therefore they don't support it? What effect would that have on the nomination?

Mr. BLEICHER. At the level of the law of the issue, since the Flower Garden Banks is not in State waters, it would not have an effect under the Marine Sanctuaries Act. It would not have binding impact. If there were an approved coastal zone management plan in either of those States, then I suppose there would be the application of the consistency requirements and I imagine an issue could be raised about whether the marine sanctuary was consistent with

the coastal zone plan and that would depend on what is in the plan.

In the California area, some of the options under all the proposals involve State waters. Under the statute the Governor of the State would then have the authority to veto the inclusion of the State waters in the sanctuary by virtue of that fact, as well as the consistency requirements, under which the State would be able to make a much stronger case for an area adjacent to its coastal waters.

As a practical matter, from a political standpoint and from a public affairs standpoint, I would think that if the perceptions in the State and the perceptions in Washington about the value of the area were so different that the State was very much opposed even though we were in favor, that that would raise some important questions and we would want to work with people to find out why and what the problem was.

Mr. BREAUX. I don't have any additional questions, Mr. Bleicher. I know the next witness points out that we had 110 nominations.

You were looking at an area of about 220,000 square miles nominated for inclusion in the marine sanctuaries program. As far as this member is concerned, that is a much larger area than we ever conceived, I think, in this committee when we were writing the law. We were looking at one possible marine sanctuary which was the *Monitor* site and one in Key Largo for coral protection. All of a sudden now we have your department look into an area in excess of 220,000 square miles to be put into marine sanctuaries.

That is a large chunk of the coastal portions of these United States and I want to emphasize that all those areas are subject to a multiple use and the area should not be roped off to the exclusion of other particular kinds of utilization, unless there is a very logical and a very strong reason for doing so.

So I have some concerns. I think you have cleared up some of the questions I have had, but I have heard too many differing opinions on what constitutes the grounds for selection of marine sanctuaries. I have heard too much with regard to esthetic values being a sole purpose for establishing a marine sanctuary.

We are going to be looking at the legislation when it comes back to us from the Senate. We are going to have to make some decisions about it at that time. We will be guided by what else we hear in these hearings.

I don't know if Mr. Hughes has any questions.

Mr. HUGHES. Thank you, Mr. Chairman. I have no questions.

Mr. BLEICHER. May I say one thing about the statistics you just cited? I have been going over the 170 recommendations and nominations. A couple of things are apparent that I hope will make you feel a little better.

One is that, in fact, there is a great deal of overlap among these 100-some or close to 200 nominations, that, in fact, my impression is that there are not 170 different areas in question. Many of these focus on the same areas, particularly when you are talking about the larger areas. So there is really not that much in area.

Second, the large areas are really about a dozen large areas, of which most are in Alaskan waters, and they are really quite differ-

ent in character from the nominations we have for areas in the rest of the country.

I think you will find that even if one day we were to wake up and find they were all marine sanctuaries, you would have much less effect involved than you suggested.

More importantly, I would point out that in all of our presentations we have talked about the creation of somewhere in the neighborhood of 30 sanctuaries as the total national program and that would be over a period of several years. Each one of these will be worked out individually through the rather extensive process.

So I hope that as we get to the individual cases, you will find us carrying out what you consider to be the spirit of the statute.

Mr. BREAUX. I think that point is well taken. I think this morning we have had some instances of areas, including the Flower Garden Banks, that really no one is sure about what activities will be allowed, such as spear fishing and other sport fishing.

I would suggest that it be done on a case by case, site by site basis and it be a relatively slow process, so that everybody has an opportunity to comment and all different viewpoints are considered before a final decision is made.

With that I thank you for your appearance.

Our next witness this morning will be Mr. John K. Cassell, senior geologist, Chevron U.S.A., Inc.

Mr. Cassell, we have a copy of your statement. We would invite you to take the witness table, and if you have any colleagues accompanying you, they certainly are welcome also.

STATEMENT OF JOHN K. CASSELL, SENIOR GEOLOGIST, CHEVRON U.S.A., INC.

[The statement follows:]

Thank you, Mr. Chairman. My name is John Cassell. I am the Staff Geologist for Environmental Affairs for Chevron U.S.A. Inc.—Western Region, which includes Alaska, the western seaboard states, Idaho and Nevada. I have a Masters degree in geology from Stanford University and am a registered petroleum geologist in the State of California. I have been employed by Chevron as a petroleum explorationist for 29 years, the last 15 of which have been connected with offshore exploration. During and preceding the 1968 OCS sale in the Santa Barbara Channel, I served as District Geologist for Chevron's offshore exploration activity in this region. For the past 5 years I have concentrated on environmental issues relating to both offshore and onshore exploration.

INTRODUCTION

My statements before you today concern the marine sanctuaries program, under the 1972 Act, the manner in which it is presently evolving, and the impact its evolution threatens to have upon our country's offshore oil and gas development program.

As you know our current oil imports constitute between 45 and 50 percent of our domestic consumption, and result in a capital outflow of about 45 billion dollars per year. The principal means of reducing this dependence on foreign oil, which also threatens our nation's security, is to find large new domestic reserves. Virtually all analysts of future U.S. exploratory potential agree that one of our last great frontiers for finding large reserves of oil and gas lies in the many unexplored, or incompletely evaluated, areas of the outer continental shelf. Many believe that as much as 60% of our remaining potential is in these regions. For these reasons the marine sanctuaries program relates very closely and importantly to the future of offshore exploration and development and, consequently, to the security and economic well-being of our nation.

In view of the above, we at Chevron are greatly concerned about the size and number of proposed sanctuaries of the West Coast and Alaska. It is difficult to

conceive that such large numbers of vast areas would qualify for designation under the Act. We are not in any way opposed to marine sanctuaries as such provided they meet the criteria set forth in the Act. Indeed, we can envision a need for sanctuaries. If they were implemented with proper recognition of multiple-use principles, on a site-specific, case-specific basis, and had reasonable geographic dimensions, we feel confident we could support their establishment.

DIMENSIONS OF THE PRESENT PROGRAM

Unfortunately, the dimensions of the program currently taking form, the size of the individually proposed sanctuaries, and their locations, are so awesome in magnitude, and in many cases so critically located, that they threaten the viability of further OCS development. As of Sept., 1977, which is the most current information available to us, about 110 sanctuaries had been proposed nationwide. By our best estimate these total approximately 220,000 square miles (141 million acres) in size. The EPA has proposed 58 of these, the DOI 22, and state or local agencies and environmental groups 30. About 19 have been proposed off the California coast, 27 off Oregon and Washington, and 21 off Alaska; a total of 67 for the west coast and Alaska; with a gross estimated total size of about 216,000 square miles. Over 200,000 square miles are proposed in Alaskan waters alone, with another 8500 square miles of Southern California, including over 2000 square miles in the Santa Barbara Channel region, the most promising oil and gas province off the California coast. We understand that 5 of the California, and 6 of the Alaskan proposals are currently in the initial stages of sanctuary consideration. Seven sanctuaries proposed in Alaskan waters exceed 5000 square miles each in size, with the largest (Gulf of Alaska Peninsula Region) being in excess of 54,000 square miles. I will return to the specific impacts of certain of these proposals in the following discussion.

MARINE SANCTUARY CONCEPTS

Chevron believes that marine sanctuaries should be established only where there is a specific and definitive need to protect, conserve, or preserve a unique and valuable marine resource. It should also be shown that such resource is threatened by a near-term potential impact which will have an undesirable destructive effect upon it. Thus, marine sanctuaries should be established on a site-specific, case-specific basis, and should have as their objective clearly defined goals in terms of what they are intended to protect or preserve and how such protection and preservation is to be accomplished.

In establishing marine sanctuaries proper consideration should be given to the scientific fact that no part of the open ocean is a closed system. Unlike land areas, which can be definitively isolated, the ocean is subject to constant change resulting from tidal, long-shore and global currents, river outwash, urban run-off, wind-drift and climatic variation. It is also affected by storms, vessel traffic and contamination by atmospheric fall-out. Many of the species which dwell in it are migratory, and come and go on a seasonal basis, sometimes varying their migratory paths or changing their habitat in response to natural forces beyond man's control. With these observations in mind two conclusions follow:

1. It will be very difficult for man, by whatever regulations or rules, to maintain a status-quo throughout large open-ocean areas. Therefore, the designation of hundreds, thousands, or tens of thousands of square miles of ocean as marine sanctuaries is a meaningless exercise. If sanctuaries of such magnitude were to be established, they would prove to be unmanageable, and beyond the scope of viable and controllable regulation, and;

2. The marine sanctuary program should not be corrupted or subverted by permitting it to be used as a tool by no-growth, anti-development special interest groups. Rather, it should be implemented in a very positive sense, with due consideration given to the practical realities and physical characteristics of the ocean environment, and with proper recognition of the effectiveness of regulation by existing agencies, resulting in the past excellent record of oil and gas development in the OCS. The latter has been clearly shown by numerous scientific studies to have had no adverse effect on the marine environment in areas which have experienced such development for more than 25 years. These can be cited should the Committee so desire.

We believe that oil and gas development and/or other activities should be allowed in marine sanctuaries, providing it can be shown that such activity will not conflict with the site-specific or case-specific purpose for which the sanctuary was established. In making this judgment appropriate mitigating measures to protect against potential conflicts should be duly considered. For example, if a sanctuary has been established to protect a certain species of life form (Para. (b), Section 922.10, regula-

tions), and it is clear that oil and gas development poses no threat to the continued existence and good health of said species, then such development should be allowed.

Where it is already clearly demonstrated that multiple-use principles can be effectively and safely employed in marine areas, OCS development definitely should be permitted. The Santa Barbara Channel, the southern California coast south of the Channel Islands, Cook Inlet and the Gulf of Mexico obviously qualify as such areas. In other similar, nearby, or related areas development should be allowed, unless scientific findings plainly show that it would pose a serious threat to a specifically defined marine resource.

We further believe that the beneficial aspects of OCS development should be carefully weighed, and given due consideration, in determining whether oil and gas development is allowed in each proposed sanctuary. Among the benefits to be considered are:

1. The potential for substantial additions to the nation's energy supply base, and;
2. The reef-function performed by platforms, which results in a proliferation of marine life in their immediate vicinity, and;
3. The potential for mari-culture development at platform sites. Two such operations are currently under way in the Santa Barbara Channel, and;
4. Marine rescue services performed from platforms, which have often served as life-saving outposts in the ocean.

Our reading of the Congressional Record gives us some reason to believe that it was not the intent of the members of Congress, during their deliberations, to enact legislation leading to the creation of marine sanctuaries wherein all resource development would be prohibited. We also have some difficulty believing that it was their intent that these sanctuaries would reach dimensions of many thousands of square miles. Had they envisioned this to be the case, it seems highly probable that they would have included in the Act of 1972 a provision requiring Congressional approval of sanctuary designations. We believe that Congress viewed sanctuaries as being of much smaller dimensions that those currently proposed, and as having site-specific, case-specific character. If our interpretation of the Congressional intent is close to the truth, then our present concept of marine sanctuaries and that of Congress in 1972 is in quite close accord.

THE MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT OF 1972

As noted earlier, we are in no way opposed to the establishment of marine sanctuaries per se. However, we do believe there are some troublesome aspects of the Act of 1972 as it now stands, and we feel constrained to bring these to your attention. Specifically:

1. We believe the designation of any large area (larger than 10 square miles) as a marine sanctuary should require Congressional approval. We fail to see any other means by which the best interests of all our citizens, their needs with respect to resource development, employment, and general benefits to be derived from the sea, can be guaranteed. We understand the Western Oil and Gas Association has proposed an amendment to Part 16 of the United States Code, Section 1432(b), which reads: "Prior to designating any waters having a surface area larger than ten (10) square miles as a marine sanctuary or addition to an existing marine sanctuary under this section, the Secretary shall obtain the consent of Congress". We endorse this proposed amendment.
2. We also believe that other Federal Departments, especially the Interior, Energy and Defense, should have more than a consultory role in sanctuary designations. We do not see how these departments can fulfill their obligations with respect to energy supply and national security if large ocean areas are placed in a special no-use category by another authority without their concurrence. We believe this is especially true in the case of the Department of Energy, which was not in existence at the time of the Act, and which is now charged with the responsibility of insuring adequate supplies of oil and gas for the United States.
3. We believe the designation of marine sanctuaries for esthetic-visual reasons [per Title III, Sec. 302(a)], is unnecessary and unwise, insofar as it might be applied to oil and gas development. The esthetic impact of petroleum facilities is very minor and, more importantly, is of finite and short duration in mankind's historic view. Few offshore platforms will be in place for more than 20 to 30 years and, when they are removed, no evidence will remain of their former presence. We understand that the Senate Committee on Commerce, Science and Transportation is currently considering the deletion of esthetic considerations for designation of marine sanctuaries. We endorse this deletion.

We earnestly hope that favorable Congressional action will be taken this year with respect to the suggested amendments and issues discussed above.

IMPLEMENTATION OF THE ACT OF 1972

We see a number of problems emerging with respect to the process of sanctuary consideration and designation under present regulations and policies implementing the Act. These relate to:

1. The mode of initiating sanctuary proposals, and;
2. Misuse of the program for purposes other than the original intent of the Act, and;
3. Potential redundancy in preparing EIS's, conducting public hearings, and regulating sanctuary areas, and;
4. Premature conclusions as to what regulations are needed for a given sanctuary, prior to environmental impact statement preparation and review, and the receipt of public input.

With respect to item one above, we are concerned about a process which permits nominations (proposals) of huge sanctuary areas of thousands of square miles on the basis of a two page letter, without site-specific findings in support of the proposal. We do not believe that serious consideration should be given to sanctuary proposals unless site-specific resource values are clearly set forth, and unless it can be shown that some proposed activity poses a real threat to these values. Factual evidence should be brought forth supporting these proposals.

In connection with item two, we observe that many current sanctuary proposals, in view of their size and location, appear to have been formulated for the express purpose of precluding oil and gas development in the OCS, rather than to preserve and protect specific ecologically unique and important marine resources. We believe this diminishes the effectiveness and significance of the program, creates unnecessary administrative burdens, and leads to needless controversy and delay. We recommend that this misuse of the program be restrained by establishing specific requirements for procedures to be followed in proposing sanctuaries and for supporting factual findings to be submitted in support of each proposal.

Regarding item three, we note that there is a substantial potential for redundancy in the conduct of the sanctuary review process and that related to OCS oil and gas lease sales. Where sanctuaries are being considered, the proposed location of which essentially coincides with, or occupies a significant part of, an area proposed for an OCS oil and gas lease sale, we would suggest that the EIS processes be melded to serve both purposes. We note that the BLM EIS's for OCS sales are intensely environmentally oriented, and cover practically all aspects (Paragraphs (a) through (e) of Section 922.10 of the sanctuary regulations) relating to marine sanctuaries. It would seem that very little would need to be added to the BLM EIS to enable it to adequately cover the marine sanctuary issue.

Concerning item four, above, we note that the proposal documents prepared by the Office of Ocean Management (so-called "White paper"), of which we have as yet seen only the one for the Flower Garden Banks in the Gulf of Mexico, apparently will contain proposed regulations, as well as a description of the marine area and its ecologic characteristics. Inasmuch as this document is to be followed by a draft environmental statement, public hearings, and a final environmental statement, we believe it is premature to propose regulations prior to the receipt of public comment, and publication of the final environmental impact statement. Rather, it would seem appropriate that the comments and discussions involved in the EIS process should be utilized in formulating such regulations as are deemed necessary after these deliberations.

Finally, we would suggest that, prior to preparing regulations for a given sanctuary, a very careful and thorough review of existing OCS orders, BLM lease stipulations, USGS regulations, EPA and NEPA requirements, CZM policies and regulations, U.S. Coast Guard policies and practices, and U.S. Corps of Engineers policies and regulations, be undertaken. When these are found to be inadequate or incomplete in providing protection for the unique reasons for which a sanctuary is established, then we suggest that they be augmented by such additional regulations as are necessary to accomplish the goals and objectives of said sanctuary. Such additional regulations should be issued concurrently with the final approval of sanctuary designation.

IMPACT OF THE MARINE SANCTUARIES PROGRAM ON OIL AND GAS DEVELOPMENT

As noted earlier, we are quite concerned about the relationship of marine sanctuaries currently proposed, and those yet to be proposed, to pending and future offshore oil and gas exploration and development. Our immediate concern focuses on the proposed California and Alaskan sanctuaries now in the early stages of consideration. Unfortunately at this writing we do not have access to maps defining the precise geographic location of the Alaskan sanctuary proposals, although we

understand that six of these are currently being studied for "white paper" preparation. Off California we understand five proposals are pending "white paper" reports.

We do not wish to burden you in this discussion with estimates of undiscovered resources, which are often conflicting and confusing at best, nor with prolonged geologic discussions of the merits of this or that region. However, we do believe it is appropriate to point out the location of several of the largest sanctuary proposals and their relationships to future currently scheduled OCS lease sales. In so doing I will refer to maps which I have brought for that express purpose, and which, if you wish, I will have copied for your files subsequently. The following tabulation summarizes what we will be observing on the maps. In the ensuing discussion I will note several of the areas which we believe to be the most promising for future oil and gas exploration and development.

CALIFORNIA SANCTUARY PROPOSALS

Proposed sanctuary	Size-square miles	Related OCS sale and date
Santa Barbara Channel [1]	2,050	Sale No. 48, June 1979.
San Diego region [1]	6,500	Do.
Tanner-Cortes Banks [1]	250	Do.
Farallon Islands-Pt. Reyes [1]	1,000	Sale No. 53, Feb. 1981.
Monterey-Big Sur [1]	600	Do.

ALASKAN SANCTUARY PROPOSALS

Proposed sanctuary	Size-square miles	Related OCS sale and date
Northeastern Gulf of Alaska	([2])	Sale No. 55, June 1980.
Beaufort Sea Coast [1]	6,300	Joint Federal-State, Dec. 1979.
Bristol Bay [1]	38,500	Not scheduled presently.
Bering Straits [1]	41,500	Sale No. 57, Dec. 1981.
Gulf of Alaska Peninsula (including Kodiak Island)	54,700	Sale No. 60, Mar. 1981.
Pribilof Islands and shelf	22,700	Not currently scheduled—dropped from former schedule.
Lower Cook Inlet [1]	([2])	Sale No. 60, Mar. 1981.
Prince William Sound [1]	10,600	Sale No. 46, Oct. 1980.
Kodiak Shelf [1]	[3] 15,000	Do.

[1] Currently in "white paper" preparation phase.
[2] Unknown.
[3] Estimated.

Several of the above cited areas are generally regarded as being highly promising for future oil and gas development. These would most certainly include the Santa Barbara Channel (a proven oil province), the San Diego Region (especially the portion, as indicated on the map, being recommended for prohibition of oil and gas development), the Beaufort Sea Coast, Bristol Bay and other Alaskan sanctuary proposals.

However, since there is no way to be certain, short of exploratory drilling and testing, whether a given area will be productive of oil or gas, the important consideration is not which areas are not most promising or are currently believed to have the greatest resource potential. The important consideration is that these very large unevaluated areas remain open and available for oil and gas exploration and development. We believe the national interest calls for Congressional action aimed at insuring that this is the case, and that our domestic energy resource development program in marine areas is allowed to go forward as effectively and expeditiously as possible.

We appreciate having the opportunity to appear before you today. Please be assured that we stand ready and willing to accommodate you in every possible way in your consideration of this very important issue.

Mr. CASSELL. Thank you, Mr. Chairman.

My name is John Cassell. I am the staff geologist for environmental affairs for Chevron USA, Inc., western region. Let me interrupt and say I might skip parts of this.

Mr. BREAUX. Your entire testimony will be made a part of the record and you can summarize if you would like.

Mr. CASSELL. Thank you.

I will start by skipping my pedigree and go down to the introduction on page 1 and say that my statements before you today concern the marine sanctuaries program, under the 1972 act, the manner in which it is presently evolving, and the impact its evolution threatens to have upon our country's offshore oil and gas development program.

In view of the above, we at Chevron are greatly concerned about the size and number of proposed sanctuaries off the west coast and Alaska. It is difficult to conceive that such large numbers of vast areas would qualify for designation under the act.

We are not in any way opposed to marine sanctuaries as such, provided they meet the criteria set forth in the act. Indeed, we can envision a need for sanctuaries. If they were implemented with proper recognition of multiple-use principles, on a site-specific, case-specific basis, and had reasonable geographic dimensions, we feel confident we could support their establishment.

I must preface the following section by telling you that new information reached me after I prepared this testimony. I will introduce this as I proceed.

The dimensions of the program currently taking form, the size of the individually proposed sanctuaries and their locations, are so awesome in magnitude, and in many cases so critically located, that they threaten the viability of further OCS development.

As of September 1977, which is the most current information available to us, about 110 sanctuaries had been proposed nationwide. I now believe the figure is about 170. By our best estimate these total approximately 220,000 square miles—141 million acres—in size. This figure and those to follow are probably too low in view of the current number of proposals.

