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HEARINGS

BEFORE THE

SUBCOMMITTEE ON OCEANS AND ATMOSPHERE

OF THE

COMMITTEE ON COMMERCE

UNITED STATES SENATE

NINETY-SECOND CONGRESS

FIRST SESSION

ON

S. 307, S. 1082, S. 1238, and S. 1286

REGULATING THE DUMPING OF MATERIAL IN THE OCEANS, COASTAL, AND OTHER WATERS

MARCH 2, 3; APRIL 15, 21, 22, AND 28, 1971

Serial No. 92–11

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OCEAN WASTE DISPOSAL

TUESDAY, MARCH 2, 1971

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON OCEANS AND ATMOSPHERE,
Washington, D.C.

The subcommittee met at 10:35 a.m. in room 1115, New Senate Office Building, the Hon. Ernest F. Hollings (chairman of the subcommittee) presiding.

Senator HOLLINGS. The committee will come to order, please.

Mr. Secretary, ladies and gentlemen, welcome.

We begin our hearings on S. 307, a bill to foster oceanic and environmental research and development.

An integral part of this bill is its provisions regarding oceanic environmental deterioration. These provisions call for a program of research and associated technological development to provide the information and understanding of the changes in ocean environmental conditions which result from man's activities.

The research program would include measurement of chemical and biological contamination of the ocean and analysis of such information to enable prediction of contamination trends.

In order to deal effectively with ocean pollution problems we must understand the effects of ocean contaminants upon ocean life and marine ecology. We must develop a predictive capability. We must understand the persistence of pollutants in the oceans. And we must have information and data available for governments and others responsible for operating in or managing ocean resources.

To ensure that available information on ocean contaminants is taken into consideration before any permit for ocean dumping is granted we have provided that the permit application must be reviewed by the Secretary of Commerce, acting through the National Oceanic and Atmospheric Administration, and findings must be made on the impact of the dumping on natural processes, human health and safety, and on the permanence of the activity.

(The bills and agency comments follow:)

Present: Senators Hollings and Spong.

Staff member assigned to this hearing: H. Crane Miller.

92D CONGRESS
1ST SESSION

S. 307

IN THE SENATE OF THE UNITED STATES

JANUARY 26, 1971

Mr. HOLLINGS introduced the following bill; which was read twice and referred to the Committee on Commerce

A BILL

To foster oceanic and environmental research and development, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act to provide for a comprehensive, long-range, and coordinated national program in marine science, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering, and Resources, and for other purposes", approved October 15, 1966, as amended (16 U.S.C. 1121 et seq.), is amended by adding at the end thereof the following new title:

"TITLE IV—OCEANIC AND ENVIRONMENTAL RESEARCH

"SHORT TITLE

"SEC. 401. This title may be cited as the 'National Oceanic and Environmental Research Act of 1971'.

"FINDINGS AND POLICY

"SEC. 402. (a) Wise development and use of the oceans, estuarine, and other waters bordering our Nation and the Great Lakes is seriously hindered by lack of understanding and knowledge of the physical, chemical, and biological processes that take place within them and the consequences of man's unregulated activities upon their properties.

"(b) It is vital for the Nation that the development of these areas be undertaken in a way such as to balance wisely competing demands for access to the oceans, estuarine, and other waters as a major source of food, minerals, power development, transportation, recreation, and other human activities.

"(c) Competing demands upon the oceans, estuarine, and other waters bordering our Nation and the Great Lakes caused by population growth and economic development have already resulted in the serious loss of living marine resources, wildlife, recreational areas, and much of this loss is permanent, with adverse changes to ecological systems.

"(d) The development and use of our oceans, coastal areas, and adjoining lands requires the ability to measure, observe, and predict ocean conditions and related environmental phenomena in order to support the Nation's economic and industrial development of these areas and to protect the life, safety, and property of the general public.

"(e) The Congress declares that it is the policy of the United States to foster a program of oceanic and environmental research and development which will provide the understanding, and the capability to understand the consequences, of natural and manmade activities in the oceans, estuarine, and other waters. Such understanding and capabilities can only come from programs directed at understanding the physics, the chemistry, and biology of the oceans, and the dynamics of the ocean-atmosphere fluids.

"DEFINITIONS

"SEC. 403. For the purposes of this Act, the term—

"(a) 'Secretary' means the Secretary of Commerce.

"(b) 'Oceans, estuarine, and other waters' means oceans, bays, gulfs, sounds, salt water lagoons, salt water harbors, estuaries, and other waters where the tide ebbs and flows, and the Great Lakes.

"(c) 'State' means the States, District of Columbia, the Commonwealth of Puerto Rico, the United States Virgin Islands, American Samoa, Guam, the territories and pos-

sessions of the United States, and the Trust Territories of the Pacific Islands.

"OCEAN ENVIRONMENTAL DETERIORATION

"SEC. 404. The Secretary is authorized and directed to initiate a comprehensive program of research and associated technological development required to provide—

"(a) the information and understanding of the changes in ocean environmental conditions which result from man's activities. He is further directed to undertake and direct a comprehensive program to provide the knowledge of the manner in which the ocean and its life interact. Said program shall include, but not be limited to, the development of systems for the measurement of the state of the chemical and biological contamination of the ocean, and the analysis of such information to enable prediction of contamination trends;

"(b) the understanding of the effects of ocean contaminants upon ocean life and marine ecology;

"(c) the development, understanding, and capability to predict physical and chemical properties of the ocean, estuarine, and other waters in order that potential effects of waste disposal or pollution can be assessed;

"(d) development of an understanding of the fate of various kinds of pollutants in the ocean; and

"(e) the data and information resulting from these programs to Federal, State, and local governments and to private enterprise responsible for operating or managing the ocean, estuarine, or other waters.

"INTER-AGENCY COORDINATION AND COOPERATION

"SEC. 405. No license, permit, or authorization to dredge materials or to dispose of waste materials or other agents which deteriorate or cause adverse change in the oceans, estuarine or other waters shall be issued by any officer or employee of the United States without having first consulted with and received findings from the Secretary concerning the effect and impact of such activity upon the oceans, estuarine and other waters. The Secretary's findings shall include, but not be limited to—

"(1) the impact of the activity on natural processes of the oceans, estuarine, and other waters, including ecological systems dependent thereon;

"(2) the impact of the activity on human health, safety, welfare, and related amenities; and

"(3) an assessment of the persistence or permanance of the activity.

"OCEAN ENVIRONMENTAL PREDICTION

"SEC. 406. The Secretary is authorized and directed to initiate a comprehensive program for—

"(a) Development of capabilities essential for providing ocean and related environmental information required for the support of the development, conservation, and protection of coastal areas of the United States. Said program shall include, but not be limited to, the development of systems for the observation and monitoring of physical, chemical, and biological phenomena.

"(b) Development of the understanding required to predict oceanic and related environmental hazards, and the operation of warning and information systems necessary to provide for efficient management of coastal areas and the protection of life and property of the general public.

"ENHANCEMENT OF THE MARINE ENVIRONMENT

"SEC. 407. The Secretary is authorized and directed to initiate a program for the enhancement and improvement of the marine environment. Said program shall include, but not be limited to—

"(a) Studies and investigations of environmental modifications to protect coastal or offshore physical structures, improve beaches, to increase biological productivity, to improve living resource habitats, and to improve man's use of the marine environment.

"(b) Conduct of engineering tests, demonstrations, and model experiments to test and demonstrate the feasibility

and consequences of proposed ocean environmental modifications.

"(c) Furnish new data and information services to Federal, State, and local governments, institutions, and private enterprise to assist activities to enhance the marine environment.

"NATIONAL OCEANIC AND ENVIRONMENTAL RESEARCH LABORATORY SYSTEM

"SEC. 408. The Secretary is authorized to initiate and support a National Oceanic and Environmental Research Laboratory System for the purposes of—

"(a) carrying out the programs authorized in sections 404, 406, and 407 of this title;

"(b) carrying out scientific investigations of the characteristics and processes of the coastal and estuarine zones of the State or region in which such laboratories are established in order to provide necessary information, assistance, and recommendations to appropriate State, local, regional, or Federal authorities responsible for the management of the coastal and estuarine zones;

"(c) carrying out the fundamental and applied technological research programs provided in section 409 of this title; and,

"(d) carrying out economic, legal, and other social

studies related to the marine environment and its resources.

"TECHNOLOGICAL RESEARCH AND DEVELOPMENT

"SEC. 409. The Secretary is authorized and directed to initiate and undertake a program of fundamental and applied technological research and development to advance the national capability to work in and to use the oceans, and in support of the research provided in sections 404, 406, and 407 of this title. The Secretary shall further undertake and support a program to assess the impact of the use of technology upon the marine environment and its resources.

"ESTUARINE SANCTUARIES

"SEC. 410. The Secretary, in accordance with his regulations, is authorized to make available to a coastal State, grants up to 50 per centum of the costs of acquisition, development, and operation of estuarine sanctuaries for the purpose of creating natural field laboratories to gather data and other long-term studies of the estuarine zones of the United States. The number of estuarine sanctuaries provided under this section shall not exceed fifteen and the Federal share of the cost of each sanctuary shall not exceed $2,000,000.

"RESEARCH ASSISTANCE

"SEC. 411. The Secretary is authorized and directed to initiate and support fundamental scientific, technological, and

social research related to the purposes of this title, and is authorized to make contracts and other arrangements (including grants, loans and other forms of research assistance) to support such research.

"COOPERATIVE PROGRAMS

"SEC. 412. The Secretary is authorized (a) to encourage and support cooperative programs under which a single national oceanic and environmental research laboratory may serve two or more States whose coastal and estuarine zones, or portions thereof, have a high degree of similarity, in geographic, biological, chemical, and physical characteristics; and (b) require submission of a satisfactory and detailed program of scientific investigation by such laboratories and evidence that the research program was planned in consultation with the governmental authorities responsible for the management of the coastal and estuarine zone.

"INTERNATIONAL COOPERATION

"SEC. 413. The Secretary, in consultation with and under the guidance of the Secretary of State, is authorized to promote international cooperation and to enter into international agreements for cooperative scientific and technological research programs for the purposes of this title—

"(a) by participation in international programs and by encouraging cooperation in scientific research by personnel of the United States and other countries;

"(b) through publication and international dissemination of research data and results;

"(c) by cooperation and measures to strengthen research capabilities of developing countries, including the participation of their nationals in research programs.

"REGULATIONS

"SEC. 414. The Secretary shall develop such rules and regulations as may be necessary to carry out the provisions of this Act.

"PAYMENTS FOR FACILITIES AND EQUIPMENT

"SEC. 415. Payments by the Secretary to any institution or agency in any program to be carried out under this Act may be used for the rental, charter, purchase, construction, preservation, and repair of any buildings, docks, vessels, and equipment necessary to such program.

"APPROPRIATIONS

"SEC. 416. There are authorized to be appropriated—

"(1) sums, not to exceed $---------- as may be necessary to carry out the provisions of section 404 of this title;

"(2) sums, not to exceed $---------- as may be necessary to carry out the provisions of section 406 of this title;

"(3) sums, not to exceed $---------- as may be

necessary to carry out the provisions of section 407 of this title; and

"(4) sums, not to exceed $---------- as may be necessary to carry out the provisions of section 410 of this title.

92D CONGRESS
1ST SESSION

S. 1082

IN THE SENATE OF THE UNITED STATES

MARCH 2 (legislative day, FEBRUARY 17), 1971

Mr. CASE (for himself, Mr. BOGGS, Mr. GRAVEL, Mr. MUSKIE, Mr. PACKWOOD, and Mr. WILLIAMS) introduced the following bill; which was read twice and referred to the Committees on Commerce and Public Works jointly

A BILL

To regulate the discharge of wastes in territorial and international waters until five years after the date of enactment of this Act, to prohibit such discharge thereafter, and to authorize research and demonstration projects to determine means of using and disposing of such waste.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, effective on the date which is five years after the date of enactment of this Act, no owner or master of a vessel may load, or permit the loading of, any waste on such vessel while such vessel is in any port of the United States, if such waste is to be discharged in ocean waters. Prior to such date such loading shall be lawful only if such owner or master first—

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(1) obtains a permit from the Administrator of the Environmental Protection Agency (hereafter referred to in this Act as the "Administrator") which authorizes the loading of such waste; and

(2) notifies the Coast Guard of such loading as prescribed in section 3.

SEC. 2. (a) The Administrator shall issue to any owner or master of a vessel a permit authorizing the loading of waste on such vessel if the Administrator finds that the discharge of such waste in any ocean waters will not damage the ecology of the marine environment. In making any such finding, the Administrator shall consider the effect of such discharge on human health and welfare (including possible adverse effects on economic, recreational, and esthetic values) and one the marine ecosystem, taking into account the proposed location of such discharge and the concentration and volume of the waste to be discharged.

(b) In no event shall any permit be issued for the discharge of any waste whatever between the Continental Shelf and the coast of the United States.

(c) The Administrator shall have the authority to ban the loading, transporting, and dumping of any specific matter deemed damaging to the marine environment or to human health and welfare.

(d) The Administrator shall have the authority to designate ocean dumping sites.

(e) Each permit issued under subsection (a) shall specify—

(1) the amount and type of waste authorized to be loaded and discharged;

(2) the exact coordinates of the location at which such discharge is permitted and a statement of the route to that location;

(3) such provisions as the Administrator deems necessary to insure that such waste will be transported to the discharge site without accidental spillage or leakage; and

(4) such other provisions as the Administrator deems necessary to carry out the purposes of this Act.

SEC. 3. (a) Any owner or master of a vessel who is issued a permit under section 2 shall notify the Coast Guard and the Army Corps of Engineers of the exact location where the waste covered by such permit is to be discharged. Such notification must be given to the Coast Guard and the Army Corps of Engineers in such manner as the Secretary of the Department in which the Coast Guard is operating, and the Secretary of the Army, respectively, shall prescribe

and not later than four hours before the departure of the vessel.

(b) The Secretary of the Department in which the Coast Guard is operating shall conduct surveillance and other appropriate enforcement activity to prevent violations of this Act.

SEC. 4. (a) Any owner or master of a vessel who violates the first section of this Act or who violates any provision of a permit issued under section 2 of this Act shall be liable to a civil penalty of not more than $50,000 for the first violation, and not more than $100,000 for each subsequent violation. No penalty shall be assessed until the person charged shall have been given notice and an opportunity for a public hearing on such charge. Upon failure of an offending party to pay the penalty, the Administrator may request the Attorney General to commence an action in the appropriate district court of the United States for such relief as may be appropriate.

(b) A vessel, other than a vessel owned or bargeboat chartered by the United States, or other property used in a violation shall be liable in rem for any civil penalty assessed under this section and may be proceeded against in any district court of the United States having jurisdiction thereof.

SEC. 5. As used in this Act—

(1) The term "discharge" means to place, release,

discharge, or by any means whatsoever to dispose, of waste in ocean waters.

(2) The term "master" includes any person acting in the capacity of a master.

(3) The term "ocean waters" means any estuarine area, coastal waters, Great Lakes, territorial waters, and the high seas adjacent to the territorial waters.

(4) The term "owner" includes any private individual or corporate owner and any public owner, whether a department, agency, or instrumentality of a State or a political subdivision thereof, of an interstate governmental entity, or of the Federal Government.

(5) The term "United States" means the States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, and American Samoa.

(6) The term "vessel" includes any vessel, scow, or boat, whether or not documented under the laws of the United States, capable of being used to transport waste in ocean waters.

(7) The term "waste" means matter of any kind or description, including, but not limited to, dredge spoil, spoil waste, garbage, sewage sludge, munitions, chemical, biological and radiological warfare agents, radioactive materials, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial wastes.

SEC. 6. On and after the effective date of this Act, any license, permit, or authorization issued by any officer or employee of the United States under the authority of any other provision of law is terminated and has no effect whatsoever to the extent that such license, permit, or authorization authorizes any activity to which this Act applies.

SEC. 7. (a) The Administrator shall conduct, and encourage, cooperate with, and render financial and other assistance to appropriate public (whether Federal, State, interstate, or local) authorities, agencies, and institutions, private agencies and institutions, and individuals in the conduct of, and promote the coordination of, research, investigations, experiments, training, demonstrations, surveys, and studies for the purpose of determining means of recovering useful materials from waste and disposing of waste in a manner that will not endanger the public health or welfare.

(b) In carrying out the provisions of the preceding subsection, the Administrator is authorized to—

(1) collect and make available, through publications and other appropriate means, the results of, and other information pertaining to, such research and other activities, including appropriate recommendations in connection therewith;

(2) cooperate with public and private agencies, institutions, and organizations, and with any industries

involved, in the preparation and the conduct of such research and other activities; and

(3) make grants-in-aid to public or private agencies and institutions and to individuals for research, training projects, surveys, and demonstrations (including construction of facilities), and provide for the conduct of research, training, surveys, and demonstrations by contract with public or private agencies and institutions and with individuals; and such contracts for research or demonstrations or both (including contracts for construction) may be made in accordance with and subject to the limitations provided with respect to research contracts of the military departments in title 10, United States Code, section 2353, except that the determination, approval, and certification required thereby shall be made by the Administrator.

(c) Any grant, agreement, or contract made or entered into under this section shall contain provisions effective to insure that all information, uses, processes, patents, and other developments resulting from any activity undertaken pursuant to such grant, agreement, or contract will be made readily available on fair and equitable terms to industries or persons utilizing methods of waste disposal and industries or persons engaging in furnishing devices, facilities, equipment, and supplies to be used in connection

with waste disposal. In carrying out the provisions of this section, the Administrator and each department, agency, and officer of the Federal Government having functions or duties under this Act shall make use of and adhere to the Statement of Government Patent Policy which was promulgated by the President in his memorandum of October 10, 1963. (3 CFR, 1963 Supp., p. 238.)

SEC. 8. This Act shall take effect immediately upon enactment.

92D CONGRESS
1ST SESSION

S. 1238

IN THE SENATE OF THE UNITED STATES

MARCH 16, 1971

Mr. BOGGS (for himself, Mr. COOPER, Mr. ALLOTT, Mr. BEALL, Mr. BAKER, Mr. BAYH, Mr. BENNETT, Mr. BIBLE, Mr. BUCKLEY, Mr. COTTON, Mr. DOLE, Mr. DOMINICK, Mr. FANNIN, Mr. GOLDWATER, Mr. GURNEY, Mr. HART, Mr. HATFIELD, Mr. HOLLINGS, Mr. HRUSKA, Mr. JAVITS, Mr. JORDAN of Idaho, Mr. MAGNUSON, Mr. MATHIAS, Mr. MUSKIE, Mr. PACKWOOD, Mr. PASTORE, Mr. PEARSON, Mr. PERCY, Mr. PROUTY, Mr. RANDOLPH, Mr. ROTH, Mr. SAXBE, Mr. SCHWEIKER, Mr. SCOTT, Mr. SPONG, Mr. TAFT, Mr. TOWER, and Mr. WEICKER) introduced the following bill; which was read twice and referred to the Committees on Commerce and Public Works jointly

A BILL

To regulate the dumping of material in the oceans, coastal, and other waters, 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 "Marine Protection Act of 1971".

FINDING, POLICY, AND PURPOSE

SEC. 2. (a) Unregulated dumping of material into the oceans, coastal, and other waters endangers human health,

welfare, and amenities, and the marine environment, ecological systems, and economic potentialities.

(b) Congress declares that it is the policy of the United States to regulate the dumping of all types of material in the oceans, coastal, and other waters and to prevent or vigorously limit the dumping into the oceans, coastal, and other waters of any material which could adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. To this end, it is the purpose of this Act to regulate the transportation of material from the United States for dumping into the oceans, coastal, and other waters, and the dumping of material by any person from any source if the dumping occurs in waters over which the United States has jurisdiction.

DEFINITIONS

SEC. 3. For the purposes of this Act the term—

(a) "Administrator" means the Administrator of the Environmental Protection Agency.

(b) "Oceans, coastal, and other waters" means oceans, gulfs, bays, salt water lagoons, salt water harbors, other coastal waters where the tide ebbs and flows, and the Great Lakes.

(c) "Material" means matter of any kind or description, including, but not limited to, dredge spoil, solid waste, garbage, sewage sludge, munitions, chemical, biological, and

radiological warfare agents, radioactive materials, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial waste: *Provided,* That it does not mean oil within the meaning of section 11 of the Federal Water Pollution Control Act or sewage from vessels within the meaning of section 13 of said Act.

(d) "United States" includes the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Canal Zone, the territories and possessions of the United States, and the Trust Territory of the Pacific Islands.

(e) "Person" means any private person or entity, any employee, agent, department, agency, or instrumentality of any State or local unit of government, or foreign government, and, except as to the provisions of section 6, any employee, agent, department, agency, or instrumentality of the Federal Government.

(f) "Dumping" means a disposition of material: *Provided,* That it does not mean a disposition of any effluent from any outfall structure, or a routine discharge of effluent incidental to the propulsion of vessels: *And provided further,* That it does not mean the intentional placement of any device in the oceans, coastal, or other waters or on the submerged land beneath such waters, for the purpose of using such device there to produce an effect attributable to other than its mere physical presence.

(g) "District court of the United States" includes the District Court of Guam, the District Court of the Virgin Islands, the District Court of the Canal Zone, and in the case of American Samoa and the Trust Territory of the Pacific Islands, the District Court of the United States for the District of Hawaii, which court shall have jurisdiction over actions arising therein.

PROHIBITED ACTS

SEC. 4. Except as such transportation or dumping or both may be authorized in a permit issued by the Administrator—

(a) no person shall transport material from the United States for the purpose of dumping it into the oceans, coastal, and other waters, and

(b) no person shall dump material (1) in that part of the oceans, coastal, and other waters which is within the territorial jurisdiction of the United States, or, (2) in a zone contiguous to the territorial sea of the United States, extending to a line twelve nautical miles seaward from the base line of the territorial sea as provided in article 24 of the Convention on the Territorial Sea and the Contiguous Zone, to the extent that it may affect the territorial sea or the territory of the United States.

PERMITS

SEC. 5. (a) The Administrator may issue permits to transport material for dumping into the oceans, coastal, and other waters, or to dump material into the waters described in subsection 4(b), or both, where the applicant presents information respecting the proposed activity which in the judgment of the Administrator indicates that such transportation, or dumping, or both will not unreasonably degrade or unreasonably endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. The Administrator shall establish and apply criteria for reviewing and evaluating such permit applications, and, in establishing or revising such criteria, shall consider, but not be limited in his consideration to, the following:

(1) the likely impact of the proposed dumping on human health, welfare, and amenities, and on the marine environment, ecological systems, and economic potentialities, including an assessment of—

(A) the possible persistence or permanence of the effects of the proposed dumping,

(B) the volume and concentration of materials involved, and

(C) the location proposed for the dumping.

(2) alternative locations and methods of disposal,

including land-based alternatives; the probable impact of requiring the use of such locations or methods of disposal on considerations affecting the public interest; and the probable impact of issuing or denying permits on considerations affecting the public interest.

In establishing or revising such criteria, the Administrator shall consult with the Secretaries of Commerce, Interior, State, Defense, Agriculture, Health, Education, and Welfare, and Transportation, the Atomic Energy Commission, and other appropriate Federal, State, and local officials. With respect to such criteria as may affect the civil works program of the Department of the Army, the Administrator shall also consult with the Secretary of the Army. 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. No permit shall be issued for a dumping of material which will violate applicable water quality standards.

(b) (1) The Administrator may establish and issue various categories of permits, including the general permits described in subsection (e).

(2) The Administrator may require an applicant for a permit under subsection (a) to provide such information as the Administrator may consider necessary to review and evaluate such an application.

(c) Permits issued under subsection (a) may designate and include (1) the type of material authorized to be transported for dumping or to be dumped; (2) the amount of material authorized to be transported for dumping or to be dumped; (3) the location where such transport for dumping will be terminated or where such dumping will occur; (4) the length of time for which the permits are valid and their expiration date; and (5) such other matters as the Administrator deems appropriate.

(d) The Administrator may prescribe such processing fees for permits and such reporting requirements for actions taken pursuant to permits issued under subsection (a) as he deems appropriate.

(e) Notwithstanding any other provision of this Act, the Administrator may issue general permits for the transportation for dumping, or dumping, or both, of classes of materials which he determines will have a minimal impact, considering the factors stated in subsection (a).

(f) The Administrator may limit or deny the issuance of permits, or may alter or revoke partially or entirely the terms of permits issued by him under this Act, for the transportation for dumping, or the dumping, or both, of specified material, where he finds that such material cannot be dumped consistently with the criteria established pursuant to subsection (a). No action shall be taken under this sub-

section unless the affected person or permittee shall have been given notice and opportunity for hearing on such action as proposed.

(g) The Administrator may, considering the criteria established pursuant to subsection (a), designate recommended sites for the dumping of specified materials.

(h) Nothing in this Act shall prohibit any transportation for dumping or dumping of material where such transportation or dumping is necessary, in an emergency, to safeguard human life. Such transportation or dumping shall be reported to the Administrator within such times and under such conditions as he may prescribe by regulation.

PENALTIES

SEC. 6. (a) A person who violates section 4 of this Act, or regulations promulgated under this Act, or a permit issued under this Act by the Administrator shall be liable to a civil penalty of not more than $50,000 for each violation to be assessed by the Administrator. No penalty shall be assessed until the person charged shall have been given notice and an opportunity for a hearing on such violation. Any such civil penalty may be compromised by the Administrator. In determining the amount of the penalty, or the amount agreed upon in compromise, the gravity of the violation and the demonstrated good faith of the person charged in attempting to achieve rapid compliance after notification

of a violation shall be considered by said Administrator. Upon failure of the offending party to pay the penalty, the Administrator may request the Attorney General to commence an action in the appropriate district court of the United States for such relief as may be appropriate.

(b) In addition to any action which may be brought under subsection (a), a person who knowingly and willfully violates section 4 of this Act, regulations promulgated under this Act, or a permit issued under this Act by the Administrator shall be fined not more than $50,000 or imprisoned for not more than one year, or both.

(c) For the purpose of imposing civil penalties and criminal fines under this section, each day of a continuing violation shall constitute a separate offense.

(d) The Attorney General or his delegate may bring actions for equitable relief to redress a violation by any person of this Act, regulations promulgated under this Act, and permits issued under this Act by the Administrator, and the district courts of the United States shall have jurisdiction to grant such relief as the equities of the case may require.

(e) A vessel, except a public vessel within the meaning of subsection 13(a)(3) of the Federal Water Pollution Control Act or other public property of a similar nature, used in a violation shall be liable in rem for any civil penalty

assessed or criminal fine imposed and may be proceeded against in any district court of the United States having jurisdiction thereof: *Provided,* That no vessel shall be liable unless it shall appear that the owner was at the time of the violation a consenting party or privy to such violation.

(f) If the provisions of any permit issued under subsection (a) of section 5 are violated, the Administrator may revoke the permit or may suspend the permit for a specified period of time. No permit shall be revoked or suspended unless the permittee shall have been given notice and opportunity for a hearing on such violation and proposed suspension or revocation.

RELATIONSHIP TO OTHER LAWS

SEC. 7. (a) After the effective date of this Act, all licenses, permits, or authorizations which have been issued by any officer or employee of the United States under authority of any other provision of law shall be terminated and of no effect to the extent they authorize any activity regulated by this Act. Thereafter, except as hereafter provided, no license, permit, or authority shall be issued by any officer or employee of the United States other than the Administrator which would authorize any activity regulated by this Act or the regulations issued hereunder.

(b) Nothing in this Act shall abrogate or negate any existing responsibility or authority contained in the Atomic

Energy Act of 1954, as amended, and section 4 and subsection 7(a) of this Act shall not apply to any activity regulated by that Act: *Provided,* The Atomic Energy Commission shall consult with the Administrator prior to issuing a permit to conduct any activity which would otherwise be regulated by this Act. In issuing any such permit, the Atomic Energy Commission shall comply with standards set by the Administrator respecting limits on radiation exposures or levels, or concentrations or quantities of radioactive material. In setting such standards for application to the oceans, coastal, and other waters, or for specific portions of such waters, the Administrator shall consider the policy expressed in subsection 2(b) of this Act and the factors stated in subsections 5(a)(1) and 5(a)(2) of this Act.

(c)(1) The provisions of subsection (a) shall not apply to actions taken before or after the effective date of this Act under the authority of the Rivers and Harbors Act of 1899 (33 U.S.C. 401 et seq.).

(2) Except as provided in subsection 11(e), nothing in this Act shall be construed as abrogating or negating any existing responsibility or authority contained in the Rivers and Harbors Act of 1899: *Provided,* That after the effective date of this Act, no Federal license or permit shall be issued under the authority of the Rivers and Harbors Act of 1899 to conduct any activity otherwise regulated by section 4 of

this Act and the regulations issued hereunder, unless the Administrator has certified that the activity proposed to be conducted is in conformity with the provisions of this Act and with the regulations issued hereunder.

(3) Where a license or permit to conduct an activity has been granted under the authority of subsections (c) (1) and (c) (2) of this section and of the Rivers and Harbors Act of 1899, no separate permit to conduct such activity shall be required under this Act.

(d) Prior to issuing any permit under this Act, where it appears to the Administrator that the disposition of the material to be transported for dumping or to be dumped may affect navigation in the navigable waters of the United States or may create an artificial island on the Outer Continental Shelf, the Administrator shall consult with the Secretary of the Army and no permit shall be issued if the Secretary of the Army determines that navigation will be unreasonably impaired.

(e) Nothing in this Act shall be construed as preempting any State, Federal territory or Commonwealth, or subdivision thereof from imposing any requirement or liability.

ENFORCEMENT

SEC. 8. (a) The Administrator may, whenever appropriate, utilize by agreement, the personnel, services, and facil-

ties of other Federal departments, agencies, and instrumentalities of other Federal departments, agencies, and instrumentalities or State agencies or instrumentalities, whether on a reimbursable or a nonreimbursable basis.

(b) The Administrator may delegate responsibility and authority for reviewing and evaluating permit applications, including the decision as to whether a permit will be issued, to an officer of the Environmental Protection Agency, or he may delegate, by agreement, such responsibility and authority to the heads of other Federal departments or agencies, whether on a reimbursable or nonreimbursable basis.

(c) The Secretary of the department in which the Coast Guard is operating shall conduct surveillance and other appropriate enforcement activity to prevent unlawful transportation of material for dumping or dumping.

REGULATIONS

SEC. 9. In carrying out the responsibilities and authority conferred by this Act, the Administrator is authorized to issue such regulations as he may deem appropriate.

INTERNATIONAL COOPERATION

SEC. 10. The Secretary of State, in consultation with the Administrator, shall seek effective international action and cooperation to insure protection of the marine environment, and may for this purpose, formulate, present, or sup-

port specific proposals in the United Nations and other competent international organizations for the development of appropriate internaitonal rules and regulations in support of the policy of this Act.

REPEAL AND SUPERSESSION

SEC. 11. (a) The second proviso to the last paragraph of section 20 of the Act of March 3, 1899 (30 Stat. 1154), as amended (33 U.S.C. 418), is repealed.

(b) Sections 1, 2, 3, 4, 5, 6, and 7 of the Act of June 29, 1888 (25 Stat. 209), as amended (33 U.S.C. 441–451b), are repealed.

(c) Section 2 of the Act of August 5, 1886 (24 Stat. 329) (33 U.S.C. 407a), is repealed.

(d) To the extent that it authorizes action regulated by this Act, section 4 of the Act of March 3, 1905 (33 Stat. 1147) (33 U.S.C. 419), is superseded.

(e) Section 13 of the Rivers and Harbors Act of 1899 (30 Stat. 1152), as amended (33 U.S.C. 407), is superseded insofar as it applies to dumping, as defined in subsection 3(f) of this Act, of material in the waters covered by subsection 4(b) of this Act.

EFFECTIVE DATE AND SAVINGS PROVISION

SEC. 12. (a) This Act shall take effect six months after its enactment.

(b) No legal action begun, or right of action accrued,

prior to the effective date of this Act shall be affected by any provision of this Act.

AUTHORIZATION FOR APPROPRIATIONS

SEC. 13. There is hereby authorized to be appropriated, out of any moneys in the Treasury not otherwise appropriated, such sums as may be necessary for the purposes and administration of this Act.

92D CONGRESS
1ST SESSION

S. 1286

IN THE SENATE OF THE UNITED STATES

MARCH 19, 1971

Mr. BOGGS introduced the following bill; which was read twice and referred to the Committees on Public Works and Commerce jointly

A BILL

To establish an immediate program for the prevention of ocean pollution.

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 "Emergency Water Pollution Prevention Act of 1971".

SEC. 2. The Federal Water Pollution Control Act is amended by redesignating sections 22 through 27 as sections 23 through 28, respectively, and by inserting after section 21 a new section as follows:

"CONTROL OF OCEAN POLLUTION

"SEC. 22. (a) In recognition of the fact that the ocean is being used at an ever-increasing rate for the disposal of pol-

lutants the purpose of this section is to provide (1) an immediate stop to the loading of vessels with any material for disposal in the oceans, and (2) for the regulation as soon as possible of any disposing of materials in the ocean from vessels in such a manner as will prevent any pollution harmful to the environment.

"(b) Effective immediately upon enactment of this section and notwithstanding any other provision of law or permit issued thereunder, no owner or master of a vessel may load, or permit the loading of, any material on such vessel while such vessel is in any port or other area under the jurisdiction of the United States if such material is to be discharged in ocean waters. After the effective date of regulations established pursuant to subsection (c) of this section such loading shall be lawful only if in accordance with a permit obtained pursuant to such regulations.

"(c) The Administrator of the Environmental Protection Agency (hereinafter in this section referred to as the 'Administrator') shall, after appropriate study prescribe, not later than six months after the effective date of this section, regulations for the control by the issuance of permits of all loading of vessels within the jurisdiction of the United States with any material which is to be disposed of in ocean waters. Such permits shall allow such disposal only (1) when it will not produce a harmful effect on the environment, and

(2) in areas outside the territorial waters of the United States and beyond the Continental Shelf which are designated by the Administrator.

"(d) The Secretary of the Department in which the Coast Guard is operating shall conduct surveillance and other appropriate enforcement activity to prevent violations of this section.

"(e) (1) Any owner or master of a vessel who violates subsection (b) of this section or who violates any provision of the regulations or a permit issued pursuant to this section shall be liable to a civil penalty of not more than $25,000 for each such violation. No penalty shall be assessed until the person charged shall have been given notice and an opportunity for a public hearing on such charge. Upon failure of an offending party to pay the penalty, the Administrator may request the Attorney General to commence an action in the appropriate district court of the United States for such relief as may be appropriate.

"(2) A vessel, other than a vessel owned or chartered by the United States, or other property used in a violation shall be liable in rem for any civil penalty assessed under this section and may be proceeded against in any district court of the United States having jurisdiction thereof.

"(f) As used in this section—

"(1) the term 'master' includes any person acting in the capacity of a master;

"(2) the term 'owner' includes any private individual or corporate owner and any public owner, whether a department, agency, or instrumentality of a State or a political subdivision thereof, of an interstate governmental entity, or of the Federal Government;

"(3) the term 'ocean waters' means any estuarine area, the territorial waters of the United States, and the high seas beyond such territorial waters; and

"(4) the term 'vessel' includes any vessel, scow, barge, or boat, whether or not documented under the laws of the United States, capable of being used to transport any material in ocean waters."

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., April 27, 1971.

B–140845.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This refers to your letter of February 24, 1971, requesting our comments on S. 307, entitled: "A bill to foster oceanic and environmental research and development, and for other purposes."

We have no special information as to the advantages or disadvantages of the proposed legislation and, therefore, we have no comment as to its merits. However, we offer the following comments concerning certain provisions of the bill.

This bill amends the Marine Resources and Engineering Development Act of 1966 by adding a new title IV. At the present time, there is not a title III to the act; however, H.R. 2439 has been introduced to provide a title III.

The act which the bill proposes to amend was approved June 17, 1966, and is codified in 33 U.S.C. 1101 *et seq.* Consequently, lines 8 and 9 on page 1 of the bill should be changed to read "approved June 17, 1966, as amended (33 U.S.C. 1101 *et seq.*), is amended by adding at the end thereof the."

Section 408, page 7, authorizes the Secretary to initiate a National Oceanic and Environmental Research Laboratory System to carry out the programs in the bill. The committee may desire that the Secretary use and expand the Department's existing network of Laboratories where possible in lieu of establishing an entirely new network.

Several Federal agencies that are currently involved in marine activities have programs to combat ocean pollution. This bill would greatly expand the efforts of the Department of Commerce in this area. We suggest that the bill include a provision requiring the Secretary to coordinate its own scientific and technical resources with the technical and operational capabilities of other Government agencies, especially the Environmental Protection Agency.

Section 411, page 8, authorizes the Secretary to enter into contracts and other arrangements (including grants, loans, and other forms of research assistance) to support such research. Section 410 provides for grants to coastal States up to 50 percent of the cost of acquisition, development, and operation of estuarine sanctuaries.

Under section 202 of the Intergovernmental Cooperation Act of 1968, the Secretary and the Comptroller General would have access for the purpose of audit and examination to any books, records, etc., that are pertinent to the grants-in-aid received by the States. However, nothing in the bill authorizes the Secretary or the Comptroller General to have access to pertinent records of local public or private agencies, individuals, organizations, etc., nor does section 202 of the Intergovernmental Cooperation Act of 1968 authorize access to records of such agencies, individuals or organizations. We recommend, therefore, that the bill be amended to include language which would provide for the Secretary and the Comptroller General or their representatives to have access for the purpose of audit and examination to the books and records of these recipients.

To carry out such recommendation, we suggest that the following section be added to the bill.

"SEC. ——. (a) Each recipient of assistance under this Act pursuant to grants, loans or contracts entered into under other than competitive bidding procedures, and other arrangements shall keep such records as the Secretary shall prescribe, including records which fully disclose the amount and disposition by such recipient of the proceeds of such assistance, the total cost of the project or undertaking in connection with which such assistance is given or used, and the amount of that portion of the cost of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit.

"(b) The Secretary and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access for the purpose of audit and examination to any books, documents, papers, and records of the recipients that are pertinent to the grants, loans, or contracts entered into under this Act under other than competitive bidding procedures, and other arrangements."

Section 415 would authorize the use of Federal funds for the purchase, construction, preservation, and repair of any buildings, docks and vessels necessary to such program. There should be considered the desirability of establishing con-

ditions or restrictions concerning the use of such buildings similar to provisions in various other grant construction programs. See 42 U.S.C. 2695.

Sincerely yours,

ROBERT F. KELLER,
Assistant Comptroller General of the United States.

DEPARTMENT OF THE NAVY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., May 3, 1971.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Your request for comment on S. 307, a bill, "To foster oceanic and environmental research and development, and for other purposes," has been assigned to this Department by the Secretary of Defense for the preparation of a report expressing the views of the Department of Defense.

The purpose of the bill is to authorize the Secretary of Commerce to undertake a variety of programs and activities relating to oceanic and environmental research and development.

It is noted that Section 402(d) of the bill provides that the development and "use of our oceans" requires an understanding of them. The only portion of the ocean which is "ours" is the territorial sea. Research should not be limited to this three-mile band of ocean nor should the United States give the impression we are claiming more of the oceans as "ours" than the present limits of our territorial sea. Substitution of the word "the" for the word "our" would clarify this subsection.

Although the bill, if enacted, would be consistent with the objectives of the Marine Resources and Engineering Development Act of 1966, great care would have to be exercised to insure that tasks and functions assigned to the Department of Commerce by this bill do not needlessly duplicate or overlap existing programs of other agencies. For example, Section 408 of the bill provides for a National Oceanic and Environmental Research Laboratory System without delineating its interface with emerging state and regional laboratories. Also, the ship construction, charter and facility support provisions contained in Section 415 could duplicate functions now undertaken by the Navy and the National Science Foundation.

The Administration's comprehensive bill to regulate the dumping of material in the oceans, coastal and other waters, S. 1238, would authorize the Administrator of the Environmental Protection Agency to issue permits to regulate dumping. Section 405 of S. 307 would require the Administrator to consult with the Secretary of Commerce prior to the issuance of such a permit. Such a procedure would appear to be an unnecessary duplication of effort.

The enactment of this bill would not have an adverse impact on the Department of Defense. Accordingly, the Department of the Navy, on behalf of the Department of Defense, defers to other interested agencies as to the merits of the bill.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Office of Management and Budget advises that, from the standpoint of the Administration's program, there is no objection to the presentation of this report on S. 307 for the consideration of the Committee.

For the Secretary of the Navy.

Sincerely yours,

LANDO W. ZECH, Jr.,
Captain, U.S. Navy, Deputy Chief.

DEPARTMENT OF STATE,
Washington, D.C., May 20, 1971.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: The Secretary has asked me to reply to your letter of February 24, 1971, requesting this Department's views on S. 307, a bill to foster oceanic and environmental research and development, and for other purposes.

The Department of State has reviewed S. 307 and suggests that two changes be made in Sec. 413. The reference to international "agreements" in the first sentence of this section should be changed to international "arrangements". Using the word "arrangements" rather than "agreements" in this situation will provide greater flexibility to the Secretary of Commerce and not confuse the existing authority of the Secretary of State for entering international agreements on behalf of the United States Government.

In addition, the Department would oppose inclusion of subparagraph (c) in Section 413. Helping to strengthen the research capabilities of developing countries would be a major purpose of the President's recently proposed International Development Institute. In carrying out this purpose regarding oceanic matters, the new Institute may draw upon the resources of the Department of Commerce, but the Department of Commerce should not be given authority to initiate and implement independent programs.

The Office of Management and Budget advises that from the standpoint of the Administration's program there is no objection to the submission of this report.

Sincerely yours,

DAVID M. ABSHIRE,
Assistant Secretary for Congressional Relations.

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., April 29, 1971.

B–135945.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: By letter of March 30, 1971, you requested our comments on S. 1082, which would regulate the discharge of wastes in territorial and international waters until five years after the date of its enactment, prohibit such discharge thereafter, and authorize research and demonstration projects to determine means of using and disposing of such wastes.

We have no special information as to the advantages or disadvantages of the proposed legislation and therefore make no recommendation with respect to its enactment. However, there is one aspect of the bill which we wish to bring to the committee's attention.

Paragraph (b) (3) of section 7 authorizes the Administrator to make grants-in-aid to public or private agencies and institutions and to individuals for research, training projects, surveys, and demonstrations. We note that the bill contains no requirement that the grantee make the accounting records used to support the amount of his grant available for audit by the Administrator of the Environmental Protection Agency or the Comptroller General of the United States. We suggest that language to this effect be included. This could be accomplished by making the following addition to section 7 of the bill:

"(d) (1) Each recipient of a grant under this Act shall keep such records as the Administrator may prescribe, including records which can be used to support fully the amount of his grant, and such records as will facilitate an effective audit.

"(2) The Administrator and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access for the purpose of audit and examination to any books, documents, papers and records of the recipient of any grant under this Act which are pertinent to such grant."

Sincerely yours,

ROBERT F. KELLER,
Assistant Comptroller General of the United States.

GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE,
Washington, D.C., May 12, 1971.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Reference is made to your request for the views of the Department of Defense on S. 1082, 92d Congress, a bill "To regulate the discharge of wastes in territorial and international waters until five years after

the date of enactment of this Act, to prohibit such discharge thereafter, and to authorize research and demonstration projects to determine means of using and disposing of such waste."

The purpose of the bill is stated in the title. If enacted, no owner or master of a vessel could load or permit the loading of waste on such vessel while such vessel is in any port of the United States if such waste is to be discharged in ocean waters after a date five years from the date of enactment. Prior to such date, such loading would be lawful only if the owner or master first obtained a permit from the Administrator of the Environmental Protection Agency and notifies the Coast Guard and the Army Corps of Engineers of his intention to load waste for the purpose of disposal. The Coast Guard would be responsible for surveillance and appropriate enforcement activity, and the bill prescribes penalties for violations.

The Department of Defense is deeply concerned about the potential effects of unregulated disposal of refuse in the waters that this bill seeks to protect. By letter dated February 10, 1971, the Administrator of the Environmental Protection Agency transmitted to the Congress the Administration's proposal "To regulate the dumping of material in the oceans, coastal, and other waters and for other purposes." The proposal was introduced as S. 1238. The Department of Defense recommends the enactment of S. 1238 in lieu of S. 1082.

The Office of Management and Budget advises that, from the standpoint of the Administration's program, there would be no objection to the presentation of this report for the consideration of the Committee and that the enactment of S. 1238 would be in accord with the program of the President.

Sincerely,

J. FRED BUZHARDT.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., April 12, 1971.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: We respond to your request of March 24 for comment on S. 1238, a bill "To regulate the dumping of material in the oceans, coastal, and other waters, and for other purposes," the "Marine Protection Act of 1971."

The Department of the Interior strongly recommends enactment of this Administration proposal to provide long sought regulation of waste disposal in ocean, coastal, and Great Lakes waters of the United States.

S. 1238 would vest in the Administrator of the Environmental Protection Agency authority to control ocean dumping of waste materials through issuance of permits and enforcement of a prohibition against the unauthorized transport of dumping of such material. In determining whether or not to approve a permit application, the Administrator would be required to consider (1) the impact of dumping on the marine environment and human welfare and (2) other possible locations and methods of disposal, including land-based alternatives, but in no event would a permit be issued for a dumping in violation of applicable water quality standards. Section 5 provides authority to designate recommended sites for the dumping of specified materials, and would allow the Administrator to deny, alter or revoke a permit for the disposal of any material that could threaten human health or the marine environment.

Jurisdiction would extend to all persons, including Federal, State, and foreign governmental organizations, who seek to dispose in territorial waters of the United States or the adjacent contiguous zone, to the extent that such disposal in the contiguous zone may affect the territorial sea or territory of the United States. Section 6 provides a civil penalty of not more than $50,000 for each violation of the prohibition against unauthorized transport or disposal and criminal sanctions for knowing and willful violations. Surveillance would be conducted by the Coast Guard, and legal action taken by the Attorney General upon request of the Administrator. A thorough analysis of its draft bill was transmitted to the Congress on February 10 by the Environmental Protection Agency.

As your Committee is aware this Department has frequently expressed its opposition to the use of ocean waters for waste disposal. Implicit in our opposition of *all* ocean dumping, however, has been the recognition that feasible

alternatives are not always available. Our concern for the environmental effects of uncontrolled dumping led to recent studies of the New York Bight and participation in the review of ocean dumping generally which preceded the issuance on October 7, 1970 of "Ocean Dumping—A National Policy", a report prepared by the Council on Environmental Quality.

We participated, too, in the preparation and review of legislation to implement the Council's recommendations. The bill now pending before your Committee, S. 1238, is the end result of close cooperation among those several Federal agencies with responsibility for the protection, conservation and management of our Nation's natural resources. The Department of the Interior will provide whatever assistance it can to the Administrator of the Environmental Protection Agency under section 5(a) of the Marine Protection Act of 1971.

President Nixon noted in his environmental message of February 8 that ocean disposal has a number of harmful effects, including destruction of marine life, decreased abundance of fish and other economic resources, modification of marine ecosystems, and impairment of aesthetic values. We urge prompt enactment of S. 1238, as the President suggested, "to assure that our oceans do not suffer the fate of so many of our inland waters, and to provide the authority needed to protect our coastal waters, beaches, and estuaries".

The Office of Management and Budget has advised that this report is in accord with the program of the President.

Sincerely yours,

HARRISON LOESCH,
Assistant Secretary of the Interior.

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D.C., April 28, 1971.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your request for a report on S. 1238, a bill "To regulate the dumping of material in the oceans, coastal, and other waters, and for other purposes."

This Department supports the enactment of S. 1238 which carries out the recommendations set forth by the President in his February 8, 1971, message on the environment.

Under this bill, the Administrator of the Environmental Protection Agency would be authorized to issue permits for dumping materials into oceans, coastal, and other waters when, in his judgment, such dumping will not unreasonably endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities.

The Administrator, EPA, would be directed to establish criteria for evaluating permit applications on the basis of their likely environmental impact including (1) possible persistence of the effects of the proposed dumping, (2) volume and concentration of materials involved, and (3) the location proposed for dumping.

Of special interest to this Department is the provision (Sec. 5(a)2) that the Administrator, EPA, consider "alternate locations and methods of disposal including land-based alternatives . . ." Since most of the land in the United States is rural land, used for farming or forestry, this Department is concerned with any land-based alternatives which might be considered. The Department of Agriculture has information and expertise relevant to the suitability of various land sites for disposal of solids, either as sanitary landfills or through methods by which many solids may be beneficially incorporated in the soil. We wish to point out that the bill very appropriately provides that, in establishing or revising criteria against which dumping permit applications would be approved or denied, the Administrator, EPA, will consult with this Department, along with several other interested Federal agencies.

The Office of Management and Budget advises that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

J. PHIL CAMPBELL,
Under Secretary.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., April 29, 1971.

Hon. WARREN A. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate, Washington, D.C.

DEAR SENATOR MAGNUSON: The Atomic Energy Commission is pleased to reply to your letter of March 24, 1971, requesting our views on S. 1238, a bill "[t]o regulate the dumping of material in the oceans, coastal, and other waters, and for other purposes." We note that two bills which are identical to S. 1238 have been introduced in the House, viz., H.R. 4247 and H.R. 4723.

S. 1238, an Administration bill, would carefully regulate (1) the transportation of materials from the United States for the purpose of disposal in the oceans and coastal and other waters of the United States, and (2) the dumping of such materials in waters over which the United States has jurisdiction. The term "dumping" and other key words in these bills are clearly defined. Both transportation and dumping would be prohibited unless the Administrator of EPA issues an authorizing permit. The Administrator would be empowered to issue such permits "where the applicant presents information respecting the proposed activity which in the judgment of the Administrator indicates that such transportation, or dumping, or both will not unreasonably degrade or unreasonably endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities."

In reviewing permit applications the Administrator would be guided by criteria to be established by him in consultation with certain named Federal agencies, including the Atomic Energy Commission, as well as "other appropriate Federal, State, and local officials."

The Administrator would have very broad authority with respect to types and scopes of permits, but no permit could be issued for dumping that would violate applicable water quality standards. The bill provides that transportation or dumping without a permit would be permitted in emergency situations where necessary to safeguard human life; in such excepted instances, reports would have to be furnished to the Administrator "within such time and under such conditions as he may prescribe by regulation."

Under the caption "Relationship to Other Laws" the bill provides, among other things, that:

"(b) Nothing in this Act shall abrogate or negate any existing responsibility or authority contained in the Atomic Energy Act of 1954, as amended, and section 4 and subsection 7(a) of this Act shall not apply to any activity regulated by that Act: Provided, The Atomic Energy Commission shall consult with the Administrator prior to issuing a permit to conduct any activity which would otherwise be regulated by this Act. In issuing any such permit, the Atomic Energy Commission shall comply with standards set by the Administrator respecting limits on radiation exposures or levels, or concentrations or quantities of radioactive material. In setting such standards for application to the oceans, coastal, and other waters, or for specific portions of such waters, the Administrator shall consider the policy expressed in subsection 2(b) of this Act and the factors stated in subsections 5(a)(1) and 5(a)(2) of this Act."

This provision recognizes that the Atomic Energy Act of 1954, as amended, vests the Atomic Energy Commission with regulatory authority over the construction and operation of nuclear facilities and the possession and use of certain defined nuclear materials, including the disposal of all radioactive materials, except radioactive material produced in accelerators and naturally occurring radium and its daughters.

In our view, the proposed legislation would provide for comprehensive and effective regulation of the discharge of materials into the marine environment. Accordingly, we favor the enactment of S. 1238.

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

Cordially,

GLENN T. SEABORG, *Chairman.*

Senator HOLLINGS. At the outset this morning we shall look into some of the factual problems of ocean dumping, specifically Navy ocean dumping practices. The dumping of 500,000 gallons of oil off Florida; the proposal to dump 50,000 tons of conventional munitions

in the ocean this year; last year's Army nerve gas dumping, have all given rise to serious questions about military and naval disposal practices of a wide range of materials. We shall start by looking into some of those practices and are glad to welcome the Secretary of the Navy, the Honorable John H. Chafee.

Secretary Chafee must leave no later than 11:10 in order to be at the White House by 11:20, but I understand that the men with you will remain behind in case we have additional questions.

Thereafter, we shall hear the testimony of Prof. M. Grant Gross, associate director for research of the Marine Sciences Research Center, State University of New York at Stony Brook. Dr. Gross' extensive research into dumping practices in New York Harbor and the New York Bight will be very welcome and helpful in our deliberation on S. 307.

STATEMENT OF HON. JOHN H. CHAFEE, SECRETARY OF THE NAVY; ACCOMPANIED BY CHARLES L. ILL, III, SPECIAL ASSISTANT TO THE SECRETARY; AND REAR ADM. NATHAN SONENSHEIN, COMMANDER, NAVAL SHIPS SYSTEMS COMMAND

Secretary CHAFEE. Thank you very much, Senator. I am delighted to have the opportunity to appear before you this morning and to testify on Navy ammunition disposal practices with particular emphasis on ocean disposal of conventional ammunition.

In previous appearances before congressional committees I have tried to emphasize my own personal commitment and the commitment of the Navy as an organization to the protection and conservation of the environment. We are committed to the spirit of President Nixon's environmental program as well as to the the letter of existing laws governing environmental control.

I believe that the Navy's efforts in such areas as smoke elimination at our firefighting schools and incinerators, our program to convert our ships to the use of distillate fuel, together with our expanding work in the areas of raw sewage disposal and oil separation are important indications that we are actively seeking a cleaner land, sea, and air environment.

We have had, in these programs, fine support from the Congress. I want to particularly stress that. The Navy has received more funds from Congress for environmental activities than any other department.

The Navy is a fighting force dedicated to the protection of this Nation. In carrying out our responsibilities the Navy is required to maintain large stocks of ammunition including rockets, bombs, projectiles, mines and depth charges distributed worldwide in depots and aboard our ships.

Like any perishable commodity these stocks, some of which date from World War II, have a shelf life. We must dispose of ammunition that becomes unserviceable, unsafe or obsolete, just like the supermarkets do with groceries that have spoiled.

In recent years we have been accomplishing this through a number of means, including demilitarization, which means taking the ammunition apart, by controlled burning, by exploding, and by ocean dumping.

It is the Navy's intention, regardless of disposal method used, to comply with all public laws for the protection of the environment. And we are fully committed to complying with the President's desire to phase out ocean dumping at the earliest possible date.

The Navy's disposal requirements include, to varying extents, practically every form of conventional ammunition. Shells, powder, bombs, mines and rockets are all involved. The following table will give you an idea of the types of materials involved and the respective amounts that we expect we will have to dispose of in 1971.

Explosive projectiles—3, 5, 7, 8 and 16 inch (10 percent).

Cartridges (complete rounds)—40 mm., 20 mm., .50 caliber (1 percent).

Small arms ammunition—.22 caliber through .45 caliber (1 percent).

Fuses (bomb and projectile), (20 percent).

Detonators (for projectile and bomb fuses, torpedoes), (10 percent).

Primers (firing element of gun ammunition cartridges), (1 percent).

Grenades (hand and rifle), (7 percent).

Firing devices (for demolition), (3 percent).

Pyrotechnics (flares and signals), (15 percent).

Ejection cartridges (seat ejection; bomb ejection), (3 percent).

Rockets (aircraft forward-firing, and ship-launched), (6 percent).

Bombs (general purpose; cluster; depth; photoflash), (12 percent).

Mines (2 percent).

Depth charges (3 percent).

Solid propellent material (1 percent).

Missile warheads (5 percent).

On the average, from 15 to 20 percent of the gross weight of this ammunition is explosive material, a significant portion of which is TNT. The balance is metal, plastic, or fiberglass.

Now, what are the ways we have used to dispose of our ammunition? Well, we have used burying to a very limited extent. However, we have abandoned burying as a disposal method because of possible deterioration of the ammunition to levels which would be unsafe if movement was ever required. Further, burial of ammunition denies beneficial use of the land area for other purposes.

DEMILITARIZATION

Demilitarization, sometimes referred to as demiling. Demilitarization includes the process in which we completely obliterate the military usefulness of a munition. This is accomplished in various ways—burning the munition in a furnace or in the air, blowing it apart (exploding), washing out the explosives, or taking the item apart (disassembly). Let me expand on each of these demil procedures:

BURNING/EXPLODING

Burning is effective for explosives and smaller ammunition items; but has the disadvantage of releasing smoke and other combustion products into the atmosphere. Exploding does the same, plus introduces a noise and shock factor. Explosion or burning byproducts generally include water, carbon monoxide and dioxide, metallic oxides and oxides of nitrogen.

WASHOUT

Washout is an effective demilitarization method for explosives and munitions which lend themselves to this approach such as mines for example, and this has little if any environmental impact. However, the recovered explosives may have to be burned if not salvageable or salable.

DISASSEMBLY

Disassembly per se will not affect the atmosphere unless the munition should explode in the process. However, we do surround all of these operations with safeguards and precautions.

Every possible means of ensuring safety is explored. I must say, despite this, we have had some tragic accidents. In the first part of February we had a tragic accident in McAlester, Okla., where three men were killed working on "demiling," taking the 20 millimeter ammunition apart.

Now, when we take the ammunition apart, some of the byproducts of demilitarization such as scrap metal and certain explosives can be sold.

OCEAN DUMPING

For many years the Navy has used deep water dumping extensively for ammunition disposal. We have experienced no major safety problems with this method. Since 1964 we have carried out 19 deep-water-dump operations in which we scuttled shiploads of ammunition. In 12 instances explosions occurred, four of which were planned for the benefit of certain research efforts in seismology.

Our oceanographers tell us that any marine life killed in these operations will rapidly re-establish itself. Where no explosion has occurred the ammunition should have no significant adverse effect on the ocean environment.

REWORKING

Reworking is the process in which we remove and replace faulty or obsolete components. For instance, we might have to replace projectile fuses which have become unserviceable.

While not a disposal method per se, reworking does generate material for disposal while returning other material to service use. We do this constantly in our ammunition renovation program and we are exploring possible expansion of this method.

FUTURE PLANS

Up to this point I have attempted to outline the Navy's problems of ammunition disposal and what our alternatives have been. I would like now to summarize our course of action from this point forward.

On February 24th Secretary Laird approved my proposal to suspend all deep water dumping of ammunition. Frankly, up until this time, we have not been able to determine the precise extent to which dumping affects the ocean and its animal and plantlife. To the best of our knowledge the environmental impact of deep water dumping is minimal. But because some of these questions remain unanswered

we have postponed all plans for ocean dumping while we undertake a reassessment of all alternative methods of disposal.