The EPA has proposed 58 of these, the Department of the Interior, 22, and State or local agencies and environmental groups, 30. About 19 have been proposed off the California coast, 27 off Oregon and Washington, and 21 off Alaska; a total of 67 for the west coast and Alaska, with a gross estimated total size of about 216,000 square miles. Over 200,000 square miles are proposed in Alaskan waters alone, with another 8,500 square miles off southern California, including over 2,000 square miles in the Santa Barbara Channel region, the most promising oil and gas province off the California coast.

We understand that five of the Californian and six of the Alaskan proposals are currently in the initial stages of sanctuary consideration. Seven sanctuaries proposed in Alaskan waters exceed 5,000 square miles each in size, with the largest—Gulf of Alaska Peninsula Region—being in excess of 54,000 square miles. I will return to the specific impacts of certain of these proposals in the following discussion.

Chevron believes that marine sanctuaries should be established only where there is a specific and definitive need to protect, conserve, or preserve a unique and valuable marine resource. It should also be shown that such resource is threatened by a near-term potential impact which will have an undesirable destructive effect upon it.

Thus, marine sanctuaries should be established on a site-specific, case-specific basis, and should have as their objective clearly defined goals in terms of what they are intended to protect or preserve and how such protection and preservation is to be accomplished.

In establishing marine sanctuaries, proper consideration should be given to the scientific fact that no part of the open ocean is a closed system. Unlike land areas, which can be definitely isolated, the ocean is subject to constant change resulting from tidal, longshore and global currents, river outwash, urban runoff, wind drift and climatic variation. It is also affected by storms, vessel traffic, and contamination by atmospheric fallout. Many of the species which dwell in it are migratory and come and go on a seasonal basis, sometimes varying their migratory paths or changing their habitat in response to natural forces beyond man's control.

With these observations in mind, two conclusions follow:

One: It will be very difficult for man, by whatever regulations or rules, to maintain a status quo throughout large, open ocean areas. Therefore, the designation of hundreds, thousands, or tens of thousands of square miles of ocean as marine sanctuaries is a meaningless exercise. If sanctuaries of such magnitude were to be established, they would prove to be unmanageable and beyond the scope of viable and controllable regulation; and

Two: The marine sanctuary program should not be corrupted or subverted by permitting it to be used as a tool by no growth, antidevelopment, special interest groups. Rather, it should be implemented in a very positive sense, with due consideration given to the practical realities and physical characteristics of the ocean environment, and with proper recognition of the effectiveness of regulation by existing agencies, resulting in the past excellent record of oil and gas development in the OCS.

The latter has been clearly shown by numerous scientific studies to have had no adverse effect on the marine environment in areas which have experienced such development for more than 25 years. These can be cited should the committee so desire.

As an addendum, I have brought with me today an abbreviated list of such citations for your reference.

We believe that oil and gas development and/or other activities should be allowed in marine sanctuaries, providing it can be shown that such activity will not conflict with the site-specific or case-specific purpose for which the sanctuary was established.

In making this judgment, appropriate mitigating measures to protect against potential conflicts should be duly considered. For example, if a sanctuary has been established to protect a certain species of life form, and it is clear that oil and gas development poses no threat to the continued existence and good health of said species, then such development should be allowed.

Where it is already clearly demonstrated that multiple use principles can be effectively and safely employed in marine areas, OCS development definitely should be permitted. The Santa Barbara Channel, the southern California coast south of the Channel Islands, Cook Inlet, and the Gulf of Mexico, obviously qualify as such areas. In other similar nearby or related areas, development should

be allowed, unless scientific findings plainly show that it would pose a serious threat to a specifically defined marine resource.

We further believe that the beneficial aspects of OCS development should be carefully weighed and given due consideration in determining whether oil and gas development is allowed in each proposed sanctuary.

Among the benefits to be considered are:

One: The potential for substantial additions to the Nation's energy supply base;

Two: The reef function performed by platforms which results in a proliferation of marine life in their immediate vicinty;

Three: The potential for mariculture development at platform sites. Two such operations are currently underway in the Santa Barbara Channel;

Four: Marine rescue services performed from platforms which have often served as lifesaving outposts in the ocean.

Our reading of the Congressional Record gives us some reason to believe that it was not the intent of the Members of Congress, during their deliberations, to enact legislation leading to the creation of marine sanctuaries wherein all resource development would be prohibited.

We also have some difficulty believing that it was their intent that these sanctuaries would reach dimensions of many thousands of square miles. Had they envisioned this to be the case, it seems highly probable that they would have included in the act of 1972 a provision requiring congressional approval of sanctuary designations.

We believe that Congress viewed sanctuaries as being of much smaller dimensions than those currently proposed, and as having site-specific, case-specific character. If our interpretation of the congressional intent is close to the truth, then our present concept of marine sanctuaries and that of Congress in 1972 is in quite close accord. What I am about to say covers the shortcomings we see in the present legislation.

One: We believe the designation of any large area—larger than 10 square miles—as a marine sanctuary should require congressional approval. We fail to see any other means by which the best interests of all our citizens, their needs with respect to resource development, employment, and general benefits to be derived from the sea, can be guaranteed.

We understand the Western Oil & Gas Association has proposed an amendment to part 16 of the United States Code. Section 1432(b), which reads:

> Prior to designating any waters having a surface area larger than ten (10) square miles as a marine sanctuary or addition to an existing marine sanctuary under this section, the Secretary shall obtain the consent of Congress.

We endorse this proposed amendment.

Two: We also believe that other Federal Departments, especially the Interior, Energy, and Defense, should have more than a consultory role in sanctuary designations. We do not see how these Departments can fulfill their obligations with respect to energy supply and national security if large ocean areas are placed in a special no-use category by another authority without their concurrence.

We believe this is especially true in the case of the Department of Energy, which was not in existence at the time of the act, and which is now charged with the responsibility of insuring adequate supplies of oil and gas for the United States.

Three: We believe the designation of marine sanctuaries for esthetic-visual reasons—per title III, section 302(a)—is unnecessary and unwise, insofar as it might be applied to oil and gas development. The esthetic impact of petroleum facilities is very minor and, more importantly, is of finite and short duration in mankind's historic view. Few offshore platforms will be in place for more than 20 to 30 years and, when they are removed, no evidence will remain of their former presence.

We earnestly hope that favorable congressional action will be taken this year with respect to the suggested amendments and issues discussed above.

Now I would like to go on to the implementation of the act. There are four points which we would like to discuss.

One: The mode of initiating sanctuary proposals.

Two: Misuse of the program for purposes other than the original intent of the act.

Three: Potential redundancy in preparing EIS's, conducting public hearings, and regulating sanctuary areas.

Four: Premature conclusions as to what regulations are needed for a given sanctuary prior to the environmental impact statement preparation and review and the receipt of public input.

I will omit some of these comments because you have them before you. But I would like to say, concerning item 4 above, we note that the proposal documents prepared by the Office of Ocean Management—so called white paper—of which we have as yet seen only the one for the Flower Garden Banks in the Gulf of Mexico, and about that one we have serious questions, apparently will contain proposed regulations, as well as a description of the marine area and its ecologic characteristics.

Inasmuch as this document is to be followed by a draft environmental statement, public hearings, and a final environmental statement, we believe it is premature to propose regulations prior to the receipt of public comment, and publication of the final environmental impact statement. Rather, it would seem appropriate that the comments and discussions involved in the EIS process should be utilized in formulating such regulations as are deemed necessary after these deliberations.

Finally, we would suggest that prior to preparing regulations for a given sanctuary, a very careful and thorough review of existing OCS orders, BLM lease stipulations, USGS regulations, EPA and NEPA requirements, CZM policies and regulations, U.S. Coast Guard policies and practices, and U.S. Corps of Engineers policies and regulations, be undertaken.

When these are found to be inadequate or incomplete in providing protection for the unique reasons for which a sanctuary is established, then we suggest that they be augmented by such additional regulations as are necessary to accomplish the goals and objectives of said sanctuary. Such additional regulations should be issued concurrently with the final approval of sanctuary designation.

Now I come to the part that I really want most to discuss with you today which is the impact of the marine sanctuaries program on oil and gas development.

As noted earlier, we are quite concerned about the relationship of marine sanctuaries currently proposed and those yet to be proposed to pending and future offshore oil and gas exploration and development. Our immediate concern focuses on the proposed California and Alaskan sanctuaries now in the early stages of consideration.

Unfortunately, at this writing we do not have access to maps defining the precise geographic location of the Alaskan sanctuary proposals, although we understand that six of these are currently being studied for "white paper" preparation. Off California we understand five proposals are pending "white paper" reports.

We do not wish to burden you in this discussion with estimates of undiscovered resources, which are often conflicting and confusing at best, nor with prolonged geologic discussions of the merits of this or that region.

However, we do believe it is appropriate to point out the location of several of the largest sanctuary proposals and their relationships to future currently scheduled OCS lease sales.

In so doing, I will refer to maps which I have brought for that express purpose and which, if you wish, I will have copied for your files subsequently.

The following tabulation on page 12 summarizes what we will be observing on the maps. In the ensuing discussion I will note several of the areas which we believe to be the most promising for future oil and gas exploration and development.

Now I would like to show you the maps. It is going to be a bit of a problem because the easel has no headboard.

Mr. BREAUX. Do you have copies of the maps?

Mr. CASSELL. Yes, sir, I turned them into your staff this morning.

Mr. BREAUX. You go ahead and discuss them and we will refer to the maps we have on the desk and you won't have to use the easel.

Mr. CASSELL. All right.

The first and most important, or at least most timely area to mention, is that of the Santa Barbara Channel. That appears on your map entitled "Offshore Leases, Morro Bay to San Diego." This map is at a scale of approximately 1 inch equals 6 miles. On it I have plotted the Santa Barbara sanctuary shaded in solid red. There are also some notations on it relating to oil and gas already produced or known to be in place and some notations showing the rough outline of the basins, sedimentary basins involved, and the like.

Somewhat different than the figure you heard earlier, we find the Santa Barbara Channel sanctuary proposal to be approximately 2,050 statute miles, square statute miles, in size. It in fact involves all of the unleased portions of the Santa Barbara channel and extends actually west somewhat from the mouth of the channel and then swings down around the channel island in a very wide arc, approximately 12 miles wide, around the south of the island. You see it shaded solidly there in red.

All of this area also shown on this map in a heavy dashed outline are the proposed tracts for sale, 48. You can see how those relate to the proposed sanctuary.

Now the Santa Barbara Channel area is a proven oil province. It is not a province about which we can say we hope to find oil or there may be some substantial resources there. It is a proven oil province and the only question remaining before us is simply how much more oil remains there. These figures have been variously estimated from 3 to 400 million barrels and some people feel a great deal more than that.

In view of the fact that there is estimated to be between 700 million and 1 billion barrels in the Santa Ynez unit alone which lies around the northern edge of the channel there, the potential for the remainder of it is probably quite large.

Now also shown on this map are two other of the California sanctuary proposals. One is the San Diego region, the CPO, so called, proposal which we estimate, not including certain State waters that are already in effect in the sanctuary status, to be about 6,500 square miles. It is shown on this map and also shown on the map are the zones that relate to the CPO proposals, zones A, B, C, and D.

One of those zones lying around the coast south of Los Angeles extending south all the way to the border is the zone where oil and gas operations are urged to be totally prohibited. That is a very substantial zone. It extends well over 100 miles probably north-south and 20 miles seaward. So you are looking at another couple of thousand square miles there probably.

Then shaded in red a little further seaward sort of nested in the middle of existing tracts and tracts proposed for sale 48 you will see the Tanner-Cortes Banks proposal which is a smaller one and which is based on a bathymetric contour rather than an arbitrary geometric outline. It is based on the 600-foot contour.

Another area in your map is the sale 53 area. It is enormous. That is a sale schedule for February 1981. It extends on up the coast from Point Conception all the way to the Oregon border. On it we have plotted the sanctuary proposals shaded in red again.

Then there are areas shaded in purple, and don't confuse those with the sanctuary proposals. Those are the negative nominations of OCS tracts submitted by the California Coastal Commission. They are not quite up to date. So the purple is not quite current. I believe the shaded sanctuary proposals are current.

The Farallon Islands—Point Reyes one shows there. It bulges out and hooks onto some land area. It is approximately 1,000 square miles in size. South of it is the Monterey-Big Sur which is around Monterey Bay there. It is approximately 600 square miles in size.

Now the sale 53 area is a frontier area. There have been a few wells drilled there in the tracts sold back in the midsixties. Those did not encounter anything commercially producible at that time. However, it is still felt that the area has substantial potential. The USGS estimates about 1 billion possible barrels of resource within it and many people feel that estimate is conservative. So it is an area that definitely deserves exploring. It is a very, very large area.

Now I have one final map. I did not have time to make a copy of this for you and I was planning to hang this copy up and talk

33-546 O - 78 - 28

about it. Instead of that, I will just bring it up now. I plan to leave you this copy.

The map you have before you now is our best interpretation of the Alaskan sanctuary proposals as we knew of them last fall and, as I mentioned earlier, we have not seen a map, so in attempting to position these very large areas we had to more or less estimate how they might reasonably be placed.

Now in some cases that was not hard because if you are going to have a sanctuary in and around Bristol Bay of 38,500 square miles, it is going to take up all of Bristol Bay and extend out well beyond it so you don't have too much trouble positioning it.

If you are going to have one in the Bering straits that has a dimension of 41,500 square miles, you have to use up all the Straits on the U.S. side of the border and then extend over into the Norton Sound and other areas in order to achieve those dimensions.

I won't take up your time by going through this list. This is not a complete list. It is not all of the proposals that were outstanding at that time. But it is the list of the ones we feel are most critical.

You will see if you look at the list on page 12 that practically all of these relate to a Federal sale either scheduled sometime over the next 2 to 3 years or in some cases to a sale which was on the schedule and has now been dropped. It was formerly on the sale schedule and has now been dropped.

I am sure if you just refer to the list and the map, it will impress you with the magnitude of the problem we feel we are confronting.

Now I will go just to a final comment. Since there is no way to be certain, short of exploratory drilling and testing, whether a given area will be productive of oil or gas, the important consideration is not which areas are most promising or are currently believed to have the greatest resource potential. The important consideration is that these very large, unevaluated areas remain open and available for oil and gas exploration and development. We believe the national interest calls for congressional action aimed at insuring that this is the case, and that our domestic energy resource development program in marine areas is allowed to go forward as effectively and expeditiously as possible.

We appreciate having the opportunity to appear before you today. Please be assured that we stand ready and willing to accommodate you in every possible way in your consideration of this very important issue.

Mr. BREAUX. Thank you very much. I appreciate your testimony and the information that you have given to the committee.

You touched in your testimony on your concern with the involvement of other agencies, that you feel they should have more than just a consultation role. You mentioned particularly DOE and the Department of Interior.

Do you know how much the Department of Interior has been involved with the companies participating in the lease sales in the areas nominated for the marine sanctuaries? Have you been put on notice by the Department of Interior that this is being done or at least considered?

Mr. CASSELL. To my knowledge, our contacts as companies would not advise us as to what extent the other Departments are involved. I actually have the feeling, although it may simply be a

personal viewpoint, that the other Departments are not very much involved.

Mr. BREAUX. You, I take it, are recommending that the other Departments that are involved in the process, instead of being consulted, would actually have a stronger role, perhaps to the point of being able to veto a proposal, if they felt that it was not in the interest of the country?

Mr. CASSELL. Yes, I think that is what I am saying. Certainly they should have a strong enough voice so that when proposals reach proportions far in excess of what is necessary to protect the site-specific resource coral bank or whatever it may be, they should be able to insist that they be reduced to a reasonable size before concurring with their approval.

Mr. BREAUX. You heard the testimony this morning of Mr. Bleicher. I think the question of oil and gas development being compatible with a marine sanctuary area designation is one I am still uncertain on as to what NOAA is interested in doing.

Is it your belief that no development would be allowed within a marine sanctuary area?

Mr. CASSELL. Well, I am going to have to recite a little history here. The first message we got, when Commander Johnson came around last fall in a series of informative meetings, was that the establishment of the sanctuary would not necessarily preclude oil and gas development or other activities, even seabed mining, kelping, and all those kind of things.

However, since then we have been hearing things that filter down to us from contacts principally back here to the effect that, well, no, the concept is that a sanctuary is a sanctuary and sanctuary means nothing, you are preserving the status quo as it exists. Of course, this news we find to be quite alarming.

Earlier this morning we find that each sanctuary should be considered as a specific case. I agree with that view. I think each sanctuary should be considered as a specific case.

However, having looked at the white paper on the Flower Garden Banks, and although that is not my territory but it is the only white paper I have had a chance to see, I don't have a great deal of confidence in this case-specific process. I will tell you why.

I don't want to use up all your time, but we are talking about two coral reefs, one of which is 75 acres in size and the other is 100 acres in size. Put together they have a total area of 175 acres. That is just a little over one-quarter of a mile, .27 square mile. In order to protect this we are talking about creating a sanctuary 518 miles in size, 2,000 times the size of the 2 coral reefs that it is intended to protect.

Then I read on into the regulation, the proposed regulations, and I also have considerable problems with those. They talk about hauling the cuttings and disposing of the drilling fluids and all at great distances from the center of the reefs.

Well, all kinds of scientific studies have been made of the disposal of cuttings and drilling fluids and they all lead to the conclusion that there is no need to do this. In fact, they have specifically conducted studies that showed cuttings from point of discharge never get more than about 150 feet from point of discharge. We are

talking in terms of 10 nautical miles these things have to be removed.

Also, they studied the dispersion of drilling fluids and they found the drilling fluids 600 or 700 feet downstream from the point of introduction into the ocean are dispersed to the point where the sedimentary suspension has the same density it has upstream from the point of dispersal. In other words, it has been returned to normal.

So it seems to me like we are confronted, first of all, with geographically a very unnecessarily large area and then we are confronted with regulations that prescribe overkill, a tremendous overstatement of what is needed to be done to provide the protection.

If this continues and if you then think about it being involved in sanctuaries of thousands of square miles, you begin to have a very difficult time seeing how you are going to be able to conduct any operation.

Mr. BREAUX. Just to the south of the proposed Flower Garden Banks Sanctuary, EPA had an approved chemical dumpsite, and to the south of that area we had an incineration site, where I guess chemicals or solids were burned in the Gulf.

Now the proposal is that you are going to create a sanctuary and not allow anything to be done there. It seems to me that we have a real potential for conflict among various departments.

Is the Flower Garden Banks area considered viable for oil and gas development?

Mr. CASSELL. Mr. Chairman, it is outside my area of geologic experience. I understand, what I believe is the case, is that it is considered to be a favorable area for the discovery and production of natural gas. Whether such a discovery has been made or any potential production is known to be present there, I can't tell you, I am sorry.

Mr. BREAUX. What about the potential in the two proposed sites off Santa Barbara and San Diego?

Mr. CASSELL. Those are, particularly the Santa Barbara, very promising. It has proven oil; it is a basin, and one continuous sedimentary geologic basin that also extends onshore, has already within it a number of very large oilfields, has in the offshore portion a number of very substantial discoveries, including this one of Exxon's Santa Ynez. And, incidentally, just as a matter of interest, this Santa Ynez unit of Exxon's, which is estimated to contain between 700 million and 1 billion barrels of oil, consists of only 18 tracts and part tracts, one-third of the number which would be in the Flower Garden Banks Sanctuary, so we have an area one-third the size of the Flower Garden Banks Sanctuary that is known to contain that amount of oil.

But anyway, there is no question the Santa Barbara Channel is a very promising region, and no question it should be explored. Furthermore, it is an area which is already under development which has already experienced the only major spill that ever reached shores as a result of domestic oil and gas exploration. There have only been 4 in the drilling of 22,000 and some wells. It has totally recovered from that spill. It has no lasting damage, and quite a number of scientific studies have been conducted and show this

clearly, that the marine conditions are extremely healthy in the Santa Barbara Channel now. In fact, under one of the oil company's piers along the coast the harbor seals hang out and live and dwell——

Mr. BREAUX. Mr. Bleicher pointed out in his testimony that the reason the sanctuary was necessary was the fact there were gaps in existing rules and regulations that cover discharges and how an area is to be managed appropriately from the environmental standpoint.

I am not too sure what those gaps are. I think rather than a gap in legislation it might be a gap in enforcement of laws in some areas. You have leases in the Santa Barbara and San Diego areas regulated by BLM, do you not?

Mr. CASSELL. Yes. The USGS is the policing agency and the BLM writes the lease stipulations and the regulations.

Mr. BREAUX. Any discharges or spills, I guess, are also regulated by the EPA and Coast Guard?

Mr. CASSELL. Yes. Different agencies have different responsibilities with respect to water quality and so forth. However, all those things are written into the regulations under which you operate. It is very hard for me to think of these gaps.