I have outlined these alternative methods previously, but we just have to look into them to a greater degree than we have in the past. I have asked Dr. Frosch, the Assistant Secretary of the Navy for Research and Development, to establish a select working group from our laboratories and systems commands to examine our disposal problem and develop a plan for progress.

Because the other services have depended upon the Navy in the past to carry out the ocean dumping of their munitions we will work closely with the Army and Air Force in this study. We are doing this study at the highest level in the Navy to insure results at the earliest date possible.

I will now outline some of the approaches our research and development people will be looking into:

IMPROVED AUTOMATION OF DEMILITARIZATION FACILITIES

The technologies for remote manipulation operations are well known and we presently apply them to some of our demil operations. We will explore ways to improve their safety while broadening their capacity and capability. This is referred to as the "brute force" way of demiling since we are physically dismantling the ammunition.

CRYOGENICS TECHNIQUES

It may be possible to significantly reduce the sensitivity of explosive compounds by freezing or cooling them prior to demilitarization. We will study the properties of our munitions under low-temperature conditions.

SOLVENT TECHNIQUES

This represents a potential alternative to the mechanical force system of demiling. Chemical baths might be used to dissolve the explosives from their containers or consideration can be given to dissolving the entire round.

MUNITIONS DESIGN IMPROVEMENTS

We will study all new munitions designs to insure that a demilitarization capability is built into them at the time they are manufactured. In addtion, our studies will consider whether we can retrofit existing munitions with new components such as fuses for example that will permit easier disassembly in the future. In the longrun, we will create considerable savings by recycling almost all of the components of the munitions.

STUDY OF WORLD WAR II OCEAN-DUMPED MUNITIONS

We are aware of several areas where we can study samples of various munitions that have been in the ocean for over a quarter of a century. The study of these can provide us with insight into what the

long-term consequences of ocean dumping might be if unexploded materials are put in the sea.

CHEMISTRIES OF EXPLOSIVES

Additional studies in this area may lead to improvement in the shelf life—in other words the longevity of our ammunition—all safety factors surrounding the handling for our ammunition.

We also want to know more about the byproducts of detonation boom in air and in the sea.

It may be that proper design will permit us to make simple conversions of obsolete but high-energy substances into sources for fuel or agricultural fertilizers.

I am convinced that we can solve our problems and, furthermore, I feel that what we are doing in the Navy will be considerable benefit to our sister services since, as I pointed out earlier, we handle the ammunitions. Anything we learn will be passed on them as well as to the private industrial community that has similar problems.

In my statement here this morning, I have tried to stress the Navy's overall determination to make as large a contribution as possible to the Nation's environmental control efforts. Part of our problem lies with technology, part of it with money. But through studies like the one we are undertaking now where we are reassessing all alternative methods of ammunition disposal, the Navy is going to continue to turn every rock in the interests of the environment.

At this time I will be happy to answer any questions that you may have.

As I pointed out, I do have to leave at 11:10 a.m., but Mr. Ill and Admiral Sonenshein will be here and will be pleased to answer any additional questions you might have.

Senator HOLLINGS. Thank you very much, Mr. Secretary. One of the principal concerns of the committee, of course, is exactly what is the policy of the Department of the Navy relative to ocean dumping.

Last December, before the Air and Water Pollution Subcommittee of Public Works, you testified at that time and Senator Eagleton—and I quote from the record here.

Your present policy is certainly no more oil dumping, that is an across-the-board blanket prohibition.

Secretary CHAFEE. Right, no oil is permitted to be collected in port in barges for sea disposal.

Senator EAGLETON. And your policy is also for the present no munitions dumping of any kind?

Secretary CHAFEE. Or chemical and biological agents.

And thereafter, by January we heard about the proposal for 50,000 tons of munitions. The story appeared in the Evening Star relative to the Council on Environmental Quality not giving approval to it, and thereafter Secretary Laird's press release, and we announced these hearings.

That is really what we are trying to get at. What is the policy? For example, do you have a copy of that order? How conclusive is the order of Secretary Laird?

Secretary CHAFEE. The order from Secretary Laird, as you will recall, was at my suggestion. I think that was also in the news release.

Senator HOLLINGS. Right.

Secretary CHAFEE. It wasn't an order from him, it was an approval of the policy we were proposing of no more ocean dumping of conventional ammunition at this time. We canceled plans for such ocean dumping while we explore the other alternatives that I mentioned.

Now, it may turn out that after we have explored alternative methods that it may be necessary to file an environmental impact statement with the Council on Environmental Quality, but we certainly don't intend to file a statement at the present time. In other words, we want to review all other methods in an effort to find an acceptable alternative to the dumping so that we can change the present policy that provides for a postponement of any dumping plans to a policy simply of no dumping.

Senator HOLLINGS. So it is not conclusive, but a postponement pending further study?

Secretary CHAFEE. Yes. We hope it works out that we can find alternatives and that is why we are putting this effort into it.

Senator HOLLINGS. You can furnish a copy of that press release for the record? Later on your Department can furnish that I am sure.

(The following information was subsequently received for the record:)

STATEMENT FOR THE RECORD ON ORDERS ISSUED FOR STOPPING OCEAN DUMPING OF CONVENTIONAL MUNITIONS

Large scale ocean disposal of conventional munitions was terminated by the Navy on August 24, 1970. This order was followed up on October 5, 1970 with an additional suspension of all small scale dumping which, in the past, has been carried out in a routine manner from the coastal ammunition depots.

Finally, on October 27, 1970, the Chief of Naval Operations summarized the information on the suspension of all ocean dumping of munitions in a message to the Navy fleets and activities world-wide.

On February 24, 1971, the Secretary of Defense announced to the public that he had suspended deep water dumping of obsolete unserviceable munitions until all alternative methods of disposal have been completely studied. The Navy order implementing Mr. Laird's decision was issued on March 6, 1971. (A copy is attached.)

PRESS RELEASE

FEBRUARY 24, 1971.

For correspondents

Secretary of Defense Melvin R. Laird announced today that he has approved a proposal by Navy Secretary John H. Chafee to suspend deep water dumping of obsolete, unserviceable munitions until all alternative methods of disposal have been completely studied.

In making his proposal to Secretary Laird, Chafee said: "Too many environmental questions remain unanswered, and for that reason the Navy wishes to postpone plans to seek approval at this time for any future ocean dumping program."

The Navy Secretary has also directed an intensive program of research and development to seek alternate disposal methods which will have minimal effect on the environment. These alternatives at the same time must provide a safe method of disposing of obsolete munitions such as projectiles, bombs, naval mines, fuses, grenades, rocket motors and missiles.

The Navy presently lacks environmentally acceptable alternate disposal methods for some types of munitions and certain categories of ammunition currently cannot safely be demilitarized, i.e., taken apart and disposed of. To find solutions to these problems, the Navy will intensify its search for improved physical and chemical disposal methods; examine opportunities for biodegradation of TNT and related compounds; and, in addition, carry out more extensive research to

insure that ammunition produced for the Navy and Marine Corps in the future will be capable of being demilitarized.

In making his proposal to Secretary Laird, the Navy Secretary also said: "The President has made clear his desire for an early phasing out of ocean dumping as a means of disposing of ammunition, and I propose this action in an effort to support that objective at the earliest possible time."

In effect, Secretary Laird's announcement will put a freeze on ocean dumping of all military munitions by the United States, since the Navy also provides deep dump services of obsolete munitions for all the Armed Services.

On December 3rd of last year, Secretary Chafee issued an order to the Navy to cease immediately the discharge in open water of sludges, industrial wastes, oil wastes, trash or rubbish collected in port.

UNCLASSIFIED MESSAGE FROM THE CHIEF OF NAVAL OPERATIONS TO NAVY FLEET, AREA, SEA FRONTIER, DISTRICT AND SYSTEMS COMMANDERS AND OTHERS

MARCH 6, 1971.

Subject: Disposal of ammunition by deep water dump.

1. The Chief of Naval Operations' message of August 24, 1970 (241736Z) suspended all large scale deep water dumping of conventional munitions in the oceans pending a review of the entire subject. On October 5, 1970 (by the Chief of Naval Operations' message 051804Z) the suspension was extended to include small quantity ocean dumps normally carried out in a routine manner by coast naval ammunition activities. The Chief of Naval Operations on October 27, 1970 (271338Z) reaffirmed to the Fleet Commanders, the ocean dumping of munitions suspension and directed them to notify all their subordinate activities.

2. The purpose of this message is to provide information on the current Department of Defense policy with respect to dumping of conventional munitions in the oceans.

3. On February 24, 1971 the Secretary of Defense approved a proposal by the Secretary of the Navy to suspend deep water dumping until all alternative methods of disposal have been completely studied. The Secretary of the Navy has directed the establishment of a high level group to reassess existing disposal methods and possibilities. Secretary Laird's action imposes on indefinite freeze on all deep water dumping of munitions by the United States at least until after the above reassessment has been completed.

4. As munitions for disposal accumulate, it will be necessary to keep them under careful scrutiny in order that the development of conditions dangerous to life may be detected and action taken. It is expected that in some cases there may be a need to deep water dump certain items as the only safe disposal method. Such cases which arise will be reported immediately by message to the Chief of Naval Operations, Chief of Naval Material, Commander Naval Ordnance Systems Command Headquarters for assessment and decision as to further action.

5. Under no circumstances is the freeze mentioned above to be considered as preventing the jettisoning of ammunition at sea when required by misfire or dud procedures in accordance with United States Navy ordinance safety precautions of Fleet doctrine. In the ammunition area, safety of life remains the first and foremost consideration.

Senator HOLLINGS. Relative to the report of the Council on Environmental Quality, they reported that the Department of Defense estimated conventional munitions planned for disposal in 1970 were 103,770 tons; in 1971, 88,835 tons; and in 1972, 80,000 tons. What are your plans to dispose of those particular quantities of munitions?

Secretary CHAFEE. You mean how are we going to do it?

Senator HOLLINGS. Yes, sir.

Secretary CHAFEE. At this time I can't tell you how we will do it. We just don't know. We are holding everything up. We are not presently in a crisis situation, but we do have some material on our shelves now that must be disposed of in the near future. We are hopeful that we can handle it through one of our alternative methods. We have a breathing space to look into these new possible alternate methods that I talked about.

Now, about one-half of our accumulating ammunition will be disposed of without a problem through our currently operating demilitarization operations. But some of it is going to be more difficult.

Senator HOLLINGS. Are you prepared to state the policy of the Navy in the disposal of sludges, industrial waste, oil waste?

Secretary CHAFEE. I testified on that subject previously in December. It is a matter of great concern to us.

Senator HOLLINGS. What is it, for example?

Secretary CHAFEE. We are not collecting waste and sludges. Wastes that accumulate in our ships ashore or in port in barges for disposal at sea are pumped to barges for shore disposal. In Mayport, Fla., for instance, we have worked out a new system. The system involves pumping oily wastes into tanks, letting it settle, disposing of the water from the bottom and then disposing of the residual oil to a disposal contractor.

Of course we have to follow through on that to make sure that the people who take it dispose of it in an appropriate manner.

Senator HOLLINGS. Are you using the load-on-top technique for cleaning Navy tankers' tanks?

Secretary CHAFEE. I am not familiar with that.

(The following information was subsequently received for the record:)

The Navy has only used the load-on-top technique to a limited extent because it is most effectively applied only when a single petroleum product is carried in a large number of tanks. In Fleet oilers multiple products are frequently carried. Load-on-top procedures can only be employed on those ships which can assign a contaminated tank to each oil product carried.

Admiral SONENSHEIN. The basic method for cleaning oil tanks in our tankers is by a process called "butterworthing" which is common marine practice worldwide. It involves cleaning the tanks with high pressure treated salt water. This is done whenever the cargo is changed, say from one type of oil to another. Butterworthing, under existing procedures and methods, creates a discharge on to the sea surface that would be in violation of the recently established criteria and laws. We are seeking to develop new methods to retain this oily waste in the tanker until such time as it comes into port and can off-load it into a system such as the Secretary described.

Senator HOLLINGS. Good. Until that is determined and that technique is developed, Admiral, what is the policy? Are you continuing to dump it, and not retain it?

Admiral SONENSHEIN. Our ships have been instructed to retain this waste within inland waters or coastal waters where there are facilities for reception. On the high seas, however, there are sometimes situations under current configurations where it has to be disposed of. One of our major efforts on which we are now embarked, is to develop within the ships' holding facilities additional tankage, piping and pumping systems that will permit ships to hold this waste until they can dispose of it to special facilities in a port or harbor.

Senator HOLLINGS. Mr. Secretary, in addition to the holding facilities, sewerage treatment facilities have been attempted, I think, with the *Canopus*——

Secretary CHAFEE. Yes.

Senator HOLLINGS. I understand that mechanism was not satisfactory.

Secretary CHAFEE. We have not gotten the bugs out of it yet, Senator. We don't want to suggest that we are home free with these problems of disposal of sewage. We are now working at 24 different proposals for the treatment of sewage aboard vessels. There are all kinds of different techniques. Basically they involve separating the sludges out and then getting rid of the sludge by burning it. The equipment we have been developing has not proven completely satisfactory to date.

Senator HOLLINGS. Going back to—excuse me, Admiral. Yes?

Admiral SONENSHEIN. To amplify on what Mr. Chafee said, with regard to the *Canopus* installation, that installation was the second trial installation we made of sanitary waste disposal units aboard ship. The first one was in the Destroyer *Fiske* that was operating in the Great Lakes. We are now planning a third installation in the *Fulton*, which is also a submarine tender. We have initiated and are carrying out considerable improvements in the 500-man test equipment which is made by Fairbanks-Morse. This is the unit which will be installed in *Fulton*. While I don't want to be overly optimistic, we do have an 85 percent confidence level that the unit being prepared for installation in the *Fulton* will be successful.

This represents, by the way, the culmination of about 5 years of effort that the Navy initiated back in 1966. These will meet, we think, with a 85 percent confidence level, the first phase draft requirements of the Environmental Protection Agency.

Mr. ILL. Excuse me, Admiral. Do you wish to speak a minute about the proposals that you have just gotten in on the second and third generation——

Senator HOLLINGS. I wish you would, because you still have about 700 ships on the high seas dumping raw sewage into the high seas; isn't that correct?

Admiral SONENSHEIN. Not exactly.

Senator HOLLINGS. Correct me then. What is the fact?

Admiral SONENSHEIN. Our submarines, of which we have a substantial number, something like 90 nuclear-powered submarines, and another hundred or so conventional, have always had sanitary tanks for holding. This has been an essential feature of submarines for tactical reasons. This permits holding sewage so that discharge into inland or coastal waters is not required. At sea, however, submarines do dispose of their sewage through dumping.

In the last 4 or 5 years, since we started attacking this problem in 1966, we have installed small macerator-chlorinator units in several of our smaller ships such as minesweepers and survey ships. So I would say something on the order of 150 ships, perhaps 200 ships, have some method of holding or treatment already installed.

However, as Mr. Ill reminds us, the work with the *Fiske*, *Canopus* and now the *Fulton* is trying to cope with the first phase of the problems of the draft statements. To achieve conformance with the second phase requirements, which are much more stringent, we are embarking on a very extensive research and development program. We have received proposals from 24 companies, as the Secretary said, for various approaches to treating sewage from ships. We have just completed the selection of four to be funded for an R. & D. effort.

I visualize it will take us another 5 years of research, development, test, correction, installation, and reinstallation, until we evolve suit-

able shipboard systems for treating sewage and meeting the second phase requirements of the Environmental Protection Agency.

Senator HOLLINGS. That is principally, of course, for the surface ships. But we already have it in the submarines.

Admiral SONENSHEIN. Yes, sir. We have the holding tanks on our submarines. The submarines, however, will need some modification with regard to in-port operations. Our plan calls for installing discharge piping and pumping systems in submarines so they can connect to sewage systems at piers in port.

Senator HOLLINGS. Do you have any idea of the relative costs? Isn't this one of the big hangups? We in Congress are going to exact environmental controls and requirements on everybody now; you already have it in the submarines, you are trying to develop it for the surface ships. Isn't the real hangup the cost of it?

Admiral SONENSHEIN. It is certainly costly indeed, sir.

Senator HOLLINGS. How costly? I would like to get an idea.

Admiral SONENSHEIN. We project for the next 5 years as much as $300 million.

Senator HOLLINGS. $300 million. That is for the next 5 years to research and develop.

Admiral SONENSHEIN. No, that is for installations.

Senator HOLLINGS. The installation will be completed during the next 5 years?

Admiral SONENSHEIN. Yes, sir.

Secretary CHAFEE. Even though we have not got the correct equipment yet, in the ships that we are building we are putting in the piping in anticipation that we will have the equipment. That way we will not have to start from scratch when the new ships become operational.

Senator HOLLINGS. Does the order relative to munitions, Secretary Chafee, apply to Navy bases worldwide or only to the bases in the United States?

Secretary CHAFEE. That is worldwide, yes, sir.

Senator HOLLINGS. I was looking for Commander Walsh. I think he went down in the *Trieste*, and he ended up on top of a munitions dump, and had to get out of there real quick. We have been dumping all over the world——

Secretary CHAFEE. That might have been somebody else's dump.

Senator HOLLINGS. It could have been. It could have been Japanese.

Secretary CHAFEE. Yes. Other nations have the same problem.

Senator HOLLINGS. What cooperation do you have with other nations, or coordination? Any at all? Suppose we go and put in $300 million and everybody else continues to dump. We still have the problem. Is there any coordination at your level of government?

Secretary CHAFEE. The President, in his message, asked that the Secretary of State in coordination with the Council on Environmental Quality to develop and pursue international initiatives directed toward the objective of phasing out ocean dumping. I can only assume the Secretary of State is pursuing this task.

Senator HOLLINGS. Mr. Secretary, what provisions are made for disposal of refuse at McMurdo Sound in the Antarctic?

Secretary CHAFEE. Are you talking of trash now?

Senator HOLLINGS. Mainly.

Secretary CHAFEE. I just don't know.

Senator HOLLINGS. Can you provide that answer for the record later on? One Senator wanted to particularly find out the policy there. Does the Navy dispose at sea pesticides or herbicides for itself or other services? Does the Navy do that?

Secretary CHAFEE. No, we are not disposing of any pesticides or herbicides.

(The following information was subsequently received for the record:)

DISPOSAL OF REFUSE AT MCMURDO

In the past, waste at McMurdo has been collected and piled on the annual ice which breaks off and carries it out to sea. Burnable material, however, has been burned. Ground burial of waste has not been feasible due to perma-frost. Temperatures are never above freezing.

The problem of environmental contamination at McMurdo has been anticipated and has been planned for during the past three years. Both a sewage treatment plant and an incinerator have been purchased for McMurdo. Construction on the pads for the two plants is proceeding. Both the sewage plant and the incinerator (with minor modifications) will meet stateside standards. The construction of both facilities should be completed within the next two years.

Senator HOLLINGS. There was one question relative to the Marine Protection Act of 1971, proposed by this administration. Have you reviewed the Marine Protection Act of 1971 that the administration just proposed?

Secretary CHAFEE. I have not.

Senator HOLLINGS. There is some controversy as to its application to the Department of Navy, but as far as you know you have not reviewed that. I was going to ask, would you be bound by the provisions regarding ocean dumping and in what way, but that is moot, of course.

Mr. Secretary, would you look at that proposed Act, Marine Protection Act of 1971?

Secretary CHAFEE. Yes, sir.

Senator HOLLINGS. And give us your views on it.

Secretary CHAFEE. Yes, sir.

(The following information was subsequently received for the record:)

During 1970 the Administration prepared the Marine Protection Act of 1970. Navy comments on this legislative proposal were included in the DOD report on the proposal to the Office of Management and Budget. The proposed legislation entitled Marine Protection Act of 1971, which was read into the Congressional Record on 18 February 1971 by Senator Cooper, is consistent with the comments submitted in the DOD report on the 1970 legislative proposal. Therefore, the Navy supports the Marine Protection Act of 1971.

Senator HOLLINGS. Mr. Secretary, it is my understanding that in prior hearings before this subcommittee it was revealed there was some 123 approved dumping sites in the gulf, Atlantic, and Pacific. How many of these are used for America? And would you provide us the location of those dumping spots?

Perhaps you don't have that information right at hand. I would appreciate that for the record.

Secretary CHAFEE. We have a chart that I can submit for the record.

(The following information was subsequently received for the record:)

Discussion of Navy Dumping Sites for Ammunition

Following WWII, the Navy conferred with the Department of Interior Fish and Wildlife Service to determine a mutually acceptable set of criteria for ammunition dumping grounds, so as to obviate the danger of netting explosive munitions by fisherman. It was agreed that within the foreseeable state of the art, commercial fishing interests would not be endangered by disposal in a minimum depth of 500 fathoms (6000 feet) at sites no closer than 10 miles to any land. Accordingly, in early 1946 the Office of the Chief of Naval Operations (CNO) initiated a review of all known ammunition dumping grounds used by the United States Military Services. As a result of this review use of many such areas was terminated because they did not meet the minimum criteria, and new ones were established. Generally, one site was either retained or provided for each of our coastally-located ammunition depots and overseas bases. This work was completed sometime in 1948. Somewhat later, the Chief of Naval Operations assigned a ship, LST–519 (USS CALHOUN COUNTY) to the sole task of dumping ammunition from East Coast and Caribbean depots. At this time, more sites were added to provide a steaming track for the ship more conserving of time and fuel. Since then, occasional requirements for new sites have arisen.

The procedure established by CNO for Navy-designated sites provided that the Naval District Commandant, who is the direct locale representative of CNO, may designate the site location and report it to the Naval Oceanographic Office (previously Hydrographic Office) for publication and the marking of charts, such actions being coordinated by the Naval Sea Frontier Commanders. There has not, in the past, been any coordination with the Corps of Engineers because all sites are located well beyond the area of Engineers' cognizance. Sites presently approved for ocean dumping of munitions are all marked on the appropriate nautical charts; as a service to the public and as a warning of possible danger in these locations. They are usually square areas 10 miles on a side, but may be smaller or a different shape depending on the charted data available when established. Should ocean dumping be resumed, the number of sites will be restricted to about 20 world-wide; each site utilized will have been scientifically assessed as to its oceanographic features—type of bottom, currents, bottom communities and other biota—by the Oceanographer, and any sites not considered favorable for any of these oceanographic considerations will never be utilized again. All Navy site selection will be controlled by CNO, with the advice and technical assistance of the Oceanographer.

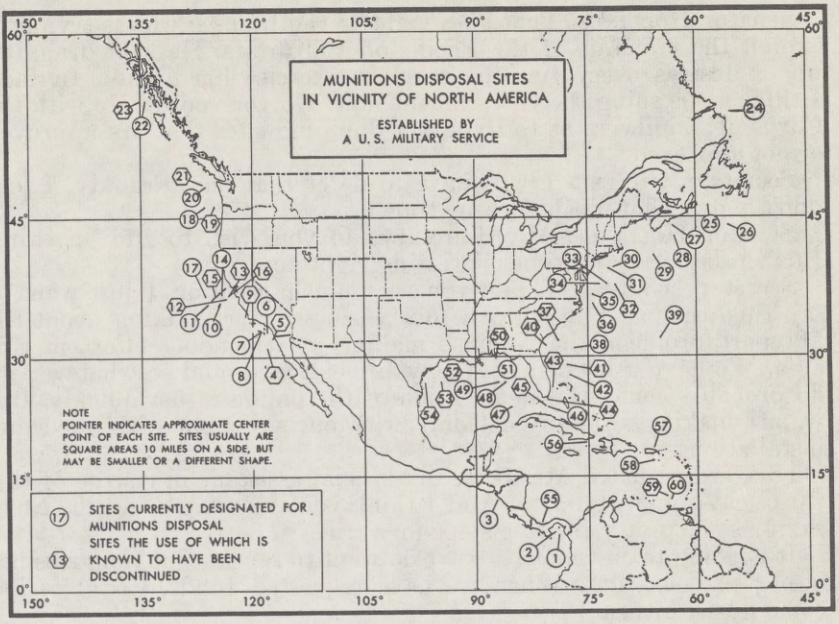
OVERSEAS MUNITIONS DISPOSAL SITES UTILIZED BY THE UNITED STATES[1]

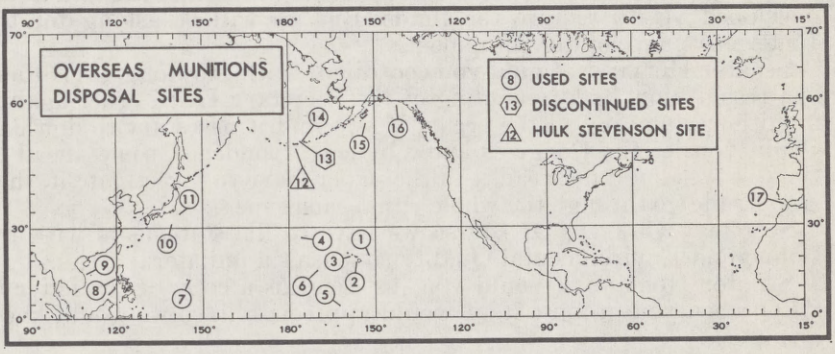
	Latitude, longitude	General vicinity of—	Water depth (fms)
1.	19°40′N, 154°40′W	Hawaiian Islands	1,500
2.	21°50′N, 157°40′W	do	1,100
3.	21°05′N, 156°00′W	Maui Island	2,000
4.	27°50′N, 177°10′W	Midway Island	2,750
5.	5°50′N, 162°20′W	Palmyra Island	3,400
6.	16°30′N, 169°50′W	Johnston Island	2,500
7.	13°15′N, 144°15′E	Guam	1,700
8.	14°22′N, 120°10′E	Grande Island	1,200
9.	16°37′W, 109°05′E	Vietnam	450
10.	30°20′N, 131°25′E	Tenega Shima	1,300
11.	34°00′N, 141°00′E	Yokohama	2,000
12.	51°22′N, 178°19′W[2]	Aleutian Islands	500
13.	51°25′N, 174°30′W	do	[3] 1,300
14.	51°40′N, 174°00′W	do	1,170
15.	56°00′N, 152°00′W	Kodiak Island	2,200
16.	52°10′N, 176°40′W	Finger Bay	2,200
17.	7°00′N, 36°00′W	Cape St. Vincent	500

[1] All sites current except 13.
[2] Not a designated disposal site. Shipload of munitions accidentally sank here (ex-SS. R.L. Stevenson).
[3] Discontinued.

MUNITIONS DISPOSAL SITES IN THE VICINITY OF NORTH AMERICA

	Latitude, longitude	General vicinity of—	Average water depth (fms)	Current or disused
1.	7°32′ N., 79°05′ W	Gulf of Panama	890	Current.
2.	7°25′ N., 79°05′ W	do	560	Do.
3.	12°30′ N., 89°10′ W	El Salvador	1,000	Do.
4.	31°40′ N., 118°30′ W	Cortes Bank	980	Disused.
5.	32°40′ N., 117°30′ W	Santa Rosa Island	1,000	Do.
6.	33°25′ N., 118°40′ W	do	600	Current.
7.	33°20′ N., 118°50′ W	Santa Catalina Island	600	Do.
8.	32°50′ N., 118°50′ W	Santa Rosa Island	600	Do.
9.	33°45′ N., 119°30′ W	Santa Cruz Island	1,000	Disused.
10.	36°30′ N., 124°40′ W	Point Conception	2,200	Current.
11.	37°40′ N., 123°40′ W	do	2,150	Do.
12.	36°40′N., 123°40′ W	San Francisco Bay	2,000	Disused.
13.	36°40′ N., 123°30′ W	do	1,750	Do.
14.	36°40′ N., 124°30′ W	Point Conception	1,800	Current.
15.	37°30′ N., 126°00′ W	North Pacific Ocean	2,300	Disused.
16.	37°10′ N., 122°50′ W	Pigeon Point	2,000	Do.
17.	36°30′ N., 125°50′ W	Point Conception	2,400	Current.
18.	46°00′ N, 126°00′ W	Cape Flattery	1,330	Do.
19.	46°00′ N., 125°30′ W	Tillamook Head	800	Disused.
20.	48°00′ N., 127°00′ W	Cape Flattery	1,400	Current.
21.	47°40′ N., 126°40′ W	do	800	Disused.
22.	54°50′ N., 134°30′ W	Canada	1,100	Current.
23.	55°00′ N., 134°20′ W	do	450	Disused.
24.	54°44′ N., 55°58′ W	do	1,400	Current.
25.	46°19′ N., 58°39′ W	do	1,000	Do.
26.	44°48′ N., 55°07′ W	do	1,300	Do.
27.	44°12′ N., 62°42′ W	do	830	Do.
28.	44°30′ N., 62°15′ W	do	720	Do.
29.	41°33′ N., 65°33′ W	do	970	Do.
30.	40°50′ N., 71°00′ W	Narragansett Bay	1,250	Do.
31.	38°30′ N., 72°07′ W	Delaware Bay	1,280	Do.
32.	39°40′ N., 70°00′ W	do	1,240	Disused.
33.	38°50′ N., 71°25′ W	do	1,280	Current.
34.	38°05′ N., 72°07′ W	do	1,000	Do.
35.	37°18′ N., 74°14′ W	Chesapeake Bay	800	Do.
36.	36°30′ N., 74°17′ W	do	1,100	Do.
37.	32°16′ N., 78°41′ W	Charleston approach	220	Disused.
38.	31°40′ N., 77°00′ W	Savannah River	700	Current.
39.	32°25′ N., 64°20′ W	Bermuda Islands	2,000	Do.
40.	30°37′ N., 79°52′ W	St. Mary's entrance	300	Disused.
41.	29°20′ N., 76°00′ W	Cape Canaveral	2,650	Do.
42.	28°15′ N., 77°50′ W	do	550	Current.
43.	26°00′ N., 79°40′ W	East coast of Florida	400	Disused.
44.	24°09′ N., 81°50′ W	Key West	400	Do.
45.	23°54′ N., 81°54′ W	do	470	Do.
46.	23°54′ N., 81°37′ W	do	500	Current.
47.	24°15′ N., 84°35′ W	do	1,700	Do.
48.	27°40′ N., 85°05′ W	Gulf coast of Florida	1,800	Do.
49.	27°00′ N., 86°00′ W	do	1,700	Do.
50.	29°20′ N., 87°15′ W	Pensacola	250	Disused.
51.	28°25′ N., 88°55′ W	Mississippi River approach	500	Current.
52.	28°30′ N., 89°10′ W	do	275	Disused.
53.	27°30′ N., 94°30′ W	Galveston	350	Do.
54.	27°15′ N., 96°00′ W	Aransas Pass	450	Do.
55.	94°5′ N., 80°05′ W	Panama Canal	1,170	Current.
56.	19°38′ N., 75°22′ W	Guantanamo Harbor	1,950	Do.
57.	18°51′ N., 65°50′ W	San Juan Harbor	750	Do.
58.	17°50′ N., 65°35′ W	Puerto Rico	1,470	Do.
59.	12°05′ N., 62°05′ W	Grenada Island	750	Disused.
60.	11°55′ N., 62°20′ W	do	320	Current.


MUNITIONS DISPOSAL SITES
IN VICINITY OF NORTH AMERICA
ESTABLISHED BY
A U. S. MILITARY SERVICE
NOTE
POINTER INDICATES APPROXIMATE CENTER POINT OF EACH SITE. SITES USUALLY ARE SQUARE AREAS 10 MILES ON A SIDE, BUT MAY BE SMALLER OR A DIFFERENT SHAPE.
17 SITES CURRENTLY DESIGNATED FOR MUNITIONS DISPOSAL
13 SITES THE USE OF WHICH IS KNOWN TO HAVE BEEN DISCONTINUED
150° 135° 120° 105° 90° 75° 60° 45°
60° 45° 30° 15° 0°


OVERSEAS MUNITIONS
DISPOSAL SITES
8 USED SITES
13 DISCONTINUED SITES
12 HULK STEVENSON SITE
90° 120° 150° 180° 150° 120° 90° 60° 30° 15°
70° 60° 30° 0°

Senator HOLLINGS. That goes right to the licensee who is trying to exploit the minerals of the Pacific off California. He kept dragging up explosives every time he tried to exercise his license. In fact, I think he is suing the Government now. Do you coordinate with the Corps of Engineers as to the exact dumping sites that are approved or not approved?

Secretary CHAFEE. I will have to defer that one. Frankly, I just don't know. That was before my time.

Senator HOLLINGS. Mr. Secretary, do you wish to add anything further, because your time is pressing right now.

Secretary CHAFEE. Thank you very much, Senator. I just want to say this, that as I testified before when we were talking about the Mayport problem, the Navy is making a tremendous effort in this area. We have a lot of ships, as you mentioned, and so whatever we do probably comes to the attention of the public rather quickly. But we are making an effort not only with our ships but with our shore installations.

I have designated Mr. Ill as my special assistant in charge of this entire environmental area. And I think you are going to see the Navy taking some pretty exciting steps forward.

It is going to cost money, but I do want to repeat that Congress has been very generous. When we have requested funds, Congress has come up with them.

Now, you might say why don't we request more funds. Well, we have not requested more funds because we have not had the techniques developed yet to require the funds. But we will be asking for the funds as we develop the equipment.

Senator HOLLINGS. Could you coordinate with the Congress if there is a resumption, or a rescinding of the Secretary Laird order against munitions dumping in the ocean, if you find it necessary to do that? Could you let the Congress know by correspondence, some ahead of time, so we would not read it in the paper, have to investigate it, then stop it, and go through the whole ritual each time?

Secretary CHAFEE. Of course we have to file statements with the Council on Environmental Quality so it isn't a unilateral action.

Senator HOLLINGS. Would you just send us a copy of the letter to CEQ when you propose it? I would appreciate it, so we would know about it.

Secretary CHAFEE. Certainly. I just hope we don't have to.

Senator HOLLINGS. Thank you very much.

Senator HOLLINGS. Mr. Ill, your official title, sir, is what?

Mr. ILL. I am a Special Assistant to the Secretary of the Navy.

Senator HOLLINGS. In charge of environmental matters?

Mr. ILL. I have that as my major responsibility at the present time, yes, sir.

Senator HOLLINGS. This is a rather new position, is it?

Mr. ILL. Yes, sir, it is. The Secretary asked me to assume this position about 3 weeks ago, I have been working with the various Navy and Marine Corps departments regarding their work to date

and their current plans so that we can assure as effective coordination as possible.

The Secretary has felt that the environment was so important that he wanted to have his office represented in the decisions that were being made and have somebody working full time on the various environmental problems. And I have been working on that.

Senator HOLLINGS. You started 3 weeks ago on a full-time assignment on the environment?

Mr. ILL. That is correct.

Senator HOLLINGS. Senator Spong, do you have any questions of these gentlemen?

Senator SPONG. Not at this time.

Senator HOLLINGS. How do you dispose of radioactive elements at sea?

Mr. ILL. The whole subject of radioactivity and our nuclear-powered ships is one that we are not prepared to deal with in detail today. This involves a lot of very specialized problems. However, a new Navy report issued last week is available and we would be very happy to furnish it for the record. It is called "The Environmental Monitoring and Disposal of Radioactive Wastes from U.S. Naval Nuclear-Powered Ships and their Support Facilities."

I might read you the synopsis of the report. It is just a short paragraph.

Senator HOLLINGS. Please.

Mr. ILL. This report has been published by Admiral Rickover's organization and I am certain that he or members of his staff would be very happy to testify in detail if you so desire.

This report summarizes data on disposal of radioactive waste from U.S. Naval nuclear-powered ships and their support facilities and summarizes results of environmental monitoring performed to confirm adequacy of waste disposal limits and procedures.

The total radioactivity discharged into all ports and harbors was 0.024 Curie in 1970, less than one-hundredth the total annual discharges of the early 1960's. Results of environmental surveys of harbor water and bottom sediment for gross radioactivity and for Cobalt 60 show that, (1) no increase in radioactivity has been detected in harbor water; (2) discharges of liquid wastes from U.S. Naval nuclear-powered ships have not caused a measurable increase in the general background radioactivity of the environment; (3) low level cobalt 60 radioactivity is detectable in localized areas of harbor bottom sediment around a few piers at operating bases and shipyards where maintenance and overhaul of Naval nuclear-powered ships have been conducted over a period of several years, these levels have decreased in recent years.

In effect, this is a detailed report that the nuclear-powered shipbuilding community has been preparing and which is regularly distributed every year to all departments of the Government who have an interest in this area. You should certainly have a copy of it also. It is extremely interesting and I believe covers the subject very adequately.

Senator HOLLINGS. We appreciate that and we will accept a copy of that report for the record.

(The following information was subsequently received for the record:)

REPORT NT-71-1
FEBRUARY 1971

ENVIRONMENTAL MONITORING AND DISPOSAL OF RADIOACTIVE WASTES FROM U. S. NAVAL NUCLEAR POWERED SHIPS AND THEIR SUPPORT FACILITIES

NAVAL SHIP SYSTEMS COMMAND
DEPARTMENT OF THE NAVY
WASHINGTON, D.C. 20360

Report NT-71-1
February 1971

ENVIRONMENTAL MONITORING AND DISPOSAL OF RADIOACTIVE WASTES FROM U. S. NAVAL NUCLEAR-POWERED SHIPS AND THEIR SUPPORT FACILITIES

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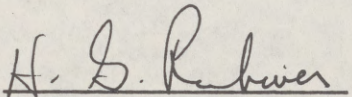
Approved by



H. G. RICKOVER, VADM USN
Deputy Commander
for Nuclear Propulsion

SYNOPSIS

This report summarizes data on disposal of radioactive wastes from U. S. Naval nuclear-powered ships and their support facilities and summarizes results of environmental monitoring performed to confirm adequacy of waste disposal limits and procedures. The total radioactivity discharged into all ports and harbors was 0.024 curie in 1970, less than one hundredth the total annual discharges of the early 1960's. Results of environmental surveys of harbor water and bottom sediment for gross radioactivity and for cobalt 60 show that (1) no increase in radioactivity has been detected in harbor water, (2) discharges of liquid wastes from U. S. Naval nuclear-powered ships have not caused a measurable increase in the general background radioactivity of the environment, and (3) low-level cobalt 60 radioactivity is detectable in localized areas of harbor bottom sediment around a few piers at operating bases and shipyards where maintenance and overhaul of Naval nuclear-powered ships have been conducted over a period of several years; these levels have decreased in recent years.

This report confirms that procedures used by the Navy to control discharges of radioactivity from U. S. Naval nuclear-powered ships and their support facilities are effective in protecting the health and safety of the general public.

The radioactivity in wastes discussed in this report originates in the pressurized water reactors of U. S. Naval nuclear-powered ships. As of the end of 1970, there were 92 nuclear-powered submarines and 4 nuclear-powered surface ships in operation. Construction, maintenance, overhaul and refueling of these nuclear propulsion plants involve nine shipyards, eleven tenders, and two submarine bases. This report first describes disposal of radioactive liquid wastes, then solid wastes. The final section discusses monitoring of the environment to determine the effects of radioactive discharges. This report brings up to date information in the Navy's 1959 report, reference 1.*

RADIOACTIVE LIQUID WASTE DISPOSAL

In the shipboard reactors, pressurized water circulating through the reactor core picks up the heat of nuclear reaction. Reactor cooling water circulates through a closed piping system to heat exchangers which transfer the heat to water in a secondary steam system isolated from the primary cooling water. The steam is then used as the source of power for the propulsion plant as well as for auxiliary machinery. Discharges of radioactivity from ships occur primarily when reactor coolant water expands as a result of being heated to operating temperature; this coolant passes through a purification system ion-exchange resin bed prior to discharge.

Liquid wastes discharged by support facilities result from operations such as draining shipboard reactor systems, decontaminating radioactively contaminated piping systems, and laundering anticontamination clothing worn by personnel. These facilities are equipped with processing systems to remove most of the radioactivity from liquid wastes prior to discharge into harbors.

The principal source of radioactivity in liquid wastes is from trace amounts of corrosion and wear products from reactor plant metal surfaces. Radionuclides with half-lives greater than one day in these corrosion and wear products include tungsten 187, chromium 51, hafnium 181, iron 59, iron 55, zirconium 95, tantalum 182, manganese 54, cobalt 58, and cobalt 60. The predominant and also longest lived of these is cobalt 60, which has a 5.3 year half-life; cobalt 60 also has the lowest concentration value for water listed by organizations which set radiological standards in references 2, 3 and 4 for these corrosion and wear radionuclides. Conservatively therefore, radioactive waste disposal is controlled by assuming that all the long-lived radioactivity is cobalt 60.

* References are listed at end of report.

The total amounts of long-lived radioactivity discharged into harbors and seas within twelve miles from shore during the past five years are listed in Table 1, which updates information in references 5 through 9. Included are data from U. S. Naval nuclear-powered ships and from supporting shipyards, tenders and submarine bases. Locations listed in Table 1 include operating bases and home ports in the U. S. and overseas which have been visited by Naval nuclear-powered ships. The quantities of radioactivity listed in this table are reported as if the entire radioactivity consisted of cobalt 60, the predominant long-lived radionuclide.

Although this table shows both gallons and curies discharged, the curie data are the more important. In 1970 the gallons shown in Table 1 for most of these organizations are no more than many single U. S. homes discharge to their sewage systems each year.

The table shows that nearly all the radioactive discharges occur where shipyards are overhauling nuclear-powered ships. In 1970, for example, a total of 0.024 curie was discharged into all harbors, including those outside the U. S. Essentially all of this came from shipyards overhauling nuclear-powered ships. Less than one percent of the total was discharged into all other harbors entered by U. S. Naval nuclear-powered ships in 1970.

This total radioactivity discharged into harbors is less than the U. S. Public Health Service (USPHS) in reference 10 reports most individual electrical power generating nuclear reactors discharge each year. Evaluation by USPHS (applicable divisions of which were incorporated in Environmental Protection Agency late in 1970) of the small radioactive discharges from electrical power generating reactors shows that these discharges caused little or no increase in environmental radioactivity.

The 0.024 curie total from the Navy nuclear propulsion program is less than the one curie per year U. S. Atomic Energy Commission (USAEC) regulations in reference 2 permit a licensee to discharge into a single sanitary sewage system.

Procedures for Liquid Wastes in Harbor

Discharge limits for radioactive liquid wastes from U. S. Naval nuclear-powered ships and their support facilities are consistent with applicable recommendations issued by the Federal Radiation Council (incorporated in Environmental Protection Agency late in 1970) U. S. Atomic Energy Commission, National Council on Radiation Protection and Measurements, International Commission on Radiological Protection, International Atomic Energy Agency, and National Academy of Sciences - National Research Council (references 2, 3, 4 and 11 through 14). In consonance with these recommendations, the policy of the U. S. Navy is to minimize the amounts

TABLE 1

RADIOACTIVE LIQUID WASTE DISCHARGED TO HARBORS FROM U. S. NAVAL NUCLEAR-POWERED SHIPS AND THEIR SUPPORT FACILITIES FOR 1966 THROUGH 1970

Locations	1966 Thousand Gallons	1966 Curies	1967 Thousand Gallons	1967 Curies	1968 Thousand Gallons	1968 Curies	1969 Thousand Gallons	1969 Curies	1970 Thousand Gallons	1970 Curies
Portsmouth, New Hampshire Naval Shipyard	155	.011	265	.012	171	.006	87	.002	68	.002
Groton-New London, Conn. Electric Boat Div., Tender at State Pier, & Sub Base	1274	.025	606	.011	469	.006	615	.006	359	.004
Newport News, Virginia Newport News Shipbuilding	1581	.055	1533	.034	1146	.025	870	.022	1466	.013
Norfolk, Virginia Naval Shipyard and Tender	1051	.023	1784	.034	184	.004	102	.005	98	.001
Charleston, South Carolina Naval Shipyard and Tenders	369	.034	320	.011	227	.004	131	.001	58	< .001
Pascagoula, Mississippi Ingalls Nuclear Division	< 1	< .001	6	< .001	9	< .001	8	< .001	7	< .001
San Diego, California Tenders at Ballast Point	18	.001	28	.001	< 1	< .001	< 1	< .001	< 1	< .001
Long Beach, California Naval Shipyard and Base	8	< .001	< 1	< .001	< 1	< .001	2	< .001	< 1	< .001
Vallejo, California Mare Island Naval Shipyard	270	.187	140	.001	391	.027	80	.001	121	.002
Bremerton, Washington Puget Sound Naval Shipyard	54	< .001	246	.002	182	.001	152	.001	136	< .001
Pearl Harbor, Hawaii Naval Shipyard and Sub Base	654	.031	683	.008	886	.006	1279	.008	258	.002
Apra Harbor, Guam	39	< .001	42	.002	26	.001	< 1	< .001	< 1	< .001
All other harbors, U.S. & Foreign	178	.013	< 1	< .001	< 1	< .001	< 1	< .001	< 1	< .001
TOTALS	5651	0.381	5653	0.116	3691	0.081	3326	0.048	2571	0.024

NOTES:

(1) Radioactivity data has been standardized to cobalt 60 and excludes tritium. Volumes are prior to dilution.

(2) A total of 0.02 curie was discharged into the river at Quincy, Massachusetts from 1961 through March 1969 when all work on U. S. Naval nuclear-powered ships was discontinued at General Dynamics, Quincy Division.

(3) A total of 0.01 curie was discharged into the river near Camden, New Jersey from 1960 through June 1967 when all work on U. S. Naval nuclear-powered ships was discontinued at New York Shipbuilding Corporation.

(4) Slight differences in volumes and radioactivity data from past reports result from using more significant figures in this Table. Volumes less than 500 gallons are shown as <1 thousand. Curies less than .0005 are shown as < .001.

of radioactivity discharged within twelve miles from shore including into harbors. Keeping discharges small minimizes the radioactivity available to build up in the environment or to concentrate in marine life. To implement this policy of minimizing discharges, the Navy has issued standard instructions defining the radioactive waste disposal limits and procedures to be used by U. S. Naval nuclear-powered ships and their support facilities. These instructions were reviewed and concurred in by the U. S. Public Health Service and the U. S. Atomic Energy Commission.

To achieve low discharges, the waste disposal procedures and limits used in the Navy nuclear propulsion program are more stringent than in the preceding references. The following are some of the procedures required by the Navy in shipyards:

a. Shipyard management at all levels is required to be involved in control of radioactive liquid waste.

b. Liquids are segregated to minimize volumes required to be processed as radioactive. Liquids with different chemical contents are collected separately to ensure the most effective waste treatment is used. Dilution is not permitted as a means of processing wastes.

c. Several stages of filtration using various pore size filters are used to remove small size radioactive particles in liquid waste. Ion exchange resin and activated carbon are normally used to remove radioactivity from liquid wastes.

d. Each shipyard has a limit specified for the total amount of radioactivity to be discharged during the year.

e. Samples are collected during processing to ensure liquid wastes are far below the permissible water discharge limits in reference 2. Typical limits used by shipyards are 30 times lower than in reference 2.

f. To ensure against operational error, liquid wastes which have been completely processed are transferred to a final clean tank and again sampled prior to discharge. Discharge from this tank is through a final filter.

g. Each discharge requires formal approval of a discharge permit signed by a designated senior radiological control person.

h. An independent organization within the shipyard audits all aspects of radioactive waste processing. This audit group is separate from the radiological control organization which monitors the actual waste processing work.

i. Audits are also performed by representatives from Naval Reactors headquarters who are assigned full time at each shipyard.

j. To ensure absolute compliance with even the smallest detail of operating procedures, each discrepancy found is brought to management attention for action. Aggressive action on such minor items prevents incidents from occurring.

Other Radionuclides

Reactor coolant also contains short-lived radionuclides with half-lives of seconds to hours. Their highest concentrations in reactor coolant are from nitrogen 16 (7 second half-life), nitrogen 13 (10 minute half-life), fluorine 18 (1.8 hour half-life), argon 41 (1.8 hour half-life), and manganese 56 (2.6 hour half-life). For the longest-lived of these, about one day after discharge from an operating reactor the concentration is reduced to one thousandth of the initial concentration and in about two days the concentration is reduced to one millionth. Most discharges from ships occur during heating up prior to power operation of the reactor, when short-lived radionuclides are at low concentrations in coolant. Total short-lived radioactivity in such a discharge is less than 0.001 curie. Because of their small amounts and rapid decay, short-lived radionuclides are less important than long lived radionuclides for waste disposal considerations.

Fission products produced in the reactor are retained metallurgically bound within the fuel alloy. The fission gases krypton and xenon are also retained within the fuel elements. However, trace quantities of naturally occurring uranium impurities in reactor structural materials release small amounts of fission products to reactor coolant. The concentrations of fission products and the volumes of reactor coolant discharged are so low, however, that the total radioactivity attributed to long-lived fission product radionuclides strontium 90 and cesium 137 in discharges from U. S. Naval nuclear-powered ships and their support facilities has been less than 0.001 curie per year for all harbors combined. Fallout of these same fission products has often been more than this in one rainfall in a single harbor.

Small amounts of tritium are formed in reactor coolant systems as a result of neutron interaction with the approximately 0.015 percent of naturally occurring deuterium present in water, and other nuclear reactions. Although tritium has a 12 year half-life, the radiation produced is of such low energy that the radioactivity concentration guide issued by the International Commission on Radiological Protection, the USAEC and by other standard-setting organizations is one hundred times higher for tritium than for cobalt 60. This tritium is in the oxide form and therefore completely soluble in water; it does not concentrate significantly in marine life or collect on sediment since it is chemically indistinguishable from water.

Tritium is naturally present in the environment because it is generated by cosmic radiation in the upper atmosphere. Reference 15 reports that the production rate from this source is about six million curies per year, which through rainfall causes a tritium inventory in the oceans of about one hundred million curies. Because of this naturally occurring tritium, large discharges of tritium would be required to make a measurable change in the background tritium concentration.

The total amount of tritium discharged during each of the last 5 years from all U. S. Naval nuclear powered ships and their supporting tenders, bases and shipyards has been less than 200 curies. Most of these discharges have been in the ocean greater than twelve miles from shore. This total tritium discharged from the entire nuclear Navy is less than a single typical electrical generating nuclear power station discharges each year (reference 10). As described above such discharges are too small to increase measurably the tritium concentration in the environment. Therfore tritium has been excluded from the data in other sections of this report.

Liquid Waste at Sea

Radioactive liquid wastes are also discharged at sea under strict controls. These ocean discharges are consistent with recommendations the Council on Environmental Quality made in 1970 to the President in reference 16. Procedures and limits for ocean discharges have been consistent with recommendations made by the National Academy of Sciences - National Research Council in reference 12 and by the International Atomic Energy Agency in reference 13. Ship discharges have contained much less radioactivity than these reports considered would be acceptable. Total long-lived radioactivity excluding tritium discharged farther than twelve miles from shore by all U. S. Naval nuclear-powered ships and their supporting tenders is shown in Table 2 for recent years.

TABLE 2

Radioactive Liquid Waste Discharged at Sea
by U. S. Naval Nuclear-Powered Ships
and Supporting Tenders

	Thousand Gallons	Curies
1966	1400	1.2
1967	1520	1.3
1968	1630	1.1
1969	1570	1.7
1970	1220	0.8

Reactor coolant is purified through an ion exchange resin bed. This resin becomes expended and periodically requires replacement. Expended resin has been discharged at sea, but this practice was discontinued during 1970. When discharged at sea, resin sinks and as it sinks, the radioactive ions in the resin are rapidly replaced by ions of the sea water. Some of the small radioactive particles in the resin bed are dispersed in sea water and the rest sink with the resin beads. The radioactivity is rapidly dispersed in the ocean due to motion of ship during discharge and subsequent action of wind, waves and ocean currents.

Resin discharge at sea was performed in accordance with procedures recommended in the National Academy of Sciences - National Research Council Publication 658, "Radioactive Waste Disposal from Nuclear-Powered Ships" reference 12. Consistent with these recommendations, Navy procedures for resin discharge at sea required:

(1) the ship be more than 12 miles from any land,

(2) the water depth be greater than 1200 feet,

(3) the ship not be in known fishing areas, and

(4) other ships not be nearby and will not be in the wake.

Publication 658 developed these procedures to assure no adverse impact on the environment if up to 300 nuclear-powered ships each discharge 400 curies of radioactivity every 2 months off the shores of the United States.

Table 3 summarizes resin discharges at sea during the last five years. These results show that the total radioactivity discharged in resin by the entire Navy each year has been less than envisaged in the National Academy of Sciences report for a single ship. Diluting this total radioactivity discharged in a year in a volume as small as one cubic mile of seawater reduces the concentration of radioactivity to less than occurs naturally in the ocean. Continued effort by the Navy resulted in improvements in 1970 which have permitted discontinuing discharge of ion exchange resin at sea. Expended resin is now packaged for land disposal in USAEC or State licensed burial grounds as solid radioactive waste.

TABLE 3

Radioactive Resin Disposal at Sea by
U. S. Naval Nuclear-Powered Ships

	Cubic Feet of Resin	Curies
1966	119	439
1967	252	259
1968	196	126
1969	406	132
1970	150	60

Two U. S. Navy nuclear powered submarines have been lost at sea in the Atlantic Ocean. The submarine THRESHER sank 10 April 1963, 100 miles from land in water 8,500 feet deep at latitude 41°45'N and longitude 65°00'W. The submarine SCORPION sank between 21 and 27 May 1968, 400 miles southwest of the Azores in more than 10,000 feet of water. The reactors used in all U. S. Naval submarines and surface ships are designed to minimize potential hazards to the environment even under the most severe casualty conditions such as actual sinking of the ship. First, the reactor core is so designed that it is physically impossible for it to explode like a bomb. Second, the reactor fuel elements are made of materials that are extremely corrosion resistant, even in sea water. The reactor core could remain submerged in sea water for decades without release of fission products while the radioactivity decays, since the protective cladding on the fuel elements corrodes only a few millionths of an inch per year. Thus in the event of a serious accident where the reactor is completely submerged in sea water, the fuel elements will remain intact for an indefinite period of time and the radioactive material contained in these fuel elements should not be released. The maximum rate of release and dispersal of the radioactivity in the ocean, even if the protective cladding on the fuel were destroyed, would be so low as to be insignificant.

Radioactive material could be released from this type of reactor only if the fuel elements were actually to melt and in addition the high-strength, all-welded reactor system boundary were to rupture. The reactor's many protective devices and inherent self-regulating features are designed to prevent any melting of the fuel elements. Flooding of a reactor with sea water furnishes additional cooling for the fuel elements and so provides added protection against the release of radioactive material.

Radiation measurements, water samples, bottom sediment samples and debris collected from the area where THRESHER sank were analyzed for radioactivity by various laboratories with highly sensitive equipment. Similarly, sea water and bottom sediment samples taken near SCORPION's hull were analyzed for radioactivity. None of these samples showed radioactivity above naturally occurring background levels and none showed evidence of radioactivity released from either THRESHER or SCORPION.

SOLID RADIOACTIVE WASTE DISPOSAL

During maintenance and overhaul operations, solid low-level radioactive wastes consisting of contaminated rags, plastic bags, paper, filters, ion exchange resin and scrap materials are collected by nuclear-powered ships and their support facilities. High-level radioactive wastes are associated with expended reactor fuel, all of which is transferred to the USAEC for processing. Solid materials from ships are not dumped at sea. They are packaged in a support facility or transferred to a shipyard for packaging. For ultimate disposal, the packaged solid radioactive wastes are shipped to burial sites licensed by the USAEC or a State under agreement with USAEC since shipyards and shore facilities are not permitted to dispose of radioactive solid wastes by burial on their own sites. Table 4 summarizes total radioactivity and volumes of radioactive solid waste disposal for the last five years.

Because of efforts to minimize solid waste, total volumes have remained nearly constant in spite of increasing work caused by increasing numbers of ships. The average annual volume for the entire Naval nuclear propulsion program could be contained in a cube measuring fifteen yards on a side. The radioactivity does not require excessively long time care in the licensed burial grounds since the principal radionuclides do not have half-lives longer than five years. In one hundred years, such radioactivity will have decayed to one millionth the initial radioactivity. In less than two hundred years, the total of all radioactivity in Table 4 will have decayed to less than the amount of radioactivity in a single luminous watch dial.

Disposal of solid radioactive wastes at sea is prohibited by the U. S. Navy. There have been two special exceptions to this policy. First on 8 April 1959 the radioactive reactor vessel and reactor plant components removed from the sodium-cooled nuclear reactor plant in the submarine SEAWOLF were escorted by the U. S. Coast Guard to a disposal site in the Atlantic Ocean 120 miles off the East Coast of the U. S. and sunk in 9,000 feet of water at latitude 38°30'N and longitude 72°06'W. The disposal was conducted at a site approved for sea disposal of radioactive waste by USAEC. This disposal site was used by other organizations for a number of years for radioactive waste as noted in reference 16. The SEAWOLF components containing approximately 33,000 curies of radioactivity were welded into a steel barge and scuttled. The low corrosion of this steel container in seawater and the method of packaging were designed to prevent any release of radioactivity to the surrounding sea. As of 1970 this radioactivity has decayed to less than 5,000 curies, essentially all cobalt 60.

TABLE 4

RADIOACTIVE SOLID WASTE FROM U. S. NAVAL NUCLEAR-POWERED SHIPS AND THEIR SUPPORT FACILITIES FOR 1966 THROUGH 1970

Facility	1966		1967		1968		1969		1970	
	Thousand Cubic Feet	Curies	Thousand Cubic Feet	Curies	Thousand Cubic Feet	Curies	Thousand Cubic Feet	Curies	Thousand Cubic Feet	Curies
Portsmouth, New Hampshire Naval Shipyard	19	10	30	198	31	151	8	3	14	16
Groton, New London, Conn. Electric Boat Div., Tender at State Pier, & Sub Base	15	1093	5	17	4	21	8	328	12	140
Newport News, Virginia Newport News Shipbuilding	7	9	17	702	14	10	17	382	28	312
Norfolk, Virginia Naval Shipyard and Tender	4	3	11	86	2	11	6	8	9	146
Charleston, South Carolina Naval Shipyard and Tenders	8	6	15	52	14	110	15	9	8	6
Pascagoula, Mississippi Ingalls Nuclear Division	0	0	0	0	0	0	1	< 1	0	0
San Diego, California Tenders at Ballast Point	1	< 1	1	< 1	1	8	< 1	2	< 1	1
Long Beach, California Naval Shipyard and Base	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vallejo, California Mare Island Naval Shipyard	9	367	9	23	8	7	8	5	12	2
Bremerton, Washington Puget Sound Naval Shipyard	1	1	14	193	14	48	11	42	18	1327
Pearl Harbor, Hawaii Naval Shipyard & Sub Base	1	< 1	1	1	3	6	4	3	5	4
TOTALS	65	1489	103	1272	92	372	78	783	106	1954

NOTES:

(1) This table includes all radioactive waste from tenders and nuclear-powered ships. This radioactivity is primarily cobalt 60.

(2) Slight differences from past reports result from using different number of significant figures in this table. Volumes less than 500 cubic feet are reported <1 thousand and less than 0.5 curie is reported <1.

The second exception was required for radioactive solid wastes from Pearl Harbor since it was not feasible to establish a burial ground in the volcanic rocks of Hawaii. Therefore an ocean disposal area 55 miles from shore was selected with the agreement of the USAEC, the U. S. Public Health Service, and the Hawaii Department of Health. The Navy Hydrographic Office determined that normal ocean currents at this location are away from shore. Low-level radioactive waste packaged primarily in fifty-five gallon steel drums weighted with concrete were disposed of by Pearl Harbor Naval Shipyard in 15,000 feet of water at this location, as shown in Table 5. The radioactivity in this waste was primarily cobalt 60. In June 1968 use of this ocean disposal area was discontinued by the Navy and wastes have since been shipped to a USAEC or State licensed land burial ground in the continental U. S.

TABLE 5

Solid Radioactive Waste Disposal in the Ocean
at Latitude 20°54'N Longitude 161°06'W

Year	Number of Disposal Operations	Volume cubic feet	Curies
1963	1	1647	0.5
1964	1	1275	0.7
1965	1	672	1.4
1966	1	682	0.3
1967	2	1134	1.0
1968	4	1720	4.5
TOTAL	10	7130	8.4

ENVIRONMENTAL MONITORING

Environmental monitoring surveys for radioactivity are periodically performed in harbors where U. S. Naval nuclear-powered ships are built or overhauled and where these ships have home ports or operating bases. These surveys are performed to verify the adequacy of liquid waste disposal procedures and limits. To ensure thoroughness and objectivity these surveys are made as independent as practicable from waste disposal operations. Samples from each harbor monitored are also checked at least annually by a U. S. Atomic Energy Commission (USAEC) laboratory to ensure analytical procedures are correct and standardized. These USAEC laboratory results have been consistent with shipyard results. As a further independent check of environmental monitoring the U. S. Public Health Service (USPHS) has conducted detailed surveys of selected harbors (references 17 and 18). USPHS has monitored the harbors at Charleston, South Carolina; Pearl Harbor, Hawaii; San Diego, California; Vallejo, California; New London, Connecticut; Newport News, Virginia; and Norfolk, Virginia. Navy monitoring results have been consistent with these USPHS surveys.

The Navy monitoring program initially emphasized analyzing water because it is used by boats and swimmers and because fish live in this water. Surveys were conducted in the harbors before any radioactivity was discharged, to establish base levels of gross beta activity of harbor water in the vicinity of berths to be used by nuclear-powered ships and locations where support facilities might discharge processed water. Results showed that superimposed on the naturally occurring radioactivity of 0.3 picocurie* of potassium 40 per milliliter of harbor water were large variations of other radioactivity from fallout. Rainwater before much dilution in harbor water sometimes has measured more than 100 times higher than this. In addition rates of introduction of naturally radioactive radium, uranium, thorium and their associated radionuclides varied. However, in more than ten years of monitoring seawater for gross beta activity commencing in 1954 in New London, Connecticut, and extending to other ports, no increases in water radioactivity were ever discovered which could be attributed to operation of nuclear-powered ships or their support facilities.

Although the general background radioactivity measurements previously used would indicate presence of radioactivity before exceeding concentrations permitted in reference 2, more sensitive measurement techniques were adopted in 1965. Currently, five water samples are taken in each harbor once each quarter year in areas where nuclear-powered ships berth and from upstream and downstream locations. These samples are analyzed

* One picocurie equals 10^{-12} curie, or one millionth of one millionth of a curie.

for gross gamma radioactivity and for cobalt 60 content. Procedures for analysis were selected to detect cobalt 60 if its concentration exceeds 0.1 picocurie per milliliter, which is 300 times lower than the USAEC limit of reference 2. No cobalt 60 has been detected in any of the 2560 water samples from 20 harbors monitored.

Harbor bottom sediment contains many of the remnants of water pollution; the top layer is generally black and has an offensive odor from decomposing organic waste materials. Silt carried by rivers also deposits on harbor bottoms, building up in depth from less than one inch per year to more than three feet per year. In falling to the bottom, this silt carries radioactivity from the water to the bottom. Therefore sampling of harbor bottom sediment became part of early Navy environmental monitoring programs to provide advance indication of radioactivity buildup in the harbor.

Initially, dried samples of harbor bottom sediment were measured for gross beta radioactivity. Results varied from 10 picocuries per gram of sediment to 300 picocuries per gram, and varied widely from sample to sample and from month to month in a single harbor. However, analysis of these data showed no harbor had increased its general background radioactivity from operations associated with U. S. Naval nuclear-powered ships.

Commencing in 1963 at Navy request, the USPHS made additional analyses of samples from some harbors to identify radionuclides present in sediment. These analyses showed cobalt 60 was the predominant radionuclide added to sediment from nuclear reactor operations. Therefore Navy monitoring procedures were changed to collect in each harbor 20 to 120 sediment samples once each quarter year. Standard six inch square samplers modified to collect only the top one-half to one inch of sediment are used for all sediment collection. The top layer was selected because it should be more mobile and more accessible to marine life than deeper layers. The samples are analyzed for gross gamma radioactivity and for cobalt 60. Results of the 3070 sediment samples from harbors in the U. S. and possessions for 1970 are summarized in Table 6. Comparison to previous environmental monitoring data in references 5 through 9 shows that environmental cobalt 60 levels have been steadily decreasing.

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TABLE 6

SUMMARY OF 1970 SURVEYS FOR COBALT 60 IN BOTTOM SEDIMENT OF U. S. HARBORS WHERE U. S. NAVAL NUCLEAR-POWERED SHIPS HAVE BEEN REGULARLY BASED, OVERHAULED OR BUILT

	Number of Samples with Cobalt 60			Total Bottom Area with Cobalt 60 over 3 pCi/g** (Square Kilometers)	Estimated Total*** Cobalt 60 in Top Layer of Sediment (Curies)
	less than 3 pCi/g*	between 3 & 30 pCi/g	30 to 300 pCi/g #		
Portsmouth, New Hampshire					
Naval Shipyard	176	0	0	0	ND
Groton, New London, Conn.					
Electric Boat Division, State Pier, and Submarine Base	377	86	1	0.1	0.02
Newport News, Virginia					
Newport News Shipbuilding	152	0	0	0	ND
Norfolk, Virginia					
Naval Shipyard and Base	344	0	0	0	ND
Charleston, South Carolina					
Naval Shipyard and Bases	382	0	0	0	ND
Pascagoula, Mississippi					
Ingalls Nuclear Division	212	0	0	0	ND
San Diego, California					
Navy Pier at Ballast Point	157	0	0	0	ND
Long Beach, California					
Naval Shipyard and Base	158	0	0	0	ND
Vallejo, California					
Mare Island Naval Shipyard	444	0	0	0	ND
Bremerton, Washington					
Puget Sound Naval Shipyard	141	0	0	0	ND
Pearl Harbor, Hawaii					
Naval Shipyard and SubBase	312	0	0	0	ND
Apra Harbor, Guam	128	0	0	0	ND

NOTES:

* Minimum detectable radioactivity is approximately 1 pCi/g (picocurie per gram). Results in units of pCi/cm^2 range from two to four times the value of pCi/g.

** One square kilometer is approximately equal to 0.4 square mile. Areas with cobalt 60 over 3 pCi/g were in immediate vicinity of piers used for berthing nuclear-powered ships.

*** Where total cobalt 60 in the surface sediment layer is less than 0.01 curie, ND is reported. Samples more than one foot deep from several harbors show that total cobalt 60 present may be two to five times that measured in the surface layer.

\# No samples from any harbor were greater than 31 pCi/g.

Table 6 shows that some samples taken near liquid waste discharge points show cobalt 60 radioactivity. However, the affected areas are small and the total cobalt 60 present is small compared to natural radioactivity present in harbors.

The first data column in Table 6 includes all samples with less than three picocuries of cobalt 60 per gram of sediment. These low levels are difficult to measure because the levels of radioactivity in sediment from other sources are much higher. The value of 30 picocuries per gram was selected for the top of the second range of data since it corresponds to the upper limit for exposure in references 2 and 4 even if consumed continuously by members of the general public. Although sediment can not be consumed by humans, it might serve as a food source for marine life. Data on uptake of cobalt 60 from sediment by marine life obtained to date show that in the salt water harbor bottom environments, no significant buildup of cobalt 60 occurs in marine life. Therefore the third range of up to 300 picocuries per gram is selected as a range which would not cause members of the general public to receive radiation exposure approaching the values set in references 2, 3, 4 and 14. Concentrations of cobalt 60 up to 300 picocuries per gram are so low that the USAEC does not require those who might possess them to be licensed. If concentrations higher than 300 picocuries per gram were to persist over substantial areas of a harbor bottom, further monitoring would be performed to determine if any of this radioactivity were being taken up by marine life for eventual consumption in food. Because of the low concentrations noted in Table 6, monitoring of radioactivity in marine life has not been necessary as part of the routine environmental monitoring programs in these harbors.

References 19 and 20 contain evaluations by USAEC laboratories of the effects on the environment from the accumulation near points of discharge of radionuclides from several other nuclear reactors. These reports conclude for these other reactors that radioactivity levels much greater than shown in Table 6 have caused no significant exposure to the general public.

An additional part of the environmental analyses has been to compare amounts of radioactivity measured in the environment with amounts discharged, as in the following example. If 0.01 curie were discharged each year for more than ten years into a single harbor, the maximum total inventory of cobalt 60 in this harbor will be 0.1 curie of cobalt 60, assuming none of this radioactivity is flushed out with river currents, tides, or dredging. If all this radioactivity were spread uniformly over a reasonable area of one square kilometer of the harbor bottom, the result would be less than ten picocuries of cobalt 60 per square centimeter. This cobalt 60 will be distributed deeply through the sediment

over the years, resulting in an average concentration less than one picocurie of cobalt 60 per gram of sediment. This is less than the amount of cobalt 60 which would be detected by present sensitive environmental monitoring techniques. Results of analyses such as these help confirm the environmental monitoring data of Table 6 and confirm that the Navy's waste discharge limits are satisfactory.

In all monitored harbors, twice per year shoreline areas uncovered at low tide are surveyed for radiation levels with sensitive radiation detectors to determine if any radioactivity from bottom sediment washed ashore. All results were the same as background radiation levels in similar areas, 0.01 to 0.04 millirem per hour. Thus there is no evidence in these ports that radioactivity from sediment is washing ashore.

Film badges are continuously posted at locations outside the boundaries of areas where radioactive work is performed. These films showed that radiation exposure to the general public outside these facilities was not above that received from natural background radiation levels.

Naval nuclear reactors and their support facilities are designed to ensure there are no detectable discharges of airborne radioactivity to the atmosphere. Filtration equipment is installed in support facilities to ensure removal of airborne radioactivity without release to the atmosphere. Exhaust stacks at support facilities which could have discharged airborne radioactivity have been monitored. There were no discharges of airborne radioactivity to the atmosphere measured above concentrations normally present in the atmosphere.

In addition to the locations listed in Table 6, environmental monitoring is performed by U. S. Navy submarine tenders which serve as operating bases for U. S. Naval nuclear-powered submarines in Rota, Spain and Holy Loch, Scotland. Results of the surveys in the harbor at Rota, Spain have not shown detectable cobalt 60 in harbor bottom sediment samples. In 1965 in Holy Loch, more cobalt 60 radioactivity than expected was detected in harbor bottom sediment and on shoreline mud flat areas uncovered at low tide. However, there had been no increase of harbor water radioactivity in Holy Loch above normal background levels. Joint U. S. and British assessments of survey results confirmed that radiation levels in the vicinity of the Holy Loch anchorage were far below those which were at all likely to cause an individual to receive radiation exposure approaching limits for members of the general public. Environmental monitoring during 1970 showed radioactivity levels in Holy Loch are steadily declining and are now less than half the levels in 1965.

CONCLUSIONS

1. The total radioactivity discharged into all ports and harbors from the U. S. Naval nuclear propulsion program was 0.024 curie in 1970.

2. No increase of radioactivity above normal background levels has been detected in harbor water where U. S. Naval nuclear-powered ships are based, overhauled, or constructed.

3. Discharges of liquid wastes from U. S. Naval nuclear-powered ships have not caused a measurable increase in the general background radioactivity of the environment.

4. Low-level cobalt 60 radioactivity in harbor bottom sediment is detectable around a few piers at operating bases and shipyards where nuclear-powered ship maintenance and overhauls have been conducted over a period of several years. Cobalt 60 is not detectable above background levels in general harbor bottom areas away from these piers. Maximum total radioactivity observed in a U. S. harbor is less than one curie of cobalt 60. Comparison to previous environmental monitoring data in references 5 through 9 shows that these environmental cobalt 60 levels have been steadily decreasing.

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Senator HOLLINGS. You talked of the other departments, Mr. Ill. Is the Navy setting the policy for ocean dumping on radioactive elements, munitions, and nerve gas? Are you doing that for the Department of Army, the Air Force, and all of the other departments? Or are they approaching it by themselves?

Mr. ILL. We actually have the responsibility for preparing major ocean dumps for conventional munitions. I cannot speak for the details of their complete programs. However, we presently have on hand several letters from the other military departments requesting that we consider certain material for future dumps, and in the past they have normally shipped their material to our bases for preparation and placement in the ships to take out for dumping.

Senator HOLLINGS. When you speak of major dumps and having responsibility for those, how do you differentiate major dumps, the ones you have responsibility for, from the ones you do not have responsibility for, and who does?

Mr. ILL. The only way that I can differentiate there is to say the Secretary of the Navy has issued an order that says there will be no dumping by the Navy and Secretary Laird's order provides that there will be no dumping within the entire Defense Department. I personally am not aware of orders that have been issued by the Secretary of the Air Force and the Secretary of the Army.

Senator HOLLINGS. Right. I understand. Thank you very much.

Admiral, do you have anything you would like to add?

Admiral SONENSHEIN. No, except one thought, and that is that 5 years ago the Navy initiated, on its own, efforts directed towards dealing with the waste generated by our ships. We have been pioneering in this field, and we are very happy to be leading the parade.

Senator HOLLINGS. Well, we appreciate the Navy leading the parade.

Do you think you are ahead of the civilians with respect to disposal of oil waste and everything else?

Admiral SONENSHEIN. Yes, sir. The Navy is further advanced with respect to the disposal of garbage, trash, and in the prevention and clean-up of oil spills. The most difficult problem, of course, is sewage disposal.

Senator HOLLINGS. And the part of the Navy that wants to run out with 500,000 gallons of oil off Florida and dump it, that gives you a black eye and makes it look like you are leading in the other direction.

Thank you very much, Mr. Ill and Admiral Sonenshein. We appreciate both of you coming this morning.

Next we have Prof. M. Grant Gross, associate director, Research, Marine Research Center, State University of New York at Stony Brook.

Dr. Gross, will you come forward, please.

STATEMENT OF DR. M. GRANT GROSS, ASSOCIATE DIRECTOR (RESEARCH), MARINE SCIENCES RESEARCH CENTER, STATE UNIVERSITY OF NEW YORK, STONY BROOK, N.Y.

Dr. GROSS. Thank you very much, Senator Hollings.

Mr. Chairman and members of the subcommittee: I appreciate this opportunity to appear before you today to present some results of my

research on waste disposal in coastal waters especially those near the New York metropolitan region, and to comment on some implications of this work with respect to S. 307.

While this research has been supported by the State University of New York, by the Bureau of Solid Waste Management, Public Health Service, and by the Coastal Engineering Research Center, U.S. Army Corps of Engineers, I speak today as an individual scientist and not on behalf of these organizations.

During 1970 my group and I surveyed waste deposits in New York Harbor, near the designated waste disposal sites in New York Bight, those waters offshore from New York Harbor, and in the western portion of Long Island Sound. I will briefly summarize our results with reference to the offshore disposal sites and New York Harbor. In other words, I will ignore Long Island Sound this morning.

The study was made of those wastes that accumulate as deposits in New York Harbor or on the adjacent continental shelf. These solid wastes are important because they are the long term environmental debts accumulated through 300 years of waste disposal in coastal waters.

I should point out that our project excluded several important types of waste materials. For example, we didn't deal with the floatable materials, refuse, garbage, or with liquid wastes discharged from the sewage treatment plants or commercial processes. We are, therefore, dealing only with those solids that accumulate on the bottom.

Turning to the New York region, the largest tonnage of wastes dumped at sea each year comes from dredging activities. These are typically 90 percent sand or riverborne silts mixed with carbon-rich solids. These carbon-rich solids apparently come from sewage or related sources, and are in turn mixed with a variable quantity of metal-rich wastes apparently from industrial activities. Dredged wastes alone amount to about 3.5 million metric tons per year in the New York metropolitan region.

The second largest source of solids is sewage sludge coming from sewage treatment plants; about 250,000 metric tons of sludge solids are taken each year from the New York metropolitan region and dumped at sea. These wastes are about 55 percent organic matter, carbon-rich materials, mixed with sand and silt carried by sewage collection facilities. There is also a small but significant contribution of metal-rich wastes apparently derived from industrial activities.

In earlier years, more than 100,000 tons of coal ash were dumped at sea. This is diminishing in quantity as the ash is used commercially and as power plants turn to petroleum or to natural gas for fuel supplies.

Finally, there are variable quantities of rubble and debris from construction and demolition activities. These, unlike the materials previously mentioned, are used for landfill operations and are dumped at sea only when there are no landfill operations conveniently located for disposal. I am informed, that during 1970 most or all of this material went into landfills.

Waste deposits are common on the bottom of New York Harbor. Based on the amount of organic matter in these deposits—I am using this as an index of sewage related materials—it appears that about 62 square miles of the harbor bottom is covered with carbon-rich deposits; about 40 percent of its total area. The harbor has a long his-

tory of receiving various wastes, including, unfortunately, a large quantity of raw or untreated sewage.

In order to solve the problems arising from dumping of wastes in the harbor, offshore waste disposal sites were established apparently beginning in the late 1880's, although the records are rather poor. The most recent disposal site was established in the late 1940's for disposal of acid wastes from a chemical factory in New Jersey. Disposal of carbon-rich materials from dredging and sludges from sewage treatment plants have left readily identifiable deposits on the continental shelf. We can use the carbon content of these wastes to map their distribution.

In mapping those wastes comparable to those in the harbor, we found about 20 square miles of ocean bottom near the disposal sites is covered by carbon-rich wastes. Effects of waste disposal can be detected over about 40 square miles. In short, the area of the continental shelf covered by waste deposits is considerably smaller than the area of the harbor covered by comparable material. Furthermore, we should remember that the major offshore disposal sites are 6 to 15 miles offshore, and therefore much farther removed from population centers than waste deposits in the harbor.

Now in addition to the carbon and other oxygen-demanding substances in the wastes, they also contain copper, lead and silver at concentration levels much higher than the natural sediments in the same area. These anomalous concentrations can also be used to delineate the distribution of these deposits on the New York Bight. Because of their potential toxic effects, we have given special attention to these metals. It appears that only lead is relatively easily extracted from the deposits. Although the evidence is far from conclusive, it appears that most of the metals in these wastes are likely to remain with the deposits on the ocean floor. Clearly we need more detailed information to permit better predictions of the behavior and fate of these wastes in the marine environment.

Effects of waste deposits on benthic (bottom-dwelling) marine organisms are most dramatic within New York Harbor. These benthic organisms cannot move long distances and thus they respond to the environment in their vicinity. Of 110 sediment samples collected in the harbor, 9 percent contained no living organisms that we could identify. Mind you, we were unable or not equipped to study bacteria, but none of the larger organisms were there. Only the pollution tolerant worm-like organisms, "sludge worms" and nematodes, were found living in 44 percent of the samples from the harbor; 10 percent of the 29 samples studied from New York Bight were similar to the harbor deposits, in that they contained only the pollution-tolerant organisms.

It is significant that no sample we collected from New York Bight was devoid of marine organisms. Thus, waste deposits are more widespread in the harbor and their effects are more deleterious than deposits near offshore waste disposal sites. In part, this reflects only about 45 years of waste disposal in New York Bight as compared to about 300 years of waste deposition in the harbor. Furthermore, it is worthwhile noting that the most thoroughly treated wastes are those dumped offshore. Untreated sewage goes directly into the harbor, and doubtless we have many other discharges close to the population centers.

The large area of ocean bottom covered by waste deposits is just one manifestation of the complexity of the problem at hand. We are dealing with many waste sources. Efforts to regulate wastes going into one area must be carefully considered to make sure that they do not simply move the problem to another area, especially areas closer to population centers.

How then do we deal with such problems? As efforts are directed toward formulation and implementation of a national policy on waste dumping in the ocean, careful attention must be given to phasing out in an orderly manner these operations found to be deleterious to coastal waters and avoid any action that would simply move them back into the harbor. We must remember these offshore disposal sites were established to alleviate problems of the city and their closure must not lead to increased waste disposal in the harbors. In other words, while protecting the marine environment we must not forget the people who live nearby.

I am pleased to see that S. 307 provides for a mechanism to provide some of the long-term answers that are needed in this area. As one New York City official put it: "The decisions for 1971 were made 10 years ago. We are now working on the installations for 1980 and 1990." The estuarine sanctuaries and National Oceanic and Environemntal Research Laboratory System should be established as soon as possible to provide the basic information needed to permit this planning and the eventual construction to lead the desired protection and enhancement of the marine environment.

There are two aspects of S. 307 that I would like to address. First, the estuarine sanctuaries. This is a commendable idea and I support it, but the $2 million Federal funding limit virtually insures that the sanctuaries will be small, undeveloped, and far from urban centers. In short, will not provide estuarine sanctuaries where they are most needed—in and near cities. Work has been in progress for literally decades to protect Jamaica Bay in New York City but this small amount of money available here would not materially support that effort.

I also heartily endorse the National Oceanic and Environmental Research Laboratory System, again with a caveat that it needs to be closely integrated with those agencies actively working on problems of environmental protection and enhancement. This goes beyond the matter of planning, but involves continued and close liaison. Without careful attention to liaison, the results of this laboratory may not be directed toward the problems with highest priority and the work will suffer.

Furthermore, absence of close liaison will likely hamper transfer of information and data from the laboratory to the field where it is to be used. I suggest as a possible mechanism that advisory committees be established for each laboratory to provide an overview of the research efforts. Such an advisory committee might include local representatives of Federal agencies, such as the Environmental Protection Agency and the Corps of Engineers as well as their counterparts from States near the laboratory and members of the academic community.

Turning now to the program for such laboratories, the report entitled "Waste Management Concepts for the Coastal Zone" recently

issued by the National Academy of Sciences—National Academy of Engineering, provides a well-considered, professionally competent evaluation of present waste-disposal technology, along with suggestions about needed improvements and some estimate of the costs thereof. I strongly recommend the NAS-NAE study for guidance in formulating action programs to be implemented by these laboratories.

Looking now at some other details of the bill, I note that the general tone of section 407 is primarily directed toward preventing further deterioration of the marine environment. We need such research, but I submit it is not enough by itself. I suggest that the section be broadened to put more emphasis on research necessary to improve environmental quality in marine areas. Such research is needed to plan and conduct effective programs to clean up or manage coastal waste deposits, including pilot projects to clean up waste deposits in selected harbor areas. For example, part of New York's waterfront might be made usable by residents, perhaps some of those in the ghetto areas, for recreation. Such research, in my opinion, must go beyond merely providing data and monitoring systems.

I am especially pleased to see that section 408 calls for the very necessary research into economic, legal, and other social studies related to the marine environment and its resources. In many urban areas these social problems often underlie environmental problems.

In summary, I recommend that legislation to deal with waste-solid disposal in the ocean take the "longer view" as well as the immediate one. We must be concerned with the problem of the accomulations of waste deposits which represent our long-term debt. We have inherited over 300 years of neglect and abuse of the coastal ocean. It will doubtless take a large effort to clean it up. S. 307 is a welcome move in that direction.

Thank you, Senator.

Senator HOLLINGS. Thank you, we appreciate your report.

The statement that you made that New York's waterfront might be made available for recreation, do you think that is really practical? You mentioned that the decisions for 1971 were made 10 years ago, and what we research and try to determine now takes about a 10-year leadtime for implementation. You also talked in terms that $2 million was insufficient for estuarine sanctuaries.

We are talking about money, we are talking about time, we are talking about terrible pollution. So is it practical—I would hope it would be, but I would like your comment—that New York's waterfront might be made usable by residents for recreation? Can you elaborate on that?

Dr. GROSS. I am sure we are all aware of the immense difficulties that urban waterfronts face at the present time. I wish I could say we could rehabilitate all of it. Certainly it would take a long period of time. I suggest, however, that we might start with small carefully selected pilot projects such as the Harlem River, for instance, where the environmental quality is not terribly degraded at present.

In order to get any immediate results—and by that I mean within 5 years—we would have to choose our areas very carefully. I believe there are opportunities—we obviously cannot clean up the entire waterfront within any foreseeable period of time in my opinion.

Senator HOLLINGS. You made a statement about the raw sewage being dumped in the harbor itself. What proportion of the city's sewage is that, 80 percent, 100 percent?

Dr. GROSS. You have some experts coming, according to the schedule, in tomorrow, and let me just give you my understanding and they can clarify it for you.

It is my understanding that the sewage from a large fraction of Manhattan now goes into the adjacent waters without treatment at this time. The construction project or schedule as I understand it ranges from 2 years for one plant to complete the tunnels necessary to transfer the material to the treatment plant, which is already in existence, to something on the order of 5 years for the complete construction of a plant on the Hudson River. So we are talking about 2 to 5 years here to make any appreciable impact over much of this region. This is why I say we are going to have to choose our areas very carefully.

Senator HOLLINGS. I welcome your reference to the NAS–NAE report, "Wastes Management Concepts for the Coastal Zone," which really is the thrust of S. 307. I want to read you just one brief paragraph and let you elaborate on it. We are saying the same thing, but this is what is intended by this proposed measure.

> One of the greatest contributions that scientists, especially biologists, can make to conserving marine values is to furnish quantitative guidelines to assist the engineers who have the responsibility for designing waste treatment and disposal systems. The design of such systems must become much more scientifically oriented than in the past. Historically such design has been concerned primarily with maintaining aerobic conditions in the receiving waters and in keepng these waters safe for human health. Ths criterion is no longer sufficient. Methods are becoming available for assessing a broad range of marine receiving water values. Thus the engineers' design should become less based on the use of "standard" systems and instead be tailored to preserve and enhance the specific receiving water values of concern.

Do you agree generally with that?

Dr. GROSS. Yes, sir, very much. I am convinced that we must have some means of predicting, in quantitative, reliable way, the results of our activities. I understand that New York City alone is spending about $1½ billion to construct sewage treatment facilities. We need a means of evaluating the impact of this, so we can have an idea of the return, both from this system of sewage treatment and projected systems. We need predictive models to permit us to come to a thorough and quantitative evaluation.

Senator HOLLINGS. In making those quantitative evaluations, can you speed it up? You testify in your statement about working on the installations now for 1980 and 1990. How would you suggest we speed it up?

Dr. GROSS. I would suggest that one of the things is the one I mentioned there with respect to the laboratory system, which is closer liaison. Right now we are suffering from a time lag between the advances that are being made in the academic, the scientific and engineering community and that that is actually being put into application. I think we need very close communications here. I think that would be the most immediate thing we could do. And this is why I think this is so essential for the laboratory system set-up under this

proposal, that it include such liaison, very active communications within the community.

Senator HOLLINGS. The actual institution by President Nixon of the National Oceanic and Atmospheric Administration would in and of itself facilitate liaison and coordination?

Dr. GROSS. It certainly does. It is always a problem for communication between these groups and we need to work in every way possible to improve that communication.

Senator HOLLINGS. On the estuarine sanctuaries, you say $2 million is too little. What would be sufficient?

Dr. GROSS. Let me suggest, if you will, one posible way of evaluating this. We might look at the amount of money being spent on construction within the various marine or coastal zones and say take 1 percent, say, as a figure for planning. So let's say the coast of New Jersey is having a half million dollars spent on construction, then $5 million might be allocated for research. One powerplant alone nowadays costs hundreds of millions of dollars. We might use something like that as an operative criterion on how we allocate our resources.

Mind you, the numbers are going to be very large. But the point I would like to make is that it is very difficult to set at this time an absolute upper limit, because it will be quite useful in certain areas, and of very little use in others.

We need something directly related to the use and to the impact of man's activities on segments of the coastal zone.

Senator HOLLINGS. But if I wanted to press a little further to go along with your testimony and name a figure in lieu of $2 million, what will I include in the bill instead of the $2 million?

Dr. GROSS. Let me do two things. First, I will give my estimate. I would say that probably, if we were in the tens of millions in terms of the Federal half of this, we would be, I am afraid, still short in many coastal areas. Second, I suggest you might ask some of the gentlemen who will be here tomorrow, whose knowledge may be more directly concerned with this.

Senator HOLLINGS. Tens of millions would give you what size sanctuary?

Dr. GROSS. Let me give you some estimates based on our experience. We at the State University of New York have a very small salt marsh sanctuary, about 160 acres, 60 miles out from New York City, and so far I believe the acquisition of lands—I will have to give the exact numbers later for the record—I believe they are on the order of a half million dollars or more. This is a pond, and associated salt marsh. It is nothing but an estuarine system in the largest sense.

So here we have 160 acres, a half million dollars, so if we scale up, we are talking about sanctuaries on the order of a few hundred to probably less than a thousand acres if other areas' cost figures are comparable to what we experience in the New York region.

Senator HOLLINGS. What I am getting at is whether the $2 million is so minimal as to really be kidding ourselves that we are doing a job, when we are not doing it at all.

Dr. GROSS. As I say, I think it would be very useful to have this amount of money. We certainly have nothing comparable at the present time. But I am afraid it will mean we will be dealing with only

very small systems. And in terms of the very large problems we would like to get answers on, I am afraid it will be very limiting.

Senator HOLLINGS. What size estuarine sanctuaries would you propose?

Dr. GROSS. The big problem is finding estuarine sanctuaries that are even available, even if we had unlimited funds. Some years ago in a moment of enthusiasm at the University of Washington we sat down with a map of the State of Washington and tried to locate possible coastal sanctuaries. And we were unable to find an area. So I am afraid this is a problem in many coastal areas, even relatively undeveloped ones.

Senator HOLLINGS. Now you are getting to an interesting point. Bernard Baruch's daughter, Belle Baruch, left to the State of South Carolina what we were told is one of the few remaining unspoiled estuarine areas available on the eastern seaboard. It is a sizeable tract, we have three rivers flowing into it.

So perhaps first we should have the research to map the availability and then we would know what we were talking about.

Dr. GROSS. I think this might be a very useful first step. You are very fortunate in South Carolina to have such areas available. We would be hard pressed to find that in the New York region, or even within 100 miles of the New York region.

Mr. MILLER. Dr. Gross, in S. 307 as presently written we have placed an upper limit of 15 estuarine sanctuaries for the coasts of the United States.

Do I understand from your testimony that we might be hard pressed to find 15 even at this late date?

Dr. GROSS. If we deal only with small ones, I suspect we could find them. If we want to go some of the larger estuarine systems that would be more useful for experimentation in terms of urban problems—I am urban oriented, let me confess that to begin with—I think we would be hard pressed to find 15 medium or large-sized systems.

Mr. MILLER. When you say medium to large sized estuarine sanctuaries, what size in terms of acreage are you talking about?

Dr. GROSS. I would say something in excess of a thousand acres I would consider a medium-sized one.

Mr. MILLER. Medium sized is over a thousand acres? How about a larged-sized one?

Dr. GROSS. We are probably considering areas of several square miles or more.

Mr. MILLER. How many square miles?

Dr. GROSS. Let me say more than 2 to 3 square miles.

Senator HOLLINGS. Dr. Gross, we are talking now of the open or unfettered original sanctuary. Let's look at Jamaica Bay, which you say they have been working on. How much would it cost to clean that bay up?

Dr. GROSS. I couldn't really give you a useful number on that. You might address this question to Mr. Lang tomorrow when he speaks.

The City of New York Environmental Protection Administration has done quite a lot of research on Jamaica Bay. I think they have the best data available. I could certainly, if you like, look further into the question and give you some estimates.

Senator HOLLINGS. I would appreciate it if you would.

Mr. MILLER. I would like to clarify one point in your testimony. When you were speaking about section 407 you said "We need this research, but it is not enough. I suggest that section 407 be broadened to include research necessary to improve environmental quality in marine areas."

I don't quite understand that in light of this language in section 407 that says "The Secretary is authorized and directed to initiate a program for the enhancement and improvement of the marine environment." And then it goes on to state what is included there. Could you expand on your statement, please?

Dr. GROSS. I recognize the fact that this language does appear early on in the language of section 407, but I would like to see more emphasis given to this problem. My feeling is that the weight of the section is directed in the sense of stopping present disposal activities, or regulating them. I would like to see more thrust given to a forward look. It is indeed going to be difficult to stop the present disposal activities that we find undesirable, but I think it will be even more difficult to reverse the trend and to start to improve the environmental quality.

I would be personally happier to see more emphasis given to rehabilitation in this section.

Senator HOLLINGS. As an experienced man in the field of marine science research, is it your suggestion that NOAA coordinate all of this relative to the coast and the civil marine research; and that the Pentagon coordinate the research relative to ammunition and oil dumping? Or from a scientist's standpoint, could it be coordinated in one particular agency of Government so we wouldn't be duplicating research costs? That is what I have in mind, duplication.

I am trying to see whether, if the Navy is going to coordinate marine research for the Army and the Air Force, then I am asking myself, is it a practical approach to say that marine research should be done by NOAA, or should we let the Navy continue on its research relative to munitions and oil, for example, and assign NOAA to more-or-less civilian pollution research?

Dr. GROSS. Mr. Chairman, I am not sure I am fully qualified to comment on this in detail. My experience has not been sufficiently broad to give me much knowledge of what is going on in the various agencies.

Let me say the impression I get from my experience, limited as it is, is that the job is sufficiently large, and we will probably need all of these agencies working on it. In other words, we need qualified personnel.

Now how we achieve the coordination and the savings that accrue from well-coordinated programs, I don't know. I am afraid I really have no suggestions along those lines, unless I might fall back to my statement of close liaison.

As you know, science is very difficult to coordinate and it is often done best at relatively low levels involving the person who actually is at the bench doing the work. This can be very effective but it is hard to predict beforehand precisely what will give you the best results. I am not sure I can really give you detailed answers on that.

Senator HOLLINGS. Dr. Gross, we appreciate very much your appearance at this time. The committee will recess until tomorrow's hearing. Thank you very much.

(The following information was subsequently received for the record:)

MARCH 12, 1971.

HON. ERNEST F. HOLLINGS,
Chairman, Subcommittee on Oceans and Atmosphere,
U.S. Senate, Washington, D.C.

DEAR SENATOR HOLLINGS: During my testimony before the Subcommittee on Oceans and Atmosphere March 2, 1971 you requested that additional information be made available on the following aspects of Section 410, of S307; including:

Probable costs of estuarine sanctuaries, with particular attention given to New York State's experience;

Recommendations about size and location of estuarine sanctuaries in the coastal zone of the United States.

Reliable data on land acquisition costs in the coastal zone are difficult to obtain. Land prices vary widely depending on the time of purchase, the land involved, and competition for the coastal site. Mr. Ned C. Smith, Executive Vice President, Open Space Institute, New York informed me that the costs they have encountered range from $150 to $15,000 per acre. Near Stony Brook on the North Shore of Long Island, prices have been quoted unofficially of approximately $25,000 per acre.

I have attached a brief statement of the experience of the State of New York in the acquisition and development of Flax Pond, a small salt marsh area on the north shore of Long Island which is owned by the state and operated as a coastal zone preserve and research facility in much the same way that I understand is intended under Section 410 of S. 307.

Despite the active support of local citizen groups and close cooperation between state agencies and the relatively simple transaction involved, site acquisition alone required about six years. Capital expenditure for land acquisition and laboratory construction (completed and projected) exceed two million dollars. Operating costs for the facility are expected to total about $330,000 per year exclusive of the cost of academic programs conducted at the site. Unanswered problems of site operation include security for research installations, access for class and recreational use, and maintenance and rehabilitation (where needed) of the area. In short, acquisition, development, and operation of even a small coastal zone site has proven to be time consuming and expensive: the facilities are difficult to manage.

Turning now to the second point. The estuarine sanctuaries established under provisions of S. 307 should include systems typical of all ten of the marine biophysical zones of the United States as identified by the *National Estuarine Pollution Study* (Report of the Secretary of the Interior to the United States Congress, pursuant to Public Law 89–753, The Clean Water Restoration Act of 1966). Estuarines within each of these natural marine regions will likely behave slightly different from systems in other regions. In order to provide the detailed knowledge required for planning and operating coastal zone facilities, it is imperative that estuarine sanctuaries be available in each of these regions. (Similar areas called "Research Preserves" by the *Waste Management Concepts for the Coastal Zone,* National Academy of Sciences-National Academy of Engineering).

Because of the massive environmental problems faced by coastal urban areas, I urge that despite high land costs, estuarine sanctuaries be established in the heavily populated Middle Atlantic Region and in Southern California, the Great Lakes should also be included in this section. (Since the term estuarine does not apply in the strictest sense to the coastal waters of the Great Lakes, perhaps the terminology in Section 410 might be changed to "Coastal Zone Sanctuaries")

Owing to the probable difficulty in obtaining coastal zone preserves for this purpose, I recommend that serious attention be given to development of compatible multiple-use agreements with various state, local agencies or other federal agencies. For example, coastal areas controlled by the Department of Defense, Department of Agriculture (Forest Service), Department of the Interior (National Park Service, Bureau of Land Management), Department of Transportation (Coast Guard), and other federal agencies might be useable for joint use as

research preserves. Areas controlled by state and local agencies might also be available. Another possibility is the joint use of areas used for such purposes as aquaculture might be useable as research preserves or coastal zone sanctuaries. In short, I suggest that serious attention be given to a thorough investigation of possibilities of obtaining these needed coastal zone areas other than purchase of new sites.

Considering the experiences of the State of New York in acquiring and developing Flax Pond, a small estuarine area, I strongly urge that the upper limit on Federal funding under the cost-shaping provisions of Section 410 be increased to ten million dollars. This would permit sites of a few thousand acres to perhaps a few square miles to be considered for purchase and development in areas where coastal areas are available and land cost within the financial limits of the program.

I hope that this material will be useful to you and your staff. If additional information is required, please feel free to call on me.

Sincerely yours,

M. GRANT GROSS,
Associate Director (Research).

Enclosures.

ACQUISITION AND DEVELOPMENT OF A COASTAL PRESERVE AND RESEARCH FACILITY AT FLAX POND, LONG ISLAND, N.Y.

(By M. Grant Gross, Associate Director (Research), Marine Sciences Research Center, State University of New York, Stony Brook, New York 11790)

Flax Pond is a small tidal inlet and salt marsh area (Fig. 1) on the North Shore of Long Island, Suffolk County, New York about 60 miles northeast of Manhattan. The 160-acre wetland site, including a buffer zone along one side of the Pond is owned by the State of New York. The State University of New York and the Department of Environmental Conservation jointly operate the site as a coastal zone preserve and use it for marine research and instructional programs carried out by the two organizations, including—

Instruction at undergraduate and graduate level.
Basic marine research projects.
Research on fisheries, both fin fish and shellfish.
Research on wetland management.
Regional research facility for use by investigators and students from other campuses in the 70-unit State University system (possibly by other organizations as well).

The experiences in the acquisition and operation of this site illustrate some of the problems involved and may provide insight into difficulties likely to be encountered in other coastal areas, especially those near urban centers.

At the time of its acquisition, Flax Pond was considered to be one of the last relatively undisturbed wetlands areas available on the North Shore of Long Island. The area has been the subject of several disputes between the local village and the property owners who at various times wished to develop it for homesites, for a marina, and for sand and gravel production.

HISTORY OF DEVELOPMENT

Efforts to acquire Flax Pond began with the University Master Plan for 1960 which included development of a Marine Sciences Research Center at the State University Center at Stony Brook. With the active cooperation and support from local governments and prominent citizens, including Dr. Robert Cushman Murphy, curator emeritus of the Museum of Natural History, and Mr. Ward Melville, a 146-acre tract including house and adjoining buildings was acquired by the State on or about March 15, 1966 at a cost of about $2,684 per acre. Since then additional land forming a buffer on one side of the property has been acquired, bringing the total area to about 160 acres. The approximate land acquisition cost totals about $500,000. The State still does not have complete control of the entire wetlands area or its surface drainage basin. Private houses occupy the eastern end of the marsh area (Fig. 1) and there are scattered houses within the surface drainage basin. Land acquisition programs are now in abeyance. I am informed unofficially that the quoted price on a 2-acre undeveloped lot near Flax Pond is $50,000, a reflection of the competition for wetland sites as far as 60 miles from New York City.

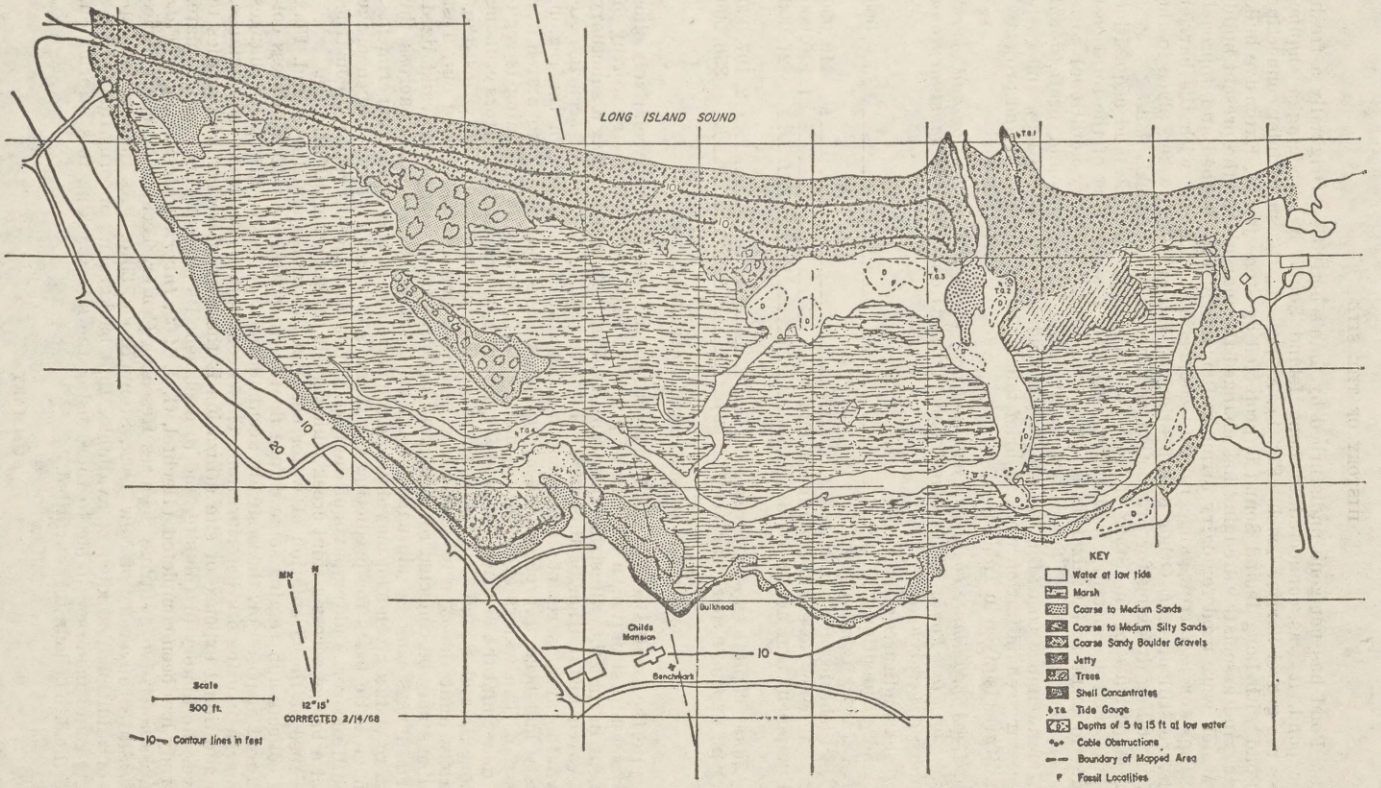

Fig. 1 Flax Pond and adjacent lands showing major physical zones.

HISTORY OF THE SITE

Flax Pond has not gone undisturbed by man's activities. Originally a freshwater pond, it was connected to Long Island Sound by dredging a channel across the gravel barrier beach (Fig. 1). At present, the small inlet connecting the Pond with Long Island Sound is protected by stone jetties. Extensive bulkheading and associated dredging has changed the marsh near the present buildings which were used for dairy farming. Remains of the roadbed and approach structures for a narrow-gauge railway connecting the house with the barrier beach are still present. Other modifications of the area has taken place in the past, including dredging for production of sand, gravel, and shellfish.

The experience of the State of New York has been that the land acquisition costs for such a sanctuary, while large, are only a small part of the total cost for development and utilization of such a facility. Necessary additional costs include: construction of laboratory, salaries for caretakers and professional staff, maintenance costs for the property including periodic cleanup, and costs of necessary rehabilitation work. A brief tabulation of the present and projected expenditures is given in Table 1.

TABLE 1.—*Approximate costs (present and projected) for acquisition and operation of Flax Pond, Long Island, New York as an estuarine sanctuary and marine research area*

Capital expenditures:	
Land acquisition	$500,000
Laboratory Construction:	
Fisheries Research	410,000
Marine Research (planning figure)	1,170,000
Equipment and access roads	27,000
Total capital expenditures	2,107,000
Operating expenses, per year (both labs)	330,000

PROBLEMS OF SITE USE AND MANAGEMENT

Despite the small size of Flax Pond, its relative isolation, and relatively simple ownership situation, a number of problems have arisen that are worthy of comment in that they illustrate the problems of using and managing a sanctuary or research installation of this type. The first problem is that of security. Although the area is remote from major roads and little known in the region, security has been a problem. Local residents have long used the marsh for recreation. The waters are used by small craft; fishing and clamming is regularly done; and the beaches are used for picnics by small boat operators cruising on Long Island Sound. While all these may be commendable activities, they definitely limit the type of scientific experiment that can be carried out. Test organisms may be collected by picnickers as souvenirs or equipment vandalized.

Certain uses may be mutually exclusive. Large classes walking across the marsh to visit a given spot may damage the marsh or interfere with experiments. We have little basis for predicting the marsh's capacity to sustain such usage and still recover. Making parts of the tidal flats accessible has required construction of a bridge across a tidal creek which itself causes some disturbance.

Because of the circulation of water between the marsh and the Sound, Flax Pond collects and retains some refuse floating in nearshore waters. Unless collected and disposed of, these steady accumulations of wastes gradually changes the marsh causing its deterioration. This necessitates continued maintenance.

An additional expense of site utilization is the cost of background studies to unravel the history of the site, and to document its present condition. To date, one study has been completed (Hechtel, G. J. 1969, *Invertebrate Survey of Flax Pond, Summer–1967*. Marine Sciences Research Center, Technical Report Series No. 1, State University of New York, Stony Brook, 39 p.). As funding for support of additional studies is available, this background information will be collected and made available to those using the site. Lacking this informaton, use of the site is definitely curtailed.

SUMMARY

Acquisition and operation of a coastal preserve and research site on the North Shore of Long Island, 60 miles from Manhattan has required more than 10 years and incurred capital expenditures in excess of two million dollars.

Annual operating expenses for two small marine research laboratories is estimated at $330,000 per year. Operations of the site, including security, and the degree of utilization possible without extensive damage to the marsh are still not completely resolved even for this small, relatively isolated site. Use of the site for research activities requires additional funding for necessary background studies.

STATEMENT OF DR. M. GRANT GROSS, ASSOCIATE DIRECTOR (RESEARCH), MARINE SCIENCES RESEARCH CENTER, STATE UNIVERSITY OF NEW YORK, STONY BROOK, NEW YORK

Mr. Chairman and members of the subcommittee, I appreciate this opportunity to appear before you today to present some results of my research on waste disposal in coastal water especially those near the New York Metropolitan Region, and to comment on some implications of this work with respect to S307.

While this research has been supported by the State University of New York; by the Bureau of Solid Waste Management, Public Health Service; and by the Coastal Engineering Research Center, U.S. Army Corps of Engineers, I speak today as an individual scientist and not on behalf of these organizations.

During 1970, my group surveyed waste deposits in New York Harbor, near the designated waste disposal sites in New York Bight and in the western portion of Long Island Sound. I will briefly summarize our results.

The study was made of those wastes that accumulate as deposits in New York Harbor or on the adjacent continental shelf. These waste solids are important because they are the long-term environmental debts accumulated through 300 years of waste disposal in coastal waters. This project excluded several important types of waste materials including floatable materials (refuse, garbage), liquid waste discharge from sewage treatment plants or commercial processes.

In the New York Region the largest tonnage of wastes dumped at sea each year comes from dredging activities. These are typically 90 percent sand or river-borne silts mixed with carbon-rich solids, apparently from sewage and related sources, and a variable quantity of metal-rich wastes apparently from industrial activities. Dredged wastes alone amount to about 3.5 million metric tons per year in the New York Metropolitan Region.

The second largest source of solids is sewage sludge coming from sewage treatment plants; about 250,000 metric tons of sludges are taken each year from the New York Metropolitan Region and dumped at sea. These wastes are about 55 percent organic matter mixed with sand and silt carried by sewage collection facilities. There is also a small but significant fraction of metal-rich wastes apparently derived from industrial activities.

In earlier years, more than 100,000 tons of coal ash were dumped at sea. This is diminishing in quantity as the ash is used commercially and as power plants turn to petroleum and natural gas for fuel.

Finally there are variable quantities of rubble and debris from construction and demolition activities. These, unlike the materials previously mentioned, are used for landfill operations and are usually dumped at sea when there are no landfill operations conveniently located for disposal. During 1970, most or all of this material went into landfill.

Waste deposits are common on the bottom of New York Harbor. Based on the amount of organic matter in these deposits, it appears that about 62 square miles of the Harbor bottom is covered with carbon-rich deposits; about 40 percent of its total area. The Harbor has a long history of receiving various wastes, including raw sewage.

In order to solve the problems arising from dumping of wastes in the Harbor, offshore waste disposal sites were established apparently beginning in the late 1880's; the most recent disposal site was established in the late 1940's for disposal of acid wastes from a chemical factory in New Jersey. Disposal of carbon-rich sediments from dredging and from sewage treatment plants have left a readily identifiable deposit on the continental shelf whose limits can be mapped on the basis of the carbon contents. Wastes comparable to those in the Harbor cover about 20 square miles of ocean bottom near the disposal sites. Effects of waste disposal can be detected over about 40 square miles. In short, the area of the continental shelf covered by waste deposits is considerably smaller than the area of the Harbor covered by comparable material. We should remember that the major offshore disposal sites are 6 to 15 miles offshore, and therefore much farther removed from population centers than waste deposits in the Harbor.

These waste deposits contain copper, lead, and silver at concentration levels much higher than the natural sediments in the same area. These anomalous concentrations can actually be used to delineate the distribution of these deposits on the New York Bight. Because of their potential toxic effects, we have given special attention to these metals. It appears that only lead is relatively easily extracted from the deposits. Although the evidence is far from conclusive, it appears that most of the metals in these wastes are likely to remain with the deposits on the ocean floor. We need more detailed information to permit better predictions of the behavior and fate of these wastes in the marine environment.

The effect of waste deposits on bottom dwelling marine organisms is most dramatic within New York Harbor. These organisms cannot move long distances and thus they record the long-term environment in their vicinity. Of 110 sediment samples collected in the Harbor, 9 percent contained no living organisms that we could identify; we were, however, unequipped to study bacteria. Only pollution tolerant worm-like organisms—"sludge worms" and nematodes—were found alive in 44 percent of the samples from the Harbor; 10 percent of the 29 samples studied from New York Bight were similar. I think that it is significant that no sample we collected from New York Bight was devoid of marine organisms. Thus, waste deposits are more widespread in the Harbor and their effects are more deleterious than deposits near offshore waste disposal sites. In part, this reflects only about 45 years of waste disposal in New York Bight as compared to about 300 years of waste deposition in the Harbor. Also, it is worthwhile noting that the most thoroughly treated wastes are those dumped offshore. Untreated sewage goes directly into the Harbor, closest to the population centers.

The large area covered by waste deposits is just one manifestation of the complexity of the problem at hand. We are dealing with many waste sources. Efforts to regulate wastes going into one area must be carefully examined to make sure that it does not simply move the problem to another area, especially areas closer to population centers.

How then do we deal with such problems? As efforts are directed toward formulation and implementation of a national policy on waste dumping in the ocean, careful attention must be given to phasing out these operations without simply transferring these problems back into the harbor where they will be close to large population centers. These offshore waste disposal sites were established to alleviate problems of the city and their closure must not lead to increased waste disposal in the harbors. While protecting the environment we must not forget the people who live nearby.

I am pleased to see that S. 30 provides for a mechanism to provide some of the long term answers that are needed in this area. As one New York City official put it: "The decisions for 1971 were made ten years ago. We are now working on the installations for 1980 and 1990." The Estuarine Sanctuaries and National Oceanic and Environmental Research Laboratory System should be established as soon as possible to provide the basic information needed to permit this planning and the eventual construction to lead the desired protection and enhancement of the marine environment.

There are two aspects of S. 307 that I would like to address. First the estuarine sanctuaries. This is a commendable idea and I support it but the two million dollar Federal funding limit virtually insures that the sanctuaries will be small, undeveloped and far from urban centers. In short, will not provide us with support where it is most needed—in and near cities. Work has been in progress for literally decades to protect Jamaica Bay in New York City but this small amount of money would not support that effort.

I also heartily endorse the National Oceanic and Environmental Research Laboratory System, again with a caveat that it needs to be closely integrated with those agencies actively working on problems of environmental protection and enhancement. Without careful attention to liaison, the results of this laboratory may not be directed toward the problems with highest priority and the work will suffer. Furthermore, absence of close liaison will hamper the transfer of this information from the laboratory to the field where it is to be used. I suggest that advisory committees be established for each laboratory to provide an overview of the research efforts. Such an advisory committee might include local representatives of federal agencies, such as the Environmental Protection Agency and the Corps of Engineers as well as their counterparts from states near the laboratory and members of the academic community.

The report *Waste Management Concepts for the Coastal Zone* recently issued by the National Academy of Sciences-National Academy of Engineering provides a well considered, professionally competent evaluation of present waste-disposal technology, along with suggestions about needed improvements and some estimate of the costs thereof. I highly recommend this study for guidance in drawing up action programs to be implemented at these laboratories.

Looking now at some details of the bill, I note that the general tone of Section 407 is primarily directed toward preventing further deterioration of the marine environment. We need this research but is not enough. I suggest that the section be broadened to include research necessary to improve environmental quality in marine areas. Such research is needed to plan and conduct effective programs to clean up waste deposits. Such research might include pilot projects to clean up waste deposits in selected harbor areas. For example, New York's waterfront might be made usable by residents for recreation. In my opinion, such research must go beyond merely providing data and monitoring systems.

I am especially pleased to see that Section 408 calls for the very necessary research into economic, legal and other social studies related to the marine environment and its resources. In many urban areas these social problems often underlie environmental problems.

In summary, I recommend that legislation to deal with waste solids take the "longer view". We must be concerned with present operations and the older waste deposits which are the long-term environmental debt we have inherited from more than 300 years of neglect and abuse of the coastal ocean. S. 307 is a welcome move in that direction.

(Whereupon, at 11:50 a.m. the hearing was recessed, to reconvene at 10 a.m., Wednesday, March 3, 1971.)

OCEAN WASTE DISPOSAL

WEDNESDAY, MARCH 3, 1971

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON OCEANS AND ATMOSPHERE,
Washington, D.C.

The subcommittee met at 10 a.m. in room 6202, New Senate Office Building, Hon. Ernest F. Hollings, (chairman of the subcommittee) presiding.

Present: Senators Hollings and Stevens.

Senator HOLLINGS. The committee will please come to order.

We continue this morning our consideration of S. 307, a bill to foster oceanic and environmental research. In particular, we are considering the need for scientific research, to assess areas in which effective management of wastes is currently limited by lack of knowledge. Or, as stated by the National Academy of Sciences-National Academy of Engineering Coastal Wastes Management Study:

> Effective rational management of the growing volume and variety of wastes generated by our accelerating coastal urbanization requires immediate initiation of a coordinated, long-term national program of research and investigation involving government, industry, and universities.

It is no longer sufficient that design of waste treatment and disposal systems be concerned primarily with maintaining aerobic conditions in the receiving waters. We must now look for scientific, quantitative guidelines to assist engineers who have responsibility for designing waste treatment and disposal systems. Methods are available for assessing a broad range of marine receiving water values.

Our four witneses today each participated in the Coastal Wastes Management Study of the National Academy of Sciences-National Academy of Engineering. Each brings a wealth of experience and knowledge in his own field of engineering or science which will be valuable to us.

I want to welcome each of you and express our appreciation of the committee for your appearance here today.

We will first hear from Mr. Martin Lang, the assistant commissioner, director of Bureau of Water Pollution Control, Department of Water Resources, Environmental Protection Administration; New York.

Mr. Lang, you are very welcome here.

You have a long title here. It sounds like it was written by one of the congressional committees.

STATEMENT OF MARTIN LANG, ASSISTANT COMMISSIONER AND DIRECTOR OF BUREAU OF WATER POLLUTION CONTROL, DEPARTMENT OF WATER RESOURCES, ENVIRONMENTAL PROTECTION ADMINISTRATION, NEW YORK

Mr. LANG. Mr. Senator, they gave me a shorter title in this issue of the magazine which I would like to show you which just came out.