Mr. Bleicher mentioned one, and that would be somebody casting anchor on a coral reef. I am not aware of the regulation that prohibits that.

Mr. BREAUX. I think BLM would clearly have the authority to do it. Whether or not they are doing it is something that is questionable.

Mr. CASSELL. I think they probably do, too.

Mr. BREAUX. Thank you very much.

Mr. Hughes?

Mr. HUGHES. Thank you, Mr. Chairman.

I gather that you feel that any of these sanctuaries really should be submitted to Congress for approval since the formula you suggest is that no acreage larger than 10 square miles should be approved as a sanctuary. The net effect is that all sanctuaries would be submitted to Congress?

Mr. CASSELL. I suppose it depends on how many are proposed of dimensions smaller than that.

Mr. HUGHES. I do not know of any.

Mr. CASSELL. Well, the *Monitor* sanctuary is just 1 square mile. I am not familiar with that one, and I have not seen a white paper on the one off Florida.

Mr. HUGHES. In the ones you have listed, the smallest that I recall was 250 square miles.

Mr. CASSELL. Oh, yes. That has been brought to our attention. There were some in the listing that we were given last fall that did not show an area. The area column in that listing was blank, so those could have been smaller. I have no way of knowing.

Mr. HUGHES. I suspect that the net effect of your testimony is that you cannot see very many instances where sanctuaries should be removed from OCS development and that they are compatible. Is that the essence of what you have said?

Mr. CASSELL. I think so.

Mr. HUGHES. That is the thrust of your testimony?

Mr. CASSELL. I think those are my thoughts on it based primarily on empirical information, the experience with which we are familiar.

Mr. HUGHES. Part and parcel of your rationale is that the Congress should pass upon any acreage over and above 10 square miles?

Mr. CASSELL. I think so. I think that what we see as a danger that confronts us is that very large areas would be withdrawn for sanctuaries which should also be explored for oil and gas, and unless provision is made to accommodate the oil and gas aspect of it, then we will be losing considerable resource potential. The Congress should have this in mind and make this decision.

Mr. HUGHES. I think in your testimony you indicated you had certain recommendations. One was that Congress pass upon any sanctuary acreage over 10 square miles, the second being that the Depatments of Energy, Interior and other agencies participate in the decisionmaking?

Mr. CASSELL. Exactly.

Mr. HUGHES. I presume what you are suggesting is that there would be more balance in the decisionmaking if these recommendations were implemented?

Mr. CASSELL. Exactly.

Mr. HUGHES. Thank you, Mr. Chairman.

Mr. BREAUX. Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman, and I thank Mr. Cassell for that testimony. I think it helps shed much light on this problem. I do not have any questions.

Mr. BREAUX. I thank you also for your testimony. I do not have any additional questions. I appreciate your testimony and the committee thanks you very much. Our next group of witnesses will be a panel. I would like them to take the table.

STATEMENTS OF STEPHEN BOYLE, PRESIDENT, GET OIL OUT ORGANIZATION; GEORGE BAILEY, VICE CHAIRMAN, BOARD OF DIRECTORS, COMPREHENSIVE PLANNING ORGANIZATION; PATRICK HEFFERNAN, NATURAL RESOURCE MANAGEMENT POLICY SPECIALIST, PRINCIPAL OF RESOURCES, OFFICIAL REPRESENTATIVE OF SANTA BARBARA COUNTY; AND DR. RUTH CORWIN, PROFESSOR OF ENVIRONMENTAL PLANNING AND ECOLOGY, UNIVERSITY OF CALIFORNIA, LOS ANGELES, COPRINCIPAL OF RESOURCES CO.

Mr. BREAUX. I think Mr. Boyle we have listed first, so go ahead and we will take your testimony. I think we have a copy of your testimony, and of course it will be made a part of the record. I invite you to proceed as you see fit.

STATEMENT OF STEVEN BOYLE

Mr. BOYLE. As you might appreciate, we are going from one extreme to the other in the subsequent pieces of testimony. I am president of Get Oil Out in Santa Barbara and I do want to thank you for the opportunity to comment on the proposed Santa Barbara Channel Marine Sanctuary. We believe the channel would be a worthwhile addition to the short list of existing sanctuaries.

Santa Barbara County has prepared a nomination document which briefly describes the resources—biological, recreational, economic—extent in the channel, and outlines alternative management plans which would rationalize the conflicting demands on these resources. In general, we agree with the plan as outlined in that document.

Rather than repeat the information which has been, or will be, given to you by the county we would like to comment on what we regard as the major deterrent to a meaningful sanctuary program—offshore oil development and production. A related problem is the Alaska oil tanker traffic which unnecessarily moves through the channel on its way between Valdez and Long Beach.

By way of preface, you should be aware that a substantial percentage of Santa Barbara County residents are unenthusiastic about channel oil development. Our organization in particular has focused on reducing the pace of development pending the clear demonstration of a need for this oil and the formulation of a program to extract, process and transport this oil with minimal impact on the quality of life in the Santa Barbara Channel region. In the absence of these elements, we see no alternative to continued opposition to channel oil operations.

It should be obvious that the channel oil is not going away and, in fact, will become more valuable in the future. For these reasons we believe the channel should be made a hydrocarbon reserve—perhaps within the context of a marine sanctuary—and left alone until needed.

I would like to mention that it is frequently asserted resources are locked up. They are locked up legislatively and they can be unlocked whenever any need really arises for them.

It should never be forgotten that oil—along with timber and coal—is quite literally the fat of the earth—stored solar energy. It should be husbanded and used most wisely.

It is sometimes suggested that our position is unrealistic: we are in the midst of an energy crisis—that we need every drop of domestic oil to avoid becoming lackeys of the Arabs. We believe that associated with any crisis there should be certain indicators of that crisis. During the crash of 1929, people jumped out of windows. During hurricanes coastal dwellers head for higher land. In New York during this blackout, people ran about in the streets breaking windows and looting. These were all indicators that something was not right.

But what are the indicators of an energy crisis? We can suggest a few. During an energy crisis we believe that energy conservation measures would not only be legislated but willingly adopted by the vast majority of American citizens. The people of this country are not fools. In a crisis they will respond to a degree more than is asked. This is a can-do Nation. In an energy crisis, beverage containers would be returnable and recyclable so that the wicked waste associated with a throwaway economy would be eliminated. Freight traffic would shift from trucks to the railroads where steel wheels rolling on steel rails are extremely efficient. Simple solar water and space heating systems would be very popular during an energy crisis, and the cost would be low due to the economies of

mass production. Carpooling would be popular and public transportation used to a greater degree than now.

Although today perhaps it is not a good indicator of that. Industry would tighten up its processes to make them more energy-efficient and less polluting. Airline schedules would be adjusted so that most planes were full.

We believe that in an energy crisis all these indicators and more would be present. We ask you, is there an energy crisis?

One indicator does exist whose significance confuses us. The Department of Energy proposes to export California residual oil to Japan. This has, of course, been the oil industry's dream since the routing of the Alaska Pipeline was first selected. The rationale, apparently, is that regulatory economics proves that exporting domestic oil—along with logs and coal—to Japan makes sense. We realize that Washington officials are concerned with weighty matters and need to deal with them in sophisticated ways. However, we would like to suggest again that the people are not fools. At the headwaters of national thought—in your own congressional districts—such an action during an energy crisis can only be thought of as idiotic. One must choose here between the existence of an energy crisis or the existence of idiotic officials. But perhaps we can have both.

We would hope that the management agency of the marine sanctuary would be sensitive and responsive to the views of Santa Barbarans, of the residents on the south coast of Santa Barbara and Ventura County. This situation does not exist now.

An official of the Department of Interior recently spoke in Santa Barbara and assured her listeners that we citizens and our local governments were "participating" along with Interior in formulating the policies regulating channel oil operations—and this is true. We are participating in the same sense that in the drama of walking a plank on a pirate ship the person being poked at with a sword is participating along with the person doing the poking. Our own pleas have had just as much impact on Interior's policies as the pleas of the plank-walkers—zero.

Other regulating agencies are little better. It is, for example, distressing to see the Coast Guard's role in mediating the conflict between OCS oil operations and shipping.

Perhaps the best indicator of how the Coast Guard views its responsibility to prevent collisions between platforms and tankers is the remarkable statement attributed to Admiral Price in the Los Angeles Times recently (Exhibit 3). Responding to the objections of shipping interests to the placement of two platforms at the Long Beach/San Pedro harbor entrance, Admiral Price is reported to have said, "If they don't want anything out there in the water, then let's take Catalina Island out of the ocean." This statement, coming from a Coast Guard official, can only be described as irresponsible.

Really, over the years regarding Admiral Price, we have come to expect the worst from him when it comes to these matters, and I think in that statement he did not let us down.

For the sanctuary to be meaningful, substantive—not symbolic—actions must be taken. We may disagree slightly with the county in the matter.

The sanctuary management program proposed by the county suggests that we monitor the channel resources such as air and water quality and regulate the users of these resources. But monitoring and regulating can be worthless exercises which only document the decline of resources. What value is it to the residents of Santa Barbara to know the exact date when birds were heard coughing in the morning rather than singing? It should be remembered that air quality in Los Angeles is monitored and regulated to a high degree, but to what end? So that the residents not only breathe bad air but read about it too?

There is still oil in the channel waters. I have some samples for you picked upon the beach at Point Conception. And, as discussed in exhibit 4, others pick up oil as well.

This is the Santa Ynez oil referred to by Mr. Cassell. It is a heavy oil. Exxon is having a great deal of difficulty trying to decide where they are going to market this oil. Their own refinery can only handle about 5,000 barrels a day of this stuff. You may have been advised that Interior has considered the environmental impact of oil operations in the channel. Certainly, if report writing and verbal rhetoric is a measure, then the impact has been considered. But for even a 9-pound EIS to be useful, some action must be based on the factual disclosures in the document.

Unfortunately, there is a virtual absence of any planning regarding oil development in the channel. Everything is done on an ad hoc basis as problems develop. If this continues, the quality of life in the Santa Barbara Channel area will be sacrificed totally. Oil production represents a real threat to our air quality, and there is a continuing chance of another major spill due to a tanker accident, an earthquake, or ordinary drilling in the geologically complex channel.

Thus, the impact statements and other documents are simply prepared, filed, and forgotten. They become worse than useless since Interior uses this waste paper as a defense in asserting that it is balancing all needs in managing the channel.

As for the Coast Guard, it views the insults from both air pollution and oil spills with philosophic calm. After all, rarely are lives lost—the Amoco *Cadiz* crew in France was lifted off the ship by helicopter, and so what if 1.6 million barrels of oil are in the water? Time heals all. One university professor will be hired to demonstrate that no lasting ecological damage has occurred. Another will reckon the value of a bird and conclude it is small. Regarding air pollution, the Coast Guard is jealously asserting its sole right to regulate air emissions from tankers, but right now it chooses to do nothing and will permit no other agency—such as EPA or the California Air Resources Board—to do anything either.

With the Amoco *Cadiz* on the rocks off France, with a fishing boat recently sunk by a tanker in our own channel, the assertions in a recent EIS concerned with oil and gas development in the Santa Barbara Channel seem grotesque:

> The past record—no platform-vessel collisions off the west coast—considered along with the present regulations, modern equipment, and the potential platform location areas, is the basis for the Geological Survey's concluding that the probability of a collision between a major ocean-going vessel and Santa Barbara Channel platforms is remote.

And,

During periods of low visibility the existence of modern radar and adequate bridge attention should preclude the danager of collision.

Yet these two paragraphs are the Interior Department's final assessment of the dangers of tanker traffic conflicts in the Santa Barbara Channel. That is in a 9-pound EIS. That was the sum total of what they had to say about tanker traffic.

And remember, one-half the tracts Exxon is now drilling on and plans ultimately to produce from are inside or between shipping lanes as shown in exhibits 1 and 2.

Even the Army Corps of Engineers is regulating things in the channel. The corps issues the basic permit to site a platform.

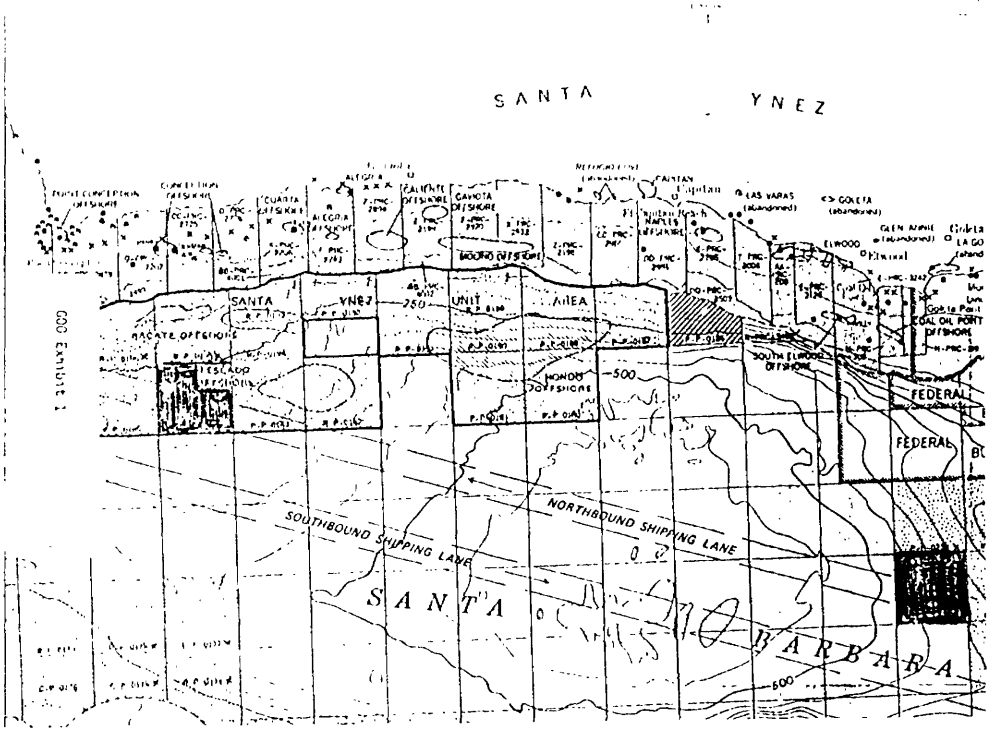
In short, at this time, we have the Interior Department, the Coast Guard and the Corps of Engineers all looking out for the channel—and we see its future as dismal. Would an additional agency—NOAA—change things so that the other lasting values of the channel are protected? If so, sanctuary status for the channel should be provided immediately as an urgent matter.

However, in all candor I think if the addition of NOAA is just to put another oar in the water which is already rather muddy, I do not think that is going to help us out very much.

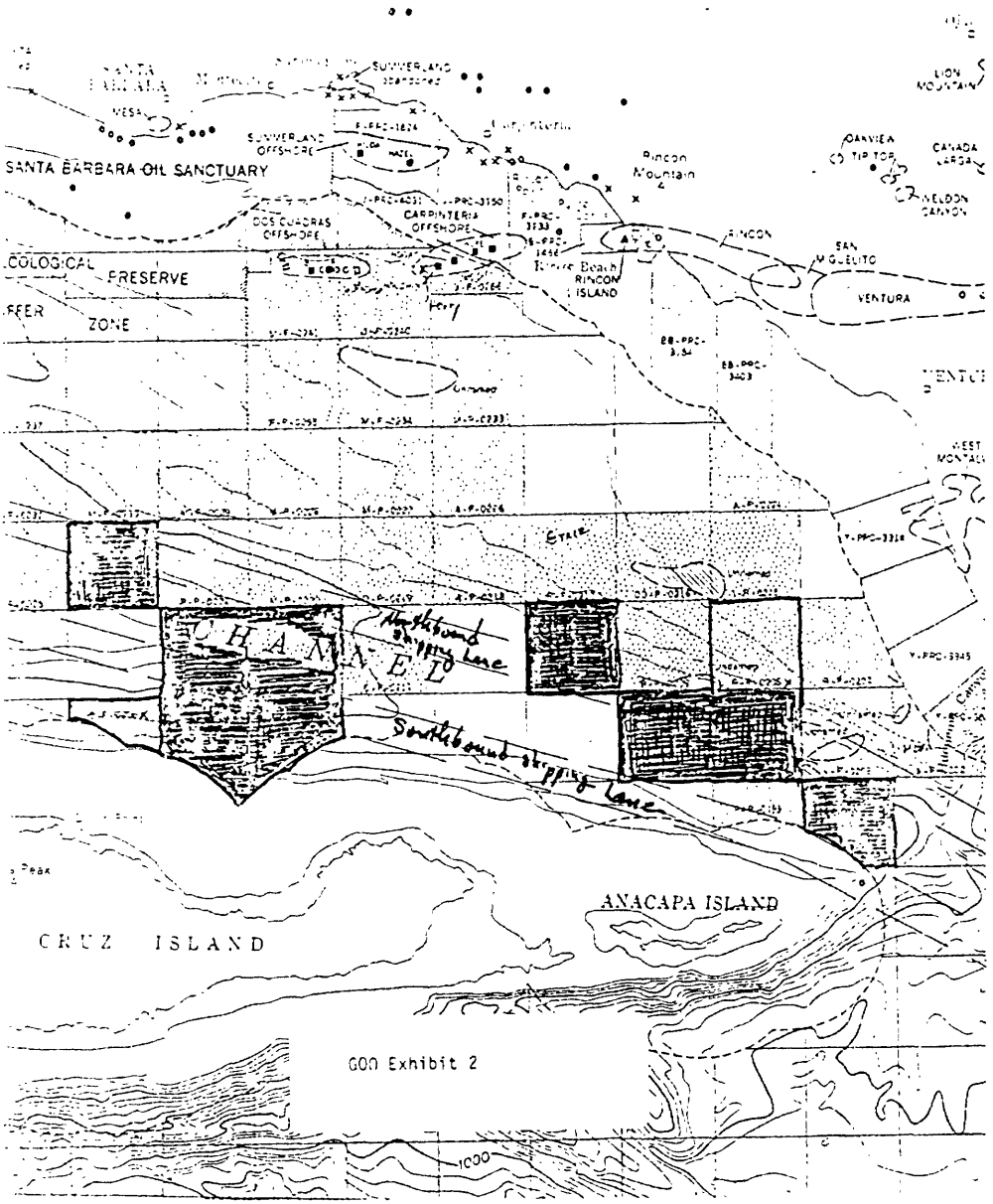
Again, we would like to thank you for inviting us to present this testimony. We do support the notion of a Santa Barbara Channel marine sanctuary to protect the wide variety of marine resources and values extant here. But you must forgive us if we remain pessimistic that a sanctuary will be of any value until the Department of the Interior recognizes that the channel is worth preserving from the environmental insult associated with oil operations in a seismically active, deep water area.

Thank you for your patience. I realize that this has been a rambling presentation, and for this I apologize. We at GOO would be happy to answer any questions that you or your staff may have now or in the future during your deliberations on these matters.

[The exhibits follow:]



BEST AVAILABLE COPY



BEST AVAILABLE COPY

GOO EXHIBIT 3

[From the Los Angeles Times, June 26, 1978]

OIL PLATFORMS POSE HAZARD, SHIPPERS SAY; PROPOSAL FOR TWO DRILLING RIGS AT ENTRANCE OF L.A. HARBOR ASSAILED

(By William C. Rempel and Robert Gore, Times Staff Writers)

A navigational "minefield" will be created at the entrance to the busiest port complex on the West Coast—Los Angeles and Long Beach—by two proposed Shell Oil platforms, shipping officials have protested to the Army Corps of Engineers.

The twin platforms—rising 241 feet above the water and covering 3.6 acres—would be stationed between two shipping lanes for incoming and outgoing traffic south of the harbor.

"We feel this would be an unacceptable hazard to navigation," said Philip Steinberg, president of the Pacific Merchant Shipping Assn. in San Francisco.

"They want to put these platforms on the front porch of the busiest port in the West. We'd end up with a veritable minefield of obstacles. It invites a catastrophe," he added.

Also protesting the platforms are an association of Southern California shippers and a San Francisco group representing ships' captains who warn that sudden and dense fog coupled with small craft congestion makes the area "complicated and dangerous" even without the platforms.

Shell paid $71.3 million in 1975 for a five-year lease from the United States Geological Survey to prospect on nine square miles of undersea land known as the Beta Tract.

Other oil companies also have acquired federal offshore oil leases, but Shell is the first to make formal application to construct a $100 million permanent drilling rig in waters 14 miles south of the harbor.

The federal leases are part of a national policy to encourage development of energy independence through exploitation of American oil reserves.

Coast Guard officials, who will play a key role in advising the Corps of Engineers about the safety of the platforms, say they would prefer that no platforms be built in the area.

"But we recognize that this is unrealistic in keeping with the national interest," said Rear Adm. Robert I. Price. He did not support the objections of shipping groups.

"If they don't want anything out there in the water, then let's take Catalina Island out of the ocean," Price said.

Others suggest that the platforms could actually be aids to navigation. They would be lighted and—in the case of the Shell platforms—would mark the separation zone between oncoming traffic.

"We don't need navigation aids in the middle of the water," Steinberg countered. "These ships don't handle like sports cars. A fixed platform restricts the flexibility of ship maneuvers in the case of emergencies or navigation errors."

Indicating tentative approval of the Shell application are officials of agencies including both ports, the State Lands Commission, Coast Guard, the USGS and the Corps of Engineers—which could be as much as 10 months away from taking a formal stand on the issue.

Opponents of the applications want a public hearing before that action is taken. They contend that approval of the Shell application could pave the way for many other applications.

"Ultimately, there could be too many drilling platforms," conceded a Corps of Engineers official. "But that decision will be made here. We're trying to balance navigational safety, national security and the public interest."

The prospects of more platforms following the Shell platforms further concerns shippers.

"It takes only one platform . . . to cause a catastrophic accident," Steinberg said. "A number of these platforms increases the chance of accident."

He warned of conflict between oil and shipping interests.

"We don't want to get to the point where everyone is staking claims—like the old 49ers—to deep-water areas near ports that are essential to safe navigation," Steinberg said.

GOO EXHIBIT 4

[From Zoo-Logic, vol. 7, No. 2, 1978]

FUNDS ARE NEEDED FOR THE OILED BIRDS

Since the oil spill of 1969, the Santa Barbara Zoo has been taking in hundreds of tarred and injured sea birds. Ours is the only facility in the Tri-Counties, and birds are brought here from as far north as Morro Bay and from as far south as Los Angeles. No bird in need is ever turned away, and frequently we have over one hundred residing here at one time. All are fish eaters and like all birds must eat often. We feed them all they can eat four times a day. This amounts to approximately 14,600 pounds of fish a year at an annual cost to the Zoo of many thousands of dollars.

We are in desperate need of a new care facility with spacious pools and heated treatment area. While practically all the birds have to be cleaned, a great many require surgical treatment, and we need to be able to afford a veterinarian to perform these services. The problem facing the sea birds will never disappear because natural seepage forms patches of floating tar through which they dive or swim.

At present, we do all we can to help these distressed birds, but without funds for proper facilities and trained personnel, our efforts are limited in their success. With your help, many more of these birds will completely recover and can be returned to the wilds where they belong.

Won't you please share our concern about these wild creatures and help us to lessen their suffering. (All donations are tax deductible.)

Mr. BREAUX. Thank you very much. I appreciate your testimony. We will have some questions after all the witnesses have had a chance to make their presentations.

Our next witness is Mr. George Bailey.

STATEMENT OF GEORGE BAILEY

Mr. BAILEY. Thank you, Mr. Chairman. In deference to Mr. Forsythe, who has left the room, I am the senior city councilman in the San Diego region. I have not stuck around that long. Being a reasonable man, I think you will find our proposal and nominations are very reasonable.

With the permission of the Chair, I will summarize our testimony to make it a little more brief.

Mr. BREAUX. Without objection, your entire statement will be placed in the record.

[The statement follows:]

STATEMENT OF GEORGE BAILEY, VICE CHAIRMAN, THE COMPREHENSIVE PLANNING ORGANIZATION OF THE SAN DIEGO REGION

MR. CHAIRMAN and members of the subcommittee, my name is George Bailey and I'm Vice-Chairman of the Comprehensive Planning Organization of the San Diego Region (CPO). I want to express my appreciation to the Committee for this opportunity to appear before you to discuss CPO's nomination of a marine sanctuary off the San Diego and Orange Counties coastline.

Before I discuss the nomination, allow me to make a brief statement as to the organization of CPO. The Comprehensive Planning Organization is the regional council of governments for the San Diego, California, area. CPO's member jurisdictions are the fourteen cities and County of San Diego. As such, CPO undertakes various regional planning programs on behalf of the member units of government in a cooperative and coordinated manner. The policy guidance for the staff is provided by the Board of Directors which is comprised of one elected representative from each of the fifteen member agencies.

This nomination is a reflection of the vital economic and environmental interests of this region. It emphasizes the need to strike a balance between those concerns and any potential development which would adversely effect these most important resources of San Diego and Orange Counties. This area is characterized by an excellent climate, recreational facilities and over 100 miles of sandy Pacific Coast shoreline that ideally suit it for a diversified tourism industry. Nevertheless, air pollution in the San Diego/Orange County area is a problem that must also be mitigated. Therefore, close control of offshore and onshore developments will be necessary to meet Federal standards. From the economic perspective, in 1976 the revenue from the tourism industry alone was almost $920 million. In addition, the federal establishment, through the Department of Defense, will spend

approximately two billion dollars a year to maintain its military operations. Further, the commercial fishing industry is a very important part of the economic base of the area. With this as background, then, it can be seen that what we are dealing with here is an issue of both economics and environment. An issue vital to our region--and an issue which we approach with the purpose of insuring that our concerns and that of the nation are properly accounted for--and that any potential developments offshore do not unnecessarily degrade this great resource.

The sanctuary CPO has nominated is depicted on the attached map. This area is approximately 7,400 square miles and encompasses the area from Pt. Vicente to the International Border and from the three mile state jurisdiction boundary westward 87 miles on the south and 105 miles on the north. As the map reveals, the sanctuary is sub-divided into three zones. Zone A is the nearshore area which extends from Dana Point to the southern boundary and from three to twenty miles westward. Zone B is the three-mile state jurisdiction encircling the islands of Santa Catalina, San Clemente, Santa Barbara, and San Nicholas. Zone C is the large area not subscribed by the other zones. We have recommended that the National Marine Fisheries Office in La Jolla be designated as the management agency for the sanctuary. This agency is currently responsible for monitoring and managing fish and marine mammal stocks. They have prepared plans for managing fish stocks through the Pacific Fisheries Management Council. Their staff of biologists and oceanographers are uniquely equipped for this role. Because of its proximity to the sanctuary and other local institutions, like Scripps Institution of Oceanography, it could establish cooperative working arrangements for research vessels and information exchange. Finally, we have recommended that an Executive Board made up of representatives from public and private organizations would work with National Marine Fisheries to provide a local oversight role.

Generally stated, our rationale for nominating this area is as follows:

1. The economic interests of San Diego and Orange Counties are directly affected by the users of this area. For example, the Navy has a major fleet operating area within the proposed sanctuary. High density operations are conducted on a daily basis in both the airspace and waterspace. Typical operations

include all weather fleet training, refueling, test flights, all weather flight training, carrier and submarine operations and amphibious training at Camp Pendleton. Another example is the recreation and tourism industries. The Orange County Planning Department estimates that twenty million visitors annually utilized the County's 42 mile stretch of coastline. In that same year, the visitors industry provided direct employment to 52,000 San Diego residents, many of which are unskilled workers. A final example is that of commercial fishing. The value of all commercial species of fish landed within the ports of San Diego, Oceanside and Newport Beach in 1975 totaled almost three million dollars, this does not include the revenue from the tuna fleet which operate outside the nominated area.

The designation of this sanctuary would insure that these multiple and varied uses, which are critical to the economic fabric of our coastal communities, will be protected from potential development which could irreversibly impact their operations. In the case of the Navy, it is not only in our local interest but in the National interest, as well, given their military mission.

2. San Diego's Air Pollution Control District (APCD) has the responsibility to permit new development and enforce the air quality regulations to attain the National Ambient Air Quality Standards. Emissions from OCS activities would seriously add to the pollutant load onshore and yet the APCD has no jurisdiction over OCS developments or activities. For example, it is estimated that nearly 13% of this area's emissions problem is created by tankering operations. Our local estimation is that it will cost nearly 70 million dollars to mitigate against those emissions. The Bureau of Land Management in preparing the environmental statements for Lease Sale No. 48 estimates emissions resulting from oil and gas development on the area to be leased and not the individual APCD's areas. San Diego must inventory and plan for offsetting emissions over which it has no initial regulatory control. The marine sanctuary program provides an opportunity to monitor the environmental effects of OCS development and insure consistency of development with required air quality maintenance plans.

3. Some of the impetus for this nomination is the possible negative impacts which could result from the oil and gas development of Lease Sale No. 48.

This lease sale is scheduled for June of 1979, and it involves numerous three mile square tracts both inside and outside the nominated sanctuary. The idea to nominate a sanctuary was developed from the President's May 23, 1977 Environmental message to Congress in which the Commerce Department was instructed to "identify possible sanctuaries in areas where development appears imminent, and to begin collecting the data necessary to designate them as such under the law." Oil and gas development does not exist in the southerly two-thirds of the nominated area. The "imminent" development for this area is one in which Southern California has had a vivid example of in the Santa Barbara blowout. The eventuality of such an occurrence along the Orange or San Diego coastline would adversely affect the local economic interests and environmental resources which are a foundation of the coastal communities. Many of the areas proposed for drilling are frontier areas involving great water depths and the utilization of pioneer technology to retrieve the oil or gas. The USGS estimates of oil and gas when converted to national consumption figures reveal that there is only a 36 hour supply of oil and 15.2 hour supply of gas for the nearshore tracts. However, notwithstanding the viability of oil and gas extraction CPO sponsored research revealed that the area should be nominated whether or not there is oil and gas development because the area is important for its own values.

4. As a habitat, the topography of the Southern California Bight provides a combination of unique physical features and productive waters for a large and diverse marine community that is unequalled in northern temperate waters anywhere in the world. The topography that is present onshore in Southern California is extended offshore and comprises the Southern California Bight. The bottom lands incorporate canyons, escarpments, banks, and troughs which are favored fishing locations. The steady northwest winds in the spring and early summer move the warmer surface waters offshore and allow an upwelling of the colder subsurface waters. The upwelled water is rich in nutrients that stimulate the production and growth of plant plankton. The increased production attracts the various intermediate members of the food chain until the mammals and seabirds are attracted to the area.

5. The dominate mammal and seabird species that are in abundance within the area forage on the members of the intermediate food chain. The presence of

these species affect the migratory patterns of the larger dominant mammals like the dolphins and whales. Several species of seabirds are also attracted to this area for similar purposes.

6. The area which is delineated as Zone A is specifically subscribed because of the recreational, research, and aesthetic characteristics of the area. This area, because of its proximity to the shoreline, is most frequently used for recreational and research purposes. This area is often viewed from the shoreline as one which has a unique aesthetic value. The economic value of this area in its present state is an integral component of the economic base of the shoreline counties and communities.

The restrictions we envision for the sanctuary are predominately oriented towards future activities which could adversely impact the area. The Comprehensive Planning Organization Board of Directors specifically exempted the commercial fishing industry and the ocean wastewater treatment outfalls from Marine Sanctuary regulations and it also recommended that oil and gas development be precluded in Zone A. The local concern is that new technology will increase the interest of various industries to utilize this area for their purposes which may be contrary to the best economic and environmental interests of the region. The establishment of a sanctuary will enable local issues to be properly taken into account in the context of overall national objectives when new projects are proposed.

It has been suggested that the specific laws which are administered by the Department of Commerce, Department of Interior, Department of Defense, or the State Department of Fish and Game would protect the area from adverse activities. That idea is not accepted locally because of the segmentation of agency authority which results in confusing or conflicting regulations among programs. The sanctuary program as we have recommended it would provide a comprehensive and more efficient management approach to the area. It is our desire to consolidate the various rules and eliminate those that are duplicating or conflicting in their intent and enforcement.

Concern has been expressed over the size of the proposed sanctuary. Locally, the Sierra Club and Community Congress have been arguing for a much larger

sanctuary. The nomination is generally supported by the Board of Supervisors from both San Diego and Orange Counties; the cities of San Diego, Del Mar, Oceanside, Laguna Beach and Newport Beach; the San Diego Regional Coast Commission; Congressman Lionel Van Deerlin; and the CPO Board of Directors. A citizens group, Concern for Offshore Oil Leasing (COOL), and the Convention and Visitors Bureau for San Diego County also support the nomination. Locally the nomination has achieved a high level of public awareness through extensive media coverage and numerous workshops sponsored by private organizations and public groups.

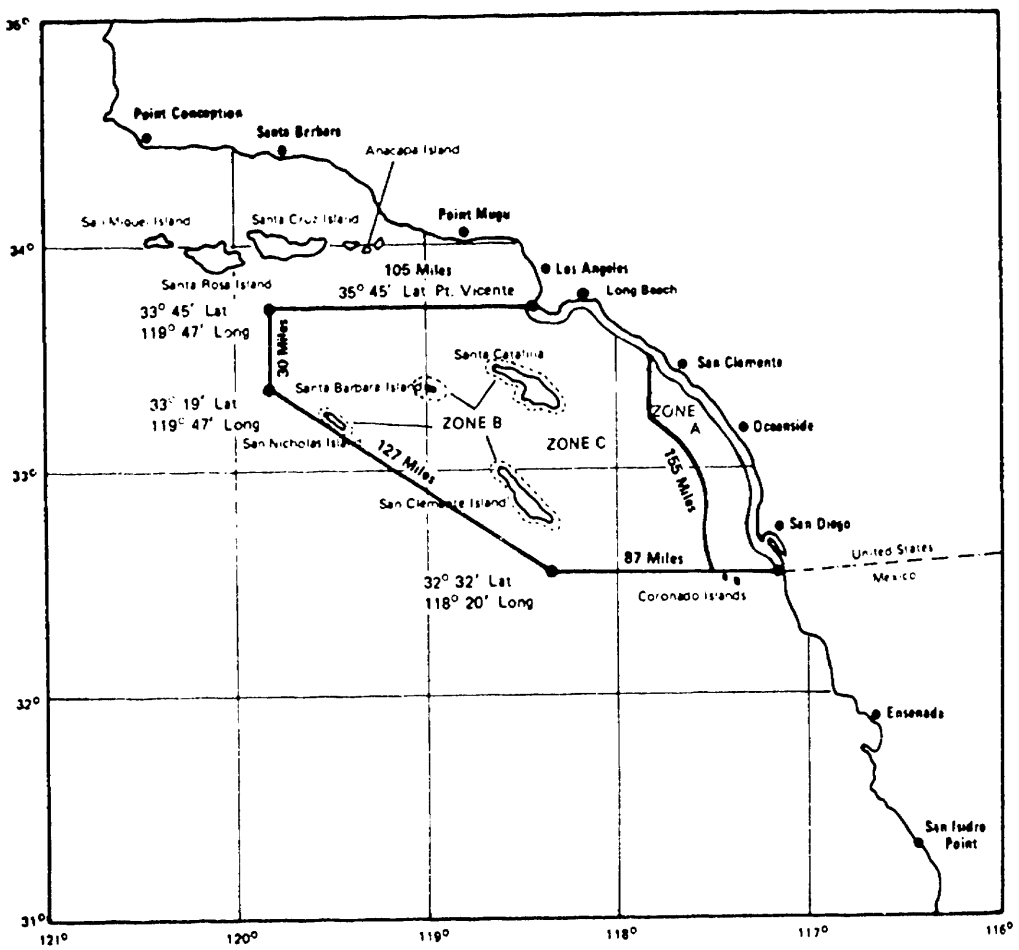
In summary, we feel the area is worthy of nomination as a marine sanctuary for its own values. The protection of the area is in the environmental and economic interests of Orange and San Diego Counties. The thrust of the regulations would focus on new development projects and would preclude inappropriate resource removal activities, assist local governments in meeting their air quality goals, monitor the affects of OCS development, provide a management authority to examine the cumulative impacts of OCS development, and enhance the multiple users of the area which economically support the shoreline communities. Additionally, we are hopeful that a sanctuary would promote further research in this area so that we can learn more about the Southern California Bight and its marine environment.

The importance of the sanctuary nomination cannot be overstated from our local point of view. We clearly feel that future inappropriate OCS developments in this frontier area would measurably detract from the quality of life that exists in the Orange and San Diego County communities. The environmental resources, both onshore and offshore, are singularly the greatest physical and economic asset to the coastal areas. They are the reason why two-thirds of the County's population reside in proximity to the coastline. The environmental assets are also the reason for the enormous influx of visitors and tourists to this area. The marine sanctuary program provides us with an opportunity and challenge to insure that the economic and environmental interests which are so vital to the Counties can be protected and enhanced for future generations. Without the sanctuary, we must address each OCS development in a piecemeal or fragmented manner. With the sanctuary we will be able to establish a partnership with the State and Federal government to develop a cooperative management approach for this area. We know the sanctuary designation is in our local interests and in our judgement it is in the interests of California and the country as a whole.

Thank you for the opportunity to present these remarks. We look forward in working with you and the Office of Ocean Management in the consideration of our marine sanctuary nomination.

Questions.

FIGURE 1
PROPOSED NOMINATION AREA*



*The staff of the Comprehensive Planning Organization is solely responsible for the conceptualization, delineation, and description of the sub-districts within the proposed marine sanctuary

STATEMENT OF CONGRESSMAN LIONEL VAN DEERLIN

TO PUBLIC WORKSHOP ON NATIONAL MARINE SANCTUARIES PROGRAM

BAHIA HOTEL - San Diego - April 18, 1978

I appreciate this opportunity to go on record in support of the proposal by the San Diego Comprehensive Planning Organization to designate a Marine Sanctuary off the SouthernCalifornia coast.

Our 65 miles of sandy beaches in San Diego County are a priceless resource that must be protected against avoidable future damages. The beaches have had a rough winter, and in many areas been largely washed away by the recurring storms. Perhaps there is not much we can do to avert the consequences of wind and rain and other natural phenomena; we certainly should be able to prevent the heedless depredations of man.

We have been fortunate in San Diego not to have suffered a catastrophe such as the oil spill that blackened the beaches of Santa Barbara in January, 1969. The consequences would be even more hideous if it happened here.

Scientists such as Dr. William Evans of the Hubbs-Sea World Research Institute have made graphically clear that this is no ordinary seabed we are talking about here -- with the usual shelf-and-slope configurations.

Rather, the area immediately off our shores is a literal extension of our land, a contintental borderland with its own mountains and valleys capable of sustaining an astonishing variety of life. The proposed sanctuary is part of a larger area known as the "Southern California Bight" which because of its topgraphical distinctions is unique in the United States and one of only a handful of such areas in the world. The Bight supports a remarkable food chain, no link of which can be broken without disruptive affects all up and down the line. We tamper with the chain at our peril.

Besides being a habitat for much of our food stocks, the waters off our coast support large-scale commercial and sports fishing, commercial shipping and on-shore industrial development. Our sparkling oceans also provide the backdrop for some of the most spectacular scenery in the world, a coastal strip that is a prime recreational attraction for millions of Southern Californians and visitors.

I am not against development taking place in the offshore waters, so long as it is compatible with the values I have just enumerated. I believe the sanctuary proposal as developed by the Comprehensive Planning Organization strikes a reasonable balance between environmental concerns and our need for new energy sources.

The sanctuary designation would permit orderly management of precious resources while allowing carefully controlled development. Offshore exploration for oil and gas would not necessarily be precluded -- but drilling for and transportation of these fuels would certainly be carefully regulated.

I understand also there would be little if any adverse impact on our domestic fishing industry from establishment of a sanctuary in these waters. My own support would ultimately be conditioned on fair treatment for the fishermen, who were operating in these waters long before the oil companies and whose livelihood depends on continuing access to the harvest of the seas. I don't really envision a problem here, however; overall, this proposed sanctuary seems fully consistent with the intent of Congress in enacting the Marine Protection, Research, and Sanctuaries Act of 1972.

# # # #

SAN DIEGO REGION'S COUNCIL OF GOVERNMENTS

RESOLUTION #78-81

COMPREHENSIVE
PLANNING ORGANIZATION
Suite 524
Security Pacific Plaza
1200 Third Avenue
San Diego California 92101
(714) 236-5300

APPROVAL OF THE DOCUMENT ENTITLED,
NOMINATION OF CERTAIN OFFSHORE WATERS
OF SAN DIEGO AND ORANGE COUNTIES

WHEREAS, the Board of Directors did authorize CPO staff to prepare a Marine Sanctuary Nomination Document (Resolution 77-107); and

WHEREAS, the report entitled Nomination of Certain Offshore Waters of San Diego and Orange Counties has been prepared in accordance with Resolution 77-107 and the appropriate Federal guidelines; and

WHEREAS, said report was accepted for distribution by the Board of Directors (April 17, 1978) and was distributed to relevant local, state, public, and private organizations; NOW THEREFORE

BE IT RESOLVED that the Board of Directors approves the document and its submission to the Office of Ocean Management with the following amendments:

1. The commercial fishing industry be exempted from Marine Sanctuary regulations.

2. The ocean wastewater treatment outfalls at Oceanside, Encina, San Elijo and Point Loma be exempted from Marine Sanctuary regulations.

3. The Orange County Board of Supervisors and coastal cities be included as representatives on the Advisory Board;

4. The Gillnetters Organization be listed as a possible organization to have representation on the Advisory Board;

5. That the staff report which addresses the comments received regarding the Nomination be incorporated into the final report;

6. That the Board of Directors reserves the right to reconsider their support of this Nomination at the "White Paper", Draft Environmental Impact Report, and draft rules and regulations' steps in the designation process.