Senator HOLLINGS. Thank you.

We will be glad to have your statement.

Mr. LANG. I do not have a formal prepared statement to read in the record. I have given a short summary statement to the young lady on your staff.

I want to identify myself and say in what manner I presume to address your distinguished Senators on this subject.

As director of the bureau of water pollution control of the city of New York, I am currently charged with implementing a $1.3 billion program to upgrade the treatment of New York City's dry weather waste waterflow, upgrading all existing facilities and building new facilities to create the capability of treating 1.8 billion gallons per day.

In the course of this program, then I have to become involved not only with interfacing with the State, interstate, and Federal agencies, but have to preoccupy myself with the mission of water pollution control itself.

It is not sewage treatment. Sewage treament is merely a tool toward the end. We define our mission as the protection and enhancement of our estuarine waters.

Now in your kind invitation you asked me to address myself to two subjects. First, the question of ocean disposal, and second, the implications of the Senate introduction. Actually these are parts of the same picture. There has been a tense preoccupation with this highly visible disposal of sludge at sea.

New York City has been practicing this since 1937. New York City also practices digestion of sludge, that is, we destroy over 50 percent of its organic content and render it nonputrescent.

In addition to that we are under close surveillance of the Corps, so there is no laissez-faire policy in ocean dumping. It is dumped in a prescribed area under prescribed conditions. We sample what is discharged there, we know what we are putting out there.

To put things in perspective, this intense interest in this one aspect, sludge dumping, has somehow masked the proper interest on the more precious inshore estuarine waters. The estuarine waters are the classic spawning grounds of marine biota. For example, we know we destroy BOD, that is, the biochemical oxygen demand, in the sludge digestion process. The total BOD that we are imposing on a couple of barren square mile of offshore water is less than one-sixth of that discharged in the upper harbor of New York City from our adjacent communities in New Jersey, where some 300 million gallons a day of virtually raw sewage is discharged.

It is like talking about a hang nail when there is a broken leg to be treated.

In other words, we would welcome an equal preoccupation with the quality of the inshore waters.

The sludge dumping that has been in progress since 1937 has caused no gross demonstrable deleterious effects offshore. There is good recreation around there, good fishing. I am an ardent salt water fisherman myself. And it is at a point 12 statute miles from the nearest point of land, in the vicinity of some of the finest bathing beaches on the eastern seaboard.

Nevertheless New York City does not condone the indiscriminate continuation of this practice. We recognize the climate of the times. We recognize the current thinking. We are virtually in accord with the finding of the President's Council on Environmental Quality that the disposal of digested sludge can continue as an interim measure under permit control. Since we are already in that category, we propose to continue in this vein, meanwhile exploring other alternatives. For example, we have already made cost analyses of moving our marine operations from 12 miles offshore to 25 miles offshore, from 25 miles to 100 miles offshore. And we find that when you get out to distances like that, other alternatives suggest themselves, such a sludge incineration.

As a matter of fact, New York City is going to show the rest of the eastern seaboard one possible mode to go in the future. We have currently under design a 70-million-gallon-per-day facility in Brooklyn, the Red Hook plant, built on the site of the former Brooklyn Navy Yard. There we propose, in lieu of digestion, to go for so-called low pressure, low temperature oxidation of sludge to yield a nonputrescible inert product which is capable, by being dried to a granular condition, of being disposed of like municipal refuse in a municipal incinerator, or, even better, when and if those barren lands, those strip mines, those short rail hauls are available for land disposal, ultimate organic recycling becomes available, we will have an ideal nonputrescible, virtually pasteurized product fit for return to the soil.

We will do this in a major prototype demonstration, which may indicate the way to go in the future.

So to sum up our views on sludge disposal, it is economical, it has cost us on the order of $12 a dry ton contrasted for example with $90 a dry ton in Chicago at this time.

To the best of our knowledge, it has no grossly deleterious discernible effects on shore. And it will continue as a viable technique, pending the assessment of the technique which we are testing now.

However, to revert to the broader implications of an oceanographic research viewpoint, New York City is so in accord with your opening statement, Senator, that we have anticipated, we have already put money in our capital budget and we are launching this year a 5-year study, the so-called New York bight study. That is, we are going to consider the entire estuarine complex in this huge megalopolis as one entity, all of the way from potable water in the Hudson to a broad arc in the open reaches of the bight.

We will gather all of the inputs and outputs of this megalopolis on these estuarine waters and use the same total systems approach that I have already used successfully in Jamaica Bay.

Let me define what I mean by total systems. It is a kind of "in" word, engineers take confidence in it, you know. What it really means is a multidisciplinary approach. We bring together a team of sanitary engineers, biologists, chemists, bacteriologists, hydrologists, mathema-

ticians, and we study the entire ecosystem of a given estuarine body.

We are doing this right now very successfully in Jamaica Bay.

What is the end product of this going to be? Is it going to be a slick brochure, you know, that we can file with all of the others?

No, it has to be the basis for rational decisionmaking in the next two decades.

Sir, I don't know how to express this, but we will admit that many of the decisions made in the decades past on the kinds of plants to be built, where they were to be located, the kind of outfalls and the location of the depths of those outfalls, were more or less visceral decisions, sort of seat-of-the-pants decisions, based on the knowledge of the art we had then.

In the last few years there are better and better tools. Even though in New York City the decisions of the 1970's have been made already, we are committed, the hardware is being designed, contracts are being let, tunnels are being bored, the foundations are being put down for this vast array of hardware, but still we owe it to the next generation to provide a more rational basis for the decisions of the 1980's and 1990's.

That is what we are doing in Jamaica Bay and that is what we are going to try to do for the entire New York bight area.

We brought in the Rand Institute to set up, and they have set up, the most sophisticated two-dimensional model of its kind, a mathematical model of the Bay, so you don't have to go, like the old story of the legend of the roast pig, you know, the only way to make roast pork was to burn down the pig pen, build the plants and see what happens. We are creating this model and testing this model, and then you can plug in, as an exercise, various combinations of inputs and then say the quality of water in this area and in that area will reach a certain standard.

This is no ephemeral dream, this is a reality now with us. We propose to extend this to the entire estuarine complex. In doing this, since this was our dream some years ago, we almost anticipated the findings of the NAS-NAE Committee. We urged that this be done in various other estuarine complexes.

Let me cite an example. You probably know the Corps of Engineers is interested in advancing the hurricane barrier concept for Jamaica Bay. Other people are interested in certain filling, bulkheading, building piers, filling in shorelines, dredging, and so on. If each of these were treated as one entity, on an ad hoc basis, you know, our ecology could be successfully whittled down piecemeal.

Far better to create a model like this, and then input the hurricane barrier and then predict its effects. I have already had some conflicts with the Corps of Engineers on this, because they have a concrete model in Vicksburg. Of course, the trouble with casting your ideas in concrete is there they are, and you become defensive about them. But a sophisticated mathematical model is capable of more flexibility, a wider range of inputs.

Senator HOLLINGS. You would not use the Vicksburg model approach? That is what I wondered as you were talking. Being a hard-nosed engineering practitioner in the pollution field, is it your testimony that as a practical matter we should make a model approach

to each one of these particular coastal and estuarine regions and areas in order to treat them realistically? You can get a lot of these reports out and put them on the shelves, but if you are really going to do something, you have to do it with this model, practical, on-the-ground approach for each of the areas. Is that what we are talking about?

Mr. LANG. Yes, sir; because decisionmaking is a hard process. If you make a decision I will build this plant, I will provide this degree of treatment—many of the decisions made by Federal, State, and interstate agencies on the kinds of plants to be built, or the degrees of treatment, I don't know how to phrase it, because I don't have the eloquence of people like yourself——

Senator HOLLINGS. You are 'way ahead of this committee in your phraseology, I can tell you that.

Mr. LANG. I think that much of these decisions were made on the basis of public sentiment and political expediency, by sheer fiat.

To cite an example, it may be imprudent of me to take on the Federal Government this way, but I remember a conference in New York City where a very distinguished counsel of the then FWQA, Murray Stein, was exhorting us to go for higher and higher degrees of treatment. He found it was like punching a pillow, because he wanted to go to 90-plus removal, and I mentioned to him I read in the newspaper the other day that you had a great triumph, the city of St. Louis opened up its plant on the Mississippi, a primary treatment plant. That is on the main stem of potentially potable water, we are here on salt water, and you want us to give you a high degree of treatment. It is not consistent.

Many of these things were not consistent. You find that the easiest way to make a decision on the degrees of treatment is to pick the highest obtainable level of technology and ask for it across the board, without any rationale whatsoever. And this is what has been done.

I am not fighting it, we are acceding to it, we are building these plants. But all I can say, sir, is that we owe it to the next generation to provide a more rational basis because whatever decisions are made in the plant we are building now, this is a fluid, changing technology.

New York City is located on estuarine salt water. But maybe over the horizon there will be nutrient removal, or maybe eventually tertiary treatment, eventually re-use of effluents.

There is one thing certain, this world is changing, so we have to be prepared for that. Whatever the State standards, the stream standards are that were set up by the Department of Interior back in 1965, there is only one way they will go, and that is up and we have to be prepared to cope with it.

Senator HOLLINGS. At this point, Mr. Lang, at some point in the evolving theory you describe, we have to put a figure in here that is realistic.

In that context we felt we had to have these hearings in order to listen to those experts in the field such as yourself.

I am wondering just how far the Federal Government really can go in assisting generally in research, or whether each one of these is a tailormade, individually planned situation? Is there any overall research from your standpoint that the Federal Government can assist in? Just exactly what would your testimony be as to the amount of

money or the degree to which the Federal Government can participate and help coordinate?

You have already told me you can't have one Federal plan for pollution in the estuarine areas of America. Then what can we have?

Mr. LANG. Let's put a figure on my study. I have estimated something like $5 million over 5 years, extrapolating my experience on Jamaica Bay.

We are going into year 1 now, which is the phase of organization and gathering of data.

The city of New York has put up in its capital budget a million dollars to launch it, of which I expect to spend only several hundred thousand dollars this year, in the hope that this project will generate State, and hopefully Federal support.

And I think this would be a modest investment. It would be a prototype. There is nothing unique about the New York Bight area, there really isn't. Maybe the hydraulic complexities may be a little greater, but it could apply to the gulf coast, the Delaware estuary——

Senator HOLLINGS. Does it include the New Jersey side where the 300 million gallons of effluents are coming out?

Mr. LANG. Yes, sir; New York City had the courage to put money into a study which transcends political and geographical boundaries, transcends city, county, and State jurisdictions.

Senator HOLLINGS. Are the New Jersey authorities cooperating, or not?

Mr. LANG. As far as I know, they are not doing anything about it. They may generate a study of their own. But we recognized long ago that our harbor, a drop of water in our harbor doesn't know politics or geography. It just knows the stresses placed upon it. If we were to wait until this millennium arrived, where all of the States join together mutually for this, we may have to wait a long time. It is important for us to get the answers now, so we have decided at this time to go it alone, hopefully to draw in Federal support.

I have over the past year or two tried to plead the case for this study here in Washington and then in regional headquarters in Boston of the FWQA. And everybody endorses it, no one ever disputed such a study should be done. But the only question is who is going to pay for it and how it can be done.

So we decided that in this case we would go it alone and hopefully generate support from our neighboring States and from the Federal Government.

Senator HOLLINGS. You talk of a 5-year study. The world changes in 5 years. But if you had the money, could you really make it in a year and a half, 18 months, or 2 years? Or is it a series of flows and ebbing, where it wouldn't be a good or reliable study unless you took it over a 5-year period?

Mr. LANG. Yes, what I was doing, I was using no theoretical concept, I was using the real hard experience that I had in the New York bight, that my counterparts in California had in the bay delta study, the problems they had in Galveston, that Mr. Porges had. We don't know how long it takes, how much talent there is in the field, how long the sampling takes, how much manpower you can deploy, what seasonal and cyclic and climatic variations you have to go through to make the results reliable.

But your comment is very cogent, things change in 5 years. You see, the harbor, the bight, or Jamaica Bay, is not crystalized like a fly in amber for continual review. Even while the study is going on its is changing. We can't stop all dredging, we can't stop all building, we can't stop all filling. But if you create a mathematical model instead of a physical concrete model, you can plug in these changes.

Senator STEVENS. I am interested to know, Mr. Lang, where you are getting your talent for these studies you are doing?

Are you using your in-house people?

Mr. LANG. I am not that blessed to have that array of talent in-house. What I have found is this: There is a diversity of talent in this field. The universities have been generating it over the past decade in all of the sciences. Oceanography, some people specialize in animals, some people specialize in the analysis of the long-lived pesticide residuals. But how to bring the whole together, you need good organization, and we use consultants' services. But that is another area. The academic community is rich in these skills. But you have to be careful. If we just say we will turn it over to a university or series of universities, it might be like everybody getting on a horse and riding off in all directions.

I always worry about some very esoteric academic type who may get interested in the life cycle of one specific dinoflagellate and pursue that ad nauseam. So you have to ride herd on this.

I think that we will involve in the New York bight study a consortium of top-flight consultants, plus ancillary tasks given out to the various skilled people in the academic community. But under close direction.

Senator STEVENS. Your article here that you gave to us, I have read through it, and it indicates you are operating 19 pollution control plants.

Mr. LANG. There is a proofreading error there. We are operating 14. We are treating 1.1 billion gallons a day of sewage.

Senator STEVENS. You mentioned you were going into a program now that you are boring out new areas for the new plants. How does this new program of sewage treatment fit in with this model you were taking about?

Mr. LANG. These are two entities, two different efforts. The program that is referred to there, this is a real engineering book, it is under design, contract are being let. This decision was made years ago. Under the State Pure Waters Bond Act of 1965, it made a billion dollars available, with 60-percent support to the municipalities. But it made it available only on the basis that you had to have your contracts committed by March 1972. It called for a tremendous acceleration of decisions and commitment to design. And we have done that. But the kinds of study I am making will be of value even after this program is completed, because, sir, the lay public of this country has been led to believe that if we only build all of the plants with the known technology, all of our streams will revert to the pristine virginal quality of the days of our ancestors, and some engineers like myself say this may not exactly happen.

Senator STEVENS. I still don't understand you. You say the decisions have been made, and you are committed to this program of these treatment plants.

Mr. LANG. Yes, sir.

Senator STEVENS. And yet you are now working on this new total modular plan I take it for the whole area.

Mr. LANG. Yes, sir.

Senator STEVENS. Are you implying that these decisions that have been made may in fact be contrary to the total recommendations you are going to have to work out for the whole area, and you are going to have to go back and rebuild these?

In other words, you are spending a billion dollars that you are going to tear out in 2 years with Federal money?

Mr. LANG. No; we are not going to tear them out, sir. What I am saying is the needs of the future may transcend present standards and we have to be prepared to move toward them on a rational basis.

Senator STEVENS. Why can't you crank the new standards into this plant—this 5-year, billion-dollar plant? Are we wedded to these decisions made in the past?

Mr. LANG. Well, when you start a major engineering enterprise, then it becomes like a stone rolling downhill, you are committed, you have let contracts. If I were to say that I would like to have second and third thoughts about my exploiting the State Pure Waters Bond issue and let, you know, some $600 million of State aid go elsewhere, I think the city should look for another director the next day.

In other words, there was one point in time when the money was available to build here now. In other words, there was a driving urgency, a short time table to utilize the bond issue. There was no time for introspection, no time for study.

Senator STEVENS. I am not being critical, I just wonder if the plan you are working on now in any way phases into what you are constructing, based on decisions made 5 years ago?

Mr. LANG. I think they will eventually be compatible and supplement each other. The basic plan now is for over 90 percent BOD suspended solids removal.

Senator STEVENS. What is that BOD?

Mr. LANG. BOD is a nice little "in" word the chemists and bacteriologists like to use. It is called biochemical oxygen demand. What it boils down to is this: When you put organic matter into water, and that organic matter undergoes any putrescence, decay, any oxidation, it utilizes oxygen. And there is a lab test where you take a certain sample, you put it in a bottle, you simulate what is supposed to happen. You put it in a bottle of water of known oxygen content, put it in an incubator for 5 days, determine the oxygen before and after, and you determine to what extent this material incubated at that temperature.

This is of vital importance, because we are talking about the difference between marine life and death. You know we all talk about dissolved oxygen. But in the waters around New York City the total capacity of the water, of the dissolved oxygen, is only 8 parts per million. We measure it in parts per million. In other words, 1 million pounds of water has the capacity to only absorb 8 pounds of oxygen. So the difference between marine life and marine death is only a precious few pounds in a million pounds of water.

So BOD tests give you some measure as to the extent to which pollutants will draw on the dissolved oxygen content of the water.

You try to do it in a stereotype test in the lab and try to extrapolate that to what would happen when the stuff is discharged in open water.

Now years ago when I went to school there used to be a simple formula, we all studied streams, nice neat streams, finite cores, known flow. You put a load in here, and you would compute the so-called dissolved oxygen by the famous Streeter-Phelps equation. There is only one trouble, this simple mathematical approach doesn't work in these complex estuarine systems, and that is why we have to resort to these sophisticated mathematical techniques.

In other words, if I know the BOD that is going in, from an industrial polluter or municipal effluent, raw sewage, that is one thing. But I have to be prepared to come up with an answer. All right, it will go in there, what effect will that have on the dissolved oxygen and say this is an oscillating target stream like the East River or the big mixing chamber like the Upper Harbor of New York. We take the BOD for a start, we have to resort to elaborate techniques to predict the effect on the oxygen regimen of the waters.

Senator STEVENS. Thank you.

Senator HOLLINGS. Mr. Lang, you have to catch a plane, I know. One final question. Of course our primary concern is ocean dumping, ocean pollution. Politically we know it is impractical to say there shall be no more ocean dumping. But from a desirability and practicality standpoint of trying to deter and arrest it and put it over to the land side. Give us your judgment on that.

How would you say the trend should be and how far can we expect to go in cutting down ocean dumping?

Mr. LANG. I will make the same plea here that I made to the President's Council on Environmental Quality. Don't make any drastic traumatic change from a procedure that is working now and which will leave us no other alternative.

If today I had to stop ocean dumping, the alternative would be shut down the plants and discharge over 1.3 billion gallons of raw sewage into the precious inner waterways of the city. That is the only alternative. Because to mount a program for incineration, to mount a program for recycling to land fills, you have to allow a reasonable lead-time, Senator, of something on the order of 10 to 15 years.

Senator HOLLINGS. That is 10 to 15 years?

Mr. LANG. Yes, sir.

Senator HOLLINGS. Do you mean we politicians are going to be politicking for this for the next 15 years and everybody is going to be right?

Mr. LANG. Sir, the word that was used in the report was to phase, and phasing indicates a period of time. For example in New York City, within a couple of years we will have well under construction another type of sludge handling process which may point the way to go for eventual changeover of the plants. If so, each changeover will take place over a period of years.

I have to be realistic and say 10 or 15 years.

Senator HOLLINGS. All right. What proportion is being disposed of in the ocean and what proportion is being disposed of on land in New York at the present time?

Mr. LANG. I put as much of my digested sludge as can be accommodated by the parks department as a synthetic soil builder on their completed landfills they are converting to park land. But that takes only 4 or 5 percent of my total production.

Senator HOLLINGS. Ninety or 95 percent is going into the ocean and rivers then?

Mr. LANG. Yes, sir.

Senator HOLLINGS. And within the next 5 years what can be practically done to change that proportion, to put more on land and less in the rivers and streams, particularly in view of your desire and mine to try to protect the estuarine areas? What should we shoot for as a practical thing?

Mr. LANG. I have to come back to the same time frame I cited before, 10 to 15 years.

Senator HOLLINGS. Then in 10 to 15 years what proportion would you have on land and in the water?

Mr. LANG. I think we could probably reverse the proportion.

Senator HOLLINGS. Ninety percent of it on land and 10 percent in the water?

Mr. LANG. Yes, sir. This is based on somehow enough pressure generated to make available land for disposal. I know that your staff and yourself are probably aware that Chicago is going into intense efforts to get sludge downstate in Illinois. You know the great expense and effort involved.

Senator HOLLINGS. I am trying to get the limits in my mind. For instance, why does Chicago have a cost of $90 a dry ton and yours is only $12 a dry ton?

Mr. LANG. Because they don't have the Atlantic Ocean. And Chicago was trying every technique—and I am sure they can tell you about this—they were trying oxidation, trying digestion, they were trying incineration, drying, filtration, all of these different techniques and they were creating a nuisance right where they were. And they sought to get land downstate, and the farmers say "You are not going to send your waste down to us." They had to make a contractual deal. So they have to handle, rehandle, dry, reship, put in special cars, and spray out and so on.

I run a very tight operation. I have a fleet of 50 oceangoing vessels, I like to use the big fast vessels on double headers, the same crew, big cargo capacity. I like to use the queen of our fleet, the *Newtown Creek*. It has variable pitch propellors, a yacht-like—I would be very pleased to take you out to sea on it.

Senator HOLLINGS. You make the garbage vehicles sound very attractive.

Mr. LANG. Sir, digested sludge is a very innocuous fluid. I don't know if I should take the committee's time to tell—a humorous anecdote, but the former chief of the Federal Water Quality Administration was Joe Moore, a Texan, former chief of the Texas water board. One day I persuaded him to come aboard our vessel, because of the controversy over Federal aid for the vessel, and it was a brisk morning, we came aboard, we had the flags flying on the *Newtown Creek*, and he says "This is a fine looking ship."

I said "Well, you have to see the cargo."

So I undogged a hatch on the deck and showed him the digested sludge.

He said "That doesn't look bad."

I said "You really have to see it." I dipped up a bucketful and rubbed it in my hands like this and said "Here is what it looks like."

He looked at it and turned to my staff man and said "That looks like good Texas crude." [Laughter.]

Someone nudged me and says "Marty, I think you just sold a sludge vessel."

Senator HOLLINGS. Thank you very much, Mr. Lang, for your appearance this morning.

(The following were submitted for the record:)

SUMMARY OF STATEMENT OF MARTIN LANG

I.—Recent public criticism of sludge dumping at sea has increased the need for thorough evaluation of this method and its alternatives for the vexing problem of sludge disposal for our coastal populations. Observations have shown no effect on adjacent beaches in the New York area. Other questions recently raised are heavy metals and the general effect on marine biota.

The alternatives are considerably more costly and at least an approach to a cost-benefit study should be made to evaluate the returns expected for the greater outlay before public policy moves away from sea dumping.

Long range rational policies must be established to avoid confusion.

II.—The City of New York not only endorses the concept of a broad regional 'total systems' approach to the management of an estuary, but has already funded, on its own, the initial phase of such a five-year study of the New York estuarine complex, extending well out into the New York Bight and up to the limit of the estuarine zone of the Hudson River. The gathering of hard data and the creation of mathematical models will set the basis for rational decisions, not only on offshore marine sludge disposal, but, even more importantly, on inshore degrees of treatment and locations of outfalls.

In viewing S. 307, Sec. 405, however laudable the intent, there appears to be created still another layer of administration to further complicate an already intricately involved jurisdictional morass. A plea is made for a single clear cut line of authority.

SLUDGE DISPOSAL IN NEW YORK CITY

(By M. M. Feldman, P.E., Commissioner, Department of Water Resources, New York City)

Sludge disposal is the solid waste problem resulting from liquid waste treatment and is subject to all the constraints that apply to solid waste processing and disposal in addition to the problems inherent in the high moisture content of sludge. We have heard much in the popular press on the solid waste problem with many proposed solutions, but the bulk of the problem remains. Lately, sludge disposal has come in for its share of public attention, but solutions are just as elusive.

It was natural in the history of waste water treatment for cities on tidewater to resort to ocean dumping of their sludge as most dependable and economical compared with elaborate, undependable and more expensive alternatives involving dewatering and incineration. New York City started ocean disposal in 1937, first by contract and then early in 1938 by the first of a line of tankers especially designed for the function. The Wards Island plant, the first involved in ocean dumping did not have digesters.

Some months after dumping started, in grounds 12 miles offshore designated by the harbor supervisor in about 80 feet of water previously used by other municipalities, a six day observation and test was run at 21 sampling points in and surrounding the grounds. Results indicated that outside of the immediate path of dumping there was virtually no discernible effect on B.O.D., D.O. or bacteria count even during the dumping operation. Within 13 hours after dumping no effect was discernible. D.O. was 9.5. B.O.D. 0.7 and total count about 10.

Turbidity was close to zero. Retesting in 1949 and 1950 confirmed these findings.

Quantities grew as new plants were added. All plants after Wards Island had digesters and their sludge output was thoroughly digested. Recent tests indicate that digestion reduces the BOD of the sludge by about 80%, a significant figure when considering its effect on the D.O. of overlying liquid.

Following are some annual quantities:

Year	Wet tons	Dry tons
1940	1,619,000	69,350
1950	1,754,000	68,921
1960	1,958,000	98,641
1969	1,989,000	87,400

During this period approximately five million wet tons were deposited on filled park land in New York City to create topsoil for golf course and general park use. Were more such land available, it would be an ideal method of disposal, involving true recycling.

Recent public criticism of ocean dumping has raised the question of its advisability. Unfortunately, much of this criticism has not considered the alternatives with their effects, nor has it considered the total environment of man on tidewater. The immediate aqueous environment is the estuary, and it is to protect the quality of the estuary that most tidewater plants are built. Overemphasis on the oceanic effects to the neglect of the immediate human environment might be called an unbalanced approach.

It is to be hoped that the recent reorganization of Federal agencies will improve the likelihood of a broad balanced approach.

There has been a dearth of modern unbiased study of the effect of effluents, treated and untreated on both estuary and continental shelf. New York City is sponsoring and starting a major comprehensive study of both in our vicinity. This is being done with the full realization that such a study will have no effect on the current massive treatment program of the City but will make more certain that decisions made a decade or two from now will have a greater factual basis than now exists for our programs.

The study will be multi-disciplined in the full sense of the word and input from oceanography must be fully integrated in the output. Unfortunately, much of the work of oceanographers has appeared as a sort of adversary procedure, pointing out difficulties and pressuring away from involving the ocean in the problems of mankind.

So far, the available studies and our information indicate that the dumping grounds have had no measurable effect on man's use of the coastline. Coliform counts at ocean beaches are very low, considerably lower than beaches in the estuary which are yet within our bathing standards. The estuary water is retained long enough to spend its BOD and coliform dieaway curve before exiting to the open sea. The writer is not aware of any report on the overall effect of the dumping on the New York Bight. Perhaps one will come out soon.

Thus, it can hardly be said that an emergency exists calling for peremptory action in either changing the dumping point or prohibiting dumping, which may lead to worse environmental results. Now is the time for thorough study and evaluation, with the setting of short and long range goals based on the findings, and always considering effects of alternatives rather than attempting to advance partisan attitudes with respect to air, water or land resources. It is all too easy to try to push ones problems onto someone else.

One area that might be investigated is the rate of assimilability of sludge on the shelf. It is possible that dispersed dumping may turn out to be acceptable. The productivity of the ocean seems to be nutrient limited. Nutrients that may produce damage in inland waters may significantly help in the ocean.

If a broad evaluation indicates that in the long run ocean disposal may have undesirable effects sufficient to warrant use of alternatives whether because of heavy metals, toxic materials or other reasons that may become apparent on further study, a massive demonstration effort must be mounted to develop the programs and hardware for other forms of disposal, be they on land, or by dewatering or oxidative processes, wet or dry followed by land disposal. Short of such an effort, I believe most knowledgeable people will agree that existing

alternates projected to future needs leave a chilling feeling with respect to dependability, economy and public acceptance.

Some alternates cost three to five times present costs, and justification for them must be made frequently in competition with the huge needs of the cities in other fields, environmental and non-environmental.

It may turn out that a viable long range program for community solid waste processing and disposal would be able to include its sludge, properly processed, within its scope. As was mentioned at the outset, sludge disposal is a solid waste problem.

At the Red Hook plant in New York City, now under design, consideration is being given to installation of equipment which would prepare the sludge for incineration in a very large adjacent municipal refuse incinerator, also under design. If such an installation is decided upon, it will be the first New York City plant not dependent on ocean disposal, and may be used as a process evaluation center, aided by the availability of huge furnaces almost within the same structure. Should a large rail haul refuse landfill program develop within the northeast corridor, as has been proposed, perhaps based on restoring strip mine areas, it would be an ideal project to incorporate sludge disposal on a test basis. Per capita output of sludge solids is considerably below other solid wastes.

So far as direct land disposal is concerned, it is extremely unlikely that public acceptance can be obtained for the dozens of square miles of land within reasonable haul required for such application, though undoubtedly some inland cities might favor this method if political acceptance could be obtained.

In summary, though much can be said against ocean disposal of sludge, it must be relied upon by major tidewater cities like New York until satisfactory alternatives can be developed and implemented. A long range policy must be established to avoid the confusion that results from frequent and unexpected changes of standards that can so easily lead to inaction while waiting for the next change.

Senator HOLLINGS. The committee will hear at this time from Mr. Norman Hume.

I might announce at this time that the Marine Protection Act of 1971, has not yet been introduced, nor referred to the committee. The details, of course, have not been studied by the witnesses.

So I am going to ask—and I know Mr. Lang will cooperate—if we submit any questions in writing on that act, that he give us his answers.

I am sure this will obtain with all of the witnesses relative to the Marine Protection Act of 1971.

Mr. Hume is a member of the State Water Resources Control Board of California.

We are delighted to have you come all of the way here to testify this morning.

STATEMENT OF NORMAN B. HUME, MEMBER, STATE WATER RESOURCES CONTROL BOARD, SACRAMENTO, CALIF.

Mr. HUME. Thank you, Mr. Chairman.

I am pleased to be here to represent the California State Water Resources Control Board and hope what I have to say may be of some help in your deliberations.

As the State and Federal Governments accelerate their respective water quality control programs, it is essential that there be no duplication of effort and that policy goals be developed to meet common objectives. The State-Federal standard setting has begun this process, and California's 32 interstate and coastal policies, which have already been approved will be amplified and included in 16 basin water quality control plans due to be completed this spring.

Our policies and plans must be designed to protect all of our water resources by eliminating present pollution loads and enhancing existing water quality conditions as soon as possible. Present pollution factors can be divided into categories including municipal and industrial waste discharges, waste sludges, dumping of containerized or other liquids and solids from vessels, and other water quality factors such as offshore oil drilling.

MUNICIPAL AND INDUSTRIAL WASTE DISCHARGES

These discharges occur principally within the State's waters, but some are made in offshore Federal waters, and, as with the other items listed below, must be subject to a coordinated approach with common objectives. Since pollution loads result from various uses man makes of the land, it is essential that the primary control agency or level of government be that which also exercises land use control, namely State and local governments. Federal efforts should, therefore, supplement the control functions of the States and intervene expeditiously only when States fail to do the job.

We are increasingly aware of the large numbers of new compounds that are contained in municipal wastes. These can be removed at the source or by high degrees of treatment. Treatment of waste disposed of to the ocean must be designed to deal with these special substances, including chlorinated hydrocarbons and mercury and not based on some arbitrary standards and the use of traditional technology.

WASTE SLUDGES

Because many compounds, including those I have mentioned, concentrate in the solid settleable matter contained in sewage, it is essential that solids be removed and not discharged to the ocean. California will achieve this through a staged elimination of such existing discharges.

DUMPING OF CONTAINERIZED AND OTHER LIQUIDS AND SOLIDS FROM VESSELS

Recently the San Francisco and San Diego regional boards—two of the nine regional boards under the California State Board's policy direction—have prohibited the dumping of barged liquid and solid wastes in areas subject to their jurisdiction. As a result of these prohibitions certain former major dischargers of waste into the ocean have instituted chemical reclamation programs or developed treatment systems. The State board is investigating similar statewide prohibitions and will act on this subject soon.

PESTICIDES AND HEAVY METALS

The State board just completed a 2-day hearing on the subject of pesticides in offshore waters, particularly those emanating from municipal sources. While California's major dischargers have made dramatic reductions in the amount of DDT that has been discharged to the environment, a large percentage of chlorinated hydrocarbons that

enter the ocean come from municipal sources. The results of this hearing are being reviewed, and we will be implementing further statewide restrictions in our urban areas to match those restrictions that are now being imposed by the Department of Agriculture which has reduced the use of DDT by 90 percent.

There is only one crop now uses DDT and that is cotton and that is in the central valleys of California.

The presence of heavy metals, such as mercury, is of great concern, but our preliminary findings have shown that they result primarily from runoff from areas with naturally occurring high mercury ores. Industrial discharges of mercury have been discontinued though residues may remain in some areas. We will be considering statewide restriction on discharge of mercury, chromium, and other heavy, toxic metals within the next few months. Most of the major sources of these elements have been restricted through individual regulation.

OFFSHORE OIL DRILLING

As we move to provide a comprehensive quality enhancement program, we are concerned about the reliability of offshore drilling operations. Obviously, we are as much interested in preventing oil spills in Federal waters as in State waters because the oil from offshore wells invariably spreads into State waters. In California's 3-mile ocean area, great care is taken in the selection of areas that are safe for drilling and in enforcing strong State and local regulations to prevent oil spills.

The California regional water quality control boards prescribe individual waste discharge requirements with respect to all anticipated discharges of waste from wells both within and without the 3-mile limit as is authorized by State law. The regional boards enjoy a high degree of cooperation for the prevention of possible pollution from all State and local agencies which directly regulate drilling in State areas. However, the local representative of the U.S. Geological Survey, the agency which administers Federal offshore leases, has refused to recognize the State's jurisdiction in this vital area of concern and has even advised potential polluters to disregard the State's authority.

We believe his conduct in this respect is wholly at variance with Federal policies as expressed in recent legislation and executive orders and that the authority of the States to prescribe protective regulations for drillers and operators of these wells should be confirmed.

CALIFORNIA JURISDICTION TO REGULATE DISCHARGES OF WASTE INTO THE OCEAN

Section 13260 of the California Water Code authorizes regional boards to regulate waste discharges into the ocean outside the 3-mile limit by a citizen, domiciliary or political agency or entity of the State that could affect the quality of the waters of the State. This State law rests upon the U.S. Supreme Court doctrine that a State may govern the conduct of its citizens upon the high seas with respect to matters in which the State has a legitimate interest and where there is no conflict with acts of Congress.

Comments printed in the California Assembly Journal on May 5, 1969, say concerning section 13260:

It is intended that the interpretation given to existing Section 13054 be continued to the effect that reports of discharges of waste to be filed with regional boards relate to discharges that 'could affect the quality of the waters of the state,' regardless of whether the discharge takes place inside or outside the boundaries of the state.

Section 13000 of the water code, which sets forth California's general policy, says among other things that—

The state must be prepared to exercise its full power and jurisdiction to protect the quality of waters in the state from degradation originating inside or outside the boundaries of the state.

The authority of the regional boards in this respect also extends to prohibiting any discharge of waste as a part of waste discharge requirements or in a water quality control plan.

The California Water Code says that the United States is subject to the provisions of the act "to the extent authorized by Federal law." The State attorney general has brought suit against both the commanding general of Fort Ord and U.S. Navy officials for polluting the State's waters, in one case by a sewer outfall at Fort Ord and in the other case by oil spills from a Navy ship.

Jurisdiction is based upon the taking of property without just compensation in violation of the fifth amendment of the Constitution, violations of the Federal Water Pollution Control Act and Federal water quality standards which were adopted by the State and approved by the Secretary of the Interior, and violations of Executive orders of the President of the United States which, in effect, direct Federal officials to cooperate and comply with State water pollution control laws. Neither of these cases has yet been decided although the State has won the first round in the Fort Ord case by successfully resisting the Government's motion to dismiss the complaint.

We believe we stand a very good chance of securing court injunctions prohibiting the dumping of wastes into the Pacific Ocean, either in or out of the State, to the extent such dumping affects water quality in the State and is contrary to water quality standards adopted by the State and approved by the Federal Government.

In conclusion, I want to emphasize that California has the authority, the determination, and the intention to stringently curtail and regulate waste discharges to the coastal environment. We also have the responsibility for the promotion of reclamation of water for reuse which will result as the program for reduction of ocean discharges is implemented. The Secretary of the Environmental Protection Agency recently stated in San Francisco that he recognizes California to have a vigorous water quality control program.

We have an excellent cooperative relationship with the Environmental Protection Agency officials in our area, and it has provided the basis for effective action which has ended pollution in San Diego Bay, Los Angeles Harbor, and is on the way to ending it in San Francisco Bay. We would recommend extending this cooperation to other Federal agencies which have authority in offshore waters. More than anything else, we need Federal support in terms of technical and financial assistance to carry out the programs I have outlined above.

With respect, Mr. Chairman, to your question a moment ago on the need for further research efforts that might be helpful on the matter of maintaining the quality of estuarine and ocean waters I have a few comments I could make here.

Senator HOLLINGS. I would appreciate it, yes, sir.

Mr. HUME. One of the things most important, I think, if we are going to remove wastes from the ocean and estuaries, we must find satisfactory alternatives on land.

The matter of finding adequate places for sludge disposal and methods to accomplish this, both effectively and economically, are of immediate concern. And I would suggest that that be given early consideration.

We are also interested in the matter of accumulating toxic substances in the water. Due to the accumulative effect of the biota of heavy metals, chlorinated hydrocarbons and various other exotic material, these substances should not be discharged to marine waters.

Source control appears necessary prior to their discharge into the environment. Source control process research is needed.

TOXICITY AND BIOSTIMULATION

The problem of toxicity and biostimulation is being studied currently in the San Francisco Bay-Delta area. This study endeavors to relate specific waste discharges to measured effects in the biological organisms in the estuary.

We need additional research to evaluate the effect of nutrient materials on the chemical, physical and biological environment of the ocean.

MARINE BIOLOGICAL MONITORING

A standardized biotic monitoring system for marine waters is needed to reduce monitoring costs and sample analysis time as well as to acquire productivity, standing crop data and to develop meaningful indices interpretable by non-biologists.

Research involving the development of an approach keyed on the monitoring of a biologic group such as the epifauna is needed to: (1) reduce sampling error, (2) reduce sample analyses costs, (3) acquire data from which can be determined meaningful toxicity and biostimulation information, (4) standardize monitoring, analytical and reporting procedures and, (5) identify specific environmentally harmful substances associated with discharge wastewaters.

THERMAL WASTE DISPOSAL

With the trend towards atomic power generation and the need to dissipate large amounts of waste heat the oceans are the prime site for location. However, the waste assimilative capacity of the oceans for thermal wastes is not known.

In order to protect the beneficial uses of the oceans from waste-heat we must know more about its capacity to dissipate heat to protect or enhance the life cycle of marine organisms. We need answers to questions relating to discharges with time, depth, location and biota.

Senator STEVENS. I am interested in this reference to the two Fed-

eral problems, one the geological survey and the other Fort Ord. I note to begin with that you mentioned the two principal areas that your board is proceeding with in California, San Francisco and San Diego. What happened to Los Angeles?

Mr. HUME. No, I mentioned Los Angeles Harbor, sir. Los Angeles Harbor has been recognized to have been improved 1,000 percent.

Senator STEVENS. But in your statement you said that the San Francisco and San Diego regional boards, two of the nine regions under your jurisdiction, have prohibited dumping of barge liquid and solid waste in the areas under their jurisdiction. What is Los Angeles doing?

Mr. HUME. The regional board has regulations in a similar manner and I think perhaps the reason—I didn't mention it—I was told orally the other day that one other discharger in that area was recently put under requirements. He must not discharge within a 3-mile area and he must discharge nothing beyond the 3-mile area that would have an adverse effect on the area within the California waters.

Senator STEVENS. Has Los Angeles got as stringent control as San Francisco and San Diego today? Have they exercised their control as a regional board over the Los Angeles area?

Mr. HUME. Yes, they have, sir. Some of the things that I spoke about today will be initiated by the regional board in Los Angeles as soon as we adopt further policies which I expect will happen within the next 2 months.

Senator STEVENS. We are familiar with the total actions as far as the Federal agencies are concerned and I am sure we cheer your goals, but tell us about the Fort Ord situation. Is California moving against the Federal Government first? Is that the idea?

Mr. HUME. Not at all, sir. The reason for moving against Fort Ord is because we moved against the cities on the other side of the Monterey Bay and they are now in the process of developing comprehensive plans and the study in its first phase has been completed.

Senator STEVENS. As I understand Monterey Bay, what you are trying to do is stop Fort Ord from discharging in the case of its outfall sewer, but the cities across the bay are being asked to plan to stop it.

Mr. HUME. No. The matter of Fort Ord there could best be taken care of by their joining the regional system which will encompass the other cities on the bay. And the President's Executive order requires Fort Ord to consider this also.

Senator STEVENS. My point is are you asking Fort Ord to do something you are not asking the cities on the bay to do?

Mr. HUME. Indeed not.

Senator STEVENS. Would a plan from Fort Ord to modify its system, showing a reasonable timetable, be acceptable to the State of California?

Mr. HUME. Yes. We have to be reasonable in all these matters.

Senator STEVENS. What about this geological survey matter you mentioned here as far as the action that has been taken by the geological survey officials? You say they have advised potential polluters to disregard the State's authority. How was that done?

Mr. HUME. Those rigs are outside of the State waters. But the matter of precautions in connection with oil spills, they could do nothing

but affect the State waters if it happened. And anticipating those kinds of problems, the recent Water Quality Act included the statement I read here with respect to outside waters. So one of the means of enforcement in such a case is set requirements on potential dischargers so that action can be taken under the law expeditiously. But they refused to comment on the requirements that we set with respect to the offshore rigs, on advice of the U.S.G.S. representative.

Senator STEVENS. Is this because they are outside of the State's jurisdiction?

Mr. HUME. Presumably, yes.

Senator STEVENS. Beyond the 3-mile limit?

Mr. HUME. They are beyond the 3-mile limit, yes, sir.

Senator STEVENS. And your regulations which you offered for comment pertained to precautions against oil spills?

Mr. HUME. Precautions and requirements that they not discharge oil which could be visible or which might get to the shore.

Senator STEVENS. Is this intentional discharging or accidental or both?

Mr. HUME. Either. I don't believe any discharging is intentional in the first instance. I think they are careful. But if they are not using the proper precautions, careful with the drilling operations, with respect to the kind and length of casing and so forth, we believe that they are running high risks then of the thing that happened with the large oil blowout at Santa Barbara.

Senator STEVENS. Are you familiar with Geological Survey regulations that exist now concerning prevention of pollution?

Mr. HUME. Personally I am not, sir. I have heard from our people who are in the enforcement of these regulations within the State that the State standards have been tougher on the requirements that the Federal. Whether they are at the present time—I think maybe the Federal standards have been changed.

Senator STEVENS. Yes, they have been changed substantially.

I just wondered. In Alaska we require the pipe to be anchored in bedrock. As I understand the old Geological Survey regulations they only required 200 feet below the ocean floor, but now they also require anchoring in bedrock or demonstration that there is no fault structure they are heading into. I just wondered whether this is something that happened in the past or whether it is something that has happened within the last 9 months.

Mr. HUME. You mean about their drilling regulations?

Senator STEVENS. Yes, about your regulations you asked them to comment on and they told them to disregard it; when did that happen?

Mr. HUME. Let me see. The correspondence in connection with that was dated May 27, 1970.

Senator STEVENS. I have only one other question. How are the Federal agencies complying with the Executive order that they should respect your State laws as far as the onshore plants are concerned? Is Fort Ord an example of failure or is there a general pattern of failure to comply?

Mr. HUME. No, I don't believe there is a general pattern because we have taken these matters up through the former FWQA and there are

liaison people with respect to that. In a couple of instances the matters have been taken up and courses have been pursued with respect to taking care of the problem. And have been done satisfactorily.

Senator STEVENS. Do you have any instances where California waters have been polluted by actions that arise in another State or another country? Are you expanding your jurisdiction up into Oregon or down into Mexico?

Mr. HUME. We have one river that flows from Oregon to California and the standards that have been set on that river have been in conjunction with discussions with our counterparts in Oregon.

Some years ago there was a problem with the matter of discharge from the city of Tijuana, near Imperial Beach, and San Diego instituted a comprehensive plan there which in part included Tijuana. San Diego City, in its metro system, has a connection to relieve some of the problems of Tijuana.

Senator STEVENS. What if you lose that Fort Ord lawsuit? Would you recommend that we consider legislation to make the state laws have prima facie if they are tougher than the Federal regulations?

Mr. HUME. Yes, I think we would. I think that is—we have given the rights to our cities and agencies to have a tougher regulation than the State provides and I think it should go one step up the administrative ladder further for the same purpose.

Senator STEVENS. You still have about 50 percent Federal land in California?

Mr. HUME. I have heard that figure, yes.

Senator STEVENS. Do you have any plans to use Federal lands for disposal of waste from the metropolitan areas?

Mr. HUME. We institute requirements. We are not an agency that acquires property. We define the goals for basin plans and we are in the process of doing that. If there are Federal lands that would help solve the problem I am sure the request would be made.

Senator STEVENS. Thank you.

Thank you, Mr. Chairman.

Senator HOLLINGS. Mr. Hume, on the California plans not to discharge solids into the ocean, you say you will achieve this, but when?

Mr. HUME. Well, it is a matter of making this a phaseout proposition. We would listen to the problems in connection with that and get those estimates from the designers of the facilities that would have to come into compliance and determine whether they are reasonable or not.

The matter of taking this up is a thing to come up officially shortly before our board, and at that time the basic plans that we have been working on and the Federal Government now requires would include those kinds of considerations within them.

Senator HOLLINGS. You have not projected any time schedule for it then?

Mr. HUME. No. We have not had hearings on what the problems would be in connection with that.

Senator HOLLINGS. Would you hazard a guess? I am just trying to find out when one State would be able to accomplish this, particularly an important State like California.

Mr. HUME. I would think that if the go-ahead were given now it would be at least 5 years before a major portion of it could be accomplished.

Senator HOLLINGS. But it could be accomplished in 5 years?

Mr. HUME. Well, that is going to depend on the money that might be forthcoming. These things are no easy accomplishments. For instance, one consideration might be on this to take sludge—I think of only one way it might be done practically—and pump it from the seaside areas into undeveloped lands even in some instances across the coastal mountains.

Senator HOLLINGS. You talked about cooperation in the Office of Water Quality of the Environmental Protection Agency. Do they actually provide or support you with dollars in any way for your research?

Mr. HUME. Yes, we received a grant of $700,000, a portion of which assists us on our research problems. In the matter of construction of treatment plans this year, this past fall the State of California passed a $250-million bond issue for the construction of plants and facilities. And that is to be a 5-year program which will represent 20 percent of the cost and the Government will put in the balance to make it 80 percent grant, if Congress provides the funding for the Federal program.

Senator STEVENS. You mentioned the mercury problem. We are quite concerned with that problem. Our seals have higher mercury contents in their livers than any other living organism, I understand. As I understand your statement, you find a lot of the mercury is natural runoff from deposits in the soil in California.

Mr. HUME. That is right. California is the second largest producer of mercury in the world.

Senator STEVENS. But this isn't natural runoff. This is a byproduct of production of mercury in California; is that right?

Mr. HUME. No; not entirely byproduct production. The byproducts production are subject to our control and we are now working on it. We have put requirements on operating mercury mines to achieve that kind of control. There was considerable mercury used in the extraction of gold in the 1800's in California. The runoff of that is locked in the sediments of the rivers and the matter of handling those sediments in proper dredging of course will be subject to our control also. But the mercury from commercial sources and industrial sources is a thing that is also subject to our control.

One of the first things that happened when it became apparent that mercury was a real problem of concern, the first indication of it in living organisms that came to our knowledge, action was taken immediately, and this was by some of the discharging agencies to reduce the use of mercury as a laundry disinfectant.

The Department of Agriculture, with respect to using mercury for fungicide on seeds, has cut back that use immediately when it was found that some pheasants had mercury in concentrations which were likely to be harmful to man.

Senator STEVENS. Do you have any studies that you can provide us with on the source of this mercury in California and the amount of it that is controllable?

I am sure your tuna people are as interested as my salmon people in this.

Mr. HUME. We have just completed a study on the manner of monitoring this to determine these things. It is very difficult to get a hold of this in a short time. We did first the matter of studying what the sources were and so forth. And there is some material on that which we would be happy to provide for you.

Senator STEVENS. Thank you very much. I would be happy to see it.

Senator HOLLINGS. Thank you very much, Mr. Hume. Unless you have something else to add we have to move on. We appreciate very much your appearance.

The committee will next hear from John D. Parkhurst from Los Angeles.

STATEMENT OF JOHN D. PARKHURST, CHIEF ENGINEER AND GENERAL MANAGER, COUNTY SANITATION DISTRICTS, LOS ANGELES COUNTY, LOS ANGELES, CALIF.

Mr. PARKHURST. Thank you, Mr. Chairman.

I would also introduce myself, if I may. I am a professional civil engineer with the experience in sanitary or environmental engineering. In addition to my work as the chief engineer and general manager of the county sanitation districts, I have had the opportunity, the pleasure, to work on a number of these studies, including the San Francisco Bay Delta study which was sponsored by the State of California. I was the chairman of the board of consultants on that particular study.

We are doing a major study in Hawaii now on the Island of Oahu and I am chairman of the board of advisors for this study.

These are the studies from which we try to learn some of the things which you heard Mr. Lang talking about this morning.

I have a prepared statement, Mr. Chairman, and I would then be glad to answer questions.

Senator HOLLINGS. You may proceed, sir.

Mr. PARKHURST. I wish to speak today on two topics presently before you, bill S. 307 and the proposed Marine Protection Act of 1971.

I would like to offer my support and endorse the policy as set forth in bill S. 307. I concur with both the content and substance of the bill.

I feel that the intent to foster oceanographic and environmental research and development is both commendable and urgently necessary.

I feel that the establishment of national laboratories (sec. 408) as a technical support group of the Environmental Protection Agency (EPA) to provide the capability for a better evaluation of pollution problems and to identify the steps necessary to eliminate them is absolutely necessary in order to permit rational, economic and direct solutions of current environmental problems.

It will initiate a viable cooperative effort under which scientists will be able to furnish quantitative guidelines to the engineers responsible for design and operation of treatment and disposal facilities.

It is also necessary to research and develop new techniques for monitoring both the acute and long-term effects on discharge of wastes

on the marine and fresh waters both near shore and in the world oceans.

This can best be accomplished by means of a coordinated national research program that has been heretofore virtually nonexistent.

Section 404 authorizes the Secretary of Commerce to initiate research and development programs to better understand and cope with the interaction of man's activities and the ocean's ecology.

Its intent is parallel to the findings and recommendations of the NAS–NAE report, "Waste Management Concepts for the Coastal Zone."

I might say that I was a member of the steering committee that prepared that report.

This includes the state of chemical and biological contamination, the effects on marine ecology, the prediction of possible future effects, and the fate of contaminants.

The information developed would be available to all government levels. Such a program would greatly augment similar work already underway in southern California.

Commencing in 1969 the southern California coastal water research project is being jointly sponsored by the cities of San Diego and Los Angeles, the Orange County Sanitation Districts, the Los Angeles County Sanitation Districts, and the county of Ventura.

These agencies which collectively discharge approximately 900 million gallons per day of municipal and industrial waste-water to the Pacific Ocean following varying degrees of treatment have budgeted for work costing in excess of $1 million for the first 3 years.

This project has received no financial support from either State or Federal levels. Section 411 which would provide moneys for assistance in research would be of major importance to such local agencies that already have undertaken such investigative effort.

Section 405 provides for coordination between EPA and National Oceanic and Atmospheric Administration (NOAA), the former as an enforcement arm, in the words of Mr. Ruckelshaus; the latter as technical staff and support.

In my opinion the rationale for enforcement can be more readily developed with the advent of technical expertise as promised in S. 307.

This scientific knowledge will also provide valid arguments to support local, State, and National funding to finance construction of the necessary treatment and disposal facilities. To date such arguments are disjointed, to say the least, and differ from expert to expert.

This work will also offer some assurance that public moneys spent for design and construction of facilities will be more wisely invested. Unfortunately, this has not always been true for many of the classical design concepts which have been used by engineers in the past and which will not suffice for the future.

I strongly concur in the need for international cooperation as suggested in section 413. In this regard reference is made to the International Association for Water Pollution Research.

This international association has been increasingly effective throughout the world and has held biennial conferences commencing in London in 1962; continuing in Tokyo in 1964; Munich in 1966; Prague, 1969; and San Francisco, 1970. The next conference is to be held in Israel in 1972.

Participants from approximately 50 countries at each of these conferences have utilized the opportunity to share and discuss research in progress in their respective countries and to promulgate solutions to water pollution problems.

I would now like to refer to the proposed Marine Protection Act of 1971.

It is my understanding that it is the intention of this act to implement the recommendations of the report of the Council on Environmental Quality released in 1970.

I strongly concur in the conclusion that there is a critical need for a national policy on ocean dumping. I am not in complete agreement, however, that "in most cases feasible and economic land-based disposal methods are available for waste currently being dumped in the ocean."

On Monday and Tuesday, March 1 and 2 of this week, here in Washington, D.C., the American Public Works Association held a "National Conference on Solid Waste Disposal Sites." Participants in the conference have generally agreed that while suitable landfill sites are available in most areas to dispose of solid waste over a period of at least 50 years, the need for acquisition and reservation of such sites at the earliest possible date is critical.

Other studies, including those conducted in Los Angeles County, indicate that while many of the chemical and industrial wastes contributing to water pollution may be safely deposited in selected landfill sites, some of the acutely toxic and other hazardous materials such as cyanides and auto-combustible wastes cannot be routinely accepted at sanitary landfill sites.

This does not mean that such materials cannot best be disposed of on land but simply that techniques for doing so have not been developed in most areas.

It is also apparent that there is a distinct connection between bill S. 307, and implementation of the Marine Protection Act of 1971.

Wastes which are currently being dumped at sea will very likely be discharged, at least initially, to the municipal sewerage system if such dumping is prohibited.

While constraints on industrial discharges will undoubtedly follow, the fact remains that only meager information exists with regard to what concentrations and which of the chemicals or toxicants have deleterious effects on the marine ecology and what processes can best be utilized to treat and/or remove such materials prior to discharge to the marine waters.

Although in many instances, even with the present state of knowledge deleterious effects have been observed, it is not only impractical but virtually impossible to completely cease discharge to the marine waters from coastal communities.

If harmful effects are to be minimized and hopefully eliminated it would appear necessary not only to identify the causative agents but also provide a practical method for their treatment and/or removal and ultimately a means of land disposal.

I wish to thank you, Mr. Chairman, for this opportunity to speak before your subcommittee.

Senator HOLLINGS. Now, this, Mr. Parkhurst, is getting right at the issue at hand. We don't want to legislate the impossible or the im-

practical. I believe you heard Mr. Lang this morning. He said that land disposal really costs nine times the cost of water disposal.

You are saying that we need more information about which chemicals or toxicants have deleterious effects. We need more research on the processes themselves. And then there is a shortage, you state, of land available for waste disposal.

Is that what you are saying?

Mr. PARKHURST. I believe so.

Senator HOLLINGS. Elaborate somewhat along this line. I am trying to get into dollar amounts, time amounts, and what should we legislate.

Suppose we pass the Marine Protection Act of 1971. Do we in a sense not only cause chaos, but really have an adverse effect, a counterproductive effect on the disposal of waste?

Mr. PARKHURST. First, I think I would like to offer that we experts, in parentheses, do not have all of the answers. We need to know or develop means, techniques, for assessing the effects of waste discharges on the marine environment. We have some bioassay techniques whereby we can put certain animals in a glass container and put in the type of water that particular animal would normally be in, add chemicals, toxicants, and try and develop a response and then try to relate that to what this particular organism might endure under operating conditions in the ocean or wherever.

And then we try to assess the particular animal's reactions to others, say, many thousands of different types of animals which may be under different stresses, under similar types of exposure.

So the technology for simply trying to measure, if you please, the concentrations and the types of materials that cause difficulties in the marine waters, this technology is just developing. The biological scientists and other scientists, the engineers, have been working on this.

We did some of this in the Bay Delta study in San Francisco. We got a few gross cuts at it, if you please, sir. In Hawaii we have done some further work on this. We are doing this in Los Angeles. We are doing this in most places where these studies are going on.

Likewise, it will not do any good, of course, as I mentioned, simply to prohibit dumping or discharge of these toxicants once they are identified, once they are removed from the waters, unless we have a place to put them. And we have to put them in a place where they are not going to cause additional damage to the, say, ground water supplies that may be existent in the area.

So we have a very closely related problem I think between removing the materials from one area and finding how to put them in another area without causing difficulty. And quite frankly we do not have the complete technology to remove all of these materials from the waste streams or the sludges, if you please, we do not have the technology to dewater these sludges to the extent that some of the regulations are now being offered and required.

This is some of the technology that will have to be developed before we can for instance take liquid sludge, which has a consistency of about 6 percent solids and reduce it to a material that can be readily incorporated into a sanitary land fill. Otherwise, of course, you are trying to transport millions of gallons of liquid sludge somewhere

Senator HOLLINGS. Therein comes into play the nationally coordinated research effort.

Mr. PARKHURST. Yes, sir!

Senator HOLLINGS. National research laboratories in section 408 which you support?

Mr. PARKHURST. Yes, sir!

Senator HOLLINGS. Suppose we pass this bill this afternoon and send it to you tomorrow morning to implement. How many laboratories, and how much in dollars and cents are you talking about? What do you think would be an appropriate coordinated national research laboratory effort?

Mr. PARKHURST. I have not addressed myself to that to the extent that I could answer that question I think with a great deal of reliability. Certainly you would want at least one of the four major areas of the country; I would say, Northeast, Southeast, Southwest, and probably Northwest, to look at the different areas.

Now, I would say that would be a minimum.

Senator HOLLINGS. None in Alaska? Very good testimony!

Mr. PARKHURST. But I would say at least we cut the pie to begin with in that manner. And then I think you should realize that the funding for these laboratories would have to be quite substantial.

Senator HOLLINGS. What is that? That is really my point. How much is involved?

Mr. PARKHURST. I think you would have to operate each laboratory at a level of several million dollars a year to be able to staff them and begin to develop this expertise that I mentioned.

Because running tests of this type is extremely expensive. One test in Los Angeles, a bioassay test, costs $100 to run one test over a 24-hour period.

Senator HOLLINGS. You had them in San Francisco. How much did that cost? Wouldn't a Federal laboratory assimilate that particular effort you made?