7. The Advisory Board which was intended to maintain local support and interest in the Sanctuary and would include representatives from numerous public and private agencies would be changed to an Executive Board with policy and decision making authority.

PASSED AND ADOPTED this 19th day of June, 1978.

CHAIRMAN

Attest: SECRETARY

MEMBER AGENCIES Cities of Carlsbad Chula Vista Coronado Del Mar El Cajon Escondido Imperial Beach La Mesa Lemon Grove National City Oceanside San Diego San Marcos Vista and County of San Diego / EX-OFFICIO MEMBER California Department of Transportation HONORARY MEMBER Tijuana B CFA

SAN DIEGO COAST REGIONAL COMMISSION
MINUTES
FRIDAY, JUNE 16, 1978 - 9:00 A.M.
CALIFORNIA STATE BUILDING
1350 FRONT STREET
SAN DIEGO, CALIFORNIA
92101

COMMISSIONERS PRESENT

Tim Cohelan, Chairman
Roger Hedgecock, Vice-Chairman
Jeffery Frautschy, State Commission Representative
Tom Gade
Harriet Allen
Tom Hamilton
Richard Rypinski
Will Hyde
Gordon Williams
Paul Graham

COMMISSIONERS ABSENT

Rita Luftig

EXECUTIVE DIRECTOR

Bruce H. Warren

REGIONAL COORDINATOR

Alan Friedman
(Deputy[absent])

DEPUTY ATTORNEY GENERAL

Anthony Joseph
Anthony Summers

STAFF

Chuck Damm
Steve Helms
Mary O'Connell

CALL TO ORDER

The meeting was called to order at 9:00 A.M. by Chairman Cohelan and the minutes of the Commission meeting of June 2, 1978 were approved.

ATTORNEY GENERAL'S REPORT

None

STATE COMMISSION REPRESENTATIVE'S REPORT

C. Frautschy announced that the next meeting of the State Commission will be on June 20, 1978 and June 21, 1978 in Los Angeles. C. Frautschy stated the Commission will hear the Issue Identification and Work Program for the City of Oceanside as well as a number of appeals from the San Diego Region. C. Frautschy further stated that the Commission will be considering a revision of the Interpretive Guidelines for the construction of sea walls.

EXECUTIVE DIRECTOR'S REPORT

Mr. Warren reviewed the agenda and addendum material for the Commission and identified those projects for which letters and evedence in support and in opposition had been received.

Mr. Warren announced changes in the agenda to wit:

Final Vote items F6953, F6867 and F7075 have been delayed.

Regular Calendar items F6996 and F7118 have been delayed.

Mr. Warren advised the Commission that they do not need to take any further action with regard to supporting the Comprehensive Planning Organization's nomination of Marine Sanctuarys. Mr. Warren stated a resolution adopted by the Commission several months ago set forth the Commission's support of the designation of Marine Sanctuarys by C.P.O.

Mr. Warren advised the Commission that he had suspended the Coastal Permits for two projects, F6917 and F6966, which also have been appealed to the State Commission. Mr. Warren stated he suspended the permits because of improper notification prior to the public hearing and a possible parcel split with a Coastal Permit.

Julie and Joel Brownell certified for the record their opposition to projects F6917 and F6966.

ADMINISTRATIVE PERMITS

F7119 2nd story addition to managers unit of existing apartment-motel. Addition would provide relocation of bedroom, and add a sewing room and bath.

SPECIAL CONDITION:

1. That prior to the issuance of a Coastal Development Permit the applicant agrees to re-designate a painted walkway-area as parking. Resulting total of 6 spaces are to be retained for parking.

Site: 722 Diamond, north side between Mission and Ocean Blvds., Pacific Beach, San Diego (APN 415-522-09).

Construction Cost: $23,000.00

Applicant: Wallace Henshaw

No. 10 THURSDAY, JUNE 1, 1978

RESOLUTION SUPPORTING THE MARINE SANCTUARY NOMINATION FOR A COASTAL AREA OFFSHORE OF SAN DIEGO AND ORANGE COUNTIES

On Motion of Supervisor Hedgecock, seconded by Supervisor Hamilton, the following resolution is adopted:

(1) WHEREAS, Title III of the Marine Protection, Research and Sanctuaries Act of 1972 provides for the designation of Marine Sanctuaries for the purpose of preserving coastal and ocean waters for their conservation, recreational, ecological, or aesthetic values; and

(2) WHEREAS, marine sanctuary designation provides a positive environmental management system; and

(3) WHEREAS, the Marine Sanctuary Nomination Document describes a proposed sanctuary area offshore of San Diego and Orange Counties (shown on the attached map) which contains valuable marine ecosystems deserving protection from such activities as offshore oil and gas production;

THEREFORE, BE IT RESOLVED that the Board of Supervisors of the County of San Diego supports the submission of the Marine Sanctuary Nomination of the designated area to the U. S. Department of Commerce.

PASSED AND ADOPTED by the Board of Supervisors of the County of San Diego, State of California, this 1st day of June, 1978 by the following vote:

AYES: Supervisors Hamilton, Moore, Hedgecock and Taylor
NOES: Supervisors None
ABSENT: Supervisors Bates

- - -

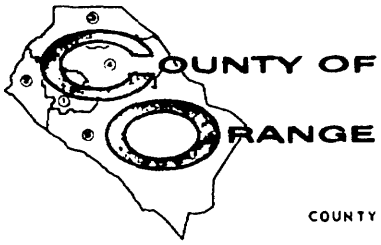
STATE OF CALIFORNIA)
County of San Diego) ss.

I, PORTER D. CREMANS, Clerk of the Board of Supervisors of the County of San Diego, State of California, hereby certify that I have compared the foregoing copy with the original resolution passed and adopted by said Board, at a regular meeting thereof, at the time and by the vote therein stated, which original resolution is now on file in my office; that the same contains a full, true and correct transcript therefrom and of the whole thereof.

Witness my hand and the seal of said Board of Supervisors, this 1st day of June, 1978.

PORTER D. CREMANS
Clerk of the Board of Supervisors
By Lorena Monteleone
Deputy

(SEAL)



COUNTY ADMINISTRATIVE OFFICE

R. E. THOMAS
COUNTY ADMINISTRATIVE OFFICER

COUNTY ADMINISTRATION BUILDING
515 NORTH SYCAMORE STREET
SANTA ANA, CALIFORNIA 92701

TELEPHONE 834-2345
AREA CODE 714

June 9, 1978

RECEIVED BY
COMPREHENSIVE
PLANNING
ORGANIZATION
JUN 15 1 5 PM '78

Paul Graham, Chairman
Comprehensive Planning Organization
Suite 524
Security Pacific Plaza
1200 Third Avenue
San Diego, CA 92101

Dear Mr. Graham:

On May 30, 1978 our Board of Supervisors adopted a position supporting the Comprehensive Planning Organization's (CPO) proposal for a Marine Sanctuary. We support this proposal with two modifications. One is that the Advisory Board be changed to an Executive Board with policy and decision making authorities and powers. The second is that the document be amended to include representatives from an Orange County coastal city and the County of Orange.

I'm enclosing a copy of the Transmittal letter which the Board approved for your information.

If you wish any additional information please contact K. Paul Raver at 834-3831.

Sincerely,

R. E. Thomas
County Administrative Officer

AM:mle
Attachments

AGENDA ITEM
TRANSMITTAL

Return to CAO

TO: BOARD OF SUPERVISORS COUNTY OF ORANGE

FROM COUNTY ADMINISTRATIVE OFFICE

CONTACT FOR INFORMATION
K. PAUL RAVER — NAME
3831 — PHONE

MEETING DATE	SUBJECT	SUPV. DIST.
MAY 30, 1978	ESTABLISHMENT OF A MARINE SANCTUARY	

SUMMARY OF REQUEST (Description for agenda)

The San Diego Comprehensive Planning Organization (CPO) will be filing Nomination Documents for the establishment of a Marine Sanctuary off the coast of Orange County. CPO is asking for your Honorable Board's concurrence in the filing of these Documents, copies attached.

ADDITIONAL DATA:

It should be noted that this document (page 11) proposes to exclude oil and gas development in Zone A which extends primarily along the San Diego coastline three to twenty miles offshore from Dana Point south to the Mexican Border. Given this nations energy problems, this item is being highlighted as a Board policy item.

PREVIOUS RELEVANT BOARD ACTIONS ON THIS SPECIFIC ITEM:

Your Honorable Board supported the establishment of a Marine Sanctuary on December 6, 1977 - Resolution 77-1893.

FUNDING SOURCE(S)	CURRENT YEAR COST	ANNUAL COST	BUDGETED?
N/A	N/A	N/A	☐ YES ☐ NO

WILL PROPOSAL REQUIRE ADDITIONAL PERSONNEL?	CONSISTENT WITH BOARD POLICY?
☒ NO IF YES, STATE NUMBER ___ PERMANENT ___ LIMITED TERM	☒ YES ☐ NEW ITEM OR EXCEPTION

RECOMMENDED ACTION

1. Reaffirm your support for the establishment of a Marine Sanctuary.

2. Support the recommendations of the CPO with the following exceptions:
   a) That the Advisory Board be changed to an Executive Board with policy and decision making authorities and powers.

   b) That the document be amended to include representatives from an Orange County coastal city and the County of Orange.

CONCURRENCES (If applicable)

I certify that this agenda item complies with Section 29 of the Board rules of procedure.

DATE

AGENCY OR DEPARTMENT AUTHORIZED REPRESENTATIVE
R.E. Thomas
County Administrative Offi...

RESOLUTION NO. 221102 R. 78-2580
JUN 12 1978

WHEREAS, the Board of Directors of the Comprehensive Planning Organization of San Diego County ("CPO") authorized the preparation of a Marine Sanctuary Nomination Document and a Grant Agreement with the California Coastal Commission to assist in this effort by a resolution adopted on September 19, 1977, numbered 77-107; and

WHEREAS, this action was based upon Agenda Report No. R-20 (OCS Lease Sale #48 and Marine Sanctuary) dated September 19, 1977 to the Board of Directors of CPO; and

WHEREAS, THE City Council of The City of San Diego desires to place itself on record concerning this matter; NOW, THEREFORE,

BE IT RESOLVED, by the Council of The City of San Diego, as follows:

That The City of San Diego supports the concept of the Nomination of a certain ocean area off the California coast as a Marine Sanctuary provided that (1) said Nomination Document be amended to provide that there be an exemption for commercial fishing within the area; and (2) that any nomination not preclude the City from continuing to pursue its application for a waiver from the requirements for secondary treatment of waste water as provided for by Federal law.

APPROVED: JOHN W. WITT, City Attorney

By C. M. Fitzpatrick
Senior Chief Deputy

CMF:vl:605.10
6/22/78
Or. Dept.: City Clerk

RECEIVED BY
COMPREHENSIVE
PLANNING
ORGANIZATION
JUL 5 8 47 AM '78

June 30, 1978

Mr. Richard J. Huff
Executive Director
Comprehensive Planning Organization
Suite 524
Security Pacific Plaza
1200 Third Avenue
San Diego, CA 92101

Dear Mr. Huff:

This letter is in response to the "Marine Sanctuary Nomination Document, Southern California Bight" we received May 8, 1978. My apologies for this very late response. Our Marine Safety Department studied the document and made recommendations, which were studied by the City Council. So, a thorough job was done, if not a timely one. We agree with the conclusion that the designation of the Southern California Bight as a Marine Sanctuary is a necessary action.

Listed below are some comments and/or reservations aimed primarily at the document itself:

1. On page 86 the statements are made that you "do not anticipate the need for regulations that prohibit non consumptive uses" and that "consumptive uses should be permitted to the extent allowed by state or federal legislation." We feel that these statements should be amended to explicitly mandate that no further regulations will, in fact, occur.

2. The Southern California Bight covers a large coastal area between Los Angeles and the Mexican border. Although you mention that the impetus behind this proposal is the potential environmental hazards produced by oil exploitation, we also feel strongly about the "sanctuary for its own merit." Therefore, we feel that if an advisory board were established to draft policies for management, etc., the coastal communities in the Bight should be duly represented.

505 FOREST AVE. • LAGUNA BEACH, CA 92651 • TEL (714) 497-3311, 546-4856

3. Also, along the same lines as above, impacts to the coastal communities, if such a sanctuary were to be established, should be discussed thoroughly.

4. We disagree with your viewpoint that the EIS process is "on the wane." Section 102 of N.E.P.A. is an important process that also allows the public to challenge the administrative decisions of government, and is being used as such throughout the nation. It should not be discounted too lightly.

5. Realizing that this document is preliminary, we would still like to comment that the implementation strategies are not well defined.

6. Finally, the cost of the management of the proposed sanctuary appears to be unrealistically low, especially for the "daily management." A more detailed analysis should be included.

Thank you for allowing us the opportunity to review and comment on this proposal.

Sincerely,

George Fowler

GEORGE FOWLER
Acting City Manager

/ct

San Diego

SAN DIEGO CONVENTION AND VISITORS BUREAU • 1200 THIRD AVENUE • SUITE 824 • SAN DIEGO, CA 92101 • (714) 232-3101

June 8, 1978

Mr. Richard Huff
Executive Director
Comprehensive Planning Organization
1200 Third Avenue
San Diego, CA 92101

Dear Mr. Huff:

The San Diego Convention and Visitors Bureau has reviewed the draft document from the Comprehensive Planning Organization (CPO) entitled Nomination of Certain Offshore Waters of San Diego & Orange Counties As A Marine Sanctuary. We endorse CPO's effort to protect the esthetic, environmental and economic resources off the Southern California coastline and we support San Diego's nomination.

Sincerely,

Dal

Dal L. Watkins
Executive Director

DLW:vat

RECEIVED BY
COMPREHENSIVE
PLANNING ORG
JUN 9 9:08 AM '78

Mr. BAILEY. Thank you, sir.

Our nomination is basically a reflection of the vital economic and environmental interests of the region. I think you should know from the economic point of view that we have several very great interests in our region. One is a $1 billion tourist industry, a $2 billion annual military industry, a fishing industry, and to speak directly to the entire region that we are talking about, the whole economic basis based upon a quality of life that basically says this is a good place to live.

Because of this we have tremendous R. & D. industries, et cetera. I think it was very much to the point that on the front page the headlines in the Post this morning spoke of the deterioration of specific areas of our region due to the smog problems.

I want to make it very clear that we are not fighting the oil industry in our proposal. We are including the oil industry in our proposal. But what we are saying is we need to take a realistic look at what marine sanctuary means and what it can mean to the very southern part of southern California.

I would commend for your attention the map in figure 1 of our testimony. This appears on page 8. This very graphically sets forth what we propose in our nomination area. Basically, this map is talking about an area 7,400 square miles in size; however, you will notice that it is divided into several zones. One zone, A, which goes from Dana Point south to the Mexican border comprises approximately 890 square miles.

In this zone it is the only zone that we have proposed restrictions on oil drilling and development. Zone B is the 3-mile limit under the State control which also includes 3 miles around various offshore islands. Zone C is basically the largest zone that we are talking about. It is a zone that we feel is worthy of consideration for its marine sanctuary uses and pluses.

Now I would like to speak very briefly from a layman's point of view to this area which we are talking about covered by zone A particularly. It is very much to the point to consider this as a marine sanctuary because of the peculiar circumstances which are ascribed to the marine bottoms, the canyons, the estuaries, et cetera, that are involved.

For this reason we have the Scripps Institute of Oceanography located there. We also have the National Marine Fisheries office in La Jolla located there. That office, by the way, we propose to be designated as the management agency for this area.

In answer to several questions brought up earlier by this committee, I would like to point out that one of the valuable things of a marine sanctuary, as we see it, is the consolidation of all the rules of the various government entities into a single management agency. We feel this is invaluable to prevent the overlapping, the stuff that you can't understand, and the inability of one agency to manage its own rules. We feel it is very important to consolidate this under a single agency.

What is bringing this proposal to a head, very frankly, is the imminent sale of tract No. 48 in June of next year. We feel it is very important the designation be made prior to this sale so that purchasers will know what we are talking about in this area.

The area we propose to exclude oil from is estimated by the Bureau of Land Management mineral resources estimate to contain only 36 hours worth of national oil and 15.2 hours worth of gas. We are not talking about vast oil and gas reserves that we are talking about in our zone A.

We are also pointing out that the present state of the art in the oil industry is not such that this particular area lends itself to any immediate development. We feel it is very important. Our mile-deep canyons, et cetera, make it very uneconomical under the present state of the art for this development. So we do not feel that we are hurting in any way the national picture.

Our proposal stops short of the Cortez source, which is a major source. I do not feel sitting here that I would be looking out the window of my house, because you might wonder why a councilman from the city of Mesa would be worrying about the shoreland. My house is 13 miles inland. If that picture were to be part of our area, you could see San Clemente Island from my house 50 miles at sea.

We are not talking about a small problem in our area. This is what has attracted people to the area and this is what keeps people in the area. We are not talking about stopping oil that is in production. We are not talking about preventing major production. We are talking about a sensible approach to the control of the marine environment offshore from the San Diego and Orange County areas of California.

With this I stop my rambling, gentlemen. I appreciate my testimony being included in the record. I am ready to answer any questions that you might have.

Mr. BREAUX. Thank you very much.

I understand that you also want to invite Dr. Ruth Corwin to the table. We welcome you.

[The statement follows:]

STATEMENT OF DR. RUTHANN CORWIN AND PATRICK H. HEFFERNAN, RESOURCES, CONSULTANTS IN RESOURCE MANAGEMENT POLICY, REPRESENTING SANTA BARBARA COUNTY, CALIF.

"Start with a carbon atom - it comes from some source - we don't know much about that. But take that carbon atom up in a kelp plant that is harvested for agar, or dies and becomes detritus, an organic muck, which is eaten by a worm, in turn eaten by a small fish, which is scooped up by a pelican or turned into albacore for us, and that's a resource. If that same bit of kelp fails to get recycled and is trapped in some sediments, overlain by impervious rocks, compressed and uplifted and found and drilled into by us for fuel - that is also a resource. This nomination deals with the interrelation between our biological and chemical resources, in an effort to see that the exploitation of one does not prevent the use and enjoyment of the other."

Background:

In his environmental message of May 23, 1977, President Carter directed the Secretary of Commerce to review areas offshore of the United States for possible Marine Sanctuary designation under the Marine Protection, Research, and Sanctuaries Act of 1972. Nominations for Marine Sanctuary designation may be submitted by any interested person or organization. On April 3, 1978, the Board of Supervisors of Santa Barbara County submitted the nomination of the Santa Barbara Channel area to the Secretary of Commerce. One June 24, 1978, the County forwarded a more complete Nomination paper and Management Information report to the National Oceanographic and Atmospheric Administration, which is preparing the "white paper" on the nomination and an impact statement for the Secretary of Commerce.

Area Nominated:

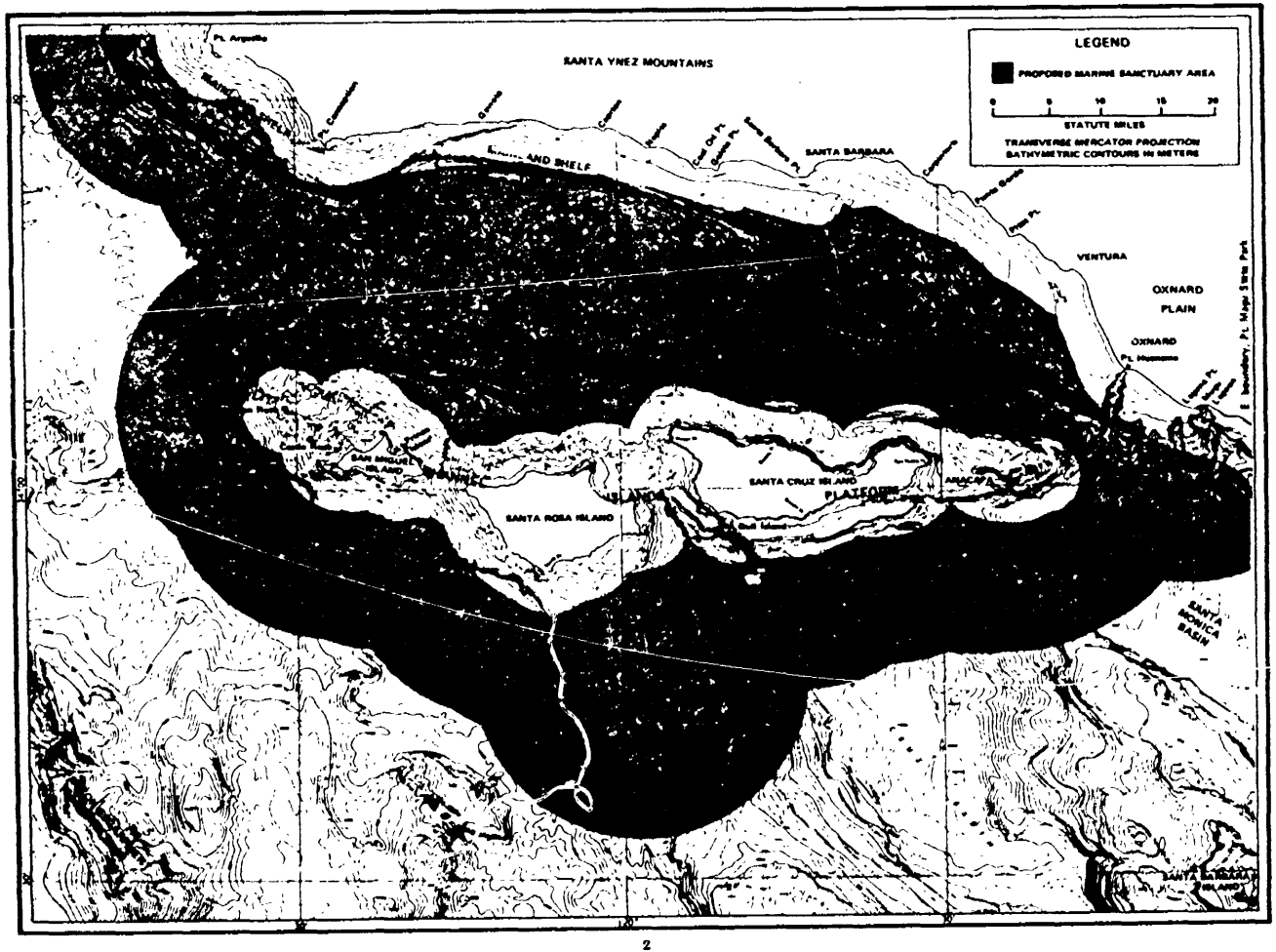
The area nominated for Sanctuary status extends from the north end of Point Arguello in Santa Barbara County, to the eastern border of Point Mugu State Park in Ventura County, California. It extends seaward to include the Santa Barbara Channel, the Channel Islands platform, and the Santa Rosa plateau. It covers approximately 3,000 square miles of the Channel waters, and a zone around the four Santa Barbara Channel Islands: San Miguel, Santa Rosa, Santa Cruz, and the Anacapas. See accompanying map.

Purpose for Nomination - Special Values of the Santa Barbara Channel:

The Act provides that areas may be nominated for protection of habitats, species, research sites, recreational or aesthetic values, or unique values. The Santa Barbara Channel Marine Sanctuary is nominated for protection of values in all of the above categories. In nominating this area, the Board of Supervisors of Santa Barbara County was mindful of the lessons learned in the establishment of the Redwood National Park in California, where the most pristine and beautiful stretch of trees given the protection of park status were threatened by exploitation in the surrounding watershed. The boundaries of the proposed Marine Sanctuary reflect this lesson by protecting the essential habitats, threatened areas, foraging grounds, and other components of the area's ecology. Multiple use of the resources within this area can be guided and regulated to avoid the kind of conflicts that were engendered by the Redwood National Park.

The nomination area's values are summarized in Figure 2. Elements of the Channel ecosystems contained in the proposed Sanctuary include the submarine shelf and fan off Point Arguello and Point Conception, the feeding grounds of the island platform and the Santa Rosa plateau, the bottom-dwelling communities and fishing grounds of the Oxnard shelf and the Hueneme and Mugu submarine canyons, and the recreation areas and foraging waters of the central Channel.

Figure 1. BOUNDARIES OF THE SANTA BARBARA CHANNEL REGION MARINE SANCTUARY NOMINATION AND PHYSIOGRAPHIC FEATURES OF THE REGION



A fifteen mile boundary line has been carefully located to include the waters within the primary foraging radius of the California brown pelican, an endangered species, and other breeding seabirds on the islands, and to provide protection to the unique assemblages of bottom dwellers in the transition zone. This choice of boundaries in relation to the range of species and the location of habitats is in response to the legislative intent of the Marine Protection, Research and Sanctuaries Act, that a sanctuary's size should be that necessary to protect the values for which it was established. In addition, the size of the area responds to the functioning of the Channel region as a unit - ecologically, hydrographically, and perceptually in the minds of those who exploit and enjoy its resources. Birds and mammals forage in several feeding grounds within the Channel and around the islands, although they nest and breed in a few specific places. Current circulate independently within the Channel, carrying nutrients and pollution with them throughout the Channel's waters. Actions in one location in the region can and do affect all other areas.

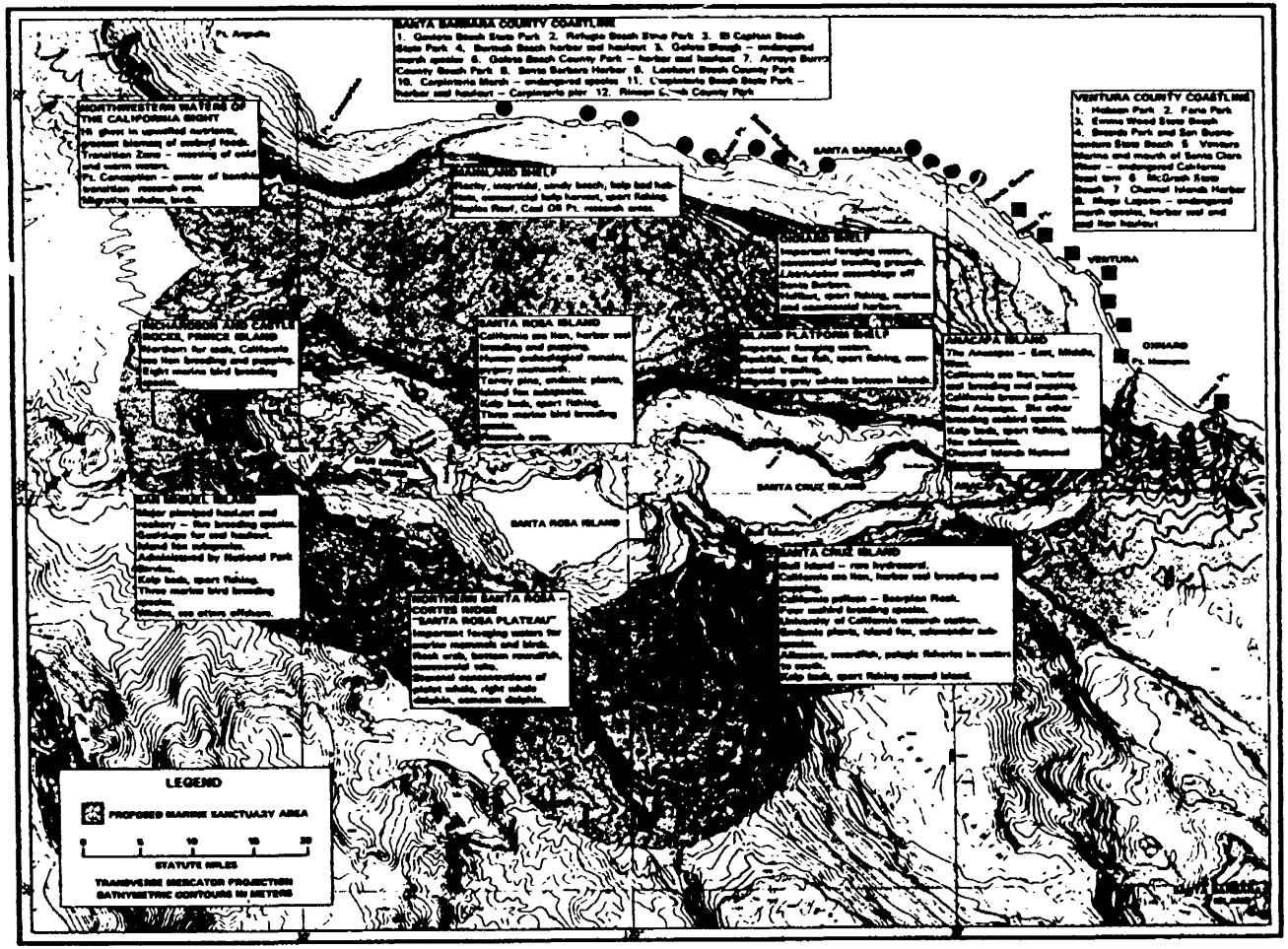
The offshore island and basin topography of Southern California is unique in the North American continental shelf, and has created an uncommon diversity of habitats for the support of marine organisms. The west coast of continental United States is in one of the world's areas of upwellings, where the productivity of the oceans is concentrated due to the increase of nutrients available in the water. The Santa Barbara Channel is a particularly important portion of these waters because of its location as the focus of the California transition zone. There are a handful of places in the world's oceans where two major marine provinces meet and intermingle. New species evolve or older ones survive in these places, greatly increasing their biological diversity. The combination of topography, upwellings, and transition zone dynamics have made the Santa Barbara

Channel a unique marine region by a definition of uniqueness that goes far beyond just a unique assemblage of organisms.

The uncommon diversity of habitats in the Channel region include the kelp beds, subtidal shelves, submarine ridges and canyons, rocky shores, sandy beaches, mudflats and estuaries, deep water basins, the unique habitats of the northern Channel Islands, and the slopes of the continental shelf facing the deep ocean. These provide an assortment of intertidal and bottom surfaces at different depths for marine plants and invertebrates, schooling areas for pelagic fish, nesting and roosting locations for seabirds, and haulout and breeding grounds for seals and sea lions. The productivity of the island platform and the mainland shelves sustain not only resident species, but thousands of migratory animals as well.

Point Conception at the west end of the nomination area provides a major biogeographical break of the eastern Pacific, where the coastal species composition change relects the change in ocean temperature characteristics. Extensive upwelling along the central and northern California coast contributes large amounts of rich, cold water to the south-moving California Current. At Point Conception, where the coast turns abruptly eastward, the California Current meets the warmer southern waters brought north by the geostrophic current. These 'rivers in the sea' carry with them the organisms of two distinct Pacific ecosystems, the northern and southern faunal provinces. The results of these two current patterns are that San Miguel and the western half of Santa Rosa are bathed by the cold California current, with flora and fauna characteristic of northern climes. Santa Cruz, Anacapa, and the eastern half of Santa Rosa receive both cold California Current water and warm counter current water. The highly significant consequences are a very rich flora and fauna with much div-

Figure 2. VALUES AND RESOURCE AREAS OF THE SANTA BARBARA CHANNEL REGION



33-546 O - 78 - 30

ersity and many species characteristic of the north and the south.

The richness of the transition zone ecology is enhanced by the presence of upwellings internal to the Channel. Prevailing offshore winds carry surface waters seaward, carrying colder, nutrient-rich waters from moderate depths to the surface. Areas of upwellings are three times as productive as the coastal zones in general, and six times as productive as the open ocean. One indication of the abundance of this combination of transition zone and upwellings in the Channel area is the high number of predator species (including man) feeding at the top of the food chain, more than in any other upwelling region in the world.

Nutrients from upwellings directly supply the phytoplankton, the primary producers of ocean food chains. But the Santa Barbara Channel also has some of the densest stands of giant kelp, the immensely productive 'forests of the sea', whose rates of production are comparable to tropical forests, and have been measured at over ten times the annual production of phytoplankton in temperate waters. Over 800 plant and animal species are known to be associated with these beds, including many valuable sport and commercial species. In the last ten years, some of the major beds south of the Santa Barbara Channel have all but disappeared due to temperature changes, sewage discharges, and kelp grazers. Neushul at the University of California, Santa Barbara, points out that the Channel beds are the most productive natural beds in Southern California and are likely to be the most productive in the northern hemisphere along this coast.

Thousands of different species of birds, seals and sea lions, whales, invertebrates, fish, and marine plants depend on the habitats of the Channel area for support. These include eighteen rare and endangered animals in the Channel or utilizing one or more of the islands, and six rare and endangered coastal plants. (See chart.) Thirty marine mammals are known for the area - six kinds

of pinnipeds, fourteen different whales, and ten dolphins. The southernmost breeding colony of the northern fur seal is located on San Miguel Island. With the breeding colonies in addition of California sea lions, harbor seals, northern elephant seals, and Stellar sea lions, San Miguel Island is the world's largest and most diverse temperate water pinniped community. The whales, porpoises, and dolphins are present by the thousands, and use the Channel and the island passes as migration paths. Seven endangered great whale species pass through the area, including the California gray whales, which migrate close in to shore on their northward journey with calves born in the Baja California lagoons.

Over 168 species of birds whose habitats are the Channel or the coast have been reported. The largest and most diverse seabird rookery is located on the San Miguel-Prince Island complex. At present eight species of seabirds nest there, although many more use the islands as a roost. Thirteen bird species have begun to evolve into endemic species, those that are found only on the islands. The Channel Islands and coastline are also a major stopping place for migratory birds such as the black brandt, the ashy petrel, and the sooty shearwater. Seven rare and endangered birds rely on the Channel's habitats for support or were former residents and are now seen as occasional visitors.

Fish, invertebrates, and plant species are of important commercial value in the region, as well as providing forage, sport, and research value to the proposed Marine Sanctuary. Almost 53 million pounds of fish were landed at Santa Barbara and Ventura ports in 1974. The anchovy, the major forage species, is abundant in the Channel region all year. The market squid, second in importance for forage, is abundant three-fourths of the year, becoming stranded on the beach by the hundreds in the summer. Lobster, crab, shrimp, abalone,

mussels, and other edible shellfish are important both recreationally and commercially, and as the basic diet for many marine mammals and birds. The island platform is especially rich in abalone. A rare invertebrate species, the hydrocoral Allopora californica, is known off Gull Island, adjacent to Santa Cruz Island. Thousands of tons of kelp are harvested for algin and other chemicals used in food, pharmaceuticals, and other products.

Recreation is a major industry in Santa Barbara County and provides significant income to Ventura County as well. Nineteen State, local, and Federal beaches and parks are located in the Channel area. In 1974-75 the eight State beaches received 2,389,378 visitors. The coast and offshore waters provide a variety of shore fishing, skindiving, scuba diving, crabbing, lobster trapping, and spear fishing opportunities. Almost 850,000 angler days were reported by the State Fish and Game Department in the Channel for 1970.

The Channel Island National Monument is the nomination area's unique Federal recreational resource. The monument includes the three islands collectively known as Anacapa Island, and Santa Barbara Island south of the proposed Marine Sanctuary. This national monument was established in 1938 primarily for its unusual geological features and unique plant and animal life. Recreational use has grown in recent years to the point where management to protect the ecological values has become imperative. In addition to the monument, the National Park Service administers permits for landing on San Miguel Island, under the jurisdiction of the US Navy. The Nature Conservancy has acquired an option over the majority of Santa Cruz Island, largest of the four, for an ecological, educational, and recreational preserve. This growing public interest in the preservation of the Channel Islands for the nation's benefit would be well-served by the management that would be provided for the surrounding waters under the

marine sanctuary designation.

The last of the values for which the Marine Sanctuary is nominated is the use of the Santa Barbara Channel for scientific research. The rugged bottom topography, good weather, transition zone, geological history, multitude of rare species, and location of several oceanographic institutions in or near the Channel area have made it popular for research. By 1921, papers on the Southern California bight were already plentiful - in 1962 the annotated bibliography of oceanographic literature just on the Santa Barbara Channel contained about 1000 references.

The Channel region offers opportunities for research in geology, physical and chemical oceanography, marine biology, paleontology, archeology, and many other fields. Rich archeological sites, both on the islands and underwater, establish that this was one of man's earliest Pacific coast residences. Pygmy mammoths, flightless ducks, giant bats, and other remains have been studied on Santa Rosa and San Miguel Islands. Evidence from fossil plants and genetic studies on island species have contributed to our understanding of evolution and the adaptation of plant and animal populations. Ecological studies are shedding light on the role of competition, environmental tolerances, and other factors which influence the abundance and distribution of particular life forms.

Research in the Channel area is conducted by the University of California at Santa Barbara, Santa Cruz, Irvine, Berkeley, and San Diego. The Santa Barbara Museum of Natural History staff is also actively involved in research on the northern Channel islands, frequently using the University research station on Santa Cruz Island. Most recently, the US Bureau of Land Management has been conducting extensive baseline studies as part of their leasing program for offshore oil and gas, and the Channel is now a key national laboratory for comparison of the effects of oil development, but only if the pristine areas of the Channel can be managed to preserve the characteristics that make them valuable as monitoring controls.

Threats to the Channel Region:

The Santa Barbara Channel region is currently the focus of offshore energy development and transportation on the West Coast. The United States Geological Survey estimates that the Channel region contains the largest accumulation of undiscovered recoverable oil, and the largest accumulation of producing offshore deposits of any location on the West Pacific coast. Additionally, the Channel's position astride the shipping routes from Alaska and the Pacific Northwest to Los Angeles and the Panama Canal subject it to extensive levels of tanker traffic and to a greater threat of oil spills, blowouts, disturbances, and chronic pollution than any other area of the Southern California Bight.

The effects of the present operations in the Channel region have for the most part been local. Twelve of the fourteen active platforms in the Channel are in its northeast end and none presently exist on the leased but as yet undeveloped Santa Rosa Plateau. Outside the mainland shelf, no development exists in or near the major foraging or habitat areas of the region, although drilling on Sale 35 tracts is now beginning to spread more widely. However the potential for environmental degradation and economic loss in the Santa Barbara Channel is the highest in the western United States coastline, outside of Alaska. The level of present and projected development makes the Channel unquestionably the most threatened discrete region on the West Coast. Eleven major energy and technology projects, including two almost simultaneous OCS lease sales, are planned for the Channel and will impact its species and habitats. These impacts can be spread throughout the Southern California Bight and can affect migrating birds and mammals that are part of a Pacific Ocean food web stretching from the Gulf of California to the Bering Sea. Each of these

projects will significantly alter the environment of the Channel region, four seriously. Each project carries potential for Channel-wide environmental damage; three have high potential. All of the proposed projects can affect the diversity of species in the Channel region, six seriously. Two projects, the SOHIO and Elk Hills tankers, have a high potential for habitat degredation, and all carry some threat to habitats. Two projects have high potential for a catastrophe similar to the 1969 spill, and all of the projects have some threat of a calamitous accident. A list of the proposed projects and their potential for degradation of the Channel region appears on Table 4. This table does not show OCS Lease Sale 53, scheduled by the Bureau of Land Management for 1981. The Channel region was the heaviest nominated area for development of the California coast in the nominations for development under Lease Sale 53.

Management of the Sanctuary:

Santa Barbara County and the Santa Barbara Channel region have been net suppliers of energy to the nation since the first offshore oil wells were drilled on the County's beaches over 50 years ago. Onshore wells in Santa Barbara County produced 93 trillion BTU's of energy last year, almost twice the County's annual consuption of 49 trillion BTU's. Offshore wells in the Channel were California's largest supplier of offshore oil and contributed significantly to the nation's energy supply. The fourteen active platforms in the Channel will continue to produce for several years and will be augmented by as many as 22 more platforms from development of Sale 48 leases, adding an estimated 200,000 barrels of oil a day to present production. County benefits from this activity are minimal, and have been further reduced by the Proposition 13 tax cuts on oil industry property in the county. Nevertheless, Santa Barbara County is now working with the Department of Energy and the California Energy Commission to development a conservation element for its general plan that will further

reduce its energy consumption, thus increasing its net energy contribution to the nation.

Faced with the reality of offshore and onshore oil development and the nation's need for fossil fuels, the County has adopted the principle of "co-management" of the Channel's mineral and biological resources. This involves careful analysis of development proposals, their impacts on the Channel region, an understanding of the ecology and dynamics of the Channel, and exploration of feasible alternatives to development proposals that can reduce impacts while meeting the needs of the operators. County staff and officials meet regularily with industry representatives and staff and officials from interested State, Federal, and other local governments to work out agreements on new development. The process is frequently painful, involving concessions from all parties, but it works. Samples of the success of the co-management principle include the conditions negotiated for the Exxon oil and gas treatment plant at Las Flores, technology-tied conditions on permits for the expansion of ARCO's treatment plant and offshore production at Ellwood and the ongoing Joint Industry-Government Pipeline Working Group, now studiying alternatives for moving Channel oil production to market.

The key to co-mangement is good faith negotiations, hard-headed decisions based on facts, and the willingness of all parties to recognize the legitimate interests of local government, the nation, and the private sector. Of course, interested parties are free to lobby and influence legislation and programs to their benefit outside of negotiations, as they all do. But the important thing is that the process can work.