Mr. PARKHURST. We had a 3-year study, and that program was a first-phase type of program, it was grossly underfunded, if I may say so. We spent $3 million. We have a budget for the southern California coastal water project of a little over a billion dollars for the first 3 years, and we expect it to again be somewhat underfunded.

I would say that either one of these projects should have had at least three times, or used and efficiently used three times the amount of funds that were used during that period of time.

If we had that kind of money we would have been able to carry out a lot more of the bioassay techniques, and other work that should have been done to get a better grasp on some of the things for which we still don't have the answers.

Also, the level of personnel that would be required to do this type of work, the highest level scientific engineering personnel with training, experience, and so the staffing operation of this type of an effort is quite expensive and quite difficult to come by.

Senator HOLLINGS. And if you had four laboratories as a consequence, at a cost of $10 million each, would that be generally in line with an effective or efficient effort or could it be economized upon?

Mr. PARKHURST. I would say at least as a beginning effort, you could cut that in half.

Senator HOLLINGS. Have four laboratories at about a total cost of around $20 million, is that right?

Mr. PARKHURST. Yes, to begin. And then get a better grasp of the work. As this work develops you would have a better rationale for giving some better figures.

Senator HOLLINGS. I want to make as a part of the record at this time the southern California coastal water research project, a description of it and the other allied papers you submitted here. We will put them in at the end of the hearing.[1]

Neither State nor Federal funds are employed there.

Mr. PARKHURST. That is correct. I might say it is not because they have not been applied for, they just have not been received.

Senator STEVENS. Could I ask a question?

Senator HOLLINGS. Yes.

Senator STEVENS. Mr. Hume mentioned $700,000. None of that trickled down to you?

Mr. PARKHURST. I don't know what he was referring to.

Senator HOLLINGS. He was talking of the Office of Water Quality of the Environmental Protection Agency, and said that they had that much assistance, but not for that particular project.

Mr. PARKHURST. No; that is correct.

Senator STEVENS. What are the energy requirements of this waste disposal concept we are getting into? Are there greater energy requirements for waste disposal of solids on land than there are at sea?

Mr. PARKHURST. Yes; the answer is very definitely, "yes." I can't give you a definite factor. But I would say this, that if you disposed of sewage solids, or the materials that would be dumped in the ocean on land, you would have two choices.

One, you have to dewater through some rather sophisticated means, which still needs development, on which we are doing a lot of research to try to develop an efficient way of taking 6-percent solids and increasing that to 90-percent solids. That will take energy, substantial amounts of energy, in evaporation, dehydration, possibly centrifuging.

The other way, if you pump it somewhere inland, 25 to 100 miles, you have to consider the pumping systems that would be required to do this—of course, once you get it there, you still have a problem of disposal. What that might be depends on where you take it.

We have areas in California such as the Mojave Desert where you could get 2,000 or 3,000 acres and put substantial quantities of this material on the land. But I would point out to you gentlemen that the materials that have to be removed, at least in my opinion have to be removed before you can safely discharge the treated waste waters to the ocean, are the same materials that would have the toxic effects if you tried to grow certain crops and so forth in it.

Probably you are looking at incorporation of this chemical waste, toxicants, into some land fill as a burial process. Now, you can make a combination, possibly, make a separation, because they have certain organic solids that do have a certain humus value, they have nitrogen contents that can be used for fertilizer.

But we have both of these, we have the residue that is probably

[1] See p. 310 for the material referred to.

causing the problems in the ocean, the organic problems are probably not so severe as the chemical problems.

Senator STEVENS. Do you have any idea how much energy you use under the present system of disposal?

Mr. PARKHURST. Actually, both systems in Los Angeles, and there are two systems, one operated by the city of Los Angeles, one by the county sanitation districts, these are both major systems, they are using the organic solids as a source of energy by decomposing them in the anaerobic digesters and producing a methane gas which is used to operate the engines, manufacture the electricity, to run the pumps.

So in terms of B.t.u.'s, I couldn't tell you offhand. But it is pretty well self-contained at the present time.

Senator STEVENS. There would have to be a great influx of energy if you were going to use land disposal.

Mr. PARKHURST. Yes, if you either dewater or pump inland, you would have to add substantially a means of power or heat to accomplish land disposal.

Senator STEVENS. Mr. Chairman, Alaska is going to be involved in some way, that is in respect to where the energy is coming from. The $20 million you are talking about is just research. You are not talking about capital plants there, are you?

Mr. PARKHURST. No, sir; I am talking about research, learning how to do it.

Senator HOLLINGS. That is not bricks and mortar for a facility.

Mr. PARKHURST. No bricks and mortar, sir. Scientific service, developing of techniques, monitoring capabilities, and then we find out what it costs.

Senator HOLLINGS. Ship operation, too?

Mr. PARKHURST. Yes; that is just a laboratory type of procedure.

Senator STEVENS. You mentioned four basic areas. Wouldn't you include the Great Lakes as a basic area also?

Mr. PARKHURST. Perhaps, if you wanted to include a fresh water facility there, it would be the fifth. I would say you certainly want, at least initially, you would want to staff up, to look at the problems and see where you go from there.

Because it is very, very difficult to crystal ball these things that far in advance.

Senator STEVENS. The chairman and I were mentioning what the possibility is that you could recycle some of the brains of these scientific people who are being displaced from various defense agencies and other agencies that are going out of business, and use some of those scientists here.

Is the retraining period too long before those people could come into this antipollution program?

Mr. PARKHURST. No, sir; I don't believe the period would be too long. Certainly I would subscribe to the statement that a retraining period would be necessary. I think there are many, many capable people that

could contribute to this kind of a program. I think, however, limited as it might be, we have personnel to get the program underway.

What we need is the initiative and funding to get going. Certainly the others will be brought in. But the nucleus of scientific people who can do this type of work are available right now, as Mr. Lang mentioned to you this morning, this work is already being done at certain levels.

We have to develop a lot more expertise. Even the people from the universities who have been pure researchers and those applied researchers, take a while to become indoctrinated into a program of this type. But they can be readily used. We have a great source of graduate students that have completed their education in the past several years and as you mentioned we do have a certain number of the high level Ph. D. people who have worked on the aerospace programs that could be, I think, over a period of time, indoctrinated into this kind of a program.

I think it would be a mistake to say they can simply move in, take over, put a man on the moon, environmentally speaking. This would be I think an oversimplification. But they can be beneficially used over a period of time I think.

Senator STEVENS. Could the laboratory program be used as a portion of the retraining concept in your opinion?

Mr. PARKHURST. Well, I think you are talking about two different things. I would hate to confuse them. I think if you are going to get the maximum efficiency out of the laboratory program, you don't want to spend all of your time trying to train certain people. Although you might work one in, if you didn't try to get the production out of the training program.

Senator HOLLINGS. Looking at section 411, which you testified in support of, which would provide for fundamental scientific, technological, and social research related to the environment and pollution, what would be a well-rounded research assistance program for the several States and communities in your judgment?

Talking again generally of dollars and cents.

Mr. PARKHURST. I think it would be an escalating type of program. I think that very few of these studies are currently underway. I mentioned one in San Francisco Bay Delta, I mentioned one underway in Hawaii that will be completed in another 10 or 12 months.

Mr. Lang spoke this morning of one which was being contemplated in New York and they completed one in Jamaica Bay. But I think if this type of program were available and research assistance were available to the local agencies, that you would see the local agencies respond first by accepting the responsibility, and seeing that they could contribute their share of some funds to get underway, because I think most of the areas recognize that they have a need for this type of work.

The only problem is they have not had the money or the technical expertise to do it. I think to begin with, almost any level of funding,

if you started off at $50 or $100 million a year to go to local assistance to agencies that you would see this produce a tremendous amount of good throughout the country.

Because as I mentioned, Hawaii is doing the same thing, they are funding their whole program and they have had to limit it to a little under a million dollars, because they didn't have the money.

However, if other areas had funds available, not only would they use it, but the areas that have already commenced operations, like southern California, Hawaii, San Francisco Bay, will use it to develop much needed additional information in order to come up with a final answer.

We are a long ways from developing the final systems to accomplish what all of our people feel they would like to have. And that is the excellent quality of water that we hear so much about. We are not that close yet.

Mr. MILLER. Mr. Parkhurst, I want to call your attention to the tables in the back of the NAS–NAE coastal wastes management report, in chapter 7, table 12, Priorities and Estimated Initial Minimum Effort for Research and Investigation Needed for Improving Waste Discharge and Receiving Water Monitoring Programs, tables 13, 14, and 15. Each has in it an estimated minimum total effort in man-years for the various elements of research that ought to be conducted.

As to these man-year efforts, do these tables represent the effort needed on a national scale or would this be a table that would be applicable to the amount of effort needed, say, for the Los Angeles County sanitary districts?

Mr. PARKHURST. This was intended as a minimum effort on a national scale.

Mr. MILLER. On a national scale?

Mr. PARKHURST. We were trying to sow a seed here, not indicating that this is what we would like to see, but this would be the absolute minimum we felt.

Mr. MILLER. So if we extrapolated from this total minimum effort that the Academies have recommended, we could come up with a reasonable dollar figure?

Mr. PARKHURST. Yes, I think that would be a pretty good approach and the basis is here for it. However, I would say of the scientists that met and worked out this report, in a week long work session, there was not unanimous agreement on this being the minimum effort necessary. It was a consensus that we more or less agreed upon, but certainly many of the scientists felt this would be well below the minimum effort that must be undertaken.

But at least it is a beginning. We are not now making this kind of effort obviously.

Mr. MILLER. Are we talking about a continuing research program? When you are talking about the research here that is needed, are you talking about a continuing research program of monitoring and surveillance, or are you talking about a one-shot type of research?

Mr. PARKHURST. I am very definitely talking about a continuing program. Because certainly, if I may justify that, the materials that are being received from industry, from society, into the receiving waters, are changing every day, with new developments, new types of materials being discharged.

And also I am sure that we are not going to see an automatic breakthrough, a clear blue sky come out in front, with all of the problems having been solved. This will be a continuing effort over many many years. And the harder we work at it, the better job we are going to do.

But we are not going to solve all of these problems overnight. In fact, in 10 or 20 years, if we make substantial progress, this will be fine. But we are not going to do it overnight, because once we have developed the technology that is necessary, then we have to build many facilities that we don't have. Also, the treatment processes, things like this, which have not at this point been developed or the plants must be constructed to utilize them.

Senator HOLLINGS. I want to include at this point in the record tables 12, 13, 14, and 15 in chapter 7 of "Waste Management Concepts for the Coastal Zone" by the National Academies of Sciences and Engineering.

(The tables follow:)

TABLE 12.—PRIORITIES AND ESTIMATED INITIAL MINIMUM EFFORT FOR RESEARCH AND INVESTIGATION NEEDED FOR IMPROVING WASTE DISCHARGE AND RECEIVING-WATER MONITORING PROGRAMS [1]

Research required to implement the Monitoring program	Research concerned with: Waste discharge	Research concerned with: Receiving waters	Estimated minimum total effort [2] (man-years)	Priority	Completion time
Uniform sampling procedures:					
Relative to mass emission rates, receiving waters, data processing	×	×	11	A	[3]
Floatable matter:					
Method of quantitation	×	×	11	A	[3]
Films:					
Method of quantitation		×	11	A	[3]
Persistent pesticides:					
Review method of determination	×	×	11	B	[3]
Persistent organics:					
Method of determination, quantitation	×	×	13	B	[3]
Gross heavy metals:					
Method of quantitation	×	----------	7	B	[3]
Gross acute toxicity:					
Method of quantitation	×	----------	7	A	[3]
Biostimulants:					
Methods and interpretation	×	----------	34	A	[4]
Biomass: [5]					
Method and quantitative description	×	×	27	A	[4]
Community structure—productivity: [5]					
Methods for long-term effects		×	50	B	[4]
Trade metals (sediments): [5]					
Method		×	11	C	[3]
Specific organics: [5]					
Method of quantitation—trade concentration	×	×	13	C	[3]
Significant discharge:					
Definition of	×	×	4	A	[3]

[1] The recommended monitoring program itself is not included.
[2] Total effort for this program area is 210 man-years.
[3] Short term (less than 5 years).
[4] Long term (less than 10 years).
[5] These projects must be examined in detail for compatibility with projects recommended under chemical factors and biological effects.

TABLE 13.—PRIORITIES AND ESTIMATED INITIAL MINIMUM EFFORT FOR RESEARCH AND INVESTIGATION IN PHYSICAL PROCESSES AND INTERACTIONS

Recommended research and investigation	Estimated minimum total effort [1] (man-years)	Priority	Completion time
Initial dilution and diffuser design	37		
Buoyant jet diffusion		B	[2]
Waste fields		B	[2]
Barge dumping of sludge		A	[2]
Thermal waste		B	[2]
Flow patterns		A	[3]
Physical processes in estuaries	185		[3]
Quantitative predictive models		A	[3]
Hydrodynamics		B	[3]
Estuary transitions		A	[2]
Biological and chemical processes		A	[3]
Turbulence processes		A	[2]
Turbulent (eddy) flux studies	72		
Observational studies		A	[2]
Predictive models		A	[2]
Subsurface tracer experiments		B	[2]
Physical processes in coastal areas	360		
Data collection		A	[3]
Intermediate-scale current patterns		A	[2]
Large-scale exchange processes		B	[2]
Decay of nonconservative constituents as related to physical factors	20	A	[2]
Interactions between floatable and settleable components of wastes and physical factors	46		
Character of floatables		A	[2]
Mechanisms of transport		B	[2]
Reduction of surface concentration		B	[2]
Case studies		A	[3]

[1] Total effort for this program area is 720 man-years.
[2] Short term (less than 5 years).
[3] Long term (less than 10 years).

TABLE 14.—PRIORITIES AND ESTIMATED INITIAL MINIMUM EFFORT FOR RESEARCH AND INVESTIGATION NEEDED IN CHEMICAL FACTORS

Recommended areas of research and investigation	Estimated minimum total effort [1] (man-years)	Priority	Completion time
Trace metals	50	A	[2]
Complexing	22	B	[2]
Inorganic aggregation	22	B	[2]
Organic aggregation	17	B	[2]
Diagenesis	13	B	[3]
Distinguish organic against inorganic	5	C	[2]
Nutrient fluxes	22	C	[2]
Organic matter distribution	13	B	[3]
Phytoplankton blooms	42	A	[2]
Anoxic conditions	17	B	[2]
Biochemical concentration	17	B	[3]
Sublethal effects	34	A	[3]
Oil spillage	134	A	[2]
Synthetic organics	17	A	[3]
Human physical activities	25	C	[3]

[1] Total effort for this program area is 450 man-years.
[2] Short term (less than 5 years).
[3] Long term (less than 10 years).

These recommendations, listed as specific projects, are indicative of broad areas of investigation, within which re-emphasis may be desirable in the future.

PROGRAM AREA OF BIOLOGICAL EFFECTS

Priorities and estimated minimum effort for project areas of research and investigation on biological effects are summarized in table 15.

TABLE 15.—PRIORITIES AND ESTIMATED INITIAL MINIMUM EFFORT FOR RESEARCH AND INVESTIGATION IN BIOLOGICAL EFFECTS

Recommended research and investigation	Estimated minimum total effort (man-years) [1]	Priority	Completion time
1. Intensive study of outfall areas and effects	620	A	[2]
2. Public health significance of wastes	25	B	[3]
3. Study of biological concentration mechanisms	40	B	[3]
4. Management of DDT		B	[3]
5. The structure and dynamics of coastal biological communities	370	A	[2]
6. Defining tolerable limits for each major use	190	A	[3]
7. Improvement of systems and models	35	B	[3]
8. Criteria for review of proposals for ecological study requirements		A	[2]
9. Evaluation of new waste products		B	[2]

[1] Total effort for this program area is 1,280 man-years.
[2] Long term (less than 10 years).
[3] Short term (less than 5 years).

Senator HOLLINGS. One final question about the estuarine sanctuaries, these field laboratories, and the assistance being made available to the various States under section 410. What are we talking about in your judgment in dollars and cents there?

Mr. PARKHURST. Again I think that this is a very, very difficult question to answer, but certainly the level of activity I think is the same. I think we are talking about the same classification of personnel, the same sophisticated processes, evaluations of toxicants' effects the development of procedures for monitoring effects.

We don't even have procedures to monitor the effects on the environment. We take a few analyses and try to relate what effects these would have on the other animals in the environment. We need to do a lot of work. So I would say that certainly the level of funding for this would be, I would think, a laboratory of about the same scope as we were previously talking about.

Senator HOLLINGS. And then we would be only limited to how far Congress though it wanted to go in the various coastal areas and the Great Lakes.

Mr. PARKHURST. Yes. Certainly we need to make a start on this. We have some limited university work being done. But relatively little elsewhere.

Senator STEVENS. I wonder if you have thought at all about how the sea grant program might be utilized to dovetail with this. Are we going to be duplicating that program if we go into this?

Mr. PARKHURST. I am familiar with the sea grant program, particularly with the work in Hawaii, and we have tied that in through the university and much of the work that has initially been identified as needed to be done by the current study will be followed on by research projects under the sea grant program at the university.

I think that there will be no conflict whatsoever. I think that there has been a fine relationship developed by those working on the different programs. And as of now, it is about the only opportunity to follow on some work in the Hawaiian areas through these sea grants that have been developed.

Senator HOLLINGS. But rather than conflict, is there duplication? That is what the Senator was wondering.

Mr. PARKHURST. I don't think there is duplication. But I think there is a very limited amount of work now underway in the sea grant program.

Senator HOLLINGS. This would merely be an extension then of the sea grant research effort?

Mr. PARKHURST. No, it would be not an extension, but it would be a much broader look than what is being done in the sea grant program. The areas we are talking about needing attention are substantially greater than is being looked at in the sea grant program.

Senator STEVENS. It is a complementary rather than an overlapping program.

Mr. PARKHURST. I see no conflict whatsoever.

Senator STEVENS. Thank you.

Senator HOLLINGS. Thank you very much, Mr. Parkhurst.

We appreciate your testimony this morning. We will now hear from Mr. Porges.

We welcome you here, Mr. Porges.

You may proceed, sir.

STATEMENT OF RALPH PORGES, HEAD, WATER QUALITY BRANCH, DELAWARE RIVER BASIN COMMISSION, TRENTON, N.J.

Mr. PORGES. Thank you, Mr. Chairman and Senators.

I would like to present my statement and then follow that with some comments.

Throughout the eons of time, oceans have been the ultimate receptacles of the discharges from the myriads of rivers that wash the continents of the world and of the precipitation which washes the atmosphere. This process is continuous and inevitable. The major rivers form the cloacae that void to the seas the drained wastes from all the lands. This process is worldwide, is occurring now, and will continue until the end of time.

The amount of material both organic and inorganic being carried by our rivers to the seas defies human appreciation; yet we know that the deltas of our rivers, for example, the classical ones at the mouths of the Mississippi and Amazon Rivers have been built up by these enormous quantities of debris. What is swept into the seas can only be guessed at.

Superimposed upon this unending history are the municipal and industrial wastes, radioactive materials, and exotics resulting from the tremendous strides in current technology. Here we are faced with new problems brought about by the discharge of these materials into the Nation's rivers, estuaries, and coastal waters. Some of the materials degrade readily while other substances are only slowly subjected to the natural breakdown by chemical and biological forces. In addition,

there is an enormous range of toxic substances discharged into our natural waters.

This statement reflects the opinion of the author and does not necessarily represent the position of the Delaware River Basin Commission. I am speaking as a private citizen and not as a representative of the commission.

PRESENT CONDITIONS

A recitation of the specific substances dumped would merely be repetitious of reports already encompassing this subject. Attached is a table from a report in Industrial Water Engineering which sets forth this material both in its annual tonnage and the cost for this type of waste handling. In 1968, over 48 million tons of dredging spoils, industrial wates, refuse, sludge construction and demolition debris, and explosives were disposed of in marine waters at a cost of approximately $30 million.

DISCUSSION

It becomes incumbent upon us to evaluate possible damages and even benefits of the present practices as it relates to ocean disposal. First, the sediment that is brought to the seas by the flowing streams must be considered primarily a natural event. Improper land management contributes to the natural sediment load. As such, it brings about the buildup of wetlands along the coastal areas and contributes to the natural balance of the tidal biota. The organic matter, supplemented by nutrients and trace elements, washed to the sea do much to support the ocean fishery. In fact, it is in the estuary and tidal exchange reaches which forms the nursery for much of our vital deep sea fishery.

The second aspect is discharge of the more exotic substances. The question may be raised now, "What is the effect of man-made discharges such as sewage sludges, industrial wastes, toxic substances, and other materials?" Dredging spoils have been disposed of by filling in valuable estuary lowlands or by transport to sea. Much of these materials are inorganic. Sewage sludges consist generally of an inorganic fraction and considerable amount of organic material. It is similar to that material normally discharged by rivers, except in a somewhat more concentrated form. Where this material is dumped, it is logical to expect a small zone to be influenced by the characteristics of the waste. The overall effect, however, could well be beneficial, because the organic material ultimately will stimulate the biological growths which form the food chains for the natural growth of fish and other aquatic life.

Next to sewage sludges and exceeding this in volume are industrial wastes. Several dumping sites along the east coast are specified for this type of material. Studies and reports on the effects of this particular material seems to indicate that there may be no significant degradation brought about by this material beyond a mixing zone. This does not mean that the practice of dumping industrial components is the proper way to handle this material as will be discussed later.

Toxic materials in dangerous doses should not be dumped. Yet, toxic materials remain so only if their concentrations are high. Virtually, all toxic materials, if diluted sufficiently, become innocuous or perhaps even beneficial, particularly some of the trace elements. Therefore, discharges of these materials must be so that they are kept within

reasonable bounds or they should be prohibited in certain concentrations.

Radioactive substances have, in the past, also been consigned to the depths of the ocean. Generally these are placed in containers or incorporated into a substance such as concrete so that their containment is relatively complete and any release will take place over a period of time when presumably their half life has passed and the materials are innocuous.

EVALUATION OF ALTERNATES

Fundamentally, the problem before us is the evaluation of the present disposal practices versus various possible alternates and their relative effects upon the health and welfare of the human population. There are several considerations that must be given to proper disposal of waste materials. The most important consideration is the prevention of the waste in the first place. It is here that our utmost effort must be devoted so as to reduce or to eliminate the problem before it occurs. This can be done with many of the industrial wastes such as the acid discharges and the dumping of various metallic compounds. In essence, dumping of these materials could be looked upon as a wasting of our natural resources.

In the case of sewage sludges, the alternatives to ocean disposal are to land or to the air. Sewage sludges in the wet or dried state can be applied to land either by burial or for soil improvement utilizing the humus and fertilizing value of the sludges. Even in these instances we must face the fact that this material can be washed into our streams and thus ultimately reach the ocean. This is especially true with nutrients such as the nitrates and phosphates. Another factor related to land application is contamination of our ground waters and this is a real problem where some of the ground water resources in Long Island and New Jersey have already shown signs of bacterial and chemical pollution. In addition, the material is produced in greatest volume in the most densely populated parts of the country where its use as fill material or as organic fertilizers for farmlands is not practical. Reclaiming these sludges and distributing them to suitable places for land application becomes an expensive procedure. This by no means implies that wherever this procedure becomes practical, it should not be vigorously pursued.

Another alternate is to burn the sludge produced by sewage plants. Here again the residual from burning the ash must still be placed upon land for ultimate disposal with the probability that the nutrient elements will ultimately reach our streams. Even that material going up the smoke stack into the air will be washed out by subsequent rainfall and again ultimately to reach the oceans.

There remains, of course, intelligently planned, ocean disposal. Here we have in mind that the waste be adequately prepared and handled for satisfactory discharge. It may be treated, digested if necessary to reduce the organic content, and then conveyed by a proper means to a specific location and relegated to the ocean depths where it does the minimum of harm. It should be monitored to assure compliance. This implies that the waste be carried sufficiently offshore and dumped to such a depth to the so-called dead areas that

it will not interfere with beneficial biological growth in the sea. It should be placed where it cannot be brought back to the coastal areas by upwelling from the ocean depths.

One of the great needs is extensive research so as to permit intelligent handling of the waste problem without appreciable damage to the environment and yet utilize fully our natural resources.

SUMMARY AND CONCLUSIONS

To briefly recapitulate, we might think of the ocean as the ultimate sink of all wastes emanating from the world continents. In truth, virtually all roads lead to the ocean. The most promising approach is salvage and reuse of all possible usable material prior to dumping. Conservation must be unrelentingly pursued. In this way, the discharge of some waste materials may be eliminated and others kept to a minimum. It is inevitable that organic materials of low level be discharged to the sea. The alternate to ocean disposal is to land or to air.

Land application must ultimately be limited because of the lack of space and suitable dumping areas. However, even this method does not eliminate many of the constituents from ultimately reaching the ocean. In addition, it raises the possibility of ground water contamination. The other alternate is incineration with voiding of much of the material to the air. Here again, subsequent rainfall will sweep this material to the flowing water courses so that much of the inorganic material will again reach the oceans. In addition, the ash residual from incineration must again be placed on the land with subsequent possibility of the material ultimately reaching the ocean.

RECOMMENDATIONS

The following recommendations are made:

(*a*) Federal law be enacted regarding responsibility for offshore disposal.

(*b*) The permit system that has been recommended by the President be implemented so as to control the amount of material discharged, the conveyance method, and the ultimate disposal sites.

(*c*) Precipitous action to prohibit ocean disposal not to be taken so as not to delay a rational logical solution to the problem.

(*d*) A location be assigned beyond the Continental Shelf for temporary disposal pending study and evaluation of all of the alternates.

(*e*) Maximum conservation be practiced so as to conserve to the utmost natural resource material as metals, acid, et cetera.

(*f*) An extensive research program be undertaken to evaluate the effects, both good and bad, on ocean disposal of organic wastes.

(*g*) Land requirements versus ocean requirements for disposal of organic wastes be evaluated.

(*h*) Reclaim for reuse all toxic materials possible, and restrict the discharge of residual toxic materials to amounts disposable by the dilution available at the disposal site.

(*i*) An international conference be set up for the development of a mutual, worldwide, control mechanism for ocean disposal.

(The table follows:)

ESTIMATED MARINE DISPOSAL COSTS FOR 1968

Type of waste	Pacific coast		Atlantic coast		Gulf coast		Total		Percent of total	
	Annual tonnage	Estimated cost	Annual tonnage	Estimated cost	Annual tonnage	Estimated cost	Annual tonnage	Estimated cost	Tonnage	Cost
Dredging spoils	7,320,000	$3,175,000	[1] 15,808,000	$8,608,000	15,300,000	$3,800,000	38,428,000	$15,583,000	80	53
Industrial:										
Wastes	981,000	991,000	3,011,000	5,406,000	690,000	1,592,000	4,682,000	7,989,000	10	27
Containerized	300	16,000	2,200	17,000	6,000	171,000	8,500	204,000	<1	1
Refuse [2]	26,000	392,000					26,000	392,000	<1	<1
Sludge [3]			4,477,000	4,433,000			4,477,000	4,433,000	9	15
Miscellaneous	200	3,000					200	3,000	<1	<1
Construction and demolition debris			574,000	430,000			574,000	430,000	1	2
Explosives			15,200	235,000			15,200	235,000	1	<1
Total wastes [4]	8,327,500	4,577,000	23,887,400	19,129,000	15,996,000	5,563,000	48,210,900	29,269,000	100	100

[1] Includes 200 000 tons of fly ash.
[2] At San Diego 4,700 tons vessel garbage at $280,000 per year were discontinued in November 1968.
[3] Tonnage on wet basis. Assuming average 4.5-percent dry solids, this amounts to approximately 200,000 tons dry solids per year being barged to sea.
[4] Radioactive wastes omitted because sea disposal operations were terminated in 1967.

Source: Smith, David D., and Brown, Robert P., "Deep-Sea Disposal of Liquid and Solid Wastes," industrial Water Engineering (September 1970).

Mr. PORGES. I would like to make a few other comments in response to your letter in which you invited comments concerning ocean research concerning pollutants and the problems of local government in waste management.

I feel that one of the main areas requiring extensive research is resource conservation. Whatever I consider or view the discharge of acid wastes or any of the metals that are being discharged, I think this is a loss of resources to this country. I also realize that these materials are dilute, but here is an area for extensive research for reclamation and reuse.

Another area of extreme importance to us, of course, is the estuaries which form the nursing area for much of the Atlantic or the deep ocean fishery. In addition, it is the coastal areas that produce much of the aquatic life in our oceans, and are worthy of extreme protection. Much more research is needed to establish and prove the interplay of these areas with the oceans.

The next area of concern would be an establishment of the possible uses of the ocean depths, how much they should be protected, and to ascertain if these form reasonable places for the disposal and discharge of waste materials.

Now this matter of the impact of the proposed ban on discharges of sludge to sea on local communities, I support Mr. Lang of New York, who indicated that it might take some possibly 20 years to develop alternate methods.

I look at waste control in a community in about 20- to 25-year cycles. For example, if a community were to embark upon a waste treatment program—by this I mean the construction of a new or improved sewage treatment facility—it must provide the engineering study, preliminary plans, financial plans, it must secure financing, and generally the bonds are for 20 or 25 years.

The design of the plant must be, any good engineer would design for 20 to 25 years. After the completion of the financing and the engineering, the construction takes place, depending upon the size of the community, from 1 to 5 years for building the plant, and then the plant probably is operated that way with some minor improvements for 10 or 15 years before they consider rebuilding or major expansion.

So you have about a 20- or 25-year cycle.

So what Mr. Lang mentioned as possible changes in this program might take 15 to 20 years.

I would like to stop now and answer any questions you may have.

Senator STEVENS (presiding). What do you think about the estimate of the amount needed for a program of this type, including four basic area laboratories, at $20 million a year to operate? Is that within the range of reason?

Mr. PORGES. What was that sum again?

Senator STEVENS. $20 million was the estimate that was given for the annual scientific operation of such a laboratory program.

Mr. PORGES. That is for operation only?

Senator STEVENS. I understand it wasn't for capital cost. It was for research alone, the scientific aspect of it.

Mr. PORGES. I would think those would be minimal costs.

Senator STEVENS. What is your Delaware commission spending now?

Mr. PORGES. For what, sir?

Senator STEVENS. Research, in terms of the total problem involved in this bill.

Mr. PORGES. The Delaware commission does not have responsibility for ocean disposal. We do not operate outside of the estuarine area and the streams.

Senator STEVENS. I see.

Your testimony seems to suggest there is a great probability that just having an ocean disposal authority and a bill that pertains to that aspect would not be sufficient. You would imply that if we are going to use land disposal, that eventually the contaminants are going to reach the ocean anyway, and there ought to be a coordinated land and ocean disposal system; is that correct?

Mr. PORGES. Very definitely; yes. In fact I would even expand it to say it should go into this conservation of materials. I think this is where the largest effort should be made, so we don't have the waste to start with. I am talking primarily of the industrial portion; municipal wastes, we will always have the same amounts probably, on a unit basis.

Senator STEVENS. Thank you.

Do you have any questions, Mr. Miller?

Mr. MILLER. Yes, I do, Senator. Thank you.

Mr. Porges, on the table that you have submitted, "Estimated Marine Disposal Costs for 1968," you have total estimated costs of $29,269,000. With the exception of the Great Lakes, this would seem to be a total cost nationally. Do you have any estimate of what percentage of that total cost for all waste disposal, the research effort, the monitoring effort that you have talked about and recommended, might cost? I wonder if this might not be a way in which we could try to approach and reasonably estimate what the Federal contribution could be, stated as a percentage of the total cost of waste disposal.

Mr. PORGES. I don't think I can answer that question. I wouldn't have any idea what the—I visualize the research effort to be much larger than just plain monitoring. In fact the problem that comes up and I think has been discussed by the previous presentations, is that we do not know the effect of these wastes on the ocean environment. We don't know how extensive these effects are, we don't know whether they are all damaging or whether there are some benefits that might be accruing from these organic matters. In other words, if we want to harvest the ocean like we harvest our farms, we might well want to fertilize the oceans and one of the ways would be using sewage sludge, which contains appreciable amounts, not excessive amounts, of phosphates that help the aquatic organisms.

So I think our research effort must be much greater than directed to this one problem of disposal at the present time.

Senator STEVENS. Yes; but the effects have not been any part of the consideration in the past. The determination has been based upon cost, hasn't it? I mean we have developed this system of ocean dumping solely because it is cheaper than any other means of disposal, haven't we?

Mr. PORGES. Yes; that is correct. And I think this is the evaluation that must be made concerning land application or hauling to mine fill-

ing up, I think we have to evaluate the damages and the effects and the costs of carrying out the program; yes.

Mr. MILLER. I have two more questions. The one is economic, the other is political.

Do you know where there have been any reliable economic studies done on the alternate means for disposal? I am aware of one study done at MIT, which I understand is under some question. They have also looked at land disposal economics, land fills, sanitary land fills, and so on.

It would be very useful to this committee to have good economic studies available to it in its evaluation of what the Federal program might be.

Mr. PORGES. I believe that Mr. Lang, of New York, can provide you with those figures. I know he has made competent studies.

Senator STEVENS. What was the source of your figures?

Mr. PORGES. These figures were merely taken from a report from Industrial Waste Engineering and is quoted here.

Senator STEVENS. Was there a similar cost for nonmarine disposal?

Mr. PORGES. No; this is merely a summation of current practices.

Senator STEVENS. But my questions are these: Doesn't this show us an estimated marine disposal cost for 1968? Was there an estimated disposal cost for nonmarine activities? Obviously the major portion of the country is inland; it is not on the coast. There must be a similar figure for on-land disposal.

Mr. PORGES. I don't believe that there have been any studies to compare what it would cost to put this on land. I think this is what you are asking?

Senator STEVENS. No; I am asking if there are any studies that show what it actually costs those who do in fact today dispose on land.

Mr. PORGES. Oh, I am sure that most of the communities that use land application will have figures; yes.

Mr. MILLER. Earlier Senator Stevens asked Mr. Hume whether he knew of any plans to have waste disposal on Federal land. I want not only to get into that, but also to ask about the problems between large urban areas, such as Philadelphia, New York, and so on, and their relations with local government in rural areas, where you might have to turn for land disposal.

In your experience can you speak generally to the problems that the large urban areas have with local government?

Mr. PORGES. Yes. One of the communities in the Delaware Basin, Philadelphia hauls at the present time their digested sludge to sea. There was considerable——

First I would like to say that sludge disposal is comparable to a solid waste disposal—garbage, trash, and so forth. Philadelphia planned and had proposed hauling their solid wastes up to their abandoned mine areas, strip mines. And the local reaction in that area was such that the whole concept had to be dropped.

We have had other problems. For example, some of the commercial operations have been using lagoons in some of the areas to handle residual industrial wastes. There have been two or three unhappy experiences when the dikes holding these land lagoons broke and we have had severe contamination of the rivers, particularly Schuylkill

is one, about 2 or 3 months ago, where a couple of the dikes broke and they flooded the areas. There are one or two left and the State of Pennsylvania is now contracting to haul this material after consultation with representatives of New Jersey and Delaware to a designated point about 100 miles off the coast, to have this waste dumped beyond the Continental Shelf.

Mr. MILLER. Thank you.

Senator STEVENS. Thank you very much. We appreciate you gentlemen coming today and assisting us in this.

Did you get a copy of the bill, by the way, the Marine Protection Act of 1971?

Mr. PORGE. It came in I think Monday. I got a copy.

Senator STEVENS. If you have any further comments on the bill, we would appreciate receiving them by letter if you desire to do so.

Thank you very much.

(Whereupon, at 12:15 p.m., the hearing was adjourned, subject to the call of the Chair.)

OCEAN WASTE DISPOSAL

THURSDAY, APRIL 15, 1971

U.S. SENATE,
COMMITTEE ON COMMERCE,
OCEANS AND ATMOSPHERE SUBCOMMITTEE,
Washington, D.C.

The subcommittee met at 10 a.m., in room 1318, New Senate Office Building, Hon. Ernest F. Hollings (chairman of the subcommittee) presiding.

Present: Senators Hollings and Spong.

OPENING STATEMENT BY THE CHAIRMAN

Senator HOLLINGS. The committee will please come to order.

This morning we are continuing our hearings on ocean dumping, and are considering four bills, S. 307, S. 1082, S. 1238, and S. 1286.

S. 307 is a broad oceanic research authorization bill for the National Oceanic and Atmospheric Administration, which would make explicit for the first time NOAA's authority and responsibility to conduct basic and applied scientific and technological research, including research on the effects of pollutants in the marine environment.

S. 1082, S. 1238, and S. 1286 are ocean dumping regulatory bills. Each would give new ocean dumping regulatory authority to the Environmental Protection Agency. Each takes a different approach to this important problem and in the hearings today, on the 21st, 22d, and 28th, we shall explore these differences and the problems and advantages of each.

Not long ago the Bureau of Solid Waste Management estimated that municipalities and industries in the United States produce solid wastes of 360 million tons per year. If we add to that the wastes from agriculture, mining, and fossil fuel production, the estimate rises to 3.5 billion tons per year, according to the Bureau.

The ocean dumping report of the Council on Environmental Quality estimated that 48 million tons of wastes were dumped at sea in 1968, somewhat less than 2 percent of the total wastes estimated by the Bureau of Solid Waste Management. But faced with more and more difficulty in finding land disposal sites, higher water quality standards, and higher costs of waste disposal, many industries and municipalities are looking to the sea as a free sink. But we have found that the oceans are not free, unlimited sinks.

The 48 million tons cited by the Council on Environmental Quality refers only to direct dumping operations. It does not include the pollutants transported by our rivers to the sea, nor the tons on extra sediments attributable to erosion from poor construction practices.

To date there has been broad agreement that unregulated ocean dumping cannot continue. Now we turn to the methods and the institutions proposed to regulate such dumping, and there is less agreement. Serious questions are raised concerning why we should turn to a new and additional regulatory program. Why not strengthen existing programs? Several agencies already have regulatory authority. What is the relationship of that authority to the new proposed authority? These and many other questions will arise in the course of the hearings.

I want to welcome today Dr. Gordon J. F. MacDonald, member of the Council on Environmental Quality; Brig Gen. George J. Hayes, Rear Adm. C. Becker, and Brig. Gen. Richard H. Groves, who will each present facets of the Department of Defense position; and Dr. Eugene V. Coan, representing the Sierra Club.

Last night I spoke to Governor West of South Carolina, who was originally scheduled to appear here today on behalf of the National Governors' Conference. The press of legislative business in South Carolina prevented his joining us today, but we hope that he will be able to join us on April 28.

Dr. MacDonald, we welcome you and will be glad to hear from you at this time.

STATEMENT OF DR. GORDON J. F. MacDONALD, MEMBER, COUNCIL ON ENVIRONMENTAL QUALITY; ACCOMPANIED BY CHARLES F. LETTOW, COUNSEL

Mr. MacDonald. Mr. Chairman and Senator Hollings, I appreciate the opportunity to meet with your subcommittee and to testify in support of the President's proposals for the control of ocean dumping as embodied in S. 1238. Protection of the marine environment has been and continues to be a high priority concern of this administration.

I take particular pleasure in appearing before you because professionally I have been involved with questions regarding the ocean for many years and have been very appreciative of the work of this Committee in highlighting the importance of the oceans to the Nation.

The Council on Environmental Quality has been deeply concerned about and involved with the problems of ocean dumping from its inception slightly over one year ago. In the President's message to Congress of April 15, 1970, on the subject of Great Lakes and other dumping, the President directed the Council to make a study and report on the ocean disposal of solid wastes.

Through the summer of last year the Council worked to prepare a report to the President on the subject. On October 7, 1970, the President transmitted the completed report to Congress, endorsing the Council's recommendations and stating that specific legislative proposals in the form of a bill would be presented to the 92d Congress. The bill was transmitted to Congress on February 8, as a part of the President's recent environmental message. This bill was introduced by

Senator Boggs as S. 1238 on March 16, and was cosponsored by a large number of members of the Senate from both parties.

During our formal study we became convinced that there is a critical need for Federal legislation to implement a national policy on ocean dumping. Today's testimony provides an opportunity for me to present our reasons for reaching this conclusion and for adhering to it in the light of our subsequent work. Then, I would like to describe our legislative proposal and comment on several of the other proposals now pending before the Senate and this committee. The closing portion of my remarks will deal with some of the international initiatives and prospects at this time.

We have not taken adequate account of the importance of oceans to our land environment. Oceans—140 million square miles of water surface—cover 70 percent of the earth. They are critical to maintaining the world's environment, contributing to the oxygen-carbon dioxide balance in the atmosphere, affecting global climate, and providing the base for the world's hydrologic system. Oceans are economically valuable to man, providing among other necessities, food and minerals.

The coastlines of the United States are long and diverse, ranging from the tropical waters of Florida to the Arctic coast of Alaska. These areas, as biologically productive as any in the world, are the habitat for much of our fish and wildlife. They also provide transportation, recreation, and a pleasant setting for more than 60 percent of the Nation's population.

These waters are also the final receptacle for many of our wastes. Sewage, chemicals, garbage, and other wastes are carried to sea through the water courses of the Nation from municipal, industrial, and agricultural sources or directly by barges, ships, and pipelines.

The amount of wastes actually transported and dumped in the ocean is small in terms of the total volume of pollutants reaching the oceans. But even so, the Council estimated that in 1968 slightly over 48 million tons of waste were dumped at sea off the shores of the United States. Of this total, the main sources of ocean dumping were:

(1) Dredge spoils (80 percent of the total by weight);
(2) Industrial wastes (10 percent);
(3) Sewage sludge (9 percent);
(4) Construction and demolition debris (about 1 percent); 2
(5) Solid waste, essentially municipal garbage (less than 1 percent).

And, as we all know, small but environmentally harmful tonnages of other materials, such as explosive munitions and chemical warfare agents, have been dumped.

Tonnages are not necessarily a good indicator of the effect of the dumped material. Dredge spoils, for example, can be contaminated with pollutants from industrial, municipal, agricultural, and other sources on the bottom of water bodies. If these contaminants are oxygen-demanding materials, they can reduce the oxygen in the receiving waters to levels at which certain aquatic life cannot survive.

Heavy metal contamination can also create water concentrations toxic to marine life. Sewage sludge, whether or not digested, to control odors and pathogens, can also contain significant concentrations of heavy metals and of oxygen-demanding materials.

Most of the dumping today takes place in designated sites for dredge spoils are scattered off the Atlantic, Gulf, and Pacific coasts, but most ocean disposal of other wastes today is concentrated in Atlantic sites off the heavily populated Northeastern States. The effects of dumping in a designated area can be disastrous, as studies of the New York Bight and of the areas off Rehoboth Beach indicate.

The problem that faces us is not limited to the effects of materials presently being dumped. The volume of waste dumping is growing rapidly, and the future impact of dumping could increase significantly relative to other sources of pollution in the ocean.

Because the capacity of land-based disposal sites is becoming exhausted in some coastal cities, some communities are increasingly looking to the ocean for disposal. And, higher water-quality standards could lead industries to also turn to the ocean for disposal.

A number of alternatives are presently available for wastes now being dumped at sea. Our Council report discusses these alternatives in detail and also evaluates present efforts to develop other disposal options, some of which such as land reclamation and recycling can be environmentally beneficial.

After an evaluation of the effect of specific types of wastes currently being dumped and of the alternatives available to dumping, the Council recommended adopting certain dumping policies for given types of materials.

Current regulatory activities and authorities are not adequate to carry out the recommended policies. The States, the Army Corps of Engineers, the Coast Guard, the Atomic Energy Commission, and the Environmental Protection Agency each exercise some control, but the dispersion of authority along with an accompanying inadequate jurisdictional base and lack of statutory standard-setting guidance prevent an effective governmental response to ocean dumping problems.

Other Government witnesses who will appear before you will describe S. 1238 in detail. But in a nutshell, to control ocean dumping adequately, the administration bill would provide a ban on the unregulated dumping of all materials into the oceans, estuaries, and Great Lakes and would provide authority to limit strictly ocean disposal of any materials harmful to the marine environment.

It would require a permit from the Administrator of Environmental Protection Agency (1) for the transportation for dumping in estuaries, the Great Lakes, and the oceans anywhere in the world of wastes which originate in the United States; and (2) for dumping by United States and foreign nationals in our territorial waters and in the contiguous zone when the dumping would affect our territory or territorial sea.

Under the bill, the Administrator would have the power to ban ocean dumping of certain materials and to designate sites for others. Transportation for dumping without a permit, or dumping in violation of a permit would be subject to civil and criminal penalties.

Specific considerations are set out for use by EPA in developing criteria for ocean dumping. The Environmental Protection Agency could refine and modify the criteria as additional knowledge on the effects of ocean dumping is gained. In no case could dumping violate

Federal-State water quality standards in the United States territorial sea.

The proposal would encourage Federal research on the effects of materials dumped or spilled into the oceans and the development of means of monitoring and controlling such disposal. In developing the criteria and the enforcement programs, EPA would work with the Coast Guard and the National Oceanic and Atmospheric Administration.

Our premise is that action is necessary now to avoid a serious national problem from ocean dumping. Moreover, adequate regulation could contribute to the restoration of many of the presently damaged areas.

Congress now has before it a number of other legislative proposals which also seek to control ocean dumping. I would like to comment on these proposals briefly, discussing those aspects of the bills which involve principles essential to effective control over ocean dumping.

I again commend the committee for the interest which you have demonstrated in this subject. We would hope that you will consider our comments as constructive suggestions and that we could work together in arriving at the best possible bill.

S. 1082, introduced by Senator Case, would regulate the discharge from vessels of wastes originating in the United States. It would require a permit from the Administrator of the Environmental Protection Agency before any dumping of such wastes could be made in ocean waters.

No discharge of any such wastes could be made in the waters above the Continental Shelf adjacent to the United States. Further, the bill would ban entirely the discharge of wastes originating in the United States, after 5 years from enactment.

We do not support limiting the affected discharges to those occurring only from vessels. Dumping of dredge spoil and other similar material often does not take place from vessels. Moreover, we would not at present favor an absolute ban on all dumping. We would not favor foreclosing the Administrator of EPA from considering a disposal option which in a given case may be environmentally the most desirable, or put another way, the least undesirable.

We also oppose that portion of S. 1082 which would bar the discharge of wastes in waters between the seaward edge of the Continental Shelf and the coast of the United States. We do not advocate an absolute ban on dumping for any area which is selected only by geography and not by its ecological characteristics.

We certainly agree that specific controls over the biologically productive and sensitive areas in our estuaries and territorial sea is essential, and that many of these areas should be protected from any dumping whatsover.

However, not all areas above the Continental Shelf are as susceptible of being harmed by disposal of relatively inert materials as are sites such as estuarine breeding and feeding zones. Relationship of the area to alternatives to ocean dumping also is important because many materials such as unpolluted dredge spoil can be dumped in the particular general sea area from which they originated, and returning

them to a carefully selected nearby site may be the action most in accord with maintaining and preserving the existing land and marine environments.

S. 307, introduced by you, Mr. Chairman, would provide the Secretary of Commerce and thus the National Oceanic and Atmospheric Administration (NOAA) with additional authority to engage in oceanic research. Through a National Oceanic and Environmental Research Laboratory System, research could be undertaken to determine the degree of ocean contamination, to discover and to assess the effects of contaminants on marine ecosystems, to develop the capacity to predict the effects on the marine environment of particular conservation, developmenttal, or waste disposal actions, and to study means of improving man's use of the marine environment.

In our view, NOAA has obtained broad authority for oceanic research and monitoring through the transfers to it in Reorganization Plan No. 4 of 1970 of the functions of the Bureau of Commercial Fisheries, the National Sea Grant program, and the Minerals Technology Center, as well as those functions pertaining to the Coast and Geodetic Survey.

The functions I have just mentioned, however, do not provide particular guidance respecting research to support an ocean dumping regulatory system. If the committee is interested in the research area, it could perhaps consider providing NOAA with specific responsibility for performing research supporting the Environmental Protection Agency's proposed responsibility as the principal ocean dumping regulatory agency.

While the administration bill does not contain any specific grant of research authority, it was drafted with the expectation that present statutory authorities provide a satisfactory basis for action to remedy the present serious informational deficiencies which were discussed in the Council's ocean dumping report. Indeed, the report noted that further research was required in such broad and diverse areas as the pathways of waste materials in marine ecosystems and the recycling of wastes and the development of alternatives to ocean dumping.

In some cases a new focus is required for research to obtain more results applicable to such programs as the proposed ocean dumping regulatory program. Some reevaluations of research and development are now underway; for example, the council is entering upon a study to assess the potentialities of recycling and some of the policy options.

S. 307 also contains general provisions which would affect the administration of a number of other government programs. An example is section 405 relating to specific interagency relationships in connection with the issuance of ocean dumping permits. We can see potential administrative problems with the procedures outlined in this section. However, on such matters as this we would defer to Mr. Ruckelshaus of the Environmental Protection Agency and to other Government witnesses who will be testifying before the committee and who are more concerned with operational matters.

Some provisions of S. 307 do not necessarily relate to ocean dumping. For example, the bill contains a provision pertaining to estuarine sanctuaries. Section 410 authorizes the Secretary of Commerce to assist State acquisitions, development, and operation of estuarine sites for natural field purposes. In our view, providing for experimental es-

tuarine sanctuaries is desirable. Such areas could provide the setting for new work on the characteristics of these transition zones between land and fresh waters and the oceans. Moreover, results of experimental work in such areas could be of value not only to regulatory and developmental programs relating to oceans, but also to programs pertaining to land use, and specifically to the policy contained in the administration's proposal entitled "National Land Use Policy Act of 1971." Nonetheless, because the implications of any system of estuarine or marine sanctuaries are so broad, and, as I have said, considerably beyond those involved in regulating ocean dumping, we suggest that providing for any such sanctuaries should more appropriately be the subject of legislation independent of that establishing ocean dumping controls.

I will limit my already extensive remarks to a brief further comment on our international efforts and prospects in this area.

Through domestic legislation such as that which we have proposed, in my judgment very effective action can be taken to curb the present and potentially harmful effects of ocean dumping. Further, such action can be taken consistent with accepted principles of international law.

Very nearly all of our problems in the United States with ocean dumping arise as a result of disposing of waste material which originates within the United States. In fact, we know of no dumping in the waters above the outer Continental Shelf of wastes not originating within the United States.

We can and should, through domestic legislation, control the transport for dumping our own wastes. We can and should also control all dumping in our territorial sea and dumping in our contiguous zone which affects our territory or territorial sea. And, as the President has stated, we will urge other nations to adopt similar measures and enforce them.

But, a completely comprehensive system for the control of ocean dumping would involve regulation of at least all harmful materials, wherever they may be generated, and wherever and by whomever they may be dumped.

The administration bill contains a section requiring the Secretary of State to "seek effective international action and cooperation to insure protection of the marine environment * * *." The Department of State, in conjunction with the council and other concerned agencies, is taking steps to assure accomplishment of this objective. We anticipate that the 1972 U.N. Stockholm Conference on the Environment, the 1973 IMCO Conference on Marine Pollution, and the 1973 Law of the Sea Conference will be all useful fora in this respect.

If the United States is in fact to exercise leadership in this critical area, if it is to persuade other nations to control their ocean disposal of wastes, then it is essential that the United States first put its own hours in order. In my opinion, prompt and favorable action by Congress to establish effective regulation of ocean dumping is a prerequisite to action by other nations.

Thank you, Mr. Chairman.

Senator HOLLINGS. Thank you very much, Dr. MacDonald.

Putting our own house in order, let's go back to the nerve gas dumping. If that were proposed again, what would be the seriatum of events to prevent the difficulties that resulted then?

Suppose the Navy or Department of Defense wanted to dump X tons of nerve gas 50 miles off the coast of Florida; what would happen under the present system?

Dr. MacDonald. Under the present system it is my understanding that the Secretary of Defense has issued an order banning all dumping of chemical agents. So I would not expect the situation to arise. If this ban did not exist, then, of course——

Senator Hollings. Let's assume it does not exist. The Secretary of the Navy testified before this subcommittee that that was the present policy, subject to change. Unfortunately we always read it in the morning papers. Isn't it true really that they have to check with your Council?

Dr. MacDonald. Under the National Environmental Act of 1969 the Department of Defense would have to prepare an environmental impact statement discussing the proposed action, detailing the environmental effects, and, very importantly, describing alternatives to the proposed action.

This draft statement would then be circulated to other interested agencies and may be made available to the public, who would then have an opportunity to comment on it.

I would, of course, assume that it would be made available to you and to the Congress.

Senator Hollings. If your Council on Environmental Quality disapproved it, could they go and dump anyway under the law?

Dr. MacDonald. Yes; under the law they could still proceed. The Council has no regulatory authority under law. It is, as you know, an advisory body. It would, if it felt the action was not the best course, attempt to persuade the Department of Defense to follow an alternative course and obviously it does have the responsibility of calling to the attention of the President any action that it feels is environmental harmful and for which an alternative exists.

Senator Hollings. So what we are trying to do with the administration bill is fill that gap, to have some regulatory agency charged with the responsibility for issuing or denying the issuance of these permits. Is that correct?

Dr. MacDonald. That is correct. Under the administration bill, the Administrator of the Environmental Protection Agency would have the responsibility for issuing or denying a permit for the disposal of any material at sea, with certain exceptions, the principal exception being the disposal at sea of oil and oily wastes, which are covered under other statutes.

Senator Hollings. Perhaps at this point it would be good to clarify just exactly what agencies are charged with responsibilities for issuing permits and how many designated dumping sites there are. It has been reported to this committee we have approximately 238 approved dumping sites. When they use that word "approved." I take it to be by the corps or other agencies of the Government. I wish you would elaborate on that. I think about half of them, or 104, are in the Great Lakes. When we talk about the oceans we are also talking about the Great Lakes.

What agencies at the moment are charged with the responsibility for issuing permits and approximately how many do we have issued

with respect to approved dumping sites, according to the information of your Council.

Dr. MacDonald. As you have mentioned, the corps has responsibility for issuing permits with regard to dumping within the territorial sea, the Great Lakes, and, as I recall it—and I would have to check to get the figures correct—I think there are approximately 240 designated dumping sites. Under the 1899 Refuse Act, the corps would issue the permits for dumping within the U.S. territorial waters.

Senator Hollings. You see what I am referring to, Dr. MacDonald, is an elaboration of that last paragraph on page 6:

> The current regulatory activities and authorities are not adequate and there is dispersion of authority and a lack of statutory guidance.

What I am asking for is an elaboration of that particular observation in that paragraph.

Dr. MacDonald. Yes. Specifically, of course, we have the corps as I have mentioned, and with regard to the disposal of radioactive materials, the Atomic Energy Commission. The Coast Guard is involved in enforcement. The Administrator of the Environmental Protection Agency is involved. So there is a dispersion of responsibility within the Government agencies. Further, we do not believe there is adequate protection in the sense that the current statutes primarily involve only the territorial waters of the United States.

We are concerned also with disposal of materials in the high seas, and one of the important provisions of the administration's bill is that it would govern the disposal of any material that originates within a U.S. port, even if the disposal is to take place 50 or 100 miles at sea, well beyond the territorial sea or the contiguous zone.

Senator Hollings. This bill, S. 1238, you would think then, would clarify the dispersion of authority and centralize it in the Environmental Protection Agency?

Dr. MacDonald. Yes. All disposal of materials with the exception, as I said, of oil and oily wastes, would come under the authority of the Administrator of the Environmental Protection Agency and thus centralize responsibility in one office and we think this is very important.

Senator Hollings. I understand there is a strong feeling on the House side relative to the corps. They say they are doing it now, they are better equipped to do it, so why not centralize it in the corps. What is your answer to that?

Dr. MacDonald. Well, the present authority in the corps, as I mentioned, extends only in terms of the territorial waters, and the Great Lakes. We think that that authority needs further extension.

Further, we believe that the Environmental Protection Agency, with its responsibilities for water quality under the law, has the resources available to it to make judgments as to whether a particular permit should be issued or denied. Therefore we strongly believe that authority should be given to the Administrator of the Environmental Protection Agency rather than to maintain a system in which the corps would have that responsibility.

Senator Hollings. What resources would be available to the Environmental Protection Agency that are not available to the corps?

Dr. MacDonald. Well, of course, the corps could draw upon the resources available to the Environmental Protection Agency. However, we feel that the experience accumulated within the Environmental Protection Agency, its ongoing activities in research and development with respect to the maintenance of water quality and to alternative means of waste disposal, makes it the logical agency to have the authority with regard to the issuance of specific permits.

Senator Hollings. Getting right to the point, the corps has had the responsibility in major part. Do you think they have exercised this responsibility adequately?

Dr. MacDonald. I would say that taking into account their delegated responsibility—that is, only within the territorial waters—they have, I believe, discharged this responsibility adequately. But our position is that there is a lot of dumping taking place outside the designated area for the corps and that we need to extend the responsibility of Federal agencies to take into account this larger area.

Senator Hollings. You talk of large areas. Are we differentiating between dredge spoil and other pollutants in the ocean? The corps has been mainly charged with the responsibility of dredge spoil dumping permits. The fact is that some members of the House advocate that we should let the corps still maintain their authority. What would be your position on that?

Dr. MacDonald. We believe we cannot always distinguish between dredge spoils and toxic materials. Dredge spoils may be contaminated in a variety of ways, with heavy metals or other toxic materials, and once they are dumped into the ocean they become available to the food chains within the ocean.

Toxic materials per se, such as industrial liquid wastes, can be dumped at present without the kind of permits that you require for dredge spoils, and we think that both classes of materials should be looked at from a unified point of view. They both present potential dangers.

One type of dumping is more obvious. When you go out and dump arsenic waste, that is a more clear and present danger. But there is also danger from the dumping of dredge spoils or sewage sludge which contain high levels of heavy metals that are potentially toxic.

Senator Hollings. Isn't one of the primary missions of the corps to develop the harbors and ports, and aren't they causing a lot of the pollution?

Dr. MacDonald. In their function of maintaining the navigability of rivers and harbors, the corps is responsible for a great deal of the dredging. In the sense that the dredge spoils are dumped into the ocean, they are responsible for part of the problem. Again, one of the very good reasons for transferring authority for regulation away from the corps is so you don't have the polluting agent, or potentially polluting agent, regulating itself.

As you know, basically the thrust of the reorganization plan that set up the Environmental Protection Agency is to separate out the regulatory authorities from the developmental authorities.

Senator Hollings. To quote former Vice President Humphrey, that would be putting the fox in the chicken coop.