It is this co-management principle that Santa Barbara County is recommending for the Channel through the framework of the Marine Sanctuary nomination. The need for a framework for regulation of development and preservation in the

Channel region is becoming painfully obvious. A complex array of overlapping State, local, and Federal agencies and international laws and regulatory bodies presently control the resources and uses of the Santa Barbara Channel. Regulation ranges from local onshore permit authority for support facilities for offshore development, to international agreements regarding the passage and conduct of shipping in those parts of the Channel region that are international waters. Conflicts among the dozen major Federal agencies (as many as 50 offices, bureaus, commissions, and laws), half-dozen State agencies, and two local counties controlling the region have frustrated cooperation and sound develoment and preservation practices since the 1920's. The struggle between two State bodies, the Coastal Commission and the Public Utilities Commission--and between these agencies and the Federal Energy Regulatory Agency--over the location of an LNG facility on the coast or offshore in the Channel is only one example. The construction of an Offshore Storage and Treatment facility for Exxon's Platform Hondo, instead of an onshore facility preferred by all parties, is another example.

The principal gap in the existing regulatory regime in the region is the inability of agencies with jurisdiction over resources or locations to exercise authority needed to protect them. The Coastal Commission, for example, is responsible for the planning and management of the State's coastal zone but has no authority over OCS development which poses a major threat to coast or over the tankers that are a serious coastal oil pollution source. This authority is split among the Bureau of Land Management, the US Geological Survey, the Corps of Engineers, the Coast Guard and other Federal agencies with no legal responsibility to protect the coastal zone (with the exception of the Corps' limited permit authority over wetlands filling). A second example

is the inability of local Air Quality Maintenance Districts, which are legally mandated to meet the 1982 National Ambient Air Quality Standards, to regulate or even predict emissions from OCS activities that will seriously degrade air quality onshore and in the Channel Islands National Monument. Other contradictions and gaps in authority are indicated in Table 5 Management Options for the Santa Barbara Channel Marine Sanctuary.

The establishment of a Marine Sanctuary will put all users on notice that Federal policy in the area is for the maintenance and restoration of the habitats, species, recreation, research, and unique values of the region within a co-management framework for development. Present policy and regulation of activities in the Channel region, piecemealed among dozens of Federal, State and local agencies will be located in one agency, NOAA, in the Department of Commerce. Overview responsibility for articulating federal policy and setting implementation mechanisms in motion will be the responsibility of NOAA, which has the technical capability and experience, and which is free of the preservation/development conflicts that frequently plague the Department of Interior. NOAA will also have the responsibility, authority, and expertise to assemble and interpret the information necessary for successful management programs based on Federal policy. NOAA can monitor the impacts and compatibility of uses of the Channel's resources and adjust its management programs to changing needs and knowledge. The Sanctuary provides the opportunity--not now present--to assess the cumulative effects of all activities in the Channel and to guide them in the nation's interest.

RARE AND ENDANGERED ANIMAL SPECIES – BREEDING AND MIGRATION DATA
SANTA BARBARA CHANNEL REGION, MARINE SANCTUARY PROPOSAL

Species	Distribution	Breeding Season	Estimated California Population	Status Trend	Migratory	Age at Maturity	Nest or Breeding Data	Number of Nesting or Breeding Sites in California
Leather-backed Turtle *(Dermochelys coriacea schlegeli)* (1, 18)*	Tropical and sub-tropical seas of west coast; some stray as far north as Vancouver Island, British Columbia	Year round with peak in May - June		Endangered: decline	Some: north in summer		Eggs buried in sand on beaches at nights: (solitary)	0
Southern Sea Otter *(Enhydra lutris nereis)* (1, 14, 19)	Santa Cruz south to Avila Beach; sighted off San Miguel, Anacapa, San Nicholas, San Clemente Islands	Year round (peak in May)	1,700+	Threatened: increase	No (only local movements)	2+ yrs.	Breed at sea	
Guadalupe Fur Seal *(Arctocephalus townsendi)* (20)	Offshore west coast, San Miguel Island	Pupping (May - July)	2-5 (Calif.)	Rare (State) 1200+ in Mexico (increasing slowly)	Some north in summer	5 - 7 yrs.	Breed on Guadalupe Island, Mexico	0
Gray Whale *(Eschrichtius gibbosus)* (13, 16)	Offshore west coast, migrates inshore through Santa Barbara Channel	Nov - Dec	11,000	Endangered: stable	Yes – north in summer; south in winter	5 - 11 yrs.	Southern Baja, Mexico (Nov - Dec)	0
Sei Whale *(Balaenoptera borealis)* (13)	Offshore west coast	Winter	9,000 (N. Pacific)	Endangered: stable – decline	Yes – north in summer; south in winter	6 - 12 yrs.		0
Sperm Whale *(Physeter catadon)* (13, 17)	Offshore west coast	Spring - summer (5 mos.)	699,000 (oceanwide)	Endangered: stable	Yes – north in summer; south in winter	M - 8 - 11 yrs. F - 10 yrs.		0

**Reference list follows "Notes and References" at end of document.*

Species	Distribution	Breeding Season	Estimated California Population	Status Trend	Migratory	Age at Maturity	Nest or Breeding Data	Number of Nesting or Breeding Sites in California
Blue Whale *(Balaenoptera musculus)* (13)	Offshore west coast	Winter	1,700 (N. Pacific)	Endangered: decline	Yes — north in summer; south in winter	10 yrs.		0
Fin Whale *(Balaenoptera physalus)* (13)	Offshore west coast	Winter	17,000 (N. Pacific)	Endangered: decline	Yes — north in summer; south in winter	6 - 12 yrs.		0
Humpback Whale *(Megaptera novaeanglinae)* (13)	Offshore west coast	Oct - March	2,500 (oceanwide)	Endangered: stable	Yes — north in summer; south in winter	6 - 12 yrs.	Oct - March	0
Pacific Right Whale *(Eubalena glacialis japonica)* (13)	Offshore west coast		220 (N. Pacific)	Endangered: stable	Yes — north in summer; south in winter			0
Island Fox *(Urocyon littoralis)* (7, 20)	All Channel Islands except Anacapa and Santa Barbara	Feb - May		Rare (State): stable	No	2 yrs. ±	Use any available structure for den	
California Brown Pelican *(Pelecanus occidentalis californicus)* (8, 9, 11)	Statewide along coast. Breeding only on *Anacapa Island and* Scorpion Rock off Santa Cruz Island	Feb - Aug	1500± in Calif.	Endangered: Increase	Yes — North after breeding		Sticks on ground or *Coreopsis.* (colonial)	3±; only breeding sites in State
American Peregrine Falcon *(Falco peregrinus anatum)* (1, 10, 21, 24)	13 territories along; coastal Calif. between Oregon and Mexico; formerly nested on Santa Cruz Island, recent sightings mainland coast and Santa Rosa Island.		30± (16 adults)	Endangered: decline	Yes	2 yrs.	Scrape on ledge high on cliffs or rocks (solitary)	8+

Species	Distribution	Breeding Season	Estimated California Population	Status Trend	Migratory	Age at Maturity	Nest or Breeding Data	Number of Nesting or Breeding Sites in California
Southern Bald Eagle *(Haliaeetus l. leucocephalus)* (1, 6, 20, 21, 22)	Mainly in interior Calif. Several nested pre-1960's on mainland coast, Santa Cruz and Anacapa Islands. Recent sightings on coast.		53± (36 adults)	Endangered			Sticks high in tree or ledge usually with some shade. (solitary)	18
California Least Tern *(Sterna albifrons browni)* (3, 4, 5, 20, 21)	San Francisco Bay to Mexico (breeding). Formerly nested on Santa Barbara and Carpinteria beaches, recently near mouth of Santa Clara and Santa Ynez Rivers.	Apr - Sept	1200	Endangered: stable	Yes – south in winter Oct - Mar	5 yrs. ±	Mud flat, bare sand - gravel area (colonial)	25±
Light-footed Clapper Rail *(Rallus longirostris levipes)* (12, 20, 21)	Goleta Slough south to San Quintin Bay, Baja. Reported at Goleta Slough and Pt. Mugu. Formerly Carpinteria Slough.	Feb: Courtship Mar: Nesting June: Eggs	260	Endangered	No	Ca. 2 yrs. spring after hatching	Nest in clumps of *Salicornia* (solitary)	13±
California Black Rail *(Laterallus jamaicensis coturniculus)* (1, 2, 20, 21)	Salt marshes from Tomales Bay south to Baja, Mexico. Early records: Hueneme and Santa Barbara. McGrath State Parks, Ventura County, 1971.	April - May		Rare (State)	Some (late summer and fall)	Ca. 2 yrs.	Cupped nest in reeds on ground or elevated above high tide line.	
Belding's Savannah Sparrow *(Lassenculus sandwichensis beldingi* (15, 20, 22)	Goleta Slough south to Imperial Beach in San Diego Co. Goleta, Devereaux, Carpinteria Sloughs.		2200	Endangered: (State listing)	No			11

Table 4 POTENTIAL FOR DEGRADATION OF SANCTUARY

Projects	Alternation of Environment	Catastrophe	Potential for Degradation	Species	Unique	Habitat	Aesthetic	Recreation	Research
1. Existing 1966, 1968 Leases to be developed	high		high	X		X	X	X	
9 - 18 platforms 1 - 4 processing plants 32 - 91 miles of pipeline • marine terminals • tanker traffic	X	X	X			X	X	X	X
2. SOHIO Pipeline Project	high	high	high					X	
2 tankers a day transit channel	X	X	X	X		X			
3. Elk Hills to Port Hueneme Pipeline	high	X	X			X	X		
MT and Storage to Port Hueneme 207 trips a year south to L.A. 208 trips a year north in Channel									
4. New state tideland drilling	low	low		low				low	
3 projects – 53 new wells processing plant expansion 50+ tanker trips per year		X	X	X		X	X		X
5. Platform Grace	X	low X	X	X		X	X	low	
6. Space Shuttle Transport System	high	high	high	high		high			
15 barge round trips per year boosters recovered and towed across channel acid rain from six emissions noise and pressure	X	X	X	X		X			
7. LNG Terminal and Plant									
onshore or offshore plant 751 Tanker trips per year in channel	high X	high	X			X	low X		X
8. Santa Ynez Unit development	X	X	X	X		X	X	low	X
3 - 5 platforms subsea units possible OS&T Tanker traffic increase									
9. Mobil Hueneme	X	X	X	X		X	X		X
10. Offshore LNG	high	high	high	X		X	low	low	
11. Lease Sale 43—11 platforms, 2 OS & T's 250 mi. of pipeline, 32 subsea completions, 3 new tanker runs	high	X	high	X	X	high X	high X	X	low

TABLE 5 MANAGEMENT OPTIONS FOR THE SANTA BARBARA CHANNEL MARINE SANCTUARY

RESOURCE THREATENED	THREAT	DEGRADATION POTENTIAL	TREND	JURISDICTION	MARINE SANCTUARY RESPONSE OPTION
Pelagic Habitat	chronic oil pollution catastrophic oil pollution alteration of environment tankers/platforms space shuttle	interference with plankton blooms damage to zooplankton loss of species reduction of commercial fishing ecosystem stress	increasing pollution	Federal International Coast Guard Corps of Engineers BLM USGS EPA gaps/conflicts	Regulation tanker management platform location seasonal regulation prohibition of damaging actions Research spill research impacts research Monitoring
Intertidal Habitats	chronic oil pollution catastrophic oil pollution alteration of environment tankers/platforms Marine terminals onshore construction LNG recreation impacts	habitat loss species loss damage to mussel community injury to individuals kelp habitat damage rare species research areas	mixed: mostly stable	Federal State Local conflicts gaps	Regulation tanker management facility location seasonal operation Research Monitoring
Subtidal Benthic Communities	chronic oil pollution catastrophic oil pollution alteration of the environment LNG facilities pipelines	habitat loss species loss damage to individuals disruption of nutrient cycles ecosystem stress unique values	unknown	Federal State Local conflicts gaps	Regulation seasonal operation tanker management platform location dumping controls Research Monitoring

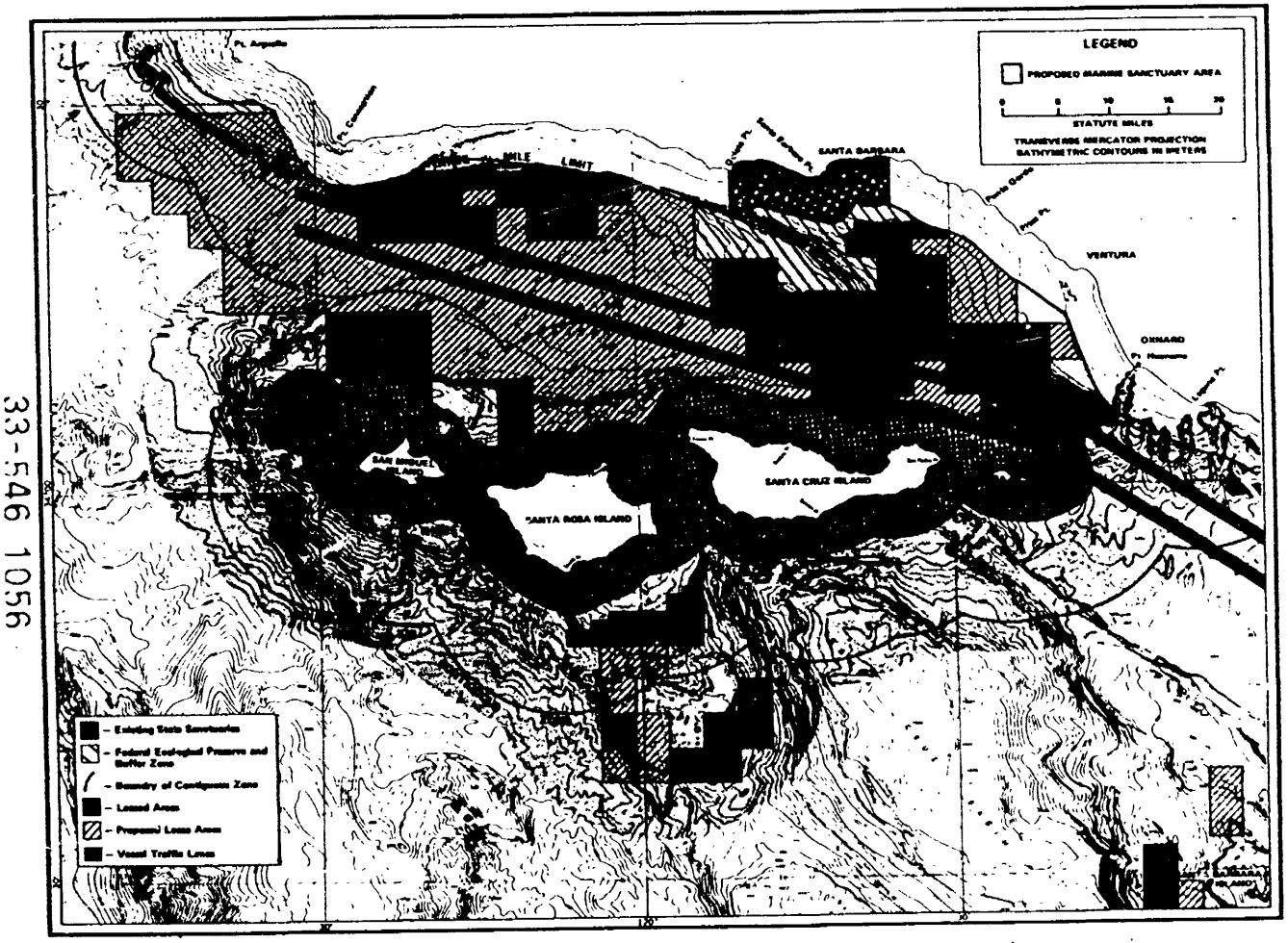
RESOURCE THREATENED	THREAT	DEGRADATION POTENTIAL	TREND	REGULATION	RESPONSE
Cetaceans	catastrophic oil tanker hits harassment	loss of species decline of value	mixed: some decline	International Federal	Regulation tankers seasonal Research Monitoring
Fish and Fishing Industry	overharvesting chronic oil catastrophic oil net damage tankers platforms pipelines leakage construction	injury to individuals species loss habitat loss ecosystem stress recreation loss	stable	Federal State	Regulation tankers pipeline platform location seasonal operation development pace spill research Monitoring
Sea Turtle	oiling tankers	slight	decline	overlaps in Federal	no response
Coastal Recreation	oiling new leases tankers platforms	loss of aesthetic values economic loss habitat loss injury	good	State Local	Regulation
Channel Islands National Monument	oiling chronic oil disturbance	recreation loss aesthetic loss habitat loss species loss ecosystem stress	stable	Federal State (waters)	Regulation Monitoring

RESOURCE THREATENED	THREAT	DEGRADATION POTENTIAL	TREND	JURISDICTION	MARINE SANCTUARY RESPONSE OPTION
Channel Islands: uplands ecology & unique features	chronic oil catastrophic oil island industry Space Shuttle Offshore LNG	injury to individuals habitat loss species loss rare species endangered species ecosystem stress	increase pollution	Federal State Local Park Service Santa Barbara County	Regulation tanker management platform location seasonal operation spill equipment Monitoring Research
Wetlands	chronic oil catastrophic oil construction tankers platforms filling	very serious los of species loss of habitat endangered species ecosystem stress injury to individuals	decline	State Local Federal	Regulation tanker seasonal operation spill clean-up development pace Monitoring Research
Pinnipeds & Sea Otters	chronic oil catastrophic oil disturbance Space Shuttle tankers platforms spill clean-up island industry	disturbance of life cycles loss of habitat loss of species loss of forage population loss endangered species rare species	mixed	State Federal	Regulation tankers seasonal Monitoring Research
Seabirds	chronic oil catastrophic oil disturbance space shuttle tankers blowouts	egg damage injury to individuals habitat damage loss of migratory bird support habitat potential for species loss	increasing pollution, disturbance	Federal, International, State	Regulations tanker management spill prevention seasonal operation space shuttle mitigation Monitoring Research

33-546 O - 78 - 31

RESOURCE THREATENED	THREAT	DEGRADATION POTENTIAL	TREND	JURISDICTION	RESPONSE
Rare & Endangered Species	oiling chronic oil disturbance tankers platforms onshore development new leases existing leases Space Shuttle	species loss habitat loss uniqueness	mixed	Federal several State several Local	Regulation tankers platform location location regulation seasonal operation Restoration Research Monitoring

Figure 15. SHIPPING LANES AND LEASE TRACTS IN THE SANTA BARBARA CHANNEL REGION



33-546 1056

STATEMENT OF PATRICK HEFFERNAN

Mr. HEFFERNAN. My name is Patrick Heffernan, representing the county of Santa Barbara, and my comments today and those of Dr. Corwin are from the county supervisors.

The first offshore oilwells in the Nation were drilled in the beaches of Santa Barbara in the twenties. We are currently producing 93 trillion Btu of energy for the Nation on an annual basis, which is about twice what the county itself consumes.

There are 14 active platforms in the channel and those platforms produce approximately 15 percent of the offshore oil that comes out of California. So offshore oil development in the Santa Barbara Channel is a reality. It has been a reality for 50 years and it is probably going to be a reality for another 40 years.

The proposal for the marine sanctuary, the nomination document which I believe you have there, is not an attempt to block offshore oil development. That is a reality and the county has dealt with that reality and will continue to. Rather it is an early response to the increasing conflicts over multiple use of our offshore marine areas due to technology which allows us to develop those areas.

I am going to summarize my testimony, so I won't follow the written copy that you have before you.

There is now a critical need on the west coast, and I believe in the entire Nation, for a consultative and regulatory mechanism to resolve the conflicts over the use of marine resources, biological, and mineral. The present scheme in the Santa Barbara Channel is in chaos. We find we have to deal with as many as 50 Federal agencies and a half dozen State and several other local agencies. They issue conflicting rules and regulations. They get into turf fights, there are regulatory gaps, contradictions between them.

As a result of this, Exxon Corp. has been forced to build an offshore storage and treatment processing plant that they didn't want to build. The county didn't want it and the State didn't. But because of a conflict with the State Coastal Commission, that plant is being built.

The county of Santa Barbara has responded to these conflicts by developing a comanagement principle in which the county, State, and Federal agencies sit down and resolve problems through hard, but good-faith, bargaining based upon very good scientific, economic data.

We have had a number of successes in this comanagement process. One is the successful negotiation with Exxon Corp. for an onshore processing plant that, if it had been built would have been a model of evironmental design. Unfortunately, the conflicts removed that from our jurisdiction.

We have negotiated an agreement with Arco for increased production from their offshore platform Holly. We are now involved in a Joint Industry Government Working Pipeline Group which is attempting by using economic and engineering studies and biological data to develop a transportation plan to move offshore production from the channel to market with the minimum air and water pollution problems that we have seen in the past. This is the county's response and it has worked very well and we intend to continue that response.

As I said, we probably are going to see offshore oil production in the Santa Barbara Channel for the next 40 years. It is not going to do us or the Nation any good to say we don't want any or we want a sanctuary that says no oil. Obviously, we are going to have to deal with that. Unfortunately, the county's authority stops at the 3-mile limit. Once we get to the 3-mile limit, we are faced with the chaotic relationship among the Federal agencies in the Outer Continental Shelf area. We can't deal with that.