Dr. MacDonald. That is right.

Senator HOLLINGS. Let's start now at the beginning with respect to the potential for pollutants in the oceans and the Great Lakes. The overall potential. Does the Council on Environmental Quality have any statistics or facts showing what the enemy is, the size of it? And what do they show, if you do have such studies?

Dr. MACDONALD. Yes; we attempted to analyze this in the ocean-dumping report which we transmitted to Congress last October. It was there that we came up with this figure of 48 million tons of materials currently being disposed of within the oceans and at a wide variety of sites—well over 200 sites on the Atlantic, Pacific, and Gulf coasts.

Our concern is not so much in the total material currently being dumped, but in the potentialities of this volume of materials growing very rapidly over subsequent years.

I mentioned in my testimony that there is, I think, an increasing temptation on the part of the municipalities, as available landfill areas decrease, and as water quality standards are increased, to look to the oceans as a place for dumping materials.

Today, we have got a number of municipalities, large cities, that are now disposing of some fraction of their solid waste and their garbage at sea. We feel that unless we take action now and attempt to control it before ocean dumping becomes the accepted disposal means, the economic wrench that would result from taking action after big cities such as New York have programed taking its solid waste to sea would be so great as to be quite a serious matter. That is, again, one of the reasons for asking for regulatory authority now, before the problem becomes critical.

We think it is a serious problem today. It is potentially a very critical problem for the future. And let's stop; let's control the problem. Prevention, I think, in this case will be far more economical than trying to cure it after it becomes critical.

Senator HOLLINGS. I want to press a little further with respect to all wastes, not just those that are being dumped presently in the oceans or Great Lakes, but all wastes. Do we have any true statistical findings there?

Dr. MACDONALD. Yes. First, in terms of solid waste we can say that today on a statistical basis every person in the United States generates about 6 to 7 pounds of solid waste per day. This waste generation has grown rather rapidly in the last 10 years; it has almost doubled in the last 30 years. If this trend continues, just in the solid waste area alone we are facing very, very serious problems.

At the same time we do not think, as I mentioned in the testimony, that total tonnage alone is a sufficient criteria. As our technology becomes more advanced, industrial processes become more complex. You introduce into the environment, or have to look to the environment to dispose of increasingly complex chemical materials, the nature of which are not completely understood, nor is their behavior once they have reached the environment completely understood. So it is both a problem of total mass of materials that we have to dispose of and also a question of the nature of the materials we have to dispose of.

We are now producing or getting potentially hazardous materials that enter the environment. We think we have to take a look at each one of these and see what can be done to lessen their impact once they reach the environment, whether it be air, water, or the ocean.

Senator HOLLINGS. Authorities from the New York Bight and other areas appeared earlier in our hearings on the engineering and cost aspects of ocean dumping.

Once we pass a law, what are we requiring in dollars and cents? How would you comply?

You state on page 12 of your testimony that a new focus is required in research to obtain more information as ocean-dumping regulatory programs develop. Who would be carrying that on? Would you be carrying that on, or would NOAA, under S. 307, be carrying it on? Or you said, for example, in comparing the Corps of Engineers with the Environmental Protection Agency, would they all have a research function, or would it be centralized, as you have now said it should be with respect to dumping permits, in EPA?

Dr. MACDONALD. The research that specifically looks at alternate means of disposal of waste we feel should be conducted primarily by the Environmental Protection Agency under the authorities that came to it in the reorganization plans from the Bureau of Solid Waste Management of HEW.

At the same time, we feel that there is a very great need for research on the effects of materials that are placed into the oceans. One of the surprising features when we did our study, one that actually disturbed me a great deal, was that we have conducted oceanographic programs for the last almost 20 years now and have spent a great deal of money in supporting oceanographic research, and yet we have found very little in the way of information with regard to what happens to materials once you place them in the ocean. There is a need for focused research, and S. 307 in this aspect I think is a very valuable contribution. It would say to NOAA, as I read it: There are these serious problems, you should be conducting research in these areas to determine what happens when you place mercury compounds, say, into the Continental Shelf at a depth of 200 meters. How does it get into the water? What happens to it once it gets in the water? Where does it travel within the food chain? How does it distribute itself. What are the long-term effects? It may be that for the disposal of certain classes of materials, the oceans offer an alternative that is less environmentally damaging than other means of disposal.

But, until we understand what happens to the materials once they reach the ocean, I think ocean dumping is a hazardous course to follow. Therefore we advocate with the permit system that there should be an underlying research program that would guide the Environmental Protection Agency in making decisions on whether or not to issue a permit, and that the long-term research, quite naturally, should be based within NOAA.

At the same time, EPA would probably wish to conduct its own research activities with regard to specific disposal methods and sites. But I think the longer term research—trying to understand what happens to materials when they are placed in the ocean, what are the NOAA.

Senator HOLLINGS. The best I can understand, you have them both doing research; is that right?

Dr. MACDONALD. I would say EPA will have to have some research activities. Let's say it is faced with a request for a permit for a spe-

cific dumping activity. It would want to look into the site, at least to have some information on which to make a decision as to whether or not that particular permit should be granted.

On the other hand, there is a very great need for basic information. NOAA now has responsibilities for charting the ocean bottom. This is critical in determining whether a site should be used or not. NOAA also has responsibility for research into various fishery activities. What I find most interesting about your bill is that it would focus attention of NOAA on the problem of basic research into ocean pollution, and I think this is what we need. We have not, in the past, tied much of our oceanographic research to specific problems that we face as a nation and as a society.

Senator HOLLINGS. One of the charges against the establishment of NOAA was that the Department of Commerce was mission-oriented. Then we found that 60 percent of the Department's personnel were scientific- and research-oriented, and that all of the attacks the politicians were making on pollution were based on materials, studies, and research emanating from the Department of Commerce.

Are you familiar with the number of researchers and the size of the research endeavor within EPA?

Dr. MACDONALD. No, I would defer to Mr. Ruckelshaus on that question.

Senator HOLLINGS. I want to commend you with respect to that proposed arsenic dumping from Rohm & Haas in Philadelphia off the coast of New Jersey. The Council on Environmental Quality, under your direction, acted very promptly there.

I talked with Mr. Haas, and he said he was going to withhold any further action until he checked with you and with the White House. Have they done that yet?

Dr. MACDONALD. No; so far they have not. It is my understanding, as you have stated it, that the company will not conduct any further operations until and if they have discussed the matter exhaustively both with the Council and with the Environmental Protection Agency.

As you know, we were notified by the Coast Guard of the intent of the company to dispose of a quantity of a compound of arsenic, continuing a practice that they had undertaken some time ago. We immediately requested that they desist from this. They responded affirmatively, very promptly, and have agreed not to dump any further materials until or and if there is complete agreement with the Environmental Protection Agency and with us.

Senator HOLLINGS. Now, let's assume S. 1238 was enacted and EPA was the Agency to issue dumping permits. The corps would continue their program under the Rivers and Harbors Act of 1889. Where would the Environmental Protection Agency begin and stop its issuing of permits and where would the corps continue its issuing of permits? Do you see any conflict between the two permit programs?

Dr. MACDONALD. I don't see any conflict here. Under the administration bill, S. 1238, the permit granting authority of EPA would supersede other permit authorities with certain exceptions, among them being the authorities granted to the AEC under the Atomic Energy Act. A further exception would be the dredge and fill activities governed by the Rivers and Harbors Act of 1899. In that case the

corps would continue to issue permits, but the permits would have to satisfy the applicable ocean dumping criteria and a certification to this effect would be made by the Administrator of EPA.

Senator HOLLINGS. What about the burden of proof, Dr. MacDonald? Would you favor a provision that would place the burden of proof on the person, the industry, or municipality that wishes to dump in either the ocean or Great Lakes? Would the burden of proof be on them to show it was not of a polluting nature, not deleterious to the marine environment? Where would the burden of proof be?

Dr. MACDONALD. We think that in section 5 of our proposed legislation we do place the burden of proof on the applicant for the permit: "the applicant presents information respecting the proposed activity." Essentially it says he has to establish that it will not unreasonably degrade or unreasonably endanger human health, welfare, and amenities. I think the intent certainly is to put the responsibility on the applicant to establish that he will not be harming the ocean environment in an unreasonable way.

Senator HOLLINGS. Would you object to adding a requirement to the administration bill requiring EPA to establish tentative guidelines for permit issuance within 6 months of the date of the enactment of the bill? Thus, after 6 months you would have published guidelines, and for all intents and purposes thereafter there would be no permits granted unless they were in conformance with those guidelines?

Dr. MACDONALD. In the administration of the bill I would expect that the Administrator of EPA would indeed have to issue guidelines. Whether this should be made part of the law or not, I wouldn't want to comment. The way one would go about providing for issuing of permits would be to establish what would be the guidelines or what would be the criteria under which permits would be issued or denied.

Senator HOLLINGS. Would you object to a provision requiring consultation with the Administrator of NOAA prior to the issuance of a permit in a contested case?

Dr. MACDONALD. I think as we have worded it, again in section 5, the Administrator of EPA in establishing the criteria would have to consult with the Secretary of Commerce, that is, with the Administrator of NOAA.

In reviewing applications for permits, the Administrator would consult with the interested Federal agencies, so again I think we have covered that in section 5.

Senator HOLLINGS. No, that is relative to guidelines, isn't it, Dr. MacDonald?

Dr. MACDONALD. No, also in reviewing applications for permits the bill states that the Administrator shall make such provisions for consultation with interested Federal and State agencies that he deems useful or necessary. So I think we haven't spelled out specifically that that Administrator would have to consult with NOAA on a particular permit. But given the fact that NOAA is the principal Federal Agency with responsibility for research in the area of the oceans, I would expect that the Administrator would be consulting with NOAA on a continuing basis, with respect to specific permits. And we certainly do have the language in here that he shall consult with other interested Federal and State agencies.

And there is a further handle on this through the Fish and Wildlife Coordination Act; he would consult with NOAA on any activity that would endanger fish or wildlife.

Senator HOLLINGS. Senator Spong?

Senator SPONG. Thank you, Mr. Chairman.

Dr. MacDonald, there are those of us who, over a period of 2 or 3 years, have advocated a consolidation of responsibilities in these areas. Speaking only for myself, I am beginning to wonder if we aren't going to end up with something more complicated than we have.

I listened to the Senator ask you if it would be all right if we bring in somebody else to consult. And I have tried to follow the role of the corps and EPA. I want to be sure that I understand this. We had four Federal agencies dealing with ocean dumping. We had the Federal Water Quality Administration, the Atomic Energy Commission, the Coast Guard, and the corps. And the thrust of your testimony in favor of S. 1238, which I am cosponsoring, is that we will be consolidating the responsibilities in EPA. But when we really review it, we have excluded the Atomic Energy Commission, we have retained in the corps all of their permit authority under the Refuse Act.

I am wondering if it would not be desirable that we give some consideration to the transferring of all permit authority to EPA. I am taking the other side of the coin from Senator Hollings' question to you about what he anticipates. I am not saying that it would be best. I think we will end up with just as much bureaucracy, consultation, and agencies dealing with each other as we had before.

I wonder that we have really accomplished with all of this except a lot of rhetoric and some reshuffling of responsibilities, with not much consolidation. So I would like for you to comment specifically on the desirability of transferring the authority for all permits to EPA.

I have nothing against the corps. It is just that I think we are going to end up with the same sort of fractured approach.

Dr. MACDONALD. Yes, quite frankly I think there is some danger of maintaining some of the bureaucractic tangle that we have been living with. I would like to make one point though that I think is very important. The thrust of the bill is in two directions. One is an attempt to consolidate bureaucractic responsibility; the other is to very much enlarge the regulartory of the Federal Government. And, this, I think, is a very key element.

First, with respect to the Atomic Energy Commission, certainly we exclude them, but at the same time through the reorganization plan the radiation standard setting function is within EPA. So even though AEC would have the permit authority for disposal of radioactive wastes, they would have to meet the standards set by EPA. Accordingly in a sense the standard setting function is indeed centralized.

With regard to the corps, we are looking at permits that would involve navigational hazards of one sort or another. This, of course, has been the tradiational function of the corps. The authorities under the various River and Habors Act sections have placed this authority within the corps. We believe that in those matters dealing with

navigation that it would be wise to retain the permit granting authority within the corps, again operating under the certification by the Administrator of EPA that the applicable dumping criteria were being met.

I agree with you that there are some potential administrative problems in putting this law into effect. I think they can be lived with. I think we can make it work.

Senator SPONG. We are discussing the subject of ocean dumping, but the corps, regardless of the creation of EPA, would retain the issuance of permits just for discharges under the Refuse Act. Isn't that correct?

Dr. MACDONALD. Yes. Under the Refuse Act of corps would continue to have authority for effluents. For dumping, EPA takes over, with this exception regarding navigation and dredge and fill. And as you know, for the implementation of the sections of the 1899 Rivers and Harbors Act other than the Refuse Act, we have put in the provision that the Administrator of EPA has to certify that the applicable dumping criteria are being met before the permit is granted by the corps.

Senator SPONG. Thank you for your answer. I certainly intend to explore the desirability of further consolidation. I don't know the answers, but down the road I am beginning to doubt very seriously if we have simplified it very much.

I have several nitpicking questions about the bill. I am going to submit these to you and ask that you answer them for the record.

Thank you Mr. Chairman.

(The questions and answer thereto follow:)

Question. Is the definition of "material" (Section 3(c) in S. 1238) intended to include bilge from commercial and government vessels?

Answer. Yes, except to the extent that the discharged bilge would constitute (1) "oil within the meaning of section 11 of the Federal Water Pollution Control Act or sewage from vessels wtihin the meaning of section 13 of said Act", as expected by the proviso to subsection 3(c), and (2) "a routine discharge of effluent incidental to the propulsion of vessels," as excepted by subsection 3(f).

Question. Is the dumping of bilge intended to be excluded from the scope of the bill under Section 3(f)?

Answer. As noted above, a proviso to subsection 3(f) exempts from S.1238's coverage "a routine discharge of effluent incidental to the propulsion of vessels". The routine discharges which would fall within this proviso are those which take place as a direct and accompanying minor occurrence of the propulsion of vessels. Accumulation of bilge water and other material and its subsequent dumping would no ordinarily have the requisite direct relationship to vessel propulsion.

Question. What effect, if any, would the permit programs by sport fishermen to establish artificial reefs in costal waters Would artificial reefs be covered by the language of Section 3(f), beginning at Line 12 on Page 3 of S. 1238?

Answer. Establishing artificial reefs in coastal waters would require a permit under S.1238. The second proviso to subsection (f) states that dumping "does not means the intentional placement of any device in the oceans, costal, or other waters or on the submerged land beneath such waters, for the purpose of using such device there to produce an effect attributable to other than its mere physical presence." Building reefs by placing "devices" such as car bodies in costal areas would not be exempted from coverage by this second proviso because the purpose of placing the car bodies on the sea floor would be to produce an effect attributabel to their "mere physical presence," *i.e.*, to provide a shelter and feeding zone for fish. In contrast, placement of oi drilling platforms, undersea cables and pipelines, oceanographic surveillance equipment, and naviga-

tion devices in such waters or on the accompanying submerged lands would be exempt under the terms of this proviso because such devices are actually used there and achieve an effect which is not dependent upon their simply resting on the sea bottom.

Question. Why is language includede in S.1238 (Section 8(b)) which would enable the Administrator to delegate to other departments or agencies his authority to review, evaluate and issue permits? Under what circumstances do you contemplate such delegations would occur?

Answer. Subsection 8(b) of S.1238 authorizes the Administrator to delegate to other departments or agencies his authority to review, evaluate, and issue permits. We contemplate that the Administrator might make this delegation to another agency such as the Coast Guard when he believed that enforcement would be enhanced, when a particular EPA regional office was not conveniently located and was unfamiliar with a particular situation, and when EPA wished to rely specifically on the administrative or technical expertise of another agency.

Question. What is the relationship of the present authority to control ocean dumping to the new authority proposed in S.1238?

Answer. Section 7 of S.1238 deals with the reationship of this legislation to other laws. Generally, except as provided in subsections 7(b) and 7(c), it provides that after the Act's effective date, existing licenses, permits, or authorizations would be terminated to the extent they authorize activity covered by this proposal, and that further licenses, permits, or authorizations of a similar nature could not be issued.

Subsection 7(b) maintains present responsibility and authority contained in the Atomic Energy Act of 1954, and provides that the provisions of Sections 4 and 7(a) of the bill do not apply to actions taken under that Act. However, the AEC must consult with the Administrator before issuing a permit to conduct any activity otherwise regulated by this proposal. Moreover, the AEC must comply with the radioactive-material standards set by the Administrator, and the Administrator is directed to consider the policy expressed in subsection 2(b) of this proposal along with the factors stated in subsections 5(a) (1) and 5(a) (2) in setting such standards for the waters covered by this proposal.

Subsection 7(c) relates to authorities contained in the Rivers and Harbors Act of 1899, respecting dredging, filling, harbor works, and maintenance of navigability. The powers are exercised for the most part by the Secretary of the Army and the Chief of Engineers. Except for the limited supersession found in subsection 11(e), the Rivers and Harbors Act authorities are not negated or abrogated, nor are existing licenses or permits issued under the Act terminated. Rather, in situations where this bill and Act of 1899 both would apply to dumping of material in connection with a dredge, fill or other permit issued by the Corps of Engineers, issuance of the permit requires a certification by the Administrator of EPA that the activity is in conformity with this proposal and any regulations issued under it. The Administrator will not issue separate permits in such cases.

The Corps does considerable dredging of its own as a part of navigation projects which it itself conducts. To the extent that these operations involve oceanic or esturaine disposal of the dredge spoils, the Corps would be required by S.1238 to go directly to EPA for a permit to make the disposal.

Subsection 11(e)'s limited supersession of the Rivers and Harbors Act pertains only to Section 13 (the "Refuse Act"). Nonetheless, after this Act becomes effective, the Department of the Army's permit program under the Refuse Act, which is administered in close cooperation with EPA on all water quality matters, will continue to regulate the disposition of any effluent covered by the Refuse Act from any outfall structure regardless of the waters into which this disposition occurs. In addition, the Refuse Act will continue to apply to all depositing of material into those navigable waters of the United States or their tributaries which are not covered by subsection 4(b) of this Act.

The objective of the limited supersession is to remove a double permit requirement in the area of overlap between S.1238 and the Refuse Act. To achieve this objective, subsection 11(e) supersedes the Refuse Act only insofar as it applies to dumping as defined in subsection 3(f), of material in the waters covered by subsection 4(b).

One further consideration deserves mention. Simple supersession of part of the Refuse Act's covearge would leave an accompanying gap in protection of

navigation. Accordingly, subsection 7(d) provides for consultation by the Administrator of EPA with the Secretary of the Army in cases where the Administrator finds that proposed activity regulated by the ocean dumping system may affect navigation or create an artificial island on the outer Continental Shelf.

Besides the provision relating to Refuse Act, Section 11 contains a number of other repeals or supersessions. Subsections 11(a) and 11(b) repeal the Supervisory Harbors Act of 1888, as amended (33 U.S.C. §§ 441–451b), and the provision of the Rivers and Harbors Act of 1899 (33 U.S.C. § 418) which preserved the Supervisory Harbors Act from supersession by the 1899 Act. The Supervisory Harbors Act provides a special authority to control transit in and from the harbors of New York, Baltimore, and Hampton Roads, Virginia. This authority has been used to regulate ocean dumping. The proposed Act would replace the authority. Subsection (c) repeals Section 2 of the Act of August 5, 1886 (33 U.S.C. § 407a), which pertains to deposits of debris from mines and stamp works. These deposits are covered by this bill or the Refuse Act. Lastly Section 4 of the Rivers and Harbors Act of 1905 (33 U.S.C. § 419), which has been used to buttress the Corps of Engineers' authority to regulate ocean dumping, is superseded, insofar as it authorizes action that would be regulated by this proposal.

Senator HOLLINGS. Following Senator Spong's line of thought and apprehension, assuming that 80 percent of the pollution in ocean dumping and the Great Lakes is constituted by dredge spoil—and that has been the testimony before this committee—you say the corps would still have 80 percent of the problem and EPA under the new bill would only have 20 percent?

Dr. MACDONALD. The corps' own dumping activities, of course, would require a direct EPA permit. That to a large extent would cover the 80 percent. As I emphasized in my testimony, I don't think——

Senator HOLLINGS. To what extent would you not cover it? Let's back into it. You say "to a large extent" you would be covering the 80 percent. Then to what extent would you not be covering it? Where would the corps still be on dredge spoil?

Dr. MACDONALD. The situation is that it would all be covered. If it were a private activity then you would have to go to EPA for a certificate on the corps permit for a dredge, and if it is a corps activity, then you get a EPA permit under the ocean dumping Act directly. So the activities would all be regulated.

I would like to make one point which I made in the prepared testimony, and that is that I don't think tonnage alone is an adequate measure of the environmental stress that you are placing on the oceans. The dredge spoils—a large volume of the dredge spoils—are unpolluted, so the net effects are rather small. What we are concerned with is the control of the disposal of, say, industrial wastes which are in many cases potentially harmful. And also of course we are very much concerned with the disposal or polluted spoils and sewage sludge.

Senator HOLLINGS. We learned that very vividly with the nerve gas problem we had. Let's assume that S. 1238 was the law today, how much would the Government be spending? How many more personnel would be required in EPA? Assume that, I want to vote for it. It costs us how much? What would my answer be?

Dr. MACDONALD. I am going to have to defer to Mr. Ruckelshaus on that.

As I understand it, EPA has developed estimates of what it will cost. But I think they will have to testify to that.

Senator HOLLINGS. Let's talk about two more things, Dr. MacDonald.

With respect to public hearings, what provision under the bill should there be for public hearings? Just one disputed cases for permits? Or no public hearings? What is your testimony with respect to the holding of a hearing for the public? And, second, the citizen's right of action, assuming that we all are going to have a citizen's right of action to come in and make Government do the job?

Is there any thing provided for those ideas in S. 1238?

Dr. MACDONALD. Yes, the bill has no provision requiring public hearings. It does have a provision authorizing the Administrator to hold public hearings. And I think it will just depend on how the head of EPA administers this act.

I would say that certainly in all controversial cases, public hearings would be held. The authorization to hold public hearings is specified in the legislation.

Senator HOLLINGS. Would you object to a requirement in contested cases of a proviso requiring public hearings?

Dr. MACDONALD. No.

Senator HOLLINGS. What, with respect to the citizen's rights of action? I don't know who we represent up here? Somebody has an idea that the citizens are not represented. Maybe they are right. We find that out every election day, But I am asking this because my environmental friends are concerned about it. I don't know whether to run for office or run for Ralph Nader.

Dr. MACDONALD. Well, as I read the various views in the recent cases involving standing, it would seem that if citizens appear at the hearings, they can be heard. I think it is as simple as that.

Senator HOLLINGS. But no specific provision is in there?

Dr. MACDONALD. There is no specific provision in our legislation for that.

Senator HOLLINGS. And you don't recommend it.

Dr. MACDONALD. No.

Senator HOLLINGS. Is there anything further you wish to add?

Dr. MACDONALD. No. I think these comments have been very helpful to us.

Senator HOLLINGS. It has been very helpful to the committee and we appreciate your appearance here this morning.

Thank you very much.

Senator HOLLINGS. I understand that the next appearances will all come as a group or team here to present the Department of Defense's position.

We are glad to hear from General Hayes, Admiral Becker, and General Groves. Would the three come forward, please.

Who will lead off first?

General HAYES. I will, sir.

Senator HOLLINGS. We will be glad to hear from you at this time, General Hayes.

STATEMENTS OF BRIG. GEN. GEORGE J. HAYES, DEPARTMENT OF DEFENSE; ACCOMPANIED BY REAR ADM. C. BECKER, DEPARTMENT OF DEFENSE; REAR ADM. THOMAS J. CHRISTMAN, U.S. NAVY; AND BRIG. GEN. RICHARD H. GROVES, DEPUTY DIRECTOR OF CIVIL WORKS, ARMY CORPS OF ENGINEERS

General HAYES. Mr. Chairman and members of the committee, I am Brig. Gen. George J. Hayes, Principal Deputy Assistant Secretary of Defense—Health and Environment.

I welcome the opportunity to appear before you today to discuss the views of the Department of Defense on S. 1238, a bill to regulate the dumping of materials in the oceans, coastal and other waters, and for other purposes.

I propose to limit my testimony to the environmental issues of the bill. Admiral Becker will subsequently provide testimony concerning military operational issues and General Groves will testify on civil works functions of the corps.

The Department of Defense is deeply concerned about the adverse ecological and environmental effects associated with the unregulated discharge of wastes and other materials into the navigable, coastal, and ocean waters of the United States. We believe that legislation to regulate such activities is desirable.

The Department of Defense has already taken action to initiate the implement comparable policy guidance which was first promulgated in the report of the Council on Environmental Quality on Ocean Dumping—a national policy—and transmitted to Congress by President Nixon on October 7, 1970.

It is clear that some of the provisions of the proposed legislation will have a significant influence on some of the functions of the Department of Defense but actions are already underway by the military departments to exert leadership in cleaning up the oceans.

On February 24, 1971, Secretary Laird approved the U.S. Navy order to suspend deep water dumping of obsolete, unserviceable munitions until all alternative methods of disposal have been completely studied. An intensive research and development program has also been directed with the aim of seeking alternative methods of disposal which will have minimal impact on the environment. In effect, Secretary Laird's announcement put a freeze on ocean dumping of all military munitions by the United States, since the U.S. Navy provides deep water dump services of obsolete munitions for all the armed services. All chemical munitions disposal at sea has been terminated, and biological warfare agents or munitions have never been disposed of at sea.

The Department of the Army has assessed in detail its proposed biological warfare agents and munitions demilitarization program and is currently staffing and coordinating with other Federal, State, and local authorities its environmental statement in accordance with Public Law 91–190 The National Environmental Policy Act of 1969. The Department of the Army also has draft environmental statements under preparation which address the disposal of chemical munitions by demilitarization on land. These programs are intended to protect the environment during disposition of these materials.

The Department of Defense believes that S. 1238 embodies a realistic approach by establishing a regulatory authority rather than by prohibiting all ocean disposal or establishing unreasonable deadlines for such termination. It is possible that future research and study may reveal that some waste materials would contribute to the rehabilitation or enhancement of the marine environment. Absolute prohibition of all ocean disposal could result in disposal techniques which pose greater hazards to man and his environment than those which currently exist. In some cases there may be no current technologically acceptable alternative. These facts weigh heavily against any proposal which would prohibit all such ocean disposal operations. S. 1238 avoids these difficulties by providing for a balancing of interests that would integrate technological or scientific knowledge with operational requirements.

It also envisions and accepts current standards which have proven to be effective in protecting human health and the marine environment. It does so by excluding the regulation of routine discharge of effluents from facilities, discharges which are already effectively regulated by existing laws.

In summary, the Department of Defense supports S. 1238 in lieu of the other bills related to marine protection which we have received. This proposal takes a stride forward in the ever expanding effort to enhance the quality of our environment—a goal with which the Department of Defense is vitally concerned in our everyday actions, wherever we may be located.

If enacted, we believe that the implementing regulations of the Department of Defense would be a valuable addition to the more general rules that are currently in effect under the National Environmental Policy Act.

Mr. Chairman, this concludes my testimony on behalf of the Department of Defense. If there are questions related to the environmental aspects of the Department of Defense program, I would be pleased to answer them. Should you have questions concerning the operational aspects of the legislation, the military department witnesses to follow will be pleased to answer those questions.

Admiral Becker has a statement which he will read.

Admiral BECKER. Mr. Chairman, I am happy to have the opportunity to appear before the committee this morning to present the Navy's view on several bills that have been proposed regarding the regulation of ocean dumping and oceanic research and development, including the administration's Marine Protection Act of 1971.

At the outset I want to stress to the committee the overall concern the Navy has with regard to all of the environmental aspects of our operations. The need to improve and enhance the quality of life in all of its forms is receiving a great deal of attention within the Navy—from the Secretary's office down through the commands to the local activities.

We are making every effort to cooperate with the President's Council on Environmental Quality, the Environmental Protection Agency and the National Oceanic and Atmospheric Administration. Also, our pollution abatement programs and projects are designed to meet evolving local, State, and Federal standards and regulations.

When it comes to the environment, the Navy is confronted with a many-faceted problem. Our efforts to date in such areas as smoke elimination at powerplants, incinerators and firefighting schools, our program to convert ships to cleaner burning distillate fuel together with the expanded effort in the construction or sewage and industrial waste treatment plants we think are important examples of our desire to seek a cleaner and more healthful environment.

We are hard at work on developing acceptable methods to handle sewage, trash, garbage, oil, and other wastes from our ships. Smoke and noise abatement from our planes are also areas in which we are concentrating. These problems are receiving the appropriate priority within the Navy and we are increasing our effort to develop the technology and the equipment required to do this job.

In recent months, Secretary Chafee has taken a number of significant initiatives with regard to ocean dumping. In December 1970, the Secretary prohibited the transporting and dumping at sea of wastes generated in-port or ashore, such as trash, refuse, oily wastes, and industrial sludges. In February of this year, as General Hayes indicated, Secretary Laird approved Secretary Chafee's proposal to suspend the deep water dumping of obsolete and unserviceable conventional ammunition until the Navy is able to determine the precise environmental effects of these dumps, as well as possible environmentally acceptable alternative methods of disposal. The deep water disposal of chemical and biological munitions has been specifically prohibited by Secretary Laird.

Each year the Navy must dispose of a significant amount of conventional ammunition that becomes unserviceable, unsafe, or obsolete. In recent years we have accomplished this through a number of means which have included demilitarization—that is, by physically taking the ammunition—apart, by controlled burning, by exploding, and by ocean dumping.

For many years, the Navy has used deep water dumping extensively for ammunition disposal and we have experienced no major safety hazard with this method. Since 1964, 19 deep water dump operations have taken place in which whole shiploads of ammunition, including the ship, were scuttled. As I mentioned, in February we suspended all deep water dumping of ammunition. While the present evidence indicates that the environmental impact of deep water dumping may well be minimal, some environmental questions remain unanswered. Consequently, plans for ocean dumping of munitions have been postponed until a reassessment of all alternative methods of disposal has been carried out.

The Assistant Secretary of the Navy for Research and Development has established a select high-level working group from our Navy laboratories and systems commands to examine the disposal problem and to develop a plan which will minimize or, hopefully, eliminate the need for ocean dumping. This is being done in consultation with the Army and the Air Force. In addition, the Navy is investigating the redesign of ammunition with the objective of easier, safer demilitarization.

In disposing of our old ammunition, it is the Navy's intention, regardless of the disposal method used, to comply with public laws

for the protection of the environment; and to work toward the President's goal to eliminate ocean dumping of munitions at the earliest date.

There are few requirements actually for the Navy or Navy contractors to dispose of Navy-generated materials into the ocean.

Perhaps the most significant situation would involve the disposal at sea of dredge material resulting from maintenance dredging of naval port facilities to insure adequate draft for ship operations. These dredging operations are now conducted under the direction and approval of the U.S. Army Corps of Engineers.

Under the administration's bill, a permit issued by the Environmental Protection Agency would be required for the regulated disposal of Navy dredgings, whether performed by Navy in-house capability or by civilian contractors. Certainly all such disposal will be performed in accordance with the standards and criteria to be developed by the Environmental Protection Agency. In any event, obtaining an APA permit for the relatively small amount of dredging in Navy ports should not impose a hardship on the Navy or on Navy contractors.

I would now like to briefly outline the Navy's basic position with regard to each of the bills being considered here by the committee.

It is the Navy's understanding that the purpose of S. 307 is to authorize the Secretary of Commerce to undertake a variety of programs and activities relating to oceanic and environmental research and development. Although the bill, if enacted, would be consistent with the objectives of the Marine Resources and Engineering Development Act of 1966, care must be exercised not to duplicate available and emerging laboratory facilities, ship construction capabilities and the layering of approvals in the administration of the permit system.

The enactment of this bill would not have an adverse impact on the Department of Defense. Accordingly, the Department of the Navy, on behalf of the Department of Defense, defers to other interested agencies as to the merits of the bill.

The proposed bill S. 1082 would regulate the discharge of wastes in territorial and international waters until 5 years after the date of enactment of the bill, and then prohibit disposal thereafter. This bill would also authorize research and demonstration projects to determine means of using and disposing of such wastes. It is entirely possible that the results of this and other search being undertaken may conclude that disposal of certain wastes into the ocean is the most environmentally acceptable approach to:

(*a*) Protect our already overloaded air and inland water resources; and

(*b*) Provide a method of beneficially recycling nutrients to certain sections of the ocean.

In addition, it is possible that more than five years will be required to develop and construct alternate land disposal methods. The 5-year deadline, imposed at this time in this bill, would preempt the results of research and development that should be conducted.

The proposed bill S. 1286 would require the immediate cessation of shipping wastes to sea for disposal for a minimum 6 month

period until the Environmental Protection Agency institutes provisions through which permits are issued for dumping. The disposal of wastes by ocean dumping has been practiced unchecked for many years, largely without the development of environmentally acceptable alternative disposal methods.

While the immediate cessation of dumping provided by this bill would not present a substantial problem for the Navy, it should be noted that the immediate cutoff could cause an insurmountable problem for cities that dispose of refuse, sludges and other wastes into the oceans.

The Navy supports S. 1238 and the phased and orderly regulated approach to the cessation of most ocean dumping while alternative methods of disposal are developed. This bill provides a logical approach to the mangement of the ocean which is based on the impact, and tradeoffs, of the total ecosystems such as human health, welfare and amenities, as well as that of the marine environment.

In looking at the various proposals, it is the Navy's contention that an appropriate ocean dumping act should provide a rational means of controlling ocean dumping which is based on the effect of the future—as well as the effect of alternative means of disposal of the materials on man's environment. In other words, discussion of legislation regarding regulating ocean dumping should include consideration for man's total environment, not only the ocean environment. We feel that S. 1238, calling for a permit system administered by the Environmental Protection Agency, which is charged with overall protection of the environment meets this criteria.

In addition, a reasonable ocean dumping act should exclude the day-to-day operational discharges from ships which are properly subject to regulation by other laws.

In summation, the Navy supports S. 1238 as a rational effective means to protecting the ocean environment while at the same time providing for consideration of man's total environment.

Mr. Chairman, this concludes my prepared statement.

General Groves. Mr. Chairman, I am Brig. Gen. Richard H. Groves, Deputy Director of Civil Works, Office, Chief of Engineers, Department of the Army. I appreciate having this opportunity to testify on the bills before your committee concerned with the subject of ocean dumping.

Mr. Chairman, these bills embody a variety of approaches to the problems associated with the dumping of waste materials in the oceans. Rather than discuss each of them in detail, I shall confine myself of discussing the administration bill and attempting to answer any question you have concerning the other bills.

Last year, at the request of the President, the Council on Environmental Quality investigated the problem of ocean pollution and concluded that there is a critical need for a national policy on ocean dumping. The recommendations of the Council were incorporated in the proposed Marine Protection Act of 1971, submitted to the Congress by the President and introduced as S. 1238.

The administration bill provides that, except as may be authorized in a permit issued by the Administrator of EPA, no person may transport material from the United States for the purpose of dump-

ing it into the ocean or other waters covered by the bill, or dump any materials into any such waters which are within the territorial jurisdiction of the United States, or dump any material into the waters of the contiguous zone to the extent that such dumping may affect the territorial sea or the territory of the United States. The bill would apply to all Federal, State, and foreign government organizations, employees and agents, as well as to private persons and entities. The waters to which the bill applies would include the Great Lakes. It would apply to all kinds of matter including dredge spoil, solid waste, sewage sludge, industrial wastes, radioactive materials, munitions, and chemical, biological and radiological warfare agents.

The Administrator would be authorized to issue permits to dump material or to transport them for dumping where in his judgment such activity will not unreasonably degrade or endanger human health, welfare or amenities, or the marine environment, ecological systems or economic potentialities.

He would be required to establish criteria for evaluating permit applications, taking into account the likely environmental effects of the proposed dumping, as well as alternative locations and methods of disposal and the impact on the public interest of issuing or denying permits or of requiring such alternative disposal.

The Administrator would be authorized to impose restrictions relating to the type and amount of materials to be dumped, and the time and place of dumping. He would be authorized to limit, deny, alter, or revoke permits where he finds that materials cannot be dumped consistently with the criteria established for the issuance of permits. Civil and criminal penalties of up to $50,000 per violation would be provided for violations of the act or any regulations or permit issued thereunder. The Attorney General would be authorized to bring actions for equitable relief to redress such violations. Surveillance and enforcement authority would be given to the Coast Guard.

The corps, under section 13 of the act of March 3, 1899—known as the Refuse Act—has authority to regulate the dumping of material in the navigable waters of the United States, including the coastal waters out to the 3-mile territorial limit. Additionally, under our Harbor Supervisory Act, 33 U.S.C. 441–451, we can regulate dumping of materials beyond the 3-mile limit through the exercise of control over the destination of a vessel leaving the harbor. This authority, however, applies only to the harbors of New York, Baltimore, and Hampton Roads.

Since most dumping occurs more than 3 miles offshore, our authorities are not adequate to provide effective regulation. The administration bill would provide a means of regulating the dumping of material which could adversely affect human health or welfare or the environment. We support its enactment.

Mr. Chairman, that concludes my statement. I will be pleased to answer any questions that the committee may have.

Senator HOLLINGS. General Groves, you testified that the corps under section 13 has the authority to regulate the dumping of material in the navigable waters and coastal waters to the 3-mile limit. Why not expand that authority?

General GROVES. That is a possibility.

Senator HOLLINGS. Rather than putting it in the Environmental Protection Agency.

What is your comment on that?

General GROVES. The feeling in the corps, sir, is that this would be one logical solution to the present problem.

Senator HOLLINGS. You are testifying on behalf of the administration bill, aren't you?

General GROVES. That is correct, sir.

Senator HOLLINGS. So you really think it should be in the Environmental Protection Agency rather than in the corps?

General GROVES. The administration bill would put it there, yes, sir.

Senator HOLLINGS. I know, I can read. But I asked how you felt about it?

General GROVES. I personally, sir, would believe it would be a simpler matter if we applied to this problem the same solution we apply to the Refuse Act problem.

Senator HOLLINGS. So you would expand the corps' authority?

General GROVES. The formula that we are applying to the Refuse Act, sir, which could be applied here, and again my own personal opinion is it would be simpler from our standpoint. It would require for us to issue the permit, in the name of the Secretary of the Army, with input from the Environmental Protection Agency concerning the standards that are applicable, which govern our action. In other words, if the applicant does not meet their standards, there is no permit.

We would also receive inputs from the Commerce and Fish and Wildlife people of Interior and Commerce with respect to effects on fish and wildlife. Their comments would be carefully considereed.

And finally we consider our own responsibilities as they relate to maintaining navigation. If all three of these tests are met, the permit is issued, and if any one of them fails, there is no permit. This is the formula we are applying in the section 13 case. It could be applicable here.

Senator HOLLINGS. Then, as your answer indicates, one of the prime missions is to maintain navigation. Concerned with maintaining navigation is the development of port facilities and keeping the harbors clear and clearing ships through channels.

Could there be a conflict between that primary mission of maintaining navigation and also protecting the environment, and would the resolving of that conflict be in favor of the primary mission of maintaining navigation? Do you see that as a conflict?

General GROVES. We see conflicts, sir, all over the place in that particular area. In almost everything we do, we affect the environment. The question is the degree to which you affect it adversely.

We routinely apply now to everything we do that has significant effects, the provisions of section 102(c) of the Environmental Policy Act of 1969, which causes us to write five-point impact statements. We evaluate this very carefully. And eventually we have to decide: Is the need for this project worth paying the price in the form of adverse environmental effects?

This is the procedure that we go through now routinely. It is obvious to us that you can't construct anything without affecting the environment. That is implicit by definition, that is what construction is.

The real hard question that we have to answer is: Is it worth paying this price? And we are making a very conscious effort to arrive at reasonable answers to that question.

Senator HOLLINGS. General, how has the corps regulated the dumping in the New York bight under the Harbor Supervisory Act, to take a particular case?

General GROVES. The Supervisory Act, as you know, was passed in 1888. Since that time the district engineer in New York has served also as harbor master and he regulates the dumping of five basic categories of materials in the bight.

Many years ago, I think 40 or 50 years ago, the present sites were designated. In effect the designation of these sites is comparable to the designation of a pierhead line or bulkhead line. In other words, anybody who has materials to be dumped which fit the definition of the uses of that area may put them there.

Now, we also issue in effect what is a permit, but this is an administrative procedure by which we keep track of who is using these sites. Once the site has been set aside for that purpose, in effect those who wish to are free to put appropriate materials in them.

Senator HOLLINGS. Thank you, sir.

Admiral Becker, relative to your statement that in December of 1970 the Secretary prohibited the dumping at sea of wastes generated in port or ashore, what is the policy with respect to ships at sea?

I am not trying to take you off guard, but there has been some correspondence between Rear Admiral Beshany and Senator Inouye of this subcommittee relative to the dumping of waste at sea of trash and garbage off Navy ships.

There are some 700 Navy ships plying the seas. And we are trying to determine really what is the policy regarding the dumping of garbage into the high seas. We were told that in accordance with this statement of yours that since December, under the Secretary's orders, they don't do that any more, and yet there have been pictures produced and forwarded to Senator Inouye showing garbage and solid wastes, with the statement made it was dumped at sea.

What is the policy?

Admiral BECKER. I have with me, sir, the Chief of Naval Operations' instruction on this matter. The subject of the instruction is "Environmental quality program, policy and assignment of responsibilities."

I can speak to that specific point. A paragraph in this CNO basic instruction which was distributed to the entire fleet states:

> In the routine operation of naval vessels, maximum use is to be made of all available port disposal facilities for all wastes prior to getting underway and upon returning. No oil of any sort, including sludge from bilges, fuel tanks, lube oil tanks, waste oil, or oily rags or trash and rubbish shall be pumped or thrown overboard within the prohibited zone which for most places is 50 miles from the coastline.

That prohibited zone refers to the Oil Pollution Act of 1961, as a result of an international agreement, prescribing a prohibitive zone as 50 miles off the coastline of the United States.

Garbage shall not be thrown overboard within the contiguous zone, which is 12 miles from the coastline.

Then it goes on to say the trash and rubbish at sea should be packaged for negative buoyancy. And one final proviso:

These requirements do not exclude the dumping of waste products when an emergency situation exists and failure to do so would clearly endanger the health and safety of personnel.

This is a recent instruction.

Senator HOLLINGS How recent is that?

Admiral BECKER. March 2, 1971.

Senator HOLLINGS. You still then dump some of your garbage, trash, and rubbish at sea?

Admiral BECKER. Yes, sir.

Senator HOLLINGS. With respect to the matter of munitions, the order in February by Secretary Chafee says you are going to withhold until you are able to determine the precise environmental effects of munitions dumping. Now, what is being done to determine it, how long a study will it be, and are we going to read in the morning paper that he did determine it and you are dumping munitions again? This keeps us off balance here and it looks like an unsteady governmental policy.

Admiral BECKER. There is no doubt but what the Navy understands what Mr. Chafee has said. He has said that there will be a suspension of all dumping of conventional ammunition until such time as this additional research and development has taken place. And we have stopped it.

As far as what are we doing in terms of the research and development, I mentioned in my testimony that Mr. Chafee set up a high-level group of people. The chairman of that group, or the gentleman who is monitoring it, is Dr. Frosh, the Assistant Secretary of the Navy for Research and Development, and the group is working under the direct supervision of the Director of Navy Laboratories.

This group consists of scientists from our Navy Ordnance Laboratory, White Oak, Md., our Navy Research Lab, Washington, D.C., our Navy Weapons Station, Indian Head, Md., and the Weapons Center, China Lake, Calif. All of these gentlemen are working with this group.

I have seen just briefly, as a matter of fact, this morning, a preliminary report. I just had a chance to glance at it and it does look encouraging and we expect we would have their report hopefully by mid-June.

And in addition to that specific organization's action, the Chief of Naval Operations has directed the Navy Material Command and the Oceanographer of the Navy to take immediate steps, in full coordination with the Director of Naval Laboratories group, to find new methods of disposal and to thoroughly research the effect of any past conventional ammunition dumpings, I mentioned 19 or so shiploads we have sunk in the last 7 years to see what effect it has had on the environment.

Senator HOLLINGS. Have you found the ships off the coast of New Jersey, two of them, sunk some 3 years ago in operation CHASE?

Admiral BECKER. I think we have, sir. There is a gentleman here from the Naval Ordnance Systems Command who can speak further on that, if you would like that.

Senator HOLLINGS. I think it would be good to hear from him exactly what happened. We are all in the dark as to dumping practices. We are trying to legislate and we don't know what we are legislating.

Admiral CHRISTMAN. I am Rear Admiral Christman, deputy commander of the Naval Ordnance Systems Command. Getting prepared to submit a statement to the Council before the cessation of dumping by Mr. Chafee, we did work with NAVOCEANO and the Woods Hole Institute in New England, to make surveys of previous dumping sites.

These sites are about 10 miles square. When those ships were sunk in those 10-mile-square sites, we did not have precise navigation fixes on them, although we know they went down within the 10-by-10 miles square.

So our initial look-sees with various underseas investigative units, *Mizar* and other ships, did not precisely in fact pinpoint any specific ships. We know we were in the general area of the dump, but we do not have positive confirmation that we saw the ships.

Senator HOLLINGS. So we still don't know. What about marine biological studies prior to the dumping, and the effect on the marine environment thereafter? You have to pretest in order to understand the changes shown in posttesting. Is that not so?

Admiral CHRISTMAN. This is certainly true, sir. As a matter of fact, when all of the concern came about the dumping in the ocean, we basically weren't at—well, we basically went at it in two ways. First of all, we knew that we had dumped material during these dumpings which Admiral Becker talked about. So we took the oldest site, and we took basically two sites, one on each coast, and we did run surveys which would simply say here is what that site looks like in the ocean today. It was our plan for the dumps which had been planned for this year, provided we got approval, to run extensive surveys before the dumping, during the dumping and after the dumping on a sampling basis to see what the ecological effect had been.

So you are certainly correct that there has not been controlled experimentation where there has been a careful examination of the site prior to dumping; the dumping occurs, and then we examine the site afterward.

On the other hand of course there are oceanographic studies which have been going on in Florida and in New England, possibly in your home State, sir, where they have been studying the bottom effect of the ocean and what is going on with sealife.

What we can say is that at least to the extent that our instruments are sophisticated now, the surveys which we did make, these two preliminary surveys, did not find any noticeable change in the environment due to the existence of the munitions.

Senator HOLLINGS. Admiral, Dr. MacDonald of the Council on Environmental Quality testified just before your appearance about the short term research and development endeavor of the Environmental Protection Agency, and the long term ocean pollution research function of NOAA. You have just spoken about the Oceanog-

rapher of the Navy, who is also engaged in research. And within the Government there must be an inadequacy, because you are consulting with Woods Hole, which I commend. If you were king for a day, where would you put ocean pollution research? Is it feasible or practical to centralize the research or coordinate it better? What would you do?

Admiral CHRISTMAN. Personally, it would be my opinion that the more people that we have who are qualified studying in the area, the better off we are. The most dangerous situation I can visualize is where we get one agency that only looks at it from one viewpoint. And we are not bringing into the public view all of these various facets of effects on ecology.

I thought that what was described was a very appropirate approach, wherein NOAA is trying to study long term effects, what is happening to the environment on the bottom, what are these little worms that crawl around there, how they are affected on a long term basis by these materials.

At the same time we face the same problem we do with rivers and with silting in the rivers and harbors. The country is going to have to take action in some fashion. So EPA is going to have to come up with short term answers pending whatever we can find out on the long term basis.

We frankly welcome both investigations and think it quite proper to have them in different agencies or at least that would be my personal recommendation.

Senator HOLLINGS. And the Oceanographer would also continue to conduct his research and development relative to defense needs; is that right?

Admiral CHRISTMAN. Yes, sir.

Senator HOLLINGS. And you think duplication, if any, is salutory?

Admiral CHRISTMAN. Yes.

Senator HOLLINGS. That we could and should afford it?

Admiral CHRISTMAN. Yes, sir. And, of course, you are probably well aware better than I that there is a tremendous effort in the Government to make sure these publications are properly made available to everyone, so it won't be a case of one agency holding their reports to themselves, but rather, each agency would be distributing reports to others.

Senator HOLLINGS. Thank you very much, Admiral.

Admiral Becker, I want you to elaborate in consonance with your colleague's statement:

> If enacted, the bill would be consistent with the objectives of the Marine Resources and Engineering Developments Act of 1966. Care must be exercised not to duplicate the available and emerging laboratory facilities.

Would you go along with the previous statement? Do you still stand by that, or do you find no duplication? That is what we are trying to determine.

Admiral BECKER. I think that what we were getting at, was if we had two agencies in the act, like the Environmental Protection Agency and NOAA, that there should be full coordination and understanding of what the two groups are doing. I am talking really of an

awareness of each other's programs, to prevent building of additional laboratories where we already have a laboratory that exists. I am talking about a coordinated effort. I surely would agree. I see nothing wrong with two major agencies involved.

Senator HOLLINGS. Then back to your statement where you talk about determining the precise environmental effects before we resume—if and when—the dumping of munitions in the ocean. You say report is due, you think, about June of this year; is that right?

Admiral BECKER. I am sure that is going to be a preliminary one, sir. I don't think I could even estimate; I have no real feel for the timing. I think Mr. Chafee would be satified only when we have determined the total effects and, if there is no adverse effect on the ecology of the ocean, then we could consider making another attempt to get permission to resume deepwater dumping.

I don't have that good a feel for it, sir. They are really just getting started.

Senator HOLLINGS. Thank you very much.

General Hayes, regarding your statement that alternative methods of disposal have been completely studied, would you elaborate on that in light of the Admiral's testimony that a high level group is studying this area also? On February 24, Secretary Laird, who has the responsibility for all arms and defense, approved the order to suspend munitions dumping until all alternative methods of disposal were considered.

Are there any alternative methods of disposal being studied, other than what this particular group is studying, to which Admiral Becker testified?

General HAYES. Yes; there are. The particular areas of concern for the Army at the present time, which is the agency that is mostly involved, have been the demilitarization of biological and chemical warefare agents. Progress has been made and it looks as if there is going to be a satisfactory solution to the disposal of the chemical agents as well as the biological agents, without resorting to deepwater dumping. This is still in the developmental phase but the progress so far has been very good.

Senator HOLLINGS. Have any studies been made to determine the cost factors and the requirement that munitions hereafter employed be able to be demilitarized safely and economically?

General HAYES. I wouldn't say we have done research in this particular area. We are trying to find out how we can put this into the budget and make a realistic assessment of what the budgetary requirements are going to be. That is as far as the research is at the moment.

Senator HOLLINGS. What is going on with respect to nuclear explosions? At one time it was thought, for example, some of the nerve gas could be buried in a chamber in the AEC's Nevada test site, and exploded nuclearly. Is that being looked into also?

General HAYES. I don't think the nuclear technique is presently being pursued, Mr. Chairman. We think we have an alternate method which will achieve the results and not have the other complications that might develop with the nuclear technique.

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Senator HOLLINGS. In the next paragraph you talk of the Army staffing and coordinating with other Federal and State authorities in the demilitarization program.

When is that staffing and coordinating to be completed? Do you have copies of that plan you can furnish the committee?

General HAYES. It will depend when the final plan, which is as I say under development, reaches the state where we can say to the State or local area "These are the factors that are going to hold." The preliminary aspects of this are under consideration already and we are now processing environmental statements as required by section 102(2) of Public Law 91-190. After processing, we will be happy to provide the statements to the committee.

Senator HOLLINGS. You state that absolute prohibition of all ocean disposal could result in disposal techniques that pose greater hazards to man and his environment than those which currently exist. Would you expand on that, please?

General HAYES. I think the key word there, Mr. Chairman, is "could" result. We don't know that they will. But we are trying to be cautious both ways. That being the key word, it puts us in the position of saying we don't really want to be boxed into untenable positions by too narrow legislation.

Senator HOLLINGS. General Groves, do you think the corps requires the obtaining of a permit for its own activities in dumping.

General GROVES. For what, sir?

Senator HOLLINGS. For dumping in the oceans. For the corps itself?

General GROVES. Presently, sir?

Senator HOLLINGS. Yes. Under the bill, S. 1238, would you consider that the corps would be required to obtain a permit for its own dumping?

General GROVES. That is my understanding, yes, sir.

Senator HOLLINGS. In your budget, I think in the expansion, under the Refuse Act, of permit activities of the corps, you are asking for some 200 more personnel. Is that correct?

General GROVES. That is to administer the section 13 Refuse Act, yes, sir.

Senator HOLLINGS. You are going to take on that many more people because you have that many more applications now. Is that right?

General GROVES. Sir; we have a continuous turnover. I can't answer the question at this time.

Senator HOLLINGS. You couldn't say whether it is from expanded demand, or whether it is turnover then?

General GROVES. We are identifying 200 spaces as being dedicated to the administration of section 13 of the 1899 River and Harbor Act only. Two hundred people and $4 million per year.

Senator HOLLINGS. Do any of you gentlemen wish to add anything further?

We appreciate very much your appearance this morning before the committee.

General HAYES. No; thank you, sir.

Senator HOLLINGS. Thank you very much.

The committee is very pleased to hear at this time from Dr. Eugene V. Coan, of the Sierra Club.

STATEMENT OF DR. EUGENE V. COAN, THE SIERRA CLUB

Dr. COAN. We appreciate this opportunity to present our views on the question of dumping into the marine environment and the Great Lakes, for this has become a matter of growing concern to us. Of our many environmental problems, this one appears to hold some especially grave dangers.

We have reached the time when we can no longer consider the ocean and the Great Lakes to be a dumping grounds of last resort. We can no longer indiscriminantly place our waste materials in the sea and assume that they will not return to haunt us. As large and powerful as the sea may seem, it is surprisingly fragile. It is also of growing importance to us.

Given time ,the fresh water of the world can cleanse itself, but the sea cannot. Once we put our chemicals and trash into it, they may be there for a very long time. We are already familiar with the tragic story of DDT, the first recognized and now best understood of a growing list of materials we have come to call "environmentally hazardous substances." It is probable that other chemicals will prove to be as long-lived and as harmful, for example other chlorinated hydrocarbons, the heavy metals, the petrochemicals lost in oil spills, and radioactive plutonium.

When we commit environmental injustice on land, it is often within our power to undo the damage, given enough time and money. If we do further harm to the sea, it will be beyond our power to undo that harm.

Moreover, we cannot allow the deep sea to be the ultimate carpet under which to sweep our trash. We know less about the life of the deep sea and its interrelationships than any other area of our planet. Recent work at Woods Hole has begun to show that the creatures of the deep sea are more diverse and abundant than we had previously supposed. We have no more right to contaminate and kill the organisms of the deep sea than those of shallow water simply because they are less well known and more distant from us.

There are three broad, interrelated areas of marine conservation. First, the maintenance of water quality. Second, the conservation of marine organisms, including fisheries and other wildlife. Third, the conservation and planning of the shoreline. Some of our fisheries have already declined, and it is increasingly difficult to determine the reasons for the declines, whether poor management or the result of coastal contamination by dumping and sewage discharge. In some ways, the use of our shoreline is dictated by the extent of water pollution. So, upgrading and maintaining water quality is a key factor in marine conservation.

Obviously, the answer is that we must stop all pollution of the sea. The sea is just as insufficient an answer to the problem of waste disposal as food from the sea is a solution to the problems of hunger and overpopulation.

We must move now to extract ourselves from this potentially dangerous situation by establishing two basic goals. First, we must set in motion the machinery which will enable us to find out what is happening to the sea and what we can do about it. Then, we must take action now where we can.

Some necessary studies have already been initiated by the Environmental Protection Agency, by the National Science Foundation, and by the sea grant program, now under the National Oceanic and Atmospheric Administration. What is required is a clear, overall set of goals, the proper funding for the programs, and coordination among the granting agencies involved.

These research goals must be (1) to establish natural levels or the existing levels of contamination for as many substances as possible over as wide an area as possible; (2) to establish water quality criteria based on extensive testing of a wide array of substances on a wide variety of marine organisms. We need to look not only for the immediate toxicity of the substances but their subtle effects on the health and reproductive ability of marine organisms for more than one generation. We need to have this information about as many organisms as possible, but certainly for the most important ones both commercially and ecologically. Until we have such exhaustive information, we cannot possibly set water quality standards.

In this regard the Environmental Protection Agency has a very long way to go.

(3) Finally, we need to put as much money as possible into funding ways to reclaim and recycle so-called wastes.

It will only be after we have a substantial amount of information in all of these three fields that we can deal adequately and knowledgeably with the problem of dumping.

Needless to say, it will be quite a while before we have the required answers. We must act now upon the most serious problems and give ourselves deadlines for eliminating marine pollution.

The legislation which should be enacted this Congress should do the following things:

(1) Establish a national policy and goal of eliminating environmentally harmful dumping in the sea and the Great Lakes.

(2) Establish a permit system under the Environmental Protection Agency for all forms of ocean dumping, including sewage discharge with pipes.

As I understand it, the new rules which are being promulgated under the 1899 act by the Army Corps will cover industrial effluents but not sewage discharge from cities. Very often the industries put their effluents into the cities' discharge and, therefore, this would escape regulation other than under the water quality standards.

I think we have reached a time when we ought to include sewage discharge under some kind of permit system, as in S. 192, which is before Senator Muskie's subcommittee.

(3) Place the burden of proof on the parties wishing to dump materials to prove that no environmental harm would be done.

(4) Establish broad criteria for the use of the Environmental Protection Agency in evaluating dumping permit applications.

As I read the bill, it seems to me that past permits which have been issued under the 1899 act for dumping are exempted from this legislation. If indeed dumping is a problem, and existing dumping is to some extent under the permit system of the 1899 act, then this bill would not be covering the permits which currently exist.

In that case, we are not regulating dumping.

(5) Allow public hearings when a dumping permit is contested.

(6) Completely prevent the dumping into the sea or Great Lakes of environmentally hazardous substances, being defined as follows: substances which persist in the marine environment because of their physical, chemical, and biological properties, and/or which become widespread in the marine environment because of their physical and chemical properties, and/or which tend to become more concentrated in living organisms than in the surrounding environment, and which present a danger to living organisms by their direct toxicity or their effect on the health or reproductive ability of living organisms or the health of man.

With regard to such substances, we should be properly acting in advance of critical threats to marine life in much the same fashion as we act with regard to drugs with dangerous side effects.

(7) Include permit regulation over major construction and earth moving on the shoreline which would result in significant erosion and silting in the nearby marine environment.

This perhaps ought to be part of coastal legislation, but I mention this because it is becoming quite a problem and it is, in essence, marine dumping.

(8) Establish fines for parties violating the regulations and establish the necessary enforcement procedures.

(9) Establish dates after which sewage to be placed into the sea or the Great Lakes must be upgraded. We would expect that much increased Federal assistance will make it possible to meet these deadlines.

In this regard, I refer to H.R. 4359 which contains such a provision.

(10) Enable substantial areas to be set aside in which no dumping would be permitted. These would serve to protect especially fragile areas and a significant number of areas to serve as baselines for biological studies.

(11) Clearly establish, in this legislation, the basic research goals outlined above to produce a long-term solution to the problem, with the necessary interagency coordination to carry out the research, and the authorization of proper funding levels.

(12) Establish a national goal for the Department of State to seek international cooperation with regard to preserving the oceans from harmful dumping.

(13) And, finally, we don't think that the Atomic Energy Commission should be so exclusively left out of the bill, and perhaps certification on the part of the Environmental Protection Agency would be in order.

Senator HOLLINGS. Dr. Coan, to get a little information about yourself. What capacity do you have with the Sierra Club?

Dr. COAN. I am a consultant to the Sierra Club on marine conservation affairs.

Senator HOLLINGS. So you are the club's consultant. And you have studied the oceans and coastline for the Sierra Club.

Dr. COAN. We are just beginning a study of the problems of the marine environment, so we can be more effective in this area.

Senator HOLLINGS. As a consultant, can you give us your educational background and your experience in this field?

Dr. COAN. I have a doctorate from Stanford University. My field is systematic zoology.

Senator HOLLINGS. Does the Sierra Club support S. 1238 or not?

Dr. COAN. With the modifications I have suggested, we would support the administration bill.

Senator HOLLINGS. The modifications being, of course, providing for public hearings in disputed permit cases, and the other things you outline here.

Now, establishing a permit system under the Environmental Protection Agency for all forms of ocean dumping, including sewage, why not the corps? What would be you answer to that?

Dr. COAN. Well, we do appreciate the Department of Defense considering that environmental pollution is a national enemy, but we have established the Environmental Protection Agency, and we would like to see as much as possible of environmental protection under the Environmental Protection Agency.

Senator HOLLINGS. Do you think the corps has been doing an adequate job?

Dr. COAN. It is just recently that the corps has gotten into establishing a permit system with regard to industrial discharge, and we don't know how that will work out.

Marine dumping is a problem. That is the reason we are seeking legislation. Evidentally then the corps has not done an adequate job under the 1899 program in the past with regard to dumping.

Senator HOLLINGS. From your experience as a consultant engaged in research, what would be your comment relative to the research conducted by the Environmental Protection Agency, the Oceanographer of the Navy, NOAA under the aegis of the Department of Commerce? Do you think all of them should be engaged in this research, or how should it be coordinated?

Dr. COAN. With regard to marine research, in general, I don't think we need one agency which has overall responsibility over the seas. But if we are attempting to seek an answer to a specific problem, as, for instance, marine dumping, we ought to have a great degree of coordination among agencies. If, for instance, we have very adequate data generated by the National Science Foundation and by NOAA on levels of marine contamination of a number of substances, but we have inadequate data on the toxicity of the substances, because the Environmental Protection Agency has failed to generate such data, then we won't have the picture.

So I think a degree of coordination, either under the Council or the Office of Science and Technology, with regard to this specific problem, would help.

Senator HOLLINGS. Your testimony is that the AEC should be included for permits under the bill. Do you have any knowledge of the extent, if any, of ocean dumping or within the Great Lakes of nuclear fissionable material or wastes?

Dr. COAN. Other than reading the Council's report, I don't.

Senator HOLLINGS. Dr. Coan, referring to item No. 6 of your testimony, there you talk about preventing dumping in the Great Lakes and in the sea of environmentally "hazardous substances," which are defined as substances which persist in the marine environment, be-

cause of their physical, chemical, and biological properties. Will you elaborate on that, because I think it encompasses what we would consider pollutants. I think it is a well stated summary, and I would like you to elaborate on that.

Dr. COAN. Well, written into the Federal water quality laws there is mention of hazardous substances. But it doesn't completely spell out what we are coming to call environmental hazardous substances.

Specifically, what we are talking about here is getting into situations from which we cannot return, putting things into the sea or into time and have harmful effects from which there is no way we can withdraw. In those cases, we can prevent further contamination, and maybe ameliorate some of the effects, but we can't get away from them. I think at least in terms of the consideration the Environmental Protection Agency ought to give in granting permits, if not directions for the kinds of things that ought not to be permitted, we ought to write in something like this, which would spell out, at the very least, our concern for this category of substances.

Senator HOLLINGS. We appreciate very much your appearance here this morning.

Is there anything you wish to add?

Dr. COAN. No, sir.

Senator HOLLINGS. Thank you a lot.

The committee will be in recess until its further hearings on the 21st.

(Whereupon, at 12:15 p.m., the subcommittee was recessed until Wednesday, April 21, 1971.)

OCEAN WASTE DISPOSAL

WEDNESDAY, APRIL 21, 1971

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON OCEANS AND ATMOSPHERE,
Washington, D.C.

The subcommittee met at 10:11 a.m. in room 5110, New Senate Office Building, Hon. Robert P. Griffin, presiding.

Present: Senators Griffin and Stevens.

OPENING STATEMENT OF SENATOR GRIFFIN

Senator GRIFFIN. The subcommittee will be in order.

Today the subcommittee will continue hearings on several legislative proposals pending before it to prohibit unregulated ocean dumping of material and to restrict ocean disposal of materials harmful to the environment. The Chair is keenly aware of the need for effective legislation in this area. I have viewed with considerable concern the degradation of the quality of the Great Lakes, and as one who represents a State in that area, I welcome the opportunity to actively participate in meaningful deliberations such as this to seek effective solutions.

As President Nixon observed in his message to the Congress on February 8, proposing his legislative program, including one of the bills before this subcommittee today, S. 1238, he said:

> As our Nation comes to grips with our environmental problems we will find that difficult choices have to be made, that substantial costs have to be met, and that sacrifices have to be made. Environmental quality cannot be achieved cheaply or easily, but I believe the American people are ready to do what is necessary.

Last Thursday the subcommittee heard from representatives of the administration—the Council on Environmental Quality and the Department of Defense—in support of the administration bill, S. 1238. Those witnesses explained the rationale of the legislation and revealed some of its inherent difficulties. We heard also the testimony of Dr. Eugene Coan of the Sierra Club who raised main points concerning the legislation.

Today we shall hear additional representatives of executive agencies. We are pleased to welcome Hon. James M. Beggs, Under Secretary of Transportation, accompanied by Rear Adm. Robert E. Hammond of the Coast Guard, and Hon. John Stevenson, Legal Adviser of the Department of State. Dr. David Smith of the Dillingham En-

vironmental Co., La Jolla, Calif., who performed much of the ocean dumping research on which we rely for basic information today, will bring welcome expertise to our deliberations. I am pleased, also, that Mr. Louis Clapper of the National Wildlife Federation will share with us his insights and critique of the pending legislation.

On behalf of the subcommittee and its chairman, Senator Hollings, I welcome all of you, gentlemen. The previous days' hearing have sharpened many of the issues. Is the legislation strong enough? Should existing regulatory programs and activities of the Corps of Engineers, the Atomic Energy Commission, and the Coast Guard be strengthened? Or, should the Environmental Protection Agency be given regulatory authority over all dumping, excluding other Federal agencies except as dumping might affect navigation?

Secretary Beggs, the subcommittee welcomes you and invites you to proceed in any way you see fit.

STATEMENT OF HON. JAMES M. BEGGS, UNDER SECRETARY, DEPARTMENT OF TRANSPORTATION; ACCOMPANIED BY REAR ADM. ROBERT E. HAMMOND, CHIEF, OFFICE OF OPERATIONS, U.S. COAST GUARD

Mr. BEGGS. Thank you, Mr. Chairman.

I appreciate the opportunity to testify today on S. 1238 and related bills, all of which are directed at the serious problem of the contamination of our oceans. I would like to introduce Rear Adm. Robert E. Hammond, Chief of the Office of Operations of the Coast Guard, who is on my right.

Secretary Volpe has said often that at the Department of Transportation environmental quality is a goal, not a constraint. I am pleased to be here today to explore with the subcommittee how the Department, through the Coast Guard, can play a positive and effective role in regulating ocean dumping.

I graduated from the Naval Academy in 1947. At that time no one questioned the capacity of the oceans to absorb our waste. We now realize, however, the peril of ocean dumping on a major scale. We now understand that we cannot continue to poison our oceans merely because they seem large enough to dilute the poison.

Administrator Ruckelshaus of the Environmental Protetion Agency and Chairman Train of the Council on Environmental Quality will testify during this hearing. Both of these gentlemen will address themselves to the environmental concerns involved. I need not reiterate their statement of the problem or their commitment to solving it. I would like, however, to assure this subcommittee that my department, through the Coast Guard, stands ready to cooperate immediately with the Environmental Protection Agency to carry out those portions of the program which they choose to delegate to us. I can also assure the subcommittee that the Coast Guard can today fulfill its responsibilities for enforcement under setion 8(c) of S. 1238.

In this regard, let me review for you the capabilities of the Coast Guard to carry out this proposed legislation. I have attached to my statement as appendix A a more thorough analysis of what is avail-

able in the way of support personnel, materials, and technical expertise to fulfill this mission.

The Coast Guard is already active in the area of ocean dumping as an adjunct to its marine environmental protection program. On a day-to-day basis they receive information on planned dumping and record the location, identity of materials, and persons involved in all observed ocean dumping activities. This information is furnished to interested agencies such as the Council of Environmental Quality and the Environmental Protection Agency. They have also monitored many dumping operations upon request.

Based on our experience, we believe effective regulation of ocean waste disposal requires three elements: A permit issuing authority, an available surveillance and enforcement capability, and effective monitoring activity. Clearly the agency vested with the responsibility for enforcement should have some involvement at each stage of the regulation scheme, particularly the issuance of permits.

S. 1238 makes provision for this in section 8(b), and we have already begun to discuss with the Environmental Protection Agency how we can be most useful to them and to the program. It is self-evident that effective surveillance and enforcement calls for knowledge of any permits issued and the terms of those permits.

The Coast Guard engages in a variety of mission areas which would support the role of the Environmental Protection Agency in the regulation of ocean dumping. They have long been established as the Federal maritime law enforcement agency. Their officers and men are trained and experienced in seamanship. The Coast Guard provides a substantial Federal maritime force for enforcement of the maritime aspects of the Refuse Act and the various other oil pollution laws. They also have a long history of involvement with the marine community in such areas as the handling of dangerous cargo and the issuance of permits for various regulated marine activities.

In addition, the Coast Guard has the facilities to carry out these functions, and with little augmentation can utilize these same facilities to participate actively in a program of ocean dumping regulation. Appendix A outlines in detail the Coast Guard units available for ocean dumping regulatory activity. As you will note, they cover all waters over which the United States has jurisdiction.

The Coast Guard can easily aid the Environmental Protection Agency in the issuance of permits, and I have listed in appendix A the locations of the already-established Coast Guard captains of the port and marine inspection offices. I wish to emphasize that these offices are well known to all members of the marine industry, both national and foreign, and are presently involved in many tasks closely related to ocean waste disposal regulation.

Captains of the port are responsible for the inspection of port structures housing hazardous materials and for the supervision of explosives loading. Marine inspectors are responsible for the inspection and certification of merchant vessels. These two types of facilities represent an already available administrative force. We believe these offices would be able to absorb a permit issuing function with a modest personnel increase. The fiscal year 1972 budget already contains 26 additional staff members for the captain of the port offices to help handle

the increased work loads caused by expanded pollution control and port security duties. Based on a projection of 3,000 to 6,000 permits a year, we would estimate that an additional $285,000 for additional personnel would be needed for this function during the first year.

In addition, the Coast Guard's experience and the data they have collected in the regulation of hazardous material transport would be readily available to assist the Environmental Protection Agency in making the necessary determinations as to whether or not particular substances should be disposed of at sea. The Coast Guard also collects oceanographic data in support of other missions which, while presently limited in scope, could be utilized in baseline determination.

Captains of the port have small boats ranging from 31 to 44 feet at their disposal for a variety of tasks including the supervision of loading of material to be dumped at sea and other calm water surveillance and monitoring—82-and 95-foot patrol boats are also available for the same tasks. Medium- and high-endurance cutters can be utilized too, and these vessels are capable of long-range operations of extended duration. Finally, Coast Guard helicopters and fixed-wing aircraft can respond in less than 1 hour for surveillance and other duties.

We are currently assuming that surveillance will be required in each instance when toxic or radioactive dumping takes place. In other cases spot checks will be made in approximately 5 to 10 percent of the dumpings. To specifically carry out the surveillance function we would initially utilize the six HU 16 aircraft which the fiscal year 1972 budget reactivates for the marine environmental protection program. The Coast Guard estimates that this places an additional burden of 600 aircraft hours or $315,000 on its resources.

The availability of surface vessels is somewhat more critical. The Coast Guard has estimated that surface surveillance activities will require 350 ship-days at a cost of $1 million. If the committee would like, I would be pleased to submit for the record how we arrived at this figure.

We would point out that our present fleet is fast approaching its limit of use, even based on multipurpose missions.

Senator GRIFFIN. Secretary Beggs, if I may interrupt, I will ask you at this point, for the benefit of the subcommittee, to submit later some indication as to how you arrived at those figures.

Mr. BEGGS. Yes, sir; we will be pleased to do so.

(The information follows:)

MIO AND COTP UNITS AND SUBUNITS LOCATED ON GREAT LAKES

(MIO—Marine Inspection Office; MIDET—Merchant Marine Inspection Establishment; COTP—Captain of the Port)

1. CG MIO Buffalo, Buffalo, N.Y.:
   MIDET Oswego
   MIDET Erie
   MIDET Alexandria Bay
2. CG MIO Cleveland, Cleveland, Ohio: COTP Cleveland
3. CG Group Buffalo, Buffalo, N.Y.: COTP Buffalo
4. CG MIO Toedo, Toledo, Ohio: COTP Toledo
5. CG MIO Detroit, Detroit, Mich.: MIDET, Bay City

6. CG MIO St. Ignace, St. Ignace, Mich.
7. CG Group Muskegon, Muskegon, Mich.: COTP Muskegon
8. CG MIO Chicago, Chicago, Ill.:
   MIDET Ludington
   MIDET South Chicago
   MIDET Milwaukee
   MIDET Manitowoc (to be replaced by MIDET Sturgeon Bay)
   COTP Chicago (unit to be under MIO in near future)
9. CG Group Milwaukee, Milwaukee, Wisc.: COTP Milwaukee
10. CG Group Sault Ste. Marie, Mich.: COTP Sault Ste. Marie
11. CG Group Duluth, Duluth, Minn.: COTP Duluth
12. CG Group Detroit, Detroit, Mich.: COTP Detroit
13. CG MIO Duluth, Duluth, Minn.

The following units are being closed as a result of recent reorganization:
   COTP Ludington
   COTP Oswego
   MIO Ludington
   MIO Milwaukee
   MIO Oswego

Mr. BEGGS. Exact requirements cannot be determined, but we believe additions to the fleet in the smaller cutter range will be necessary in the future in order to fully perform our surveillance function.

Further personnel expenses to maintain liaison with the Environmental Protection Agency will be necessary.

If requested, we could also aid the Environmental Protection Agency in oceanographic monitoring of dump sites and adjacent waters. The Coast Guard has for several years been a major participant in the U.S. oceanography program. This participation takes the form of daily observations from lightships and offshore light stations as well as from a variety of ships.

Seasonal oceanographic cruises are also carried out in specially equipped vessels. Craft are therefore already available for this function and the only additional cost would be for specialized equipment. In this regard the Coast Guard Office of Research and Development and the Office of Engineering are developing monitoring technology and instrumentation to support our present operational programs. Of particular importance will be the development of sensors specially for pollution control purposes.

Finally, our oceanographic unit and our marine scientists are skilled and experienced in the evaluation of environmental data as a result of our efforts in oceanography survey work including the International Ice Patrol.

In short, the Department of Transportation stands ready and able to aid the Environmental Protection Agency in administering this program. We believe we have the ongoing failities to carry out not only the surveillance and enforcement aspects of the program already assigned to us in S. 1238, but also, if delegated by EPA, the permit issuing and ocean monitoring function.

This concludes my prepared statement,

Mr. Chairman, I would be pleased to answer any questions.

Senator GRIFFIN. Secretary Beggs, I want to commend you first of all on what I think is a good statement, a statement that is specific in terms of what it would cost and how many additional personnel would be needed for the Coast Guard to perform its appropriate role here.

I might also add that while some other agencies of the Federal Government may have a credibility gap, the Coast Guard doesn't suffer from that problem.

Mr. BEGGS. We are very proud of them, Mr. Chairman.

Senator GRIFFIN. Now, then, I mentioned my interest in the Great Lakes. It is my understanding that this legislation, while it is referred to as "an ocean dumping bill," does include and apply to the Great Lakes, and in your appendix you list facilities and capabilities available at the ocean cities but make no reference, as far as I can tell, to what facilities or capabilities are available on the Great Lakes. Was that an oversight?

Mr. BEGGS. That was an oversight, Mr. Chairman.

Senator GRIFFIN. Let me say, the oversight of the Great Lakes has been something that has been a rather disturbing problem to me, but I am sure you can comment on it.

Mr. BEGGS. I can assure you, Mr. Chairman, that we are conscious and very much aware of the needs and the problems of the Great Lakes. There is in the Great Lakes, as you know better than I, a growing problem of pollution.

Senator GRIFFIN. In some ways we have an even more severe problem in the Great Lakes. This great body of fresh water is certainly much more limited in terms of scope and so forth than is the ocean, and I believe the threat is much more imminent, much more acute, although both these areas certainly deserve our attention.

Mr. BEGGS. Yes, sir. I have here a list of the Coast Guard facilities in the overall Great Lakes region. They include seven marine inspection offices, eight merchant marine inspection establishments and nine captains of the port.

In addition, in the lakes we have one Coast Guard icebreaker, eight buoy tender-type vessels, and a number of 90-foot patrol boats which can be used for pollution patrol.

In addition, there are three air units located in the Great Lakes region, and these of course are also available.

I would be pleased, Mr. Chairman, at this time to submit this for the record.

Senator GRIFFIN. It will be so received.

Secretary Beggs, some of the other members of the subcommittee couldn't be here and submitted some questions which I will raise at this time.

Can you advise the subcommittee whether the general law enforcement authority of the U.S. Coast Guard under the administration's proposal is premised upon section 89 of title 14 of the United States Code, and if so, would you have any objection if an appropriate amendment were made to the bill citing that authority?

Mr. BEGGS. Yes, sir. We have general and broad law enforcement powers under section 89 of United States Code 14, but we would have no objection to the inclusion of a reference to that.

Senator GRIFFIN. Thank you very much.

In connection with the source of authority, could you advise the subcommittee what effect, if any, the bill S. 698, the administration's proposed Port and Waterways Safety Act of 1971—now also pending before this committee, might have upon effective enforcement? Should

some recognition be given to such possible effect during the subcommittee's deliberations on the pending ocean-dumping legislation?

Mr. BEGGS. We believe both bills are necessary for the Coast Guard to carry out overall pollution surveillance.

They are needed to prevent both problems,—the possible accidental discharge of hazardous materials or polluting materials into our waters in the case of the ports and waterways safety bill and the illegal dumping of pollutents in the case of this legislation. We think the two bills are complementary. They are independent of each other, but we believe both are necessary. We urge the passage of both by the Congress.

I might ask Admiral Hammond if he has anything further on that, but in general, I would say we are very strong for both bills and we think that the Coast Guard is able to do both jobs.

Admiral HAMMOND. I have nothing further to say, sir, except that in anticipation of passage of the ports and waterways safety bill, we have provided in our fiscal year 1972 budget for necessary augmentation of our forces. We feel that these additional forces will also enable us to undertake the jobs connected with the dumping bill. But as the Secretary said, both of these bills are very important.

Senator GRIFFIN. Let me just say in that connection, the fear has been expressed by many, including one of the witnesses who will appear here tomorrow, that the legislation pending before the committee would have an adverse effect upon port and harbor development and even maintenance of ports and harbors. Would you have any comment on that?

Mr. BEGGS. That is not our view, Now, we have received comments from some port authorities and other State and local interests expressing the fear that in one way or another the safety act will inhibit the development of ports.

Not only isn't that our view, we believe that unless an effective safety program is adopted and carried out, there will be a detrimental effect on the development of our ports. We do not think that the activities of the Coast Guard in providing inspection and surveillance under the Port and Waterways Safety Act will in any way inhibit development. In fact, it should enable the more effective utilization of the current facilities that exist in our ports for the handling of hazardous and pollutant materials.

Admiral Hammond, would you want to add to that?

Admiral HAMMOND. I would add that the Ports and Waterways Safety Act will give us the ability to control and manage the traffic systems within our ports. This can do nothing but enhance the port facilities and the uses we make of the vessels in the ports themselves.

Senator GRIFFIN. Using the proposal of regarding the dumping of arsenic compounds at sea, as an example, how does a matter such as the Rohm & Haas proposal come to your attention? Under what present authority is the Coast Guard acting?

Mr. BEGGS. Insofar as dumping in general, it would not specifically come to the attention of the Coast Guard. However, we do maintain, or are beginning to maintain I should say, surveillance of hazardous material dumping under the authority of our basic legislation which gave the Department of Safety role in the area of hazardous mate-

rials. We are now setting up procedures which we hope will inform us any time hazardous materials are disposed of in the contiguous zone or territorial waters of the United States.

I would have to admit, Mr. Chairman, that as of today this program is in its very early stages and I could not guarantee that every one of these hazardous material dumps come to our attention.

Can you add to that, Admiral Hammond?

Admiral HAMMOND. No. sir; I couldn't.

Senator GRIFFIN. In that regard, as I understand it, the pending legislation does not include any specific provision or mechanism whereby the Coast Guard would be alerted by the Environmental Protection Agency when dumping permits are granted. What I am referring to is some type of advance notice to the Coast Guard in order that it may effectively enforce such permits. Should there be language written into the legislation along that line?

Mr. BEGGS. Mr. Chairman, it is correct that there is nothing specifically in the statute providing for notification of the Coast Guard. However, we have already held discussions with EPA on this question. It is the opinion of counsel that we can effectively, by regulation, provide for the advance notification of the Coast Guard and even the displaying of permits on the vessels as they dump.

There would be no objection on our part to the inclusion of such a provision in the legislation.

However, we think it can be adequately handled by regulation.

Senator GRIFFIN. That statement in the record is helpful and assures us that advance notification will be given whether or not the bill is amended.

Recently, the Merchant Marine Subcommittee held a hearing on S. 1223, concerning the annual appropriation authorization for the Coast Guard. In your statement you discuss cost estimates for the first fiscal year and your capabilities under the authorization being considered by the committee.

Now, the question arises, pursuant to the report requirements of the legislative Reorganization Act of 1970, as to the estimated 5-year cost which may be incurred by the Coast Guard. Have you made such an estimate?

Also, am I to understand from your statement that all you need in order to fulfill responsibilities under the Act necessary for the coming fiscal year is an additional $1.6 million?

Mr. BEGGS. That is essentially correct, Mr. Chairman, as to the $1.6 million. The estimated 5-year cost of the program would be $6.5 million. This includes personnel augmentation and aircraft and vessel operating costs. The first-year cost of $1.6 million should taper off in the fourth and fifth years if dumping is curtailed as CEQ desires. These costs do not include costs of acquiring vessels or monitoring equipment. It is our view that much of the surveillance activity that needs to be done can be in the nature of administrative surveillance.

In the case of extremely hazardous material, as I mentioned, where they are toxic or radioactive, there will have to be actual surveillance. But in many, many cases where various types of spoil are being dumped in the waters, administrative surveillance, a review of log books, navigational records and so forth, would determine whether the dump has been properly handled.

This, of course, requires that we provide effective monitoring of the waters in the contiguous zone to determine the long-range effects of dumping. This we intend to do. It may well be that as time goes on we will require additional resources to effectively monitor the overall contiguous zone and the Great Lakes. If so, we will request them.

Senator GRIFFIN. Mr. Miller has a question that bears on that.

Mr. MILLER. Mr. Secretary, I am trying to understand this monitoring which you are talking about. In testimony that will be presented by Dr. Smith later this morning, he will distinguish between operational monitoring, which is to insure that specified discharge procedures are complied with, and that is what you have been predominantly talking about so far. He will then also talk about technical monitoring which deals with the fate of the waste and the responsibility of the environment to that waste.

In your comments just now, it seemed to go more to the technical monitoring.

Mr. BEGGS. That is correct.

Mr. MILLER. Is your jurisdiction presently limited to the territorial waters and the contiguous zone or can you not go beyond that?

Mr. BEGGS. We can go beyond that. My comments were with relation to the enforcement part of the activity. We have control over U.S.-flag vessels on the high seas as well as in the territorial waters and contiguous zone. However, we only have effective control over foreign vessels when they are in the territorial waters and to a somewhat lesser extent in the contiguous zone—not on the high seas. The monitoring activity, though, can and does extend as far out to sea as we wish.

Now, the convention on the Continental Shelf, which is the area I think of greatest concern here, is somewhat unclear, and I expect Mr. Stevenson can comment on that. But it is my understanding there are several things in the works inluding a United Nations sponsored Conference on the Law of the Sea. In addition, I understand that there is a conference being called to discuss the shelf and the rights and responsibilities of each nation concerning the Continental Shelf.

My comments referred specifically to surveillance and control of the dumping activity in the territorial waters and the contiguous zone, not on the shelf.

However, I think clearly that insofar as the establishment of baseline data, the technical monitoring activity, we must of course consider the entire ocean area and clearly this includes the Continental Shelf area.

In the Department of Transportation, the Coast Guard has been assigned the responsibility for a number of years of gathering data as a routine function in connection with patrol and other actitivies on the high seas. as a part of this, and with the development of new type sensors and instrumentation, we would expand this monitoring activity to cover the additional responsibility for determining the effects of dumping.

Senator GRIFFIN. Secretary Beggs, has the Cost Guard included ocean pollution research in its oceanography budget? Can you comment?

Mr. BEGGS. Yes, they have. This is a modest budget item, but it is in the budget. Admiral Hammond may have something to say about that.

Admiral HAMMOND. Primarily, our efforts in research and development for pollution control have been in the oil pollution field: Methods of cleanup, methods of containing spilled oil and so forth. We do have research going on in another field that will help us with dumping, and that is the development of sensors with which we can detect changes in the water and the marine environment caused by any type of pollution.

Senator GRIFFIN. Secretary Beggs, are there any improvements to enforcement procedures that the Coast Guard can recommend from its experience in the regulation of transportation of materials for dumping as the most effective means available for regulating ocean dumping? What other methods may be available which might be even more effective?

I don't know if that is a question you can answer off the top of your head, but we would like your guidance, and particularly the guidance of the Coast Guard.

Mr. BEGGS. Let me make a start, and then I will ask Admiral Hammond to comment further. We have been developing in the ports, by means of the Captains of the Port and the Marine Inspection Offices, inspection of vessels in the port area, before they move out to sea to determine whether they have complied with the regulations that exist. I think this is very important, because it insures that vessels involved in dumping or other types of marine activity, have effectively implemented all of the procedures and mechanisms that are neessary to insure both safety and control over their movement through the waters.

I think this activity should properly be expanded in future years, and it is our intent to do so.

Insofar as your specific question relative to the dumping bill, there are any number of ways that surveillance can be carried out by helicopters, by fixed-wing aircraft, by ships that are in the area on patrol, and by specific accompaniment of a ship that is engaged in dumping.

Admiral Hammond, could you add to that?

Admiral HAMMOND. I believe, if I understand your question, Senator, that the bill, as currently proposed, has all the elements that are necessary to the formulation of the regulations which will allow the Coast Guard, EPA and other agencies to do the job. I think nothing else would be required in the bill itself.

Senator GRIFFIN. Well, I think in effect you may have answered this question, but let me put it specifically: In your view, does the Coast Guard have the capability to undertake the permit issuing authority proposed in S. 1238?

Mr. BEGGS. The answer is yes, Mr. Chairman.

Senator GRIFFIN. Could the Coast Guard establish and apply criteria for ocean dumping?

Mr. BEGGS. I think we could assist in developing criteria, and I think we would want to assist both NOAA and EPA in developing such criteria, but I think the main burden of this should properly be with those two agencies because they have a broader base of knowledge and are charged with a broader responsibility in this area than the Department of Transportation and the Coast Guard.

I would say we can assist in a major way because of the scientists and ocean engineers that we have in the Coast Guard as well as the

practical operational capability that exists in the Coast Guard as a result of its long service in observing problems in the ocean areas. But there two agencies are, I think, more competent and probably in better shape to develop the overall criteria.

Bob, do you want to add to that?

Admiral HAMMOND. I would only say that we would envision that EPA, under their present statutory authority, would establish the standards upon which the environment would be maintained and which would govern the whereabouts and types of waste material to be dumped; and the Coast Guard, if it were delegated the permit-issuing authority, would use those guidelines in issuing the permits.

Senator GRIFFIN. Secretary Beggs and Admiral Hammond, we appreciate your appearance and statement and the answers to questions that you have given. I am sure they will be very helpful.

If you have nothing further to add, we will give Mr. Stevenson an opportunity to testify.

Mr. BEGGS. Thank you, Mr. Chairman, It was a pleasure being here.

Senator GRIFFIN. Mr. Stevenson, we are glad to have you. If you want to identify those who accompany you, you may proceed in any way you wish.

STATEMENT OF JOHN STEVENSON, LEGAL ADVISER, DEPARTMENT OF STATE; ACCOMPANIED BY WILLIAM SALMON, DEPUTY DIRECTOR, OFFICE OF ENVIRONMENTAL AFFAIRS; AND F. ALLEN HARRIS, SPECIAL ASSISTANT TO THE LEGAL ADVISER

Mr. STEVENSON. Thank you, Mr. Chairman.

I have with me Mr. William Salmon, the Deputy Director of the Office of Environmental Affairs in the State Department, and the Special Assistant to the Legal Adviser, Mr. Allen Harris.

Mr. Chairman, I appreciate the opportunity to testify in support of the President's proposal to control ocean dumping—the Marine Protection Act of 1971 (S. 1238). The focus of my testimony this morning will be on the jurisdictional aspects of this legislation and the international efforts being undertaken by the administration to protect the marine environment.

The proposed Marine Protection Act of 1971 has been carefully drafted to maximize U.S. control over ocean dumping activities consistent with accepted principles of international law. I would like to discuss briefly these international law principles.

Traditionally, the law of the sea has been faced with two fundamental problems—defining the extent of coastal state jurisdiction over the ocean and accommodating conflicting uses of the high seas. Although we continue to work on several aspects of these problems, great advances were made in 1958 with the adoption of the four Geneva Law of the Sea Conventions. These conventions codified the existing law of the sea and established several important new international legal principles. These conventions, to which we and many other nations are parties, establish the present legal basis for coastal state control of ocean activities.

The Convention on the Territorial Sea and the Contiguous Zone provides in its first article that the sovereignty of a coastal state extends "beyond its land territory and its internal waters, to a belt of sea adjacent to its coast, described as the territorial sea." With the exception of the right of innocent passage through the territorial sea, the United States under both this Convention and customary international law enjoys complete control over all activities in our 3-mile territorial sea.

Furthermore, the Convention provides that a coastal state in a zone of the high seas contiguous to its territorial sea may exercise the control necessary to prevent the infringement of customs, fiscal, immigration or santiary regulations within its territory or territorial sea. Article 24 of the Convention specifies that this contigous zone may not extend beyond 12 miles from the coast. Thus, within this contiguous zone, the United States can enact measures to prevent unlawful pollution of its territory or territorial sea. It is important to bear in mind that U.S. authority under the convention does not derive from a right to prevent pollution of the contiguous zone as such, but from a right to prevent pollution of our territory or territorial sea.

A state, or course, has jurisdiction over vessels flying its flag on the high seas irrespective of their location. A state may also determine the conditions under which materials may be removed from its territory, and specifically has the power to prohibit such removal by its own or foreign nationals and vessels.

Beyond 12 miles, a state has no rights under international law to regulate the activities of foreign vessels on the high seas in the absence of an international agreement. The Convention on the High Seas is explicit on this point; Article 2 begins by stating:

> The high seas being open to all nations, no state may validly purport to subject any part of them to its sovereignty.

Article 6, in relevant part, provides:

> Ships shall sail under the flag of one State only and, save in exceptional cases expressly provided for in international treaties or in these articles, shall be subject to its exclusive jurisdiction on the high seas.

The Geneva Convention consider that dumping should be treated under the high seas regime, that is by regulation of one's nationals and by international agreement. In this connection, we must also consider the question of enforcement. The basic principle regarding vessels on the high seas is that they are subject to the exclusive jurisdiction of the flag state except as otherwise agreed. There is no treaty giving the United States authority to arrest a foreign vessel on the high seas for dumping.

With these legal principles in effect, it is important that our national ocean dumping legislation be carefully drafted so not to purport to regulate high seas activities of foreign flag vessels. S. 1238, another ocean dumping bill also under consideration by this subcommittee, is so broadly drawn that it might be subject to international misunderstanding. It appears to control ocean dumping on the high seas irrespective of whether the materials being transported for ocean dumping originate from territory under U.S. jurisdiction. We may exercise control only over dumping occurring in waters under

our jurisdiction, over the transportation for dumping of material from territory under our jurisdiction, or over ships of our registry.

The administration's proposed Marine Protection Act of 1971 establishes control over the transportation of material by any person from the United States for dumping on the high seas.

In this connection, I wish to note the fact that to our knowledge all dumping off our coasts at present originates from the United States and we have no reason to believe the situation will change. The act would also establish control over the dumping of material by any person from any source in the 3-mile territorial sea of the United States and in the additional 9-mile contiguous zone adjacent to the territorial sea to the extent dumping in this contiguous zone may affect the territorial sea or territory of the United States. Both the provision on transport for the purposes of dumping and the provision on dumping in the territorial sea and contiguous zone would apply to American and foreign nationals and vessels. We believe this is the proper exercise of our jurisdiction under international law, and fully meets all cases of dumping now arising or likely to arise in the future.

The accommodation of various uses of the high seas, as I mentioned earlier, has been a fundamental issue in the development of the law of the sea. Article 2 of the High Seas Convention provides in part:

> These freedoms [navigation, fishing, laying submarine cables and pipelines flying over the high seas] and others which are recognized by the general principles of international law, shall be exercised by all states with reasonable regard to the interests of other states in their exercise of the freedom of the high seas.

It is thus clear that ocean dumping must be conducted with reasonable regard for the interests of other states in their exercise of the freedom of the high seas. This obviously includes the protection of the high sea environment and its fisheries and living resources. It can be anticipated that a future treaty on dumping is likely to place very heavy empasis on the need to protect the common interests states have in preservation of the marine environment.

What I would like to emphasize is that we cannot unilaterally resolve these marine pollution problems by extending our jurisdiction in violation of accepted principles of international law. We must resolve these problems multilaterally and we are presently working to do so in several forums.

The Preparatory Committee for the 1973 Law of the Sea Conference has charged one of its three subcommittees to work on the problem of marine pollution. I expect this subcommittee to produce treaty provisions for the 1973 Law of the Sea Conference establishing international protection for the marine environment. In this connection, Mr. Chairman, I had the honor to serve as U.S. representative to the Preparatory Committee for the Law of the Sea Conference last month, and specifically suggested ocean dumping as one aspect of the marine pollution problem that required international action.

Mr. Chairman, you will be pleased to note that the United States was the first country to present such proposals to the Preparatory Committee for specific action to combat marine pollution. With your permission, I would like to make copies of our recent statement in the Preparatory Committee available to this committee.

Senator GRIFFIN. Let the Chair state that we have a copy of the statement made by the witness on March 25, 1971, and without objection a copy of that statement will be printed in the record following the statement now being delivered.

Mr. STEVENSON. Thank you very much.

President Nixon's proposals regarding the seabeds beyond the limits of national jurisdiction are also relevant. The draft, U.N. Convention on the International Seabed Area, submitted by the United States as a working paper last August to the U.N. Seabeds Committee provides that "all activities in the international seabed area shall be conducted with strict and adequate safeguards for the protection of human life and safety and of the marine environment." The draft contains regulatory provisions to further bias ends and contains provisions for compulsory settlement of disputes. Accordingly, international means would be available to insure that all seabed activities, including dumping, are conducted in accordance with the requirement that there be strict and adequate safeguards for the protection of the marine enviroment.

An International Working Group on marine pollution has been established by the Preparatory Committee for the 1972 United Nations Conference on the Human Environment. The working group will prepare a marine pollution agenda submission for the conference which will probably include proposals that nations ban the dumping of certain harmful substances in the oceans and adopt systems for the regulation of ocean dumping.

Work is also under way in the NATO Committee on the Challenges of Modern Society and the Intergovernmental Maritime Consultative Organization. The latter is preparing for a 1973 conference to ban all intentional discharges into the seas by ships of oil, oily wastes, and other noxious substances.

Accordingly, I am confident that in the next few years we will see major international developments banning the ocean disposal of toxic industrial wastes, highly radioactive materials, heavy metals, chemical warfare agents, and the setting of international standards to prevent damage to the marine environment from exploration and exploitation of the seabed.

In closing, I would like to mention briefly the proposed "National Oceanic and Environmental Research Act of 1971." (S. 307). There clearly is a need for an effective program, both within the United States and internationally, of oceans and environmental research to provide the basic information which will enable the development of effective national and international regulations to protect the marine environment. The Department of Commerce, through NOAA, already has substantial authority to conduct such research, which would support the Environmental Protective Agency's proposed ocean dumping regulatory activities. We would defer to these agencies as to the need for and the appropriateness of the authority which S. 307 would provide.

I believe that the administration's ocean dumping bill—the Marine Protection Act of 1971—is an important domestic first step which will lead to effective international control of the universal problem of

marine pollution. I strongly urge the adoption of this comprehensive ocean dumping bill.

Thank you very much, Mr. Chairman.

I will be happy to answer any questions.

(The following information was subsequently received for the record:)

U.S. MISSION,
U.S. INFORMATION SERVICE,
Geneva, March 25, 1971.

ENLARGED UNITED NATIONS COMMITTEE ON THE PEACEFUL USES OF THE SEABED AND THE OCEAN FLOOR BEYOND THE LIMITS OF NATIONAL JURISDICTION—SUBCOMMITTEE III

STATEMENT BY THE HONORABLE JOHN R. STEVENSON, UNITED STATES REPRESENTATIVE, PALAIS DES NATIONS, GENEVA

MR. CHAIRMAN: The two principal subjects assigned to Subcommittee III are "preservation of marine environment (including, inter alia, the prevention of pollution) and scientific research."

The United States believes strongly that preservation of the marine environment and marine pollution are appropriate subjects for international action, and has supported various activities in this area for many years.

On May 23, 1970, President Nixon announced a new U.S. Oceans Policy in which he pointed out that States are becoming apprehensive about the ecological hazards of unregulated use of the oceans and seabeds. He urged that a new international seabed regime should, inter alia, protect the ocean from pollution. He stated that if new international agreements with respect to Law of the Sea can be obtained, over two-thirds of the earth's surface can be saved from national conflict and rivalry, be protected from pollution, and put to use for the benefit of all.

The problems of pollution are no longer restricted to our cities nor to the streams, rivers and estauries of our land masses. Residuals of some pollutants can now be found in all the seas and oceans of the world. Such pollutants have their origin in both maritime and land-based activities. Pollution from the latter is carried to the oceans by air currents, by fresh water run-off or is the result from deliberate disposal of material into the oceans.

Growth in the world population and advances in technology have produced rapid increases in waste products and the long held view that the oceans have an infinite ability to accommodate the consequences of human activity has been proven false. We now recognize that pollutants reaching the seas and ocean are a threat to the health and general welfare of mankind, as well as to the productivity of living resources of the oceans.

Pollution affects the marine environment, its living resources and ultimately human beings in a variety of ways. Toxic substances can kill animals or plants which come in contact with them. Still other pollutants may alter the oceans' environment making it unsuitable for animal life. Finally, pollutants can be concentrated into living resources of the ocean and as a consequence these resources may become unsuitable as human food.

The impact of some pollutants on the ocean and its inhabitants and its consequence to human beings is not yet clear. It is, however, obvious that increased understanding of the amount, distribution and effects of pollution in the marine environment will be required to implement effective measures for pollution control and that a variety of actions will be required depending on the nature and origin of the pollutant.

The complexity of the problem is further evidenced by the growing number of international organizations dealing with some aspect of the marine pollution problem. At the same time we have to recognize that the marine pollution problem and the need to preserve the marine environment are an important part, but only a part, of the global environment problems to be discussed at the 1972 Stockholm Conference on the Human Environment. The measure we de-

cide to take here in the marine area must take into account the wider problems of human environment and should in no way conflict with measures which might be taken in that wider area.

To be effective, action must be taken in concert among states to prevent pollution and they must be prepared to implement agreed actions. If only a few states should take the needed anti-pollution measures, any resultant improvement might prove to be temporary only. In the absence of cooperative international action, competitive economic pressures will severely limit national abilities to take or require the costly measures needed to protect the marine environment. Only a broad international approach can provide sufficient incentives for all states concerned to do their part.

The Seabed Committee, of course, has been assigned the responsibility for dealing with seabed pollution. The Declaration of Principles regarding the seabed adopted by the General Assembly in December 1970 contemplates that the international seabed regime will include such provision. Accordingly, this aspect of the marine pollution problem must necessarily have an important relationship to the work of Subcommittee I on the international seabed regime and machinery as well as to the work of this Subcommittee. It is our view that the regime should provide that all activities in the international seabed area shall be conduced with strict and adequate safeguards for the protection of human life and safety and of the marine environment. Moreover, the safe the regime treaty itself as well as a major environmental protection role for development of seabed resources necessarily requires appropriate provisions in the international machinery to be established under the regime.

In his second Foreign Policy Report, issued on February 25, 1971, the President of the United States suggested that the following essential measures be taken by the international community in the near future:

Identification of pollutants and other ecological hazards which are dangerous on a global scale.

Establishment of an effective world monitoring network to keep track of these environmental dangers.

Initiation of a global information system to facilitate exchange of experience and knowledge about environment problems.

Establishment of internationally accepted air and water quality criteria and standards.

Development of international guidelines for the protection of the environment.

Achievement of comprehensive international action programs to prevent further environmental deterioration and to repair the damage already done.

Development and improvement of training and education programs to provide the skilled capability to meet the environmental challenge.

Almost all of these suggestions apply with special urgency to the marine environment. In particular we need to focus our attention on drafting articles on major problems relating to marine pollution.

In identifying such problems, we should acknowledge work accomplished by IMCO concerning oil spills from ships, FAO and its technical conference of December 1970 dealing with issues of marine pollution on living resources of seas and expected contributions of the 1972 Stockholm Conference. Examples of major areas of concern might include the following:

A. Such international machinery as may be required for determining marine pollution research priorities, for coordinating research efforts, and for collecting research information and arranging for its exchange.

B. Regulation of deliberate disposal of materials into the ocean.

We recommend that drafting of articles begin promptly. In the preparation of draft articles we should seek assistance as required from the appropriate specialized agencies and other public and private international organizations active in the field. Experts from these organizations should participate in a consultative capacity. Similarly, we believe that our preparatory work should be closely coordinated with the related work for the Stockholm Conference. We should avoid duplication. In particular, should some parallel working group be established by the committee engaged in the preparatory work for the two conferences, a member of the bureau of each group should be invited to participate in the other group.

I would like to emphasize again the complexity of the issues before us, the need to take into account other efforts in this area, and the importance of tailoring each solution to the special requirements of each particular problem.

I turn now to the second of the two subjects assigned to Subcommittee III, scientific research.

The United States has long identified itself with the need to expand world efforts in scientific research of the Oceans. Our initiative calling for an International Decade of Ocean Exploration exemplifies that posture. We consider that scientific research should not be interfered with and should be conducted with the view to open publication for the benefit of all. We whole-heartedly support the applicable principle stated in the Declaration of Principles (Resolution 2749) which states in relevant part: "States shall promote international cooperation in scientific research exclusively for peaceful purposes . . . through effective publication of research programs and dissemination of the results of research through international channels". I have discussed already some forms of cooperation we favor in connection with preservation of the marine environment and marine pollution. In general, it is our belief that cooperation in scientific research in the marine environment will help ensure that the oceans will be developed and used in ways which will benefit mankind. Through increased knowledge we can all better understand the oceans and make optimum use of their resources.

We recognize the particular interest of developing countries in learning how the seas may help solve such problems as chronic short-falls of protein for their populations; how fresh water may be obtained from the sea; how weather may be modified to improve crop production and to avoid such catastrophies as rampaging hurricanes; and how new, inexpensive energy sources might be tapped. Answers to such questions will require further scientific activity and cooperation in the period ahead.

Scientists have in fact a long tradition of sharing information although the vast quantities of data accumulated and the limitations on their processing and interpretations often delay their dissemination and use. The best means of ensuring that there is a flow of scientific information is actual participation in scientific projects and continued support for existing scientific mechanisms for the exchange of data, such as the World Data Center System and the World Weather Watch. New means of data acquisition, such as Earth Resource Survey Satellites, may offer new opportunities for international cooperation and sharing of benefits as they fulfill their promise.

In our view this Subcommittee should draw upon the experience and knowledge of other bodies, such as the specialized agencies and inter-governmental organizations, in performing its work. Resolution 2750 (C) invites inter alia, the 10C to cooperate fully with the Seabed Committee, in particular by preparing such scientific and technical documentation as the Committee may request. We favor taking full advantage of this suggestion. Similarly, the Committee may well wish to draw upon the FAO, IMCO, and the Human Environmental Secretariats for support.

In this connection, it would be most helpful to our work if the Secretariat would provide each of the members of this Committee with copies of treaties and other basic documents produced by other international and intergovernmental organizations concerned with marine pollution and scientific research.

Thank you, Mr. Chairman.

Senator GRIFFIN. Thank you, Mr. Stevenson.

I wonder if you would care to discuss the recent activity of the NATO Committee on the Challenges of Modern Society and the proposal made by the United States in Brussels to prevent dumping of waste at sea. Unfortunately we failed in that effort. Where do we go from here? Is this kind of an indicator of where our international efforts are going to lead? Do you have any words of wisdom as to the future?

Mr. STEVENSON. Mr. Chairman, I think we are still basically developing a program in the international field. There are several dif-

ferent agencies, as I mentioned, dealing with this problem. One of the most pressing questions, both for us nationally and also for the international agencies, is how to coordinate to the greatest possible extent this work so it is complementary rather than in any sense competitive. I would like to ask Mr. Salmon if he would like to comment on this.

Mr. SALMON. Thank you. I believe, Mr. Chairman, you are referring to the discussions that were held earlier this week in Brussels, the semiannual Plenary Meeting of NATO's Committee on the Challenges of Modern Society (CCMS) at which Mr. Russell Train, Chairman of the CEQ, led the American delegation.

I think the concern that was expressed by the countries there is indicative of the interest, a very strong domestic interest many countries have, in how they use the oceans. There was also concern expressed by many delegates there that we do something. The U.S. delegation supported a Belgian proposal to hold a CCMS meeting on ocean dumping. Other delegations did not agree as there are already several other efforts underway on this subject. Nevertheless, there is a lot of work to do on the subject internationally.

Mr. STEVENSON. I would like to add, Mr. Chairman, of course there are various stages in the international approach. The first stage is formulating a general policy and goals. The final stage, achieving international agreements, is the most satisfactory as it will finally resolve this problem.

Senator GRIFFIN. Thank you, Mr. Stevenson.

I am very pleased that the ranking minority member of this subcommittee, the distinguished Senator from Alaska, Mr. Stevens, has now joined us. I think it is altogether appropriate, particularly since I have to go to the floor, that we turn the gavel over to you.

Without objection, I would like to enter in the record a story from the Washington Post on April 20, 1971, entitled "U.S. Fails in Proposal to End Dumping of All Waste in the Ocean."

(The article follows:)

U.S. PLAN FAILS AT NATO CONFERENCE—BAN ON OCEAN DUMPING IS REJECTED

(By Alfred Friendly, Washington Post Foreign Service)

BRUSSELS, April 19.—An American proposal to prevent dumping of all wastes at sea—similar to its earlier promising initiative to eliminate intentional discharge of oil wastes—failed here today at a NATO conference on protecting the environment.

The American delegation to the NATO Committee on the Challenges of Modern Society had hoped to get authorization for a preparatory body to work up a policy to end the universal practice of ocean dumping of universal wastes, trash and sewage.

Like the commitment that NATO countries have made to end intentional oil waste discharges by 1975 or 1980—an achievement of earlier committee meetings—the idea was to obtain international agreement on a policy to be designed to end ocean dumping.

Britain, Canada and France demurred, it was reported, ostensibly on grounds that other international bodies are already working on the problem. The more probable reason, it was believed, is the financial cost that such a policy would entail. Some nations, moreover, remain convinced that the ocean is still the best and most logical place for waste disposal.

The United States, seeing the consequences of a sea made dead by dumping of barge-carried waste on the continental shelf off New York Harbor, hoped to take the first steps toward international agreement to end the practice.

DANISH CONCERN

Denmark, as well, said it could not tolerate delay. Danish delegates said the Baltic Sea is already subject to such oxygen starvation as to be almost dead, and that the North Sea is rapidly becoming the same.

On other subjects in the two-day meeting, however, there was progress described by the American contingent as remarkable and encouraging. They were particularly impressed by the fact that NATO governments for the most part had empowered their officials to act on problems such as pollution of the air, coastal and inland waterways, flood mitigation and highway safety. They were enthusiastic about developments of experimental vehicles designed for passenger protection.

Russell E. Train, chairman of President Nixon's Council on Environmental Quality and head of the American delegation, emphasized at a news conference that delgates were reporting on positive actions—particularly pilot programs—rather than making promises.

He warned, however, that it is folly to expect that pollution of air, rivers and oceans could be ended overnight. He said the problems are "exceedingly complex" and inevitably costly.

U.S. COMPANY

Rear Admiral R. Y. Edwards of the U.S. Department of Transportation told reporters that one major American oil company—he would not identify it—has already ended the practice of discharging oil waste from the flushing of tanker bunkers at sea or in coastal waters. Under regulations pending in the United States, all tankers must put an end to it by 1975 if possible and 1980 at latest.

It was also learned that the marine safety committee of the International Maritime Consultation Organization of which the Soviet Union is a member, accepted the Challenges of Modern Society Committee policy on oil spillage at a March meeting in London. In fact, the Russians asked to make the declaration more inclusive in forbidding the discharges at sea of "noxious substances"—industrial chemicals—as well as oil wastes.

Another report at today's meeting told of remarkable new developments in experimental engines—electric, turbine and improved internal combustion—whose gaseous emissions would be even less than the minimums prescribed for American cars to come into effect later in this decade.

Senator STEVENS (presiding.) Mr. Stevenson, do you see anything in this bill that would affirm in any way the administration's proposal on the seabeds?

Mr. STEVENSON. No; Mr. Chairman, this bill is directed at a narrower problem than the administration's seabed proposal. This bill basically is limited by existing international law principles. It does not purport to provide any basis for entering a treaty in this area. So its jurisdictional provisions have been drafted to comply with what the existing state of the law is, rather than what it might be on the basis of any future international agreement.

Senator STEVENS. I understand that. However, I just want to make sure the record is clear. I am one of those who opposes the administration's statements on the seabeds and I would not want to be a party to or in any way connected with legislation inferentially endorsing that draft of the U.N. convention on the seabed area.

Mr. STEVENSON. You would not be doing so.

Senator STEVENS. You have indicated some optimism that in the next few years we will see major international developments banning ocean disposal of toxic industrial waste, highly radioactive materials, heavy metals and chemical warfare agents. Other witnesses have stated that Congress should act now to prohibit by statute the ocean dumping of such materials, giving no permit authority at all to any

responsible regulatory agency. Do you believe that an outright nondiscretionary prohibition of ocean dumping of such materials would have a positive or a negative impact upon your international negotiations?

Mr. STEVENSON. Senator Stevens, the provisions in this bill comply with existing international law and are completely adequate for all of the dumping that now takes place off our shores. All the dumping that takes place on our shores, as Commissioner McDonald pointed out, originates from U.S. territory. This legislation completely regulates that sort of dumping. There is no necessity to purport to regulate dumping originating in foreign ports, because it just does not end up off our coasts at the present time. I would say, sir, that if we were to attempt to assert the right to control foreign vessels beyond our territorial sea, because this could be a basis for asserting very extensive jurisdiction, it would be a problem for our international negotiations. This would be true not only with respect to the seabed area, but more particularly with respect to the U.S. interest in getting international agreement on the 12-mile territorial sea. It would not be consistent with the U.S. approach which is to attempt to deal with these problems through international agreement rather than by having individual States expand their jurisdiction unilaterally.

Senator STEVENS. Isn't this precisely what Canada did with their assertion of a 200-mile jurisdiction?

Mr. STEVENSON. They asserted a 100-mile jurisdiction for purposes of pollution control in the Arctic, north of 60° latitude. It is for that reason we objected to their proposal.

Senator STEVENS. I understand you did not in your statement discuss the situation in the Great Lakes as it involves Canada and the United States and foreign vessels which use the Great Lakes. What is the progress to date regarding the recommendations for a joint commission insofar as it affects the problems of this bill?

Mr. SALMON. Senator, the International Joint Commission report which was released at the end of 1970 dealing with the Lower Great Lakes and the International Seaway, has brought about an extensive amount of cooperative work between the United States and Canada at the Federal level and at the State and provincial level. In June 1970, a ministerial meeting was held to review the draft recommendations of the International Joint Commission.

The meeting established a binational working group with 10 subgroups. One of these subgroups is dealing with the provisions of regulating shipping on the Great Lakes. Today and tomorrow the joint working group is going over the final subgroup reports in anticipation of a ministerial meeting in Washington in May or June to review the reports and the working group's recommendations. We hope to proceed from there to agreement on these recommendations and getting on with the job.

Senator STEVENS. Do those agreements address the same problems of dumping as this bill, S. 1238?

Mr. SALMON. They are much broader than the scope of this bill. The authority provided in this bill will be of great assistance to meeting some of the problems on the Great Lakes.

Senator STEVENS. Mr. Stevenson, subsection 3(f) of this bill, which is the administration's legislative proposal, defines the term "dumping." It excludes disposition of any effluent from any outfall structure, routine discharge of effluent incidental to the propulsion of vessels, and the intentional placement of any devices in oceans, coastal, or other waters or on submerged lands beneath such waters. In connection with the placement of devices in the ocean and other waters, can you advise the subcommittee as to the reason for the exclusion and whether it has any bearing upon negotiations or agreements considering the placement of military hardware in the ocean bottom; and if this approaches upon national security matters, please state that, and we will be glad to deal with the matter in another way. I am referring to section 3(f) of the bill.

Mr. STEVENSON. I would like to submit a written reply to that question.

(The information follows:)

Section 3(f) of the proposed Marine Protection Act of 1971 excludes from the activities regulated by the Administrator of EPA, the intentional placement of any device in the ocean, or on the seabed, whose purpose there is to produce an effect attributable to other than its mere physical presence.

The purpose of this Act is to provide the Administrator of EPA the power to regulate both ocean dumping of material in waters under United States jurisdiction and the transportation for dumping of material originating from U.S. territory. As there is no intention that this legislation should supercede the regulatory powers of other agencies which control the placement of devices in the oceans and on the seabed which perform specific functions, an exclusion is provided in Section 3(f). Some examples of the types of activities regulated by other Agencies are: the Department of the Interior and the Army Corps of Engineers regulation of the placement of oil drilling platforms on the continental shelf and NOAA regulation of the placement of oceanographic monitoring equipment. In addition, the Defense Department and the Coast Guard supervise the placement of such equipment such as sonar buoys on the seabed floor. The Army Corps of Engineers are charged with primary responsibility to regulate the placement of cables and pipelines on the seabed.

The focus of the Act before the Committee is to protect the marine environment from the effects of ocean dumping, not to regulate the other uses of the seabed. That is the reason for the exclusion.

Senator STEVENS. As to the second, a routine discharge of effluent incidental to the propulsion of vessels, would this also include vessels propelled by atomic energy and, if so, does this mean we have not control over any discharges of the atomic powered German vessels, for example, if they enter our waters?

Mr. STEVENSON. As far as this act is concerned, that is true, sir.

Senator STEVENS. Would we have any control in any other way?

Mr. STEVENSON. I think there are a number of agreements in this area, but again I would like to supplement the record to give you a complete answer. As far as the oil, there is separate regulation of oil under the Federal Water Pollution Control Act, and various IMCO Conventions dealing with oil spills.

(The information follows:)

Under the provisions of the 1958 Convention on the Territorial Sea and Contiguous Zone (15 UST 1606) foreign flagships have a right of innocent passage through the territorial sea of the United States. However, if a foreign vessel calls at a U.S. port the United States has jurisdiction to regulate any discharges from that vessel within the port area. This applies to both conventional and nuclear-powered vessels.

Senator STEVENS. In regard to (b), was it your intention that if a vessel had negligently allowed a leak to continue through its propulsion system that we would have no control over it?

Mr. STEVENSON. I think the whole program here is the act was not designed to deal with the problems of pollution that are or are going to be regulated by other means. In other words, this bill was just designed to deal with the dumping problem and not with pollution that is incidental to the operation of a vessel.

There are other approaches to that, and I would be glad to supplement the record with what is being done in that area.

Senator STEVENS. I am familiar with the antipollution laws, particularly the old one that is now being enforced, and I think it is very effective when it is properly enforced. But I think the record ought to be clear that we are not, by those exclusions, attempting to build any immunity for those vessels which are negligently operating and in fact polluting, even though it is not dumping.

The exclusions apparently also raise the questions of, why is the exclusion for any effluent from any outfall structure included in this? Don't you consider that to be dumping?