We have proposed a marine sanctuary with a single agency with strong oversight and review powers to help resolve those conflicts so the 2 billion barrels of oil we know are in the channel can be developed in such a way that the biological and recreational resources and half a billion pounds of fish supported by those biological resources can also be enjoyed by the people of the United States. This is essentially why we have put this document before you.

Rather than go into the details of the gap, the regulatory problems and the comanagement principles, the county is attempting to work out with the industry and Federal agencies, I would like to ask Dr. Corwin to explain the kinds of hard, biological data that the Santa Barbara County nomination is based on.

If you refer to the map which is on page 2 of the testimony you have before you, you will see the gray areas are nominated areas. Every one of those areas and every line drawn to indicate our nomination is based on very solid biological fact.

We have spent over $20,000, I would estimate, of donated scientific time plus $8,000 of contributed consultant time and 6 weeks of very hard work almost 7 days a week, drawing those lines and justifying every one of them.

We intend to continue this process from the county's point of view. In order to do that, we need facts. We need the kind of data you find in the management information document I believe your counsel has. The county does not have the facilities to develop that data nor does the State coastal commission. This is one reason why we have asked NOAA to assist us in designating a nomination area for a marine sanctuary because once that is designated, we can begin to develop the biological data necessary to make rational decisions concerning the conflicts of resource development in that area.

Dr. Corwin will explain why those lines have been drawn and the kind of data we need to make good, solid decisions in the future.

STATEMENT OF DR. RUTHANN CORWIN

Dr. CORWIN. I would like to point out that the area that is covered by gray in this map we have estimated to be a little over 3,000 square miles. I am not sure where the previous estimates came from, and I would be disappointed if the estimate the gentleman from NOAA was using was based upon a misinterpretation of this information.

Mr. BREAUX. I think they might have been lumping Santa Barbara and San Diego together.

Dr. CORWIN. That would give you over 10,000 square miles.

Mr. HEFFERNAN. Their figure was 1,200 to 1,300 and Mr. Cassell's figure was 2,000. In actuality it is 3,050.

Dr. CORWIN. That is the area of the county's nomination.

Mr. BREAUX. Do you have a figure on San Diego?

Mr. BAILEY. It is 7,400 including all 3 zones.

Mr. BREAUX. That is one of the problems. We don't even know how much acres we are talking about as far as a sanctuary.

Dr. CORWIN. As Mr. Heffernan mentioned, although we put in a great deal of effort to decide on the size of this, we recognized it is up to the Federal Government to settle on the final area, but the estimate of this area was a little over 3,000 square miles. This includes the central Santa Barbara Channel area and the zone south of the Santa Barbara Channel Islands.

I would like to draw an analogy. In nominating this area, the Board of Supervisors in Santa Barbara County kept in mind the establishment of the Redwood Park in California. In that park the most beautiful and pristine trees were given protection but the watershed was not protected, which left it free for the exploitation which eventually damaged the national park. Congress had to go through many hearings and spend millions of dollars to remedy that situation.

In nominating the full Channel area, the supervisors felt that they were meeting the intention of the language of the act. Multiple use of the resources of this area can be guided and regulated. This would avoid the conflicts engendered by the Redwood National Park.

What we have in southern California is an uncommon diversity of habitats for marine organisms.

Because of the island and basin topography elements of the Channels ecosystems contained in the proposed sanctuary include the submarine shelf and fan off Point Arguello and Point Conception, the feeding grounds of the island platform and the Santa Rosa plateau, the bottom-dwelling communities and fishing grounds of the Oxnard shelf and the Hueneme and Mugu submarine canyons, and the recreation areas and foraging waters of the central Channel.

A 15-mile boundary line has been carefully located to include the waters within the primary foraging radius of the California brown pelican, an endangered species, and other breeding seabirds on the islands, and to provide protection to the unique assemblages of bottom dwellers in the transition zone. This choice of boundaries in relation to the range of species and the location of habitats is in response to the legislative intent of the Marine Protection, Research and Sanctuaries Act, that a sanctuary's size should be that necessary to protect the values for which it was established.

Mr. BREAUX. Dr. Corwin, I will have to recess in a moment because we have a recorded vote on the floor of the House.

[A brief recess was taken.]

Mr. BREAUX. The subcommittee will please come to order.

I think when we recessed, Dr. Corwin was making some remarks. Please continue.

Dr. CORWIN. Thank you. I will try to summarize this briefly.

What I was trying to point out is the incredible richness and ocean productivity off of southern California which is worthy of

attention from the Federal Government, to reserve and manage in relationship to other resources which we also value.

I mentioned the offshore island and basin topography which is unique in the North American Continental Shelf and has created an uncommon diversity of habitats for the support of marine organisms. The west coast of Continental United States is in one of the world's areas of upwellings, where the productivity of the oceans is concentrated due to the increase of nutrients available in the water.

The Santa Barbara Channel is a particularly important portion of these waters because of its location as the focus of the California transition zone, where the cold northern waters meet warm southern waters, increasing the total diversity of species beyond the number of species either to the north or the south. The focus of the transition zone is Point Conception, at the west end of our nominated area. The combination of species diveristy, topography, and upwellings makes this a truly unique marine area.

This definition of uniqueness to me is a far better definition that goes much beyond just an unusual assemblage of organisms. When you are thinking about marine policy and what truly needs to be protected along the coast of the United States, it is this kind of biological productivity we want to emphasize and not just one rare species or assemblage of organisms.

In the Santa Barbara Channel, the high productivity supports thousands of different species of birds, seals and sea lions, whales, invertebrates, fish, and marine plants, which depend upon the habitats of the Channel area for support. These include 18 rare and endangered animals in the Channel or utilizing one or more of the islands, and 6 rare and endangered coastal plants. Thirty marine mammals are known for the area—6 kinds of pinnipeds, 14 different whales, and 10 dolphins. The southernmost breeding colony of the northern fur seal is located on San Miguel Island. With the breeding colonies in addition of California sea lions, harbor seals, northern elephant seals, and Stellar sea lions, San Miguel Island is the world's largest and most diverse temperature water pinniped community.

This in itself is deserving of attention, but in addition, but in addition over 168 species of birds whose habitats are the Channel or coast have been reported. From the Channel itself almost 53 million pounds of fish were landed in one recent year, a direct benefit to us from this high-level of productivity.

The important point is, why did we choose this particular size area? Why have we recommended setting aside over 3,000 square miles in this kind of sanctuary? Probably I should explain a little about how we define the boundaries.

The 15-mile boundary line was carefully located to include the waters within the primary foraging radius of the breeding seabirds and to provide protection to the unique assemblages of bottom dwellers in the transition zone. This choice of boundaries in relation to the range of species and the location of habitats is in response to the legislative intent of the Marine Protection, Research and Sanctuaries Act, that a sanctuary's size should be that necessary to protect the values for which it was established.

A smaller area would not provide that kind of protection.

In addition, the size of the area responds to the functioning of the channel region as a unit, ecologically, hydrographically, and perceptually in the minds of those who exploit and enjoy its resources. Birds and mammals forage in several feeding grounds within the channel and around the islands, although they nest and breed in a few specific places. Currents circulate independently within the channel, carrying nutrients and pollution with them throughout the channel's waters. Actions in one location in the region can and do affect all other areas.

I would like also to point out that we have in the nomination area the Channel Island National Monument, which is the area's unique Federal recreational resource. The monument includes the three islands collectively known as Anacapa Island, and Santa Barbara Island south of the proposed marine sanctuary. This national monument was established in 1938 primarily for its unusual geological features and unique plant and animal life. In addition, the National Park service is now supervising landings on San Miguel Island and the Nature Conservancy has taken an option on Santa Cruz Island, largest of the four, to presreve an major portion of the island. This I think reflects the public interest in the preservation of this area from a national perspective.

I would like to turn this back to Mr. Heffernan and let him close by pointing out the threats we are facing and the kind of management we are talking about.

Mr. HEFFERNAN. Thank you.

As I indicated, Santa Barbara Channel is a major offshore oil producer. There are 11 major development and technology projects scheduled for this channel. The list of those projects is in the testimony that has been provided to you, and the report you have indicates the kinds of dangers that they pose for the channel's values.

Rather than to run around hysterically and scream that the oil platforms are coming, our approach has been to develop the baseline data necessary to start the process of drawing up the kinds of management guidelines that can accommodate this development over the next 30 years. As I mentioned earlier, however, we do not have the resources, the State of California does not, and we need to rely upon an agency such as NOAA that has good, strong oversight capability similar to that of the Fish and Wildlife Service's under their act to provide us with that data and begin to draw some kinds of management guidelines.

The county will continue with its comanagement principles. The hard decisions that have to be made balancing off are going to be made whether or not. We would like to ask this committee in its deliberations concerning NOAA's budget to keep in mind that the Santa Barbara Channel can be used as a laboratory to develop the kind of experience the country is going to need to resolve conflicts throughout its coastline as marine resource development continues. We have almost every single problem you can imagine. We have almost every single kind of resource.

Within an integrated framework of the marine sanctuary process we think we can develop an integrated management program that allows mineral resource development and protection of biological resources and can also transfer this experience to the rest of the

Nation so we do not have 40 more years of conflict as we have had in the past.

Mr. BREAUX. I want to thank all of you for your testimony.

Mr. Boyle, do you see the marine sanctuary program as a program that would allow you or anyone proposing marine sanctuaries to keep out any development?

Mr. BOYLE. The question is, we think so. We are not sure. I spoke earlier this year with someone at NOAA when we were first contacted regarding the presentation in Santa Barbara when Commander Johnson came through. At that time he said to us that it was NOAA's intention not to fight with the Department of the Interior over oil and gas, that NOAA was not going to get into any conflict with the Department of the Interior. That being the case, our own interests in a sanctuary waned somewhat, because I think I made it clear that we are opposed to the development of oil and gas in the Santa Barbara Channel.

However, we have subsequently heard that maybe there is a benefit of having NOAA run a marine sanctuary there if they bring some sort of rationalizing through to bear on the regulation in the channel. As has been pointed out, there are so many people regulating things in the channel that you do not know who to go to when you have a problem. They seem to be butting heads all the time. To the extent that slows down channel oil development, perhaps we will agree with leaving things as they are. To the extent they speed things up, I don't know.

I think right now, though, really things are not good from our point of view in the channel and maybe a change is in order in any case. If we are going to lose our fight regarding channel oil, we might as well lose it in a grand manner by dealing with one organization rather than a multiplicity of them.

Mr. BREAUX. On page 2 of your testimony you point out that there are hydrocarbon reserves in the Santa Barbara Channel and they should be left alone until needed. My question is, when do you think we will reach that point? We are already importing over half the oil we use in this country.

Mr. BOYLE. I do not pretend to know when we are going to need it. I am not sure whether our organization knows. The question is, are we using the resources that we have right now in a wise way? Is there going to be anything left for our children or our grandchildren? I think that is the issue. Right now in Santa Barbara, for example, on a weekend we see hundreds, maybe thousands of gigantic campers coming through on highway No. 1. They get maybe 6 miles to a gallon. People actually drive these back and forth to work.

The question is, do we need Santa Barbara oil in order to, I think, waste it in that way? Do we need, as I understand the Department is proposing—I believe Congress has to act on this by either accepting or rejecting—this Department of Energy proposal to export oil to Japan.

The problem is the Alaska oil coming in. If the Alaska oil went to the original market or the market that really needs it, the Midwest and east coast, there would never be any problem.

Mr. BREAUX. One of the problems is getting oil through the State of California. That is one of the reasons why we have the proposal to sell it to Japan.

Mr. BOYLE. Of course, Sohio has hit a very sore spot in southern California by the proposal to convert those natural gas lines to oil. We are facing a proposal to import LNG from Indonesia right now, and closing down the natural gas lines would seem to preclude the acquisition of more gas from the Southwest, whether it is Texas, New Mexico, or Oklahoma. I believe there is a surplus of natural gas in Texas, for example, that the producers have been selling in the intrastate market. They have said until people in Texas start buying more gas, they will have to commit their supplies to the interstate market, hence to states such as California, who have been traditional importers.

Mr. BREAUX. Mr. Bailey, in your testimony you had suggested that the overall management authority be placed in the National Marine Fisheries Service. I am concerned whether that is the sound approach, because of the fact that while National Marine Fisheries has a great deal of expertise in the areas of their jurisdiction, I am not sure they are competent in the overall area of managing an entire marine sanctuary.

Mr. BAILEY. We proposed also, in addition to that, to have a committee composed similar to what Santa Barbara has proposed to work with them. Our studies have indicated that within the area, the immediate area, they have probably the most expertise covering marine sanctuaries.

Mr. BAILEY. Actually, we have proposed to exempt recreation from the marine sanctuary we are proposing. We do not anticipate any impact. We certainly will watch for problems.

Mr. BREAUX. The next question: Why have the National Marine Fisheries Service manage the area, if you are not going to have any control over sport and commercial fishing?

Mr. BAILEY. Mainly because the basic commercial activities that would continue in the area.

Mr. BREAUX. If you are exempting them from any of the regulations, I guess that it is because of the fact you do not think they are causing any problem. So the problem area you are talking about is either tanker safety or tanker traffic or oil and gas development?

Mr. BAILEY. To a certain extent, sir, it is. I would like to point this out in looking at the total picture. The fisheries area certainly is one that we encourage and we have had very good success with. We do not have any major economic impact. It is compatible with what is going on in the area, it is compatible with the preservation——

Mr. BREAUX. You do not understand. I do not argue with that at all. I question the validity of having the National Marine Fisheries Service manage the area when you do not really have a fishery problem at all. Your problem, I take it, is oil and gas development and/or tanker traffic. The National Marine Fisheries Service has a lot of expertise, but not in that area at all.

Mr. BAILEY. Mainly we were looking for the one Federal Government agency with a degree of expertise in the marine sanctuary area which was located within the region and strategically located

and interested in the problem. This is why they were selected. If it seems fit to select another, we think someone should manage it. All we are saying, they are there and they have a great amount of expertise now.

Mr. BREAUX. You realize they have no expertise in oil and gas development?

Mr. BAILEY. I certainly agree.

Mr. BREAUX. You probably question whether Interior has any, but they are the agency in charge of the program.

Mr. BAILEY. No, I think very much we recognize the need for oil and gas. Our whole area was developed on the basis of oil and gas. This is one of our problems.

Mr. BREAUX. You also exempted any regulation of sewerage outfall?

Mr. BAILEY. Because we have proven that we do not have an adverse condition with our outfalls now.

Mr. BREAUX. Have you had problems with tanker traffic? Have you had any collisions in the Santa Barbara area?

Mr. BAILEY. We have had none, to my knowledge.

Mr. BREAUX. The proposal would eliminate any tanker traffic in the channel?

Mr. BAILEY. It would propose to control it or certainly examine it to a great extent.

Mr. BREAUX. Will you elaborate on that?

Mr. HEFFERNAN. I think you said Santa Barbara Channel?

Mr. BREAUX. Excuse me.

Mr. BAILEY. We do not have a major problem.

Mr. BREAUX. But the proposal recommends consideration of having no tanker traffic in that area. The reason I asked the question, the Coast Guard indicates to me it is not a problem, it is one of the clearest areas, one of the areas of least obstruction in that whole part of southern California.

Mr. BAILEY. Basically we are not saying it is a problem. We do not propose under our proposal to regulate that. That is why I tried to introduce my remarks on the basis of a reasonable approach.

Mr. BREAUX. It might be my fault because I was thinking about Santa Barbara. You are basically addressing your remarks to San Diego; is that correct?

Mr. BAILEY. Yes.

Mr. BREAUX. Mr. Heffernan, let's you and I talk about that for a moment. What do you think NOAA will do that the Coast Guard cannot do already?

Mr. HEFFERNAN. Coast Guard regulation CGIG 9 rule 10 are not mandatory. I have checked this out with Admiral Price's office and also with the new admiral's staff. Tankers entering the Santa Barbara Channel are required to use the traffic separation lanes or to stay out of them, depending upon the will of the captain. Once they are in the traffic separation lanes, they can leave them, providing they follow prescribed procedures. However, the Coast Guard has been monitoring compliance with the traffic separation lanes and they find it is very high, and I agree with them.

I think they are doing a good job on a voluntary basis. Nonetheless, in December, on a clear night a tanker, the Sansenina II ran

over a fishing boat that was anchored in one of the traffic separation lanes. We presently have no explanation for that. There have been reports of near misses in the channel between tankers and commercial boats.

Now, we are not contradicting the Coast Guard position that at present tanker traffic is not a danger, but we are saying if you look at the future—and I would recommend you take a look at table 4 in my testimony—you will see that we are going to have an enormous increase in tanker traffic, LNG ships and possibly also commercial fishing within the Santa Barbara Channel, and each one of those plans is being made independently with no regard for other projects. We are concerned that without some overall coordination which the Coast Guard is unable to do at this time, we are going to have an increase in those accidents and we are concerned one of those accidents may be an LNG tanker.

Mr. BREAUX. Is your proposal just to make mandatory traffic lanes?

Mr. HEFFERNAN. No, sir. Our proposal is much more complicated. We have endorsed Congressman Lagomarsino's proposal to move the Sohio tankers outside the channel, providing it is done with good biological data. It does not have to be a danger providing those vessels are adequately supervised and the captains are made aware of dangers such as whales, fishing boats in the traffic separation lanes, et cetera. At present there is no way to communicate from onshore or offshore with those captains to alert them to dangers that may be present.

There is also no way to regulate the tanker traffic so if ther is a problem, a spill, a collision, et cetera, it won't hit rare endangered species, breeding populations, or something like this. What we would like to see from NOAA is the kind of biological data necessary to draw up a tanker management plan that will not inconvenience the transportation of oil and will also provide the least amount of danger to the rare and endangered species, breeding populations and biological resources of the channel. That takes research, it takes information and it takes a little negotiation. We currently do not have the information and we currently do not have an ability to do the negotiation.

Mr. BREAUX. One of the problems with this—and I think NOAA is going to find this out—you are operating in an area of international waters. Unless we have some kind of international treaty, the ability of the United States to act is going to be in serious question from a legal standpoint.

Mr. HEFFERNAN. You are correct, sir, and at your pleasure if you would take a look at our management document you will note we have addressed that question. There is an opinion in there by an attorney well known for his ability in marine law and who also was a participant in the Law of the Sea Conference. We have examined the volumes of the shipping in the channel. We find it is U.S. bottoms which are subject those regulations. We have learned there is currently a draft of the Law of the Sea Treaty draft circulating, which would give the United States some sort of regulation over foreign traffic within those international waters. However, the problem is not really the foreign traffic which is outside of our jurisdiction. The problem is the increase in U.S.

bottoms traffic which is subject to our jurisdiction, and we have taken this into account in our management recommendations.

I would also like to point out we have not recommended hard, solid regulations. What we are recommending in our management proposal is that the data and information be collected now so that when these problems begin to arise in 1985 we don't have to run around and say: We need some more research, stop everything.

Mr. BREAUX. I am interested in the statement in the nomination generally to the effect that the presence of platforms does not discourage use of seashore areas. Am I correct in concluding from that that you would not seek a prohibition on platforms just for aesthetic reasons?

Mr. HEFFERNAN. Absolutely. We may seek units for environmental reasons. The West Channel Oilfields were developed—and completely developed—in the early 1960's, as far as we can tell, with no recognizable environmental damage. One of those platforms has been removed and two abandoned. We have lived with oil platforms since 1966. While they do not contribute to the view, we realize that there is a necessity for them. We would like, however, in our management program to see to it that the projects that are contemplated for the channel, which include two almost simultaneous lease sales, are stretched out in such a way we do not have an influx of platforms all at once in one area. This is our major concern.

We have 4 platforms now. Our concern is that all these projects and all these platforms are going to converge at one point in time and we will have a forest of platforms similar to that existing in the Gulf.

The gulf is a different situation. It does not have the kinds of esthetic and recreational values—monetarily.

Mr. BREAUX. We have the same problem. We have over 20,000 oil and gas wells in the Gulf of Mexico, and I guess it depends on the viewpoint of the individuals who are living and working in that area. Number one, the platform contributes to sport fishing and commercial fishing problems that you run into, obviously. They generally have to be well lighted and marked, and that is all under BLM requirements. It is already an existing law.

The question we are trying to decide in committee is the extent of authority that the Marine Sanctuary Title gives NOAA. It is a real balancing of interests, and that is what the committee intends. We are not trying to stop development for the sake of stopping development. It is a question of balancing interests. I appreciate your taking all this time to be with us to present your testimony. I realize you have traveled a long distance. The committee is particularly appreciative of that. We wanted to make sure we heard from most of the concerned groups to make sure the committee had a balanced approach.

I think we have had that today and now we have to make some decisions. I thank you very much for your presentations. With that, the Subcommittee on Oceanography will stand adjourned until further call of the chairman.

[Whereupon, at 12:55 p.m., the subcommittee adjourned.]

○