Mr. SALMON. Senator, to repeat Mr. Stevenson's comments, this bill is designed to deal only with ocean dumping. Outfalls provide a different control problem.

Senator STEVENS. Even if the outfall goes beyond the 3-mile limit?

Mr. SALMON. The fact that it goes through the 3-mile territorial sea means that our Government can control the outfall,

Senator STEVENS. I am very interested in the Department's reason for opposing Canadian assertion of jurisdiction. I talked last evening to one of the Canadian representatives, and it is my understanding that they were asserting 200 miles into the Northwest Passage conservation jurisdiction beyond the 12-mile contiguous zone. Has the Department taken an official position on this in terms of the Canadian Government?

Mr. STEVENSON. Yes; we submitted notes to the Canadian Government with respect to their action. In fact, they took simultaneously three separate actions. One was to establish the 100-mile Arctic pollution control zone which as yet has not been implemented. They have regulations but they have not actually put those regulations into effect. The second thing they did was to extend their territorial sea to 12 miles. The third thing which they did was to establish certain exclusive fishery zones, and that third action has been implemented fairly recently.

Senator STEVENS. I would be encouraged as an Alaskan if the U.S. State Department would do the same thing. It is not pertinent to this hearing, however. It does seem that their activities with regard to pollution control are going to have a major impact upon our Alaska Pipeline transportation system from Valdez down the west coast. I wonder if you considered that in terms of what they are doing.

Mr. STEVENSON. I believe the Coast Guard has been studying rather carefully the effect of the Canadian regulations on our operations. I think they can give you a fairly complete answer to that.

Senator STEVENS. Are we going to just merely protest it, or are we going to do anything to indicate a comparable concern over the Canadian vessels as they enter ports of Maine, the Puget Sound or as they go up our Inside Passage in order to deliver materials into Skagway that go through to Canada? I would think there ought to be some sort of reciprocity in terms of dealing with our Canadian neighbors.

Mr. STEVENSON. We have been discussing with the Canadians the possibility of doing some of the things internationally on the basis of international agreements that they have done unilaterally. We have always favored cooperation to achieve the same sort of objective that they have attempted to achieve unilaterally. So we would welcome the possibility of international agreement. We feel that that is the way these problems should be dealt with.

Senator STEVENS. I want to suggest to you that if they act unilaterally and, in effect, bar the transportation of our oil to the market, that we may as a State act unilaterally to bar some of the transportation of their items to Skagway.

Mr. STEVENSON. This is precisely why we favor multilateral rather than unilateral action, because you get an escalation of measures and countermeasures if there has not been agreement beforehand.

Senator STEVENS. But I do not see much progress in dealing with the matter. As far as we are concerned, unilateral actions, whether they be off Chile or off Canada, seem to have a great impact upon our commerce. We do not seem to be very astute about dealing with the same problems as they relate to the same nationals. I call your attention specifically to the volume of traffic entering Portland, Maine, or Puget Sound. If they are going to have conservation jurisdiction over our vessels, I would very much like to see us have conservation jurisdiction over their vessels. If this takes an agreement by them, they have already asserted their jurisdiction.

Mr. STEVENSON. Basically, Senator, when foreign vessels come into our ports, we can in effect, if the Congress wishes to do so, enact such legislation as is desirable without any international law problems. Once foreign vessels come into our ports they are within our jurisdiction. The only problem relates to foreign vessels which are not entering our ports but are navigating beyond our territorial waters in international waters.

I would like to point out that we are very conscious of these problems. One of the major activities of this Government with respect to the preparatory work for the 1973 Law of the Sea Conference is precisely designed to deal with these pollution problems in an international way. Pollution is one of the major items on the agenda.

One of the three subcommittees is dealing with that problem.

Furthermore, we already have some international agreements in this area. We have the agreements that were negotiated under the auspices of IMCO, which are presently waiting ratification by a number of countries, which give coastal States the right to take certain preventive action when there is a threat of oil spill pollution and also provide for liability.

There has been movement, not as much as we would like, but there has been enough to indicate that the international community can agree on this. There certainly seems to be the will to do so now.

Senator STEVENS. Alaskans do not exactly disagree with our Canadian friends in terms of this extension of conservation and pollution jurisdiction. We would like to see that become a norm in dealing with the North American continent, particularly with regard to the type of gear that fishing vessels use or tankers pumping their bilges as they pass through our waters, or at least what we consider our waters, even though they are beyond the 3-mile limit. I would very much be interested in a summary of these matters that you say are pending. Where did you say they were negotiated?

Mr. STEVENSON. Under IMCO, that is the Inter-Governmental Maritime Consultative Organization. I believe the IMCO conventions are presently pending before the Senate. There will be hearings in May on those conventions.

Senator STEVENS. Would you have someone on your staff give me a summary of those?

Mr. STEVENSON. Yes, sir.

Senator STEVENS. I am sure that is before the Foreign Relations Committee, not this committee.

Mr. STEVENSON. It is the Foreign Relations Committee.

(The following information was subsequently received for the record:)

On May 20, 1970, the President submitted to the Senate for advice and consent to ratification two Conventions done in Brussels at the 1969 International Legal Conference on Marine Pollution Damage—the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties and the International Convention on Civil Liability for Oil Pollution Damage. The President also transmitted for advice and consent to acceptance, certain amendments to the International Convention for the Prevention of Pollution of the Sea by Oil.

The Convention Relating to Intervention on the High Seas is important in dealing with oil pollution hazards on the high seas since at present it is unclear under international law what rights a State has to take action against a foreign flag vessel beyond its territorial sea. The Convention permits Parties to take such measures on the high seas as may be necessary to prevent, mitigate, or eliminate a "grave and imminent" danger of pollution by oil to their coastline or related interests.

No measures may be taken under this Convention against any warship or other ship owned or operated by a State and being used only on governmental non-commercial service. Except in cases of extreme urgency requiring measures to be taken immediately, a coastal State exercising the right to take measures is required to first consult with other States affected by the maritime casualty, particularly the flag States or States concerned, and to notify persons whose interest would be affected by the proposed action. The Convention requires that measures taken by a coastal State be proportionate to the actual or threatened damage to it, and establishes the right of the vessel owner to question the measures taken and receive compensation for unjustified coastal State action. Any controversy over whether a certain action by a State was justified under the Convention, whether compensation is obliged to be paid, and the amount of such compensation, is to be submitted to conciliation at the request of any of the parties concerned, or if conciliation does not succeed, to arbitration, as specified in the Annex to the Convention.

The Convention on Civil Liability establishes rules relating to the liability of the owner of an oil-carrying vessel to governments and private parties for damages caused by oil pollution. Under the Convention, the owner of the vessel is liable in all cases for oil pollution damage except when he can prove that the damage was caused by certain specified acts. The Convention does not apply to warships or other ships owned or operated by a state and in use only on governmental non-commercial service. The Convention specifies pro-

cedures under which the owner of a ship may limit this liability (per incident) to $134 per gross registered ton or $14 million, whichever is lesser. The limitation is not permissible if the incident occurred as a result of "the actual fault or privity of the owner." The owner of a ship carrying over 2,000 tons of oil in bulk as cargo is required to maintain insurance or other financial security sufficient to cover his potential liability under the convention. A Contracting State is required to forbid vessels under its flag to trade unless a certificate has been issued. Actions for compensation for pollution damage in the territory, including the territorial sea of one or more Contracting States, or for compensation for preventive measures taken to prevent or minimize pollution in such territory or territorial sea, may be brought only in the courts of such Contracting State or States. With respect to ships owned by a Contracting State and used for commercial purposes, each State is subject to the same jurisdictions and is required to waive all defenses based on the status of the sovereign State.

The amendments to the 1954 Convention for the Prevention of Pollution of the Sea by Oil consist of 9 changes in substance to the existing Convention. The principal change is to Article III and is based on the principal of total prohibition of oil discharge subject only to certain specified exceptions for practical reasons. It thus eliminates the need for free zones in which dumping and discharge of oil is not regulated. The exceptions to the general prohibition on oil discharge require that the ship or tanker be proceeding enroute and that the "instantaneous rate of discharge oil content" does not exceed 60 liters per mile. This new criteria of a limiting rate of discharge per unit distance introduces a limit below which pollution has been shown in practical experiments to be negligible. In the case of ships other than tankers, the oil content of the discharge must be less than 100 parts per 1,000,000 parts of the mixture and discharge must be made as far as practicable from land. In the case of a tanker the amount of oil so discharged must be limited to 1/15,000 of the total cargo-carrying capacity and the discharge must take place more than 50 miles from the nearest land. The definitions in Article I of the Convention are amended to take into account the new control measures. The other changes in the Convention basically improve the reporting procedures under the Convention and further implement the change in principle made in Article III.

Senator STEVENS. Thank you very much.

I understand Dr. Smith is our next witness. We appreciate very much your testimony.

I understand, Doctor, that you have a statement. If you would be interested in submitting it for the record and summarizing it or, under the circumstances, just discuss it briefly, I think it would be a good thing to do.

STATEMENT OF DR. DAVID D. SMITH, DIRECTOR OF PROGRAM DEVELOPMENT, DILLINGHAM ENVIRONMENTAL CO., LA JOLLA, CALIF.

Dr. SMITH. I would welcome a chance to touch on the high points. The details of the statement have been submitted.

Senator STEVENS. Thank you. It will be printed in the record completely.

Dr. SMITH. My presence here today primarily is based on about 3½ years specialized work in solid waste and related pollution control problems. I am trained in marine geology, but I have worked in a variety of the pollution control fields, including preparation of a major report on the status of offshore disposal in connection with and under contract with environmental protection agency office of solid waste management, and this report will be coming out quite shortly. The significance of that report is it formed one of the major

sources for preparation of the Council of Environmental Qualities, "ocean dumping—a national policy statement," which is, I believe, in turn the basis for Senate bill S. 1238, that is, the Marine Protection Act of 1971.

In this forthcoming EPA-Dillingham report, we have recommended that the current confused legal status regarding marine disposal requires definitive clarification, as well as an effective regulatory and research program to address itself to a number of problems associated with marine disposal. Thus, my testimony today is generally in support of S. 307 and S. 1238. I feel, however, quite strongly that certain modifications and additions to at least S. 1238 should be made.

I can illustrate these points rather briefly. We are faced with a matter of attitude in the United States today. It seems clear that in the general public's mind the idea prevails that disposal of any waste materials in the ocean is inherently bad, and therefore should be stopped, or at least severely curtailed. This is the philosophy of S. 1082 and S. 1286. I am opposed to this, and I will explain why.

I am convinced, and I believe if you will talk to various professionals in the waste management field you will find general agreement, that ocean dumping of selected types of waste—and I emphasize selected—is not only permissible but is in fact quite desirable. Thus, one of the principal objectives of my testimony today is to urge you to recognize the desirability of such disposal and to make adequate provisions in these bills which encourage ocean disposal of what I term "compatible" wastes.

The point came up in two of the bills regarding cessation, permanent cessation and termination of marine disposal. I am definitely opposed to this. I think it will be abandoning a very major source, that is, the ability of the ocean to accept waste.

I make one other preliminary point. I fully recognize that this approach, as in my statement here, favors ocean disposal of all of certain types of wastes may seem contrary to everything you have heard or read regarding waste disposal at sea. I recognize also that in the present era of aroused public interest in the environment, in which ecology has become virtually a "motherhood issue," there are certain significant hazards, both politically and professionally, in what at first may seem to favor what others might term pollution.

Getting to the basics of it, fundamentally, the marine waste disposal issue boils down to this: Man produces large volumes of waste which must be disposed of. The question is: Where are we going to put it? If we can recognize the ocean's ability to accept enormous volumes of waste, then the key decision is simplified. It becomes what types of waste can we put in the sea safely and what must be disposed of elsewhere.

The reason I think this is terribly important is the following. We all recognized there is a relatively limited amount of dollars that can be spent on environmental protection and environmental improvement.

It is my opinion these moneys must be spent most wisely, and therefore spent on problems that are most critical. Therefore, my testimony has essentially four key points.

There is a need to recognize in the bill that will be reported out by this committee that the waste assimilative capacity of the sea is enormous. I can hardly overstate or overemphasize that there has been a general failure to recognize this.

We hear a lot of what I term vastly oversimplified and commonly ill-founded statements that any discharge of waste to the sea is pollution. This is just not true. If you will talk to qualified sanitary engineers, qualified biologists who are concerned with waste management, I think you will find general agreement with this. I have talked to a number of people on the marine board of the National Academy of Engineering. I would refer as a matter of record to some of the testimony by John Parkhurst and others, particularly the National Academy of Science, the National Academy of Engineering reports entitled "Waste Management Concepts in the Coastal Zone." This is a very key document.

My second point. I have said first we need to recognize the assimilative capacity of the sea, and we need to figure out now how to use it. Sea disposal is highly desirable for compatible or quasinatural wastes.

In addition sea disposal is probably acceptable—I say probably; we need work on it—for various special types of wastes where deep water presents the least hazard to man. Obsolete munitions that are not chemical and of that nature probably do belong in the deep sea contrary to many other statements.

The third point, the new law needed to regulate oceanic disposal should facilitate rather than hinder such types of marine disposal. I think this is critical. The law must have specific provisions pointing out that there are desirable aspects of marine disposal.

Finally, my fourth point, the law must authorize and facilitate research on marine disposal of wastes. We are dealing here directly with S. 307 as tied in and supporting S. 1238.

You may ask what do I consider compatible types of waste. Several of these, perhaps the most significant, is unpolluted dredge spoils. Testimony presented elsewhere has indicated that something on the order of 38 million to 40 million tons of dredge spoils per year are disposed of at sea. Of this, approximately 35 percent are pollutive, but the remaining materials are in my opinion totally adequate for sea disposal.

Let's develop that logic for just a moment, and we will pass on to my concluding point.

Senator STEVENS. You are talking about just normal dredge material.

Dr. SMITH. Harbor evening, channel excavation, yes, sir, that is correct, even some construction work.

The point is as a geologist, I feel particularly qualified to speak to this point. We have in essence enormous runoff from all the rivers in the United States, and certainly in Alaska the Yukon is a tremendous transporter of, if you would, natural dredge spoil. What I am saying is if we can extrapolate that same view to recognize that many rivers normally deliver huge quantities to the sea, then a small additional increment which man takes to the sea, if he puts it in the right place—I am not saying every place is the right place in the shelf, we have to find the right place, perhaps these are beyond the edge of the shelf,

down in the continental slope, in the abyss, but we must recognize there are a series of right places even on the shelf. Many marine biologists if you sit down and really talk to them will admit that vast areas of our Continental Shelf are essentially barren deserts regarding bottom fauna. I feel that type of area can be located relatively easier. I have seen this in under water television in various parts of the world, and they can be utilized as select disposals of unpolluted dredge spoil.

To go into the other direction, to put them in land fill operations, to dewater them is enormously expensive.

I contend there are right places in the sea for certain types of material.

Senator STEVENS. Do you put agriculture and cannery wastes in the same category as unpolluted dredge spoil and certain mining wastes?

Dr. SMITH. I think the materials which are normally biodegradable and which don't have a significant increment of, say, chemicals due to processing—I am talking now about some canners in the bay area who discharge to the sea, the wastes they discharge to the sea to my knowledge are virtually free of processing additives, if you would. To me disposal of that material in deep water will, if anything, enhance the environment. My point is simply that in the average deep-water area, materials of this type degrade rather rapidly. There is a deficiency of nutrient material. The bagasse off the east coast of Hawaii, this is sugar cane processing waste. If you get it deep enough it lies there and it is virtually inert or it degrades slowly. If it is shallow enough, it degrades rapidly. I think the key point is it cannot be left at the surface. One of the recommendations is that we require engineering development work to show us how to put certain select materials in depths where they are not esthetically offensive.

In earlier testimony the question came upon monitoring. I think it is terribly critical here to distinguish between two types of monitoring. One of these is the surveilance aspect, and that is certainly the province of the Coast Guard, which deals with the effectiveness, the observation of the required discharge specifications, if you would, where and how the ship should be operated, where can it discharge, how soon shall it return. By the same token there is a very critical area which I think is generally overlooked perhaps even more so, because this is the area of technical monitoring which deals with what is the nature of the response of the environment to the presence of waste, and secondly what actually happens to that waste. We refer to it as what is the fate of waste.

This tends to be ignored. This is not ignored in S. 307. I think tying S. 307 and S. 1238 together makes a great deal of sense. But the reason I stress the need for technical monitoring, at the present time, as Dr. Parkhurst pointed out and others in previous testimony before this committee, we really don't have adequate technical basis for setting what a waste management engineer terms "marine water quality values" or "marine receiving quality water values." We can do this in the lakes and the rivers, but as to the offshore, and this is where a lot of waste is going, and I contend a lot of waste should continue to go if it is compatible, we need research in order to effectively establish, if you would, how much compatible waste we put in one place at a given time. We all know what a blivot(?) is, 10 pounds of pigs in a 5-pound bag. I think that is the problem we face on the New York bight. We had

some of the right kinds of materials going out there, but they were going into great concentrations, in other words, a poor waste management practice, partly because of poor information. With adjustments in that, I think the New York bight kind of problem can be avoided in many other areas of the U.S. Continental Shelf.

Senator STEVENS. Does your idea about dumping of compatible waste refer to the Great Lakes as well as the oceans?

Dr. SMITH. Mr. Stevens, my information deals primarily with the oceans. I am primarily associated with salt water environments. So, I would not feel competent to testify to the subject. From what I have read, however, I would be very reluctant to extrapolate that, because I think the assimilative capacity of those lakes has been tested. In Lake Erie we found the limits. The oceans are a completely different situation.

Senator STEVENS. When you refer to technical monitoring, who do you envision would do this? Is this beyond the competence of the Coast Guard in your opinion, and if so, why, and who do you think should do it?

Dr. SMITH. I am in general aware of the competence of the Coast Guard and the diligent means with which they carry out their mission. Without, however, increased funding of a substantial order, I don't think they could handle the technical monitoring aspects. They are putting the platform there to monitor from a surveillance sense. Perhaps it makes a great deal of sense that a Coast Guard vessel should therefore be so equipped to carry out the technical aspects as well, what is happening to the waste. I tend to think of it on the contrary, however, that the Coast Guard has the vehicle, they are taking care of the surveillance aspect, and it will be scientists from EPA and other Federal agents with greater technical expertise who would be, if you would, the passengers on that vehicle, the platform, as the oceanographer refers to it, to proceed with this technical monitoring program.

Senator STEVENS. Is that a selective process for the dumper to provide that type of technical monitoring, or do you think that ought to be a condition of any permit.

Dr. SMITH. The question hinges around a matter of costs and around which wastes we are discussing. If we are talking about, say, dredge spoils, which is predominantly, if you would, the product of the corps, who is charged with maintaining our rivers and harbors and our entrance channels, the, the dumper in fact is the Federal Government, one branch, and to me while they can carry out a certain type of monitoring, say, in estuaries. I think if you get into the situation of asking each disposal agent to be fully responsible, you are going to have duplication of effort and expenditure of funds that should probably not be spent. I favor focusing the monitoring aspect perhaps, say, in EPA. As a private businessman, I am also certainly in favor that some of these problems should go outside the agents on contracts on a competitive basis.

Senator STEVENS. You have heard the discussion of the EPA permit authority discussed here this morning. Do you think that the full load could be assumed by the Coast Guard?

Dr. SMITH. In answer to that, may I read my last point and then perhaps elaborate?

Senator STEVENS. Sure.

Dr. SMITH. My final point is this, and I would like to read it word-for-word: At the present time I am alarmed with the situation I see developing regarding the fundamental legal aspects of marine waste disposal and more generally in the area of environmental and pollution control law. This situation centers around two major factors. I am reading on page 13 of my statement.

At the present time, this is the first factor, in the area of pollution control, the burden of proof, I believe, is primarily on the plaintiff—not on the plaintiff, but on the defendant. In other words, not on the person who alleges damage, he doesn't have to prove it. It is the person who says I didn't damage the environment. In essence this amounts to being guilty until proven innocent, and this is, of course, certainly the reverse of what our standards of justice have been before. This is a generalization and it is a fairly strong one. But I think most people in the waste disposal field have strong opinions on this and a number of them favor the words I have just stated to you now. I think we have had a kind of reversal in our normal application of standards of justice.

There is a second point. Because of the way the EPA is structured, that Agency may find itself in a rather awesome position in any given case of serving as arresting officer, prosecutor, judge—and these are more or less in the sequence with which the case occurs—fourth, appellate review authority, and fifth, expert technical witness. All of these are wrapped up in one agency. I have no doubts whatsoever as to the integrity of the EPA staff. I do question, however, whether it is possible for EPA or anyone to remain totally objective as judge and review authority when they also serve in all these other roles at the same time on the same case.

My point there is that this is directly applicable to your question, could another agency effectively handle the permit system. I don't feel qualified to address myself to the abilities of the Coast Guard to take this on. As far as technical competence, I think EPA is stronger. As far as the amount of men and material to commit to it, again I think EPA is stronger, but this is a question of money and in which departments these authorities should rest. I do not feel competent to so recommend one agency versus another at this point.

Senator STEVENS. A number of persons have expressed concern that regulating the dumping of dredge spoil will impede harbor and port development. What amount of regulation of dumping of this dredge spoil would be appropriate, in your opinion? Do you think it should be handled under a general permit concept under section 5(e) of this bill, S. 1238, or how do you think we should handle the dumping of dredge spoil?

Dr. SMITH. In general, I support section 5(e) of this bill. I would feel that with certain modifications of wording, perhaps we need not get into the details of it now, that that type of permit with provision for certain, if you will, check-in at disposal site, either with a surveillance vessel or using some type of electronic equipment to be sure that the disposal vessel did go to the particular site.

I think the permit approach is acceptable as long as—and there is one other point in my testimony—as long as you don't provide in

the wording of the bill or say clearly eliminate what I term the opportunity for minor officials in a given agency to liberally interpret such words, and, in essence, pocket veto applications for permits.

Part of the problem we saw in the study we did for the EPA, the Office of Solid Waste Management, is that some industrial organizations wanted to comply with the law. It was a question of whom did you go to for a permit, who was the dominant agency. An application, say, in one corps district, and the corps then was the dominating scene, might take no more than 3 months to process. In the adjacent corps district, because of different points of view, it might take a year and a half. As a result of this, there were some cases where disposal would be shifted to the adjacent corps district to take advantage of the ease of obtaining the permit.

I am not commenting whether this disposal was either good or bad; it was just the administrative procedures.

Senator STEVENS. Well, I note on page 7, subsection (e), it says that—

> Notwithstanding any other provisions of the Act, the administrator may issue general permits for the transportation for dumping, or dumping, or both, of classes of materials which he determines will have a minimal impact, considering the factors stated in Subsection (a).

Doesn't that cover most of the items you are talking about, the actual discretion for the administrator to issue these permits if there is a minimal impact? Are you saying that these are items that have more than such an impact but still ought to be handled under some specialized procedure?

Dr. SMITH. I think you are dealing with two classes, one that fits here, but my concern is that wording should be, if you would, broader or, if you would, more pointed in the sense of recognizing that certain types of waste are acceptable. What I am afraid of here is the lower levels of any given organization charged with issuing these permits can exercise pocket veto by saying we can make so many provisions necessary, then what in effect happens, the permits are unobtainable and the concerns that you expressed about the adverse effects dealing with harbor development, development of our ports, would in fact occur. Because once you have to slow down dredging significantly, and this is already a massive expenditure of Federal and private funds, once you have to do this, if you reduce rates, say, by 30 percent, your costs go up significantly.

When you say reduced rates, if it takes just that much longer to get the permit, it just means it is just that more red tape. If we in this bill clearly state that certain types of these are acceptable prima facie, then I think we will have eliminated that possibility that at the local level there will be, if you will, the pocket veto exercised.

Senator STEVENS. Do you mean that we ought to define what substances are such that they will have a minimal impact under that section? If so, are you saying that compatible wastes, as you have listed in your statement, are such that do have minimal impact?

Dr. SMITH. I am suggesting virtually that. Whether all of the wastes I have listed, I think this is—I would recommend all the wastes. Others may agree on a smaller or shorter list. My point is I think very few people will argue on the unpolluted dredge spoils pro-

vided they go, if you will, to an acceptable or desirable site offshore. I think the whole crux of my testimony is if we try to turn off or bend the use of a natural resource, which the rivers have been disposing of spoil there for years, if we try to limit this and perhaps not recognizing that resource, we are entailing the potential expenditure of vast sums of money, considerably more difficult regulatory procedure, and the inability to put that money on really critical environmental problems, where I think it should be spent.

Senator STEVENS. Who is to decide the where? If it is decided that these are compatible, there is still the basic question as to where they should be disposed of. Who would you have make that decision?

Dr. SMITH. I believe the individuals in EPA, particularly those who have had a chance to look at this concept and think about it. There are some officials there in that organization who can sympathize with this approach. By the same token, if there is a total protectionist tone implied in this bill, then we are not going to have the idea of utilization.

I think we can do both. I think we can protect our estuarine resources and use, if you would, areas on the shelf or off the edge of the shelf which have little or no value.

Senator STEVENS. Tell me a little bit about this Dillingham Environmental Co. that you are with. What do they basically do? I note that you did this report for solid wastes management, but what do you basically do?

Dr. SMITH. We have three types of principal activities as an environmental consulting company. One of these is evaluation of ecologic problems for municipalities, State and regional authorities, and for private industry.

The second is what we term an analysis or systems analysis type study. The solid waste program that I have just discussed here was one of these.

A second one was an evaluation of the offshore oil spill problem for the American Petroleum Institute. That has been published separately.

A third area would be planning programs, say, for the State of California, the State of California regional agencies, and the Oahu water quality study which Dr. John Parkhurst cited twice in his testimony. We are carrying out one-third of that. We are evaluating all of the offshore receiving water characteristics.

On the basis of that work as well as a lot of other work, I come forth today with this position.

Senator STEVENS. Do you have any specific amendments to suggest to the bill, or are you suggesting that we should review the bill, and make it more permissive as well as prohibitory?

Dr. SMITH. I am suggesting that you should review this. I would be willing to submit specific recommendations by letter for the record.

Senator STEVENS. I think it would be very helpful to the committee if you do that.

I would have some question although I am not an expert in it, about your listing of compatible wastes; for instance, organic municipal refuse and clean residue from incinerators. Those seem to be incompatible as far as I am concerned.

Dr. SMITH. May I point out the list is essentially in the decreasing order of compatibility, and you will note that is at the base. Subsequently in the testimony, I indicate that there is research and development work required concerning municipal refuse.

We have done preliminary in-house studies on the prospects of disposal at sea. The city of San Francisco discussed to undertake this work. We did, we worked with the Regional Water Quality Board of the State of California, and decided at least 2 years of environmental work would be required. By that I mean even placement of, say, 200 tons on a site off San Francisco, another site off San Diego, another site off Honolulu, and we have talked to all three cities about this and the EPA, and this was being considered very satisfactory and very favorable as a logical sort of extension of the initial study we undertook.

All right, are there other places on the sea that you can even put municipal refuse? I say that is the least compatible on the list.

Senator STEVENS. How do you group the classification of organic municipal refuse and clean residue from incinerators with the same category of compatibility? They would seem to be basically incompatible to begin with. Am I misunderstanding what you mean by "organic municipal refuse?"

Dr. SMITH. Respectfully, I believe you are.

Senator STEVENS. What is it?

Dr. SMITH. The residue from certain high level incinerators and I am now depending on information given me by people who are specialists on those processes——

Senator STEVENS. That is organic municipal refuse?

Dr. SMITH. We are talking about two different things.

Senator STEVENS. What do you mean by it?

Dr. SMITH. Essentially the swill, garbage, household refuse, and tree cuttings and this sort of thing, which placed in the sea at deep water will degrade and will not act as a toxic material.

I am contending, and I indicate in the testimony, that the place for that type of material in the ocean is in 6,000 to 10,000 feet of water and based on restricted circulation where the biodegradable does not affect the activities. The Puerto Rico trench is one of these. These have the ability to receive waste.

Senator STEVENS. Did you have anything further, Dr. Smith?

Dr. SMITH. I was then going to merely add in conclusion the incinerator residue, there are several municipal incinerators operating now in various parts of the United States. In some of these areas what to do with the material that is produced at the other end of the incinerator is a serious question.

Incinerators really are volume producers. They flame all the flammables, get rid, if you would, of the organic materials and those other matters that will burn. What comes out the other end is relatively clean.

There are some processes for cleaning still further. What do you do with that residue? That is a solid waste. Some of the Japanese say that should go into building material. Without getting into those peripheral problems, I am saying this together with your organic debris that we as citizens generate in our cities, these are at the bottom of the list which I question as I do in my testimony saying research

is needed on these. Whether they are to be included or not included, the point is, they are on the list.

The problem of disposal of these wastes, say, for the city of San Francisco is becoming increasingly expensive, and literally a savings by taking it to sea might amount to several million dollars now and probably tens of millions of dollars in the next 10 years.

Senator STEVENS. If you or the agencies you are working with have any specific suggestions or amendments to the bill, we would be pleased to receive them by letter or by a statement, if you wish to submit an additional statement. I am sure the committee has no desire to make it prohibitory to handle wastes.

On the other hand, if I correctly interpret the tenor of the legislation, it is intended to be a restrictive bill.

Dr. SMITH. I recognize that and seek merely provisions for special materials.

Senator STEVENS. The total question of the complication of disposal at sea versus the disposal by landfill or otherwise is something the committee has been quite interested in. If you have any guidance for us in that regard and we did get some testimony from officials from San Francisco, as I recall, on that matter—we would be very interested to have it.

Dr. SMITH. There is a brief summary here regarding some aspects of the San Francisco landfill operation where we were actually asked to make a quotation and did a preliminary analysis cost estimate. That was a preliminary.

I will endeavor to get additional materials and submit to you something for the record.

Senator STEVENS. Thank you very much, Dr. Smith.

(The statement follows:)

STATEMENT OF DR. DAVID D. SMITH

Mr. Chairman and members of the committee, my name is David D. Smith. I am Director of Program Development with the Dillingham Environmental Company in La Jolla, California. I am a marine geologist and have worked on solid waste marine disposal problems and a number of other environmental protection and pollution control problems for the last three and one-half years. I am co-author (with Mr. Robert P. Brown of Delmar, California) of a forthcoming report summarizing the status of marine disposal of solid waste from U.S. coastal cities. This report will be published very shortly by the Solid Wastes Management Office of the Environmental Protection Agency, for whom we carried out this work under contract. The unpublished version of this report was a major source in the preparation of the Council on Environmental Quality's "Ocean Dumping—A National Policy," which in turn is, I believe, the basis for Senate bill S. 1238, the "Marine Protection Act of 1971, to which I will address myself in a moment.

As we have recommended in this forthcoming EPA–Dillingham report, the current confused legal status regarding marine disposal requires definitive clarification, and an effective regulatory and research program is much needed. Thus, my testimony today is generally in support of S. 307 and S. 1238—but I feel strongly that certain modifications and additions to these bills should be made.

I can best illustrate this point by speaking first to Senate bills S. 1082 and 1286, which also deal with ocean disposal and are currently being considered by this Subcommittee. In this regard, it seems clear that in the general public's mind the idea prevails today that disposal of any waste materials in the ocean is inherently bad, and therefore should be stopped, or at least severely curtailed. Senate bills S. 1082 and S. 1286 are in essence based on this philosophy.

I am convinced (and I believe that you will find many professionals in the waste management field in general agreement) that ocean dumping of selected types of waste is not only permissible but is in fact highly desirable. Thus, one of the principal objectives of my testimony today is to urge you to recognize the desirability of such disposal and to make adequate provisions which encourage ocean disposal of what I term "compatible" wastes.

For this reason, I am opposed to S. 1082 and S. 1286—the former would prohibit ocean discharge of *all* wastes in five years; the latter calls for an immediate stop to ocean disposal followed by promulgation of regulations within six months which would authorize by permit limited disposal at sea. In my opinion, immediate cessation of all ocean disposal is unwarranted by the evidence that is currently available.

On the other hand, I support the basic concepts embodied in S. 307 and S. 1238. I suggest additional provisions in these bills along the lines of the balance of my testimony here today.

One other preliminary point before proceeding—I fully recognize that my statement favoring ocean disposal of certain types of wastes my seem to you to be contrary to almost everything you have heard or read regarding waste disposal at sea. I recognize also that in this present era of aroused public interest in the environment, in which ecology has become virtually a "motherhood issue," there are hazards both politically and professionally in what at first may seem to favor what others term pollution.

Basically, the marine waste disposal issue boils down to this—man produces large volumes of waste which must be disposed of. The question is: Where are we going to put it? If we can recognize the ocean's ability to accept enormous volumes of waste, then the key decision is what *types* of waste can we put in the sea and what must be disposed of elsewhere?

In this context there are four key points in my testimony today:

1. The need to recognize and utilize the *waste assimilative capacity* of the sea can hardly be overstated, particularly in light of the vastly oversimplified and commonly ill-founded general view that any discharge of waste to the sea is pollution.

2. Sea disposal is—

a. highly desirable for "compatible" or "quasi-natural" wastes

b. acceptable for various special types of wastes for which at-sea disposal in deep water presents the least hazard to man.

3. The new law needed to regulate oceanic disposal should facilitate rather than hinder such types of marine disposal.

4. The law must authorize and facilitate research on marine disposal of wastes. While operational monitoring (or surveillance) of dumping by the Coast Guard is certainly important, this must be paralleled by comprehensive technical monitoring which will measure the short- and long-term effects of the waste on the environment and more specifically on the ecosystem.

May I now elaborate on each of these points—One, regarding effective utilization and management of the space resource and assimilative capacity of the sea—there is no disagreement that the marine food chain must be protected, but it simply isn't necessary to turn off all types of marine disposal in order to do this. Some wastes are likely to muck up the marine environment—other wastes are very *unlikely* to do so. It is vital that we distinguish between the two and insure that marine disposal of compatible wastes is allowed to continue.

In the category of compatible wastes I would include:

a. unpolluted dredge spoil

b. construction and demolition debris

c. certain mining wastes

d. oil well drill cuttings

e. effluent (but not sludge) from sewage treatment plants

f. various agriculture and cannery wastes

g. organic municipal refuse and clean residue from incinerators and other treatment processes (some of which are still in developmental stages).

For compatible wastes, the question is *where* in the sea (or more correctly, where on the sea floor) is the proper place to put these wastes, and what volume can a given area assimilate without significant deleterious effects? Part of our marine disposal problem to date has been that we have been putting too much otherwise compatible waste in one place (we simply have exceeded

the assimilative capacity in that area); we have also put some materials in the wrong place, *e.g.*, large volumes of dredge spoils dumped too close to a rich oyster or clam fishery is obviously poor waste management practice.

But there are *right* places in the sea for well-managed marine disposal of compatible waste—there are some right places on the continental shelf, and virtually all the continental slope and the abyssal depths are right places. For example, there are natural desert areas on the sea floor where the bottom fauna is extremely sparse. With little question, the best human use for these areas is as a receptacle for these wastes.

Two, regarding the desirability of sea disposal of compatible wastes such as unpolluted dredge spoil, there is substantial precedent for marine disposal of this type of waste. Witness the enormous volumes of sediment carried to the sea each year by the rivers of the world. This is nature's equivalent of dredge spoil. Roughly the southern one-third of the state of Louisiana and substantial portions of several of our costal plain states were built geologically in just this way. In spite of this extremely long-term natural "loading" of the sea with waste, there is convincing evidence that the chemical composition of the sea has not changed for millions of years. The point seems clear: The ocean has the capacity to accept and assimilate truly enormous volumes of natural and quasi-natural wastes from the land. Therefore, there is no fundamental reason why mankind should not make use of this assimilative capacity of the sea, provided that the wastes we so discharge are more or less equivalent to natural wastes (that is, compatible) and do not contain significant amounts of highly toxic substances.

Further, there are a number of reasons why unpolluted dredge spoil (which is by far the largest volume of compatible waste currently being discharged at sea) should continue to be so disposed of. Fox example, if the sand in this spoil is discharged at the right offshore locations along the California coast, it would help to counteract the general starvation and resulting erosion of that state's beaches. This starvation has resulted from the interruption in the normal river-delivered sand supply because of dam construction along most of California's rivers.

Another argument in favor of continued sea disposal of dredge spoil is the fact that on-land disposal is not only considerably mose costly but may bring serious ecological consequences as well. Specifically, unpolluted dredge spoil is a substantially more serious ecologic problem when deposited in a shallow coastal estuary than when it is discharged in proper deeper water localities offshore. As a case in point, biologists of the National Marine Fisheries Service have concluded that land fill associated with dredging operations in the Boca Ciega estuary southwest of St. Petersburg, Florida, has caused a loss in fishery products in that estuary totaling $1.4 million annually. Not all of this drudge spoil could have gone to sea for discharge, but the case illustrates the nature of the loss and the tradeoff that I'm talking about. In short, we can protect our estuarine fisheries by discharging dredge spoil at more suitable sites offshore.

What about marine disposal of garbage, trash, and related materials? There is evidence to indicate that much of man's municipal refuse can probably be placed in selected narrow, deep oceanic troughs (which have restricted water circulation) with virtually no polluting effect on the overlying shallower waters which host the bulk of the food chain. This is probably true for the deep trench north of Puerto Rico and for several of the continental borderland basins off the Southern California coast. Several geologic scientists recently suggested that 1) the sediment accumulation rates in some tectonically active trenches (like the Puerto Rican trench) are sufficient to bury waste deposited there in a relatively short time, and 2) the material so buried will eventually move downward into the earth's crust for digestion at depth. This truly is waste recycling on a grand scale.

Although this concept may seem somewhat grandiose at first glance, the economics of marine disposal of municipal refuse are sufficiently attractive to require careful consideration. For example, San Francisco's 2,000-odd tons of waste per day presently cost about $7.00 per ton to haul from the central collection station in the city to a land fill about 35 miles away. This same waste load could most certainly be placed in suitable sea floor sites with no contamination of food chain waters for roughly one-half to two-thirds of this

cost. As land fill sites in coastal cities become progressively harder to find, farther from the city, and thus more expensive to use, the pressure to save millions of dollars annually by operating carefully planned, engineered, and managed sea disposal systems will increase substantially. For this reason, the bill you report out of this Committee should have provisions which not only allow for this type of selected disposal but should authorize and support the required research and development.

Three, the new law needed to regulate ocean disposal effectively must have provisions which facilitate rather than hinder sea disposal of compatible waste. The present wording of Senate bill 1238 contains no such provisions.

In this regard, what does the term "regulate" mean in this bill? Perhaps the meaning is keyed to the background of a person reading the terms. Because of the likelihood of misinterpretation, I think it is particularly important that the regulations embodied in this bill be written in such a way (and their intent made unmistakably clear) that the various required permits, inspections, reports, and related procedures do not provide minor officials within the regulatory agency with what in fact amounts to a "pocket veto" on marine disposal of compatible waste.

There is no need here to detail the specific nature of the regulations which should govern disposal operations. Several aspects of this question are discussed at length in the forthcoming EPA-Dillingham report, and such organizations as the Marine Board of the National Academy of Engineering can provide the Committee with expert guidance on this subject.

Another point regarding regulations which requires clarification is the use of the term monitoring. There are two broad categories of monitoring: a) operational monitoring or surveillance to insure that the specified discharge procedures are complied with, and b) technical monitoring which deals with the fate of the waste and the response of the environment to the waste. The law must provide for effective monitoring of both types. The reasons for operational monitoring are self-evident; the reasons why technical monitoring is equally critical are not so apparent and therefore require some clarification. This is covered in the following section on research.

Four, regarding needed research—what is the state of our knowledge as to the response of the marine environment (and its associated ecosystem) to waste disposal? We have very meager knowledge of what the effects of marine waste disposal really are. In short, most of the work done to date did not cover an adequate time span nor were the observations at the disposal site sufficiently numerous to provide statistically conclusive answers. Thus we generally have qualitative results suggesting that many marine disposal operations are relatively innocuous. But we badly need much more information of a comprehensive nature. Accordingly, I strongly support S. 307 and its provisions for the establishment of national laboratories as a technical support group of the Environmental Protection Agency.

Looking at the problem from a slightly different point of view—let's put it in the terminology of the waste management/sanitary engineer. In his words, we need to establish realistic quantitative marine receiving water values on which to base the design of marine waste disposal systems. At the present time we simply do not have these values, nor do we even have an adequate technical basis for more than a preliminary selection of tentative values. Yet arbitrary selection of numerical standards has been precisely the tendency of a number of regulatory bodies.

Technical monitoring and related research to determine the fate of waste disposed of at sea and the response of the marine ecosystem to that waste is vital in order to obtain the technical information from which we can then develop marine receiving water values. Development of meaningful values will take a lot of costly research work on various aspects of waste discharged at sea—probably three to five years of research, with certain programs continuing even longer.

Rather than offer a long list of recommended research items, let me refer you to the statement on research needs presented in the report of the Council on Environmental Quality, entitled "Ocean Dumping—A National Policy." In addition to the needs cited there, I would emphasize the need for a) research which will enable us to select the offshore sites most suitable for marine disposal of compatible waste and b) engineering development work to insure effective systems for placing this waste at the most desirable localities.

My final point is this: I am alarmed at the situation I see developing regarding the fundamental legal aspects of marine waste disposal, and more generally in the area of environmental and pollution control law. The situation centers around two major factors—

First, at the present time, in the area of pollution control the burden of proof is not on the plaintiff but on the defendant. In essence, you are guilty until you can prove yourself innocent. This, of course, is certainly the reverse of what our standards of justice have been heretofore. Yet it is nevertheless very close to true for the environmental scene today.

Second, because of the way the Environmental Protection Agency is structured, that Agency may find itself in the rather awesome position (in any given case) of serving as 1) arresting officer, 2) prosecutor, 3) judge, 4) appellate review authority, and 5) expert technical witness. All these wrapped up in one agency! I have no doubts whatsoever as to the integrity of the EPA staff. I do question, however, whether it is possible for EPA (or anyone) to remain totally objective as judge and review authority when they also serve in the other roles at the same time on the same case.

In summary, I urge you to insure that the bill reported out of this Committee include provisions for: 1) continued use of the ocean's space resource for selected sea disposal of wastes that are generally compatible with the marine environment, 2) adequate (but not inhibitory) regulations which provide for technical monitoring as well as for operational surveillance, 3) research which will carefully evaluate the assimilative capacity of the various segments of the sea floor for different types of wastes and which will lead to the establishment of realistic marine receiving water quality values, and 4) engineering development work which will provide the systems and techniques required for optimum beneficial use of the sea, including select waste disposal.

I thank the Committee for this opportunity to appear and present testimony as a private citizen and concerned scientist deeply interested in protecting our environment and in effectively utilizing our resources as well.

Senator STEVENS. Mr. Clapper.

STATEMENT OF LOUIS CLAPPER, CONSERVATION DIRECTOR, NATIONAL WILDLIFE FEDERATION, WASHINGTON, D.C.

Mr. CLAPPER. Senator, in view of the time element, I would like permission to file my statement in complete form and merely to summarize and to emphasize certain portions.

Senator STEVENS. Thank you very much. Your statement will appear in the record, and if you have any additional comments to make, we will be happy to have them.

Mr. CLAPPER. To try to summarize, Senator, I think we would say we believe unwanted wastes should be reclaimed or recycled back into the overall ecological system, and we simply can't see any valid reason in princple for using the Nation's offshore areas for disposal of wastes. If this cannot be accomplished, and we would understand it might be difficult in some areas, we think favorably of plans to phase it out over a period of years, and we call attention there in my first summary statement with respect to several bills, some in the House, which have schedules for phasing out this activity.

We also like section 3(b) of S. 1238, the specific coverage which does go to the Great Lakes and some other areas to which the bill would be applicable.

We think it is appropriate for the EPA to be empowered to issue these permits, if any dumping is to be allowed. We think that S. 1238 appears to give the EPA Administrator suitable discretion in issuing permits and we like the provision in this proposal which burdens the applicant with providing information to justify a permit.

We agree that the EPA Administrator should be authorized to designate by permit the type and amount of materials to be transported and/or dumped and the location, and the period of time that the permit is valid.

Now, of course, we recognize that some placement of materials perhaps is beneficial, and we have a certain interest in the disposition of old auto bodies, concrete tile and so forth in developing fishing reefs that we think are a beneficial application of some of the unwarranted materials in certain areas.

We are in concurrence and would call the committee's attention to provisions in two House bills, H.R. 3662 and H.R. 4359, which would immediately suspend the dumping or disposal of radioactive wastes, toxic industrial wastes, and chemical or biological warfare materials.

We hope the committee will give thoughtful consideration as well to two points in S. 192: To public hearings on permit applications, and to having EPA decisions reviewed by the Council on Environmental Quality. That bill I don't think was in the list that the committee has under consideration.

We recommend that the committee give consideration to proposed section 7 in S. 1082 which would provide for determining means of recovering useful materials from wastes. We think this is a meritorious effort if some kind of beneficial use can be discovered for what are now considered wastes.

In the last of the points I made in our statement, point 11, we note that S. 307 would establish the National Oceanic and Environmental Research Act of 1971, and we agree with most of the expressed policies here in the bill, that the United States foster a program of oceanic and environmental research and development to provide an understanding of natural and manmade activities in the oceans, estuarine areas, and other waters. And, we would be pleased to see activated a comprehensive program of research and associated technological development.

As we read S. 307, no permit for disposals of wastes into oceanic or estuarine waters would be issued without a review of the findings of research in the impacts of ocean dumpings and we most certainly hope and trust any program will take these factors into account. However, we have some reservations about the program envisioned by S. 307.

We note that section 5 of S. 1238 charges EPA with issuing permits on ocean dumping, with the Administrator establishing and applying criteria for evaluating applications. It would be presumptive that the EPA Administrator should consult with several other Federal agencies, including Commerce, on any kind of criteria that would be developed in conjunction with this program. However, on the other hand, S. 307 would make the Secretary of Commerce responsible for the research program, and this is the provision about which we have some severe reservations.

Back when the establishment of the National Oceanic and Atmospheric Administrator was proposed, we spoke out in opposition to actions which split off the Bureau of Commercial Fisheries—at least those activities which relate protection and management of fishery resources, and associated research—from Interior and the Bureau of Sports Fisheries and Wildlife.

We believe these functions should remain in the same agency and coordinated with management of fresh water aquatic resources. For this reason, among others, we have endorsed establishment of a new Department of Natural Resources.

Other phases of the program envisioned by S. 307 relate to ocean environmental protection, enhancement of the marine environment, a national oceanic and environmental research laboratory system, technological research and development, and the establishment of estuarine sanctuaries as well as research assistance, cooperative programs, and international cooperation. Some of these functions, at least, appear to relate more to coastal zone management. While we are in accord with the principles in most of these proposals, we think that the coastal zone management program belongs more properly in the proposed Department of Resources than in Commerce.

As a matter of fact, Mr. Chairman, we would point out that EPA itself does have some facilities for developing information on the effects of ocean dumping. EPA has a national marine quality laboratory at Narragansett, R.I., which could offer much of this information if it is ever funded and staffed as was originally planned about 10 to 12 years ago.

In this connection, we have noted with particular interest the provisions in the House bill, H.R. 3662, which would authorize and direct EPA to conduct research and investigation on the marine ecology, authorizing the appropriation of $1 million annually for this purpose.

That is the conclusion of my statement, Senator.

Senator STEVENS. Mr. Clapper, I wonder in view of the fact I think about 65 or 70 percent of the earth's surface is water and we are worrying about—I am, I am sure you are, too—about the environment of our wildlife and man if there isn't some middle ground in terms of this dumping of wastes in the oceans that the National Wildlife Federation would support.

I gather from a summary of your statement that you would favor the strictest prohibition of offshore dumping?

Mr. CLAPPER. Yes, sir; that is correct.

Senator STEVENS. What would you have us do with this waste? Put it on the public lands?

Mr. CLAPPER. Some sort of landfill operation, Senator, or perhaps some types of dredge materials could be bulkheaded when associated with the improvements of harbors or other waterways. We just simply think, as a matter of principle, we shouldn't dump in the ocean just like we shouldn't desecrate our streams with pollutants, and we hope we can eliminate this to the greatest extent possible within reasonable bounds.

Senator STEVENS. I am sure we would agree with you about the streams. I wonder where we are going to put it, if we eventually transform all of our public lands into landfills.

Mr. CLAPPER. There is an opportunity that I have tried to point out in recycling and reuse. There are many new opportunities here, we think, to reclaim many of the items that are now being disposed of at sea, and there are certain items that we simply can't see at all why they should be disposed of in the ocean. Even though it perhaps costs more to dispose of chemical warfare agents by neutralizing them in other manners, we simply do not think they belong in the oceans. This is the way we feel about it.

Senator STEVENS. With regard to your comments on maximum fines, realizing that each day of a violation constitutes a separate offense, what would your agency or organization consider to be an appropriate penalty?

Mr. CLAPPER. We simply don't know about this, Senator. It is a matter of judgment, and I suppose one person would have a ceiling that he thinks would be adequate, and another would feel that another would be adequate. We don't know. We haven't any position whether $10,000 would be adequate or $50,000. We would like for it to be enough to be a deterrent for whatever actions are taken, rather than a license to pollute or a license to dump. We can also understand that it can be so restrictive that very few courts would ever be prone to impose such a fine. This is the reason we indicated here that maybe something in the neighborhood of $50,000 would be a reasonable amount. I don't know, and I don't know anybody else who really knows this.

From your experience in the Interior Departments Solicitor, Senator, I am sure you know that this is an arbitrary decision, that it would be difficult for anyone to make it.

Senator STEVENS. The problem is continuing fines. You get so prohibitory that you don't get any enforcement.

Mr. CLAPPER. That is correct.

Senator STEVENS. What did you think about the suggestion this morning to delegate permit authority to the Coast Guard? Has your organization thought about that?

Mr. CLAPPER. Not so much the Coast Guard, Senator. I simply feel at the present time that the Coast Guard's activities should be limited largely to surveillance and not into the types of research that I think you are speaking about, and in the issuance of permits.

The corps, as I read their testimony presented last week, is interested in the permit system. We think that this, like Senator Hollings pointed out, might be another case of the fox guarding the henhouse, and we would like for EPA to have this authority to issue the permits.

Senator STEVENS. Do you think there ought to be a consolidation of everything into EPA or at least into one Federal agency?

Mr. CLAPPER. No, sir. We think that EPA as a regulatory agency should have charge of issuing these types of permits. It is noticeable that EPA would not be consolidated into the Department of Natural Resources as we had suggested with respect to our comments on S. 307, that these functions would continue to be in the management area and would not be regulatory as we see EPA's functions.

Senator STEVENS. I noted that you indicated an exception for the dumping of car bodies that make artificial reefs. Are there any other areas that you would except from a general prohibition against ocean dumping? What are the dredge spoil or the inert building materials or these other areas that were mentioned here by the previous witness, Dr. Smith?

Mr. CLAPPER. We simply would not like to see anything dumped in the ocean that absolutely doesn't have to be. We recognize there will be projects where harbors will be improved where navigation is involved, where some materials will result in a dredge spoil, and if these are unpolluted, perhaps this would be the one exception to ocean dumping that we would endorse.

But even there we would like to see that held to a minimum, because we think it can be done perhaps better elsewhere.

Senator STEVENS. I think we can all agree that there are some wastes that have to be disposed of here.

Is it your suggestion that EPA be given the authority to permit dumping when there is no other acceptable alternative, or that we should prohibit dumping altogether of certain of these noxious materials?

Mr. CLAPPER. As a matter of principle, we would like just to oppose any type of ocean dumping, but we realize at least for some time there is going to be some regulation necessary, and we believe EPA is the proper agency to handle this.

Senator STEVENS. If we pass this bill, and overnight there is a prohibition against dumping, what are the cities of San Francisco and Los Angeles and New York and Chicago going to do? It seems to me there ought to be a permit area where EPA makes the decision as to that?

Mr. CLAPPER. That is correct. As I indicated, there is a phaseout plan in several of these bills that would be the best alternative in our opinion under EPA's permit system.

Senator STEVENS. I assume then you somewhat begrudgingly accept the 5-year phaseout period?

Mr. CLAPPER. Correct, sir. That is correct.

Senator STEVENS. Under the National Environmental Policy Act, the Council of Environment Quality has authority to review the decisions of Federal agencies with impact on environment.

Is the federation recommending that in addition to that specific provision be made under this legislation for CEQ review of ocean dumping decisions of EPA?

Mr. CLAPPER. Certainly, we would like to see CEQ participating in the developing of the guidelines and the criteria and all the other aspects that will relate to the issuance of permits.

Senator STEVENS. Let's get specific. Are you suggesting that EPA ought to file an impact statement with CEQ on every one of these dumping permits?

Mr. CLAPPER. I don't think that is practical.

Senator STEVENS. Is the federation satisfied that the regulation of transportation is the best available form of regulation of ocean dumping? Basically what we are doing is regulating the transportation.

Mr. CLAPPER. State that again, Senator.

Senator STEVENS. You are basically facing a system of permits to transport material for dumping. Are you satisfied that the regulation of transportation is the best available form of the regulation of ocean dumping?

Mr. CLAPPER. I am not sure that is entirely correct, Senator. As I see it, there are other aspects of dumping that could not necessarily be related to transportation but go into some of the basins and the lagoons and the Great Lakes and areas that would not necessarily relate to transportation. It would be more in accord with the water quality standards that EPA is developing in conjunction with the States to a great extent.

As we see it, the problem is one of trying to regulate what is going in to these bays and oceans, and if it is required that the regulations apply to transportation, that is one thing. If it is the type of material, that is something else.

I have seen some of the pollution sludge spoil that Jersey City has been dumping off the New York bight area, and this type of thing we think can be disposed of somewhere else on land better than at sea. This is the kind of thing this wouldn't necessarily affect transportation, although certainly you have to have a permit in order to barge it out there, I guess.

Senator STEVENS. I am interested in your comment that you support this program of research proposed by the National Oceanic and Environmental Research Act, but that you have reservations about NOAA. Why is it?

Mr. CLAPPER. NOAA would be brought back into the Department of Natural Resources, would it not, Senator, according to the administration's plan? There we think that all the technical expertise that you have in the Bureau of Commercial Fisheries and other phases of NOAA would then be back into the same department where they would be correlated with the Land Management Agency, the Bureau of Sport Fisheries and Wildlife, with the Bureau of Land Management; even the Forest Service and the Soil Conservation Service are to go into that agency, as we understand it.

Senator STEVENS. I assume you recognize that hasn't been done yet, and, as long as NOAA is in Commerce, you wouldn't have any objection to this bill giving NOAA that responsibility, which apparently is within the area of their expertise.

Mr. CLAPPER. That is correct.

Senator STEVENS. Thank you very much, Mr. Clapper. We appreciate your statement.

(The statement follows:)

STATEMENT OF LOUIS S. CLAPPER ON BEHALF OF THE NATIONAL WILDLIFE FEDERATION

Mr. Chairman, I am Louis S. Clapper, Conservation Director of the National Wildlife Federation which has its national headquarters at 1412 Sixteenth Street, N.W., here in Washington, D.C.

The National Wildlife Federation has affiliates in all 50 States and the Virgin Islands. These affiliates, in turn, are made up of local groups and individuals who, when combined with associate members and other supporters of the Federation, number an estimated three million persons.

Mr. Chairman, we want to commend the Committee for holding these hearings on ocean dumping. In our opinion, this is a major problem—one which merits immediate action—and we are pleased by the interest of members of this Committee and by other members of the Congress who have introduced appropriate legislation on the subject.

Basically, the Federation does not believe that the oceans or the Great Lakes or other areas of the U.S. shorelines should be used for dumping or waste disposal purposes. Ed Chaney, one of our Staff members, is outlining this attitude in a forthcoming article for our NATIONAL WILDLIFE Magazine and he points out quite appropriately that the earth is a closed system—that nothing actually can be thrown away. Unwanted wastes must be reclaimed or recycled back into the overall ecological system.

We note that both S.1238 and S.1082 defines "material" or "waste" as "matter of any kind of description, including, but not limited to, dredge spoil, solid waste, garbage, sewage sludge, munitions, chemical, biological and radio-

logical warfare agents, radioactive materials, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial wastes." Bills to the House (H.R.3662 and H.R.4359) define "waste materials" as "all solid and liquid products or byproducts of the industrial processes (including tailings, sediments, and like materials resulting from marine mining or dredging activities), industrial waste acids, chemicals, sewage, sludge, garbage, dredge, spoils, radioactive materials, construction and demolition debris, military ordnance, explosives, and any other form of discarded material or equipment." After reviewing these definitions, Mr. Chairman, *we simply cannot see any valid reason for using the Nation's offshore water areas for disposal of these wastes.* For far too long, this has been another indication of the "out-of-sight," "out-of-mind" attitude toward waste disposal and we no longer can afford this type of degradation in our environment.

If dumping is to be allowed, however, then we generally are in agreement with the below listed principles which are expressed by one or more of the bills under consideration:

1. For the reasons already expressed, we note with exceptional interest that some bills "phase out" ocean dumping. In the Senate, S.192 would terminate all dumping by June 30, 1975. H.R.3662 and H.R.4359 would phase out ocean dumping of municipal and industrial wastes with primary treatment by 1972, by secondard treatment by 1974, and tertiary treatment by 1976. S.1082 phases out ocean dumping in five years. In lieu of outright prohibition, we would be in accord with that schedule.

2. It is our firm belief that any regulation of dumping should apply to all U.S. waters and the oceans outside this Nation's territorial waters and the contiguous zone. In this connection, we like the definition contained in Section 3(b) of S.1238 which specifies the coverage as "oceans, gulfs, bays, salt-water lagoons, salt-water harbors, other coastal waters where the tide ebbs and flows, and the Great Lakes." The definition in S.307 is essentially the same.

3. We think it is appropriate for the Environmental Protection Agency to be empowered to issue permits, if any dumping is to be allowed, if the action will not degrade the environment or ecological systems or endanger human health, welfare, or the amenities. S.1238 appears to give the EPA Administrator suitable discretion in issuing permits and we like the provision in this proposal which burdens the applicant with providing information to justify a permit.

4. We agree that the EPA Administrator should be authorized to designate by a permit the type and amount of materials to be transported and/or dumped and the location, as well as the period of time that the permit is valid. This is outlined in S.1238. And, we also are in accord with that proposal's requirement that a permit shall not violate applicable water quality standards. Some "dumping," of course, is beneficial. Old auto bodies, concrete tile, etc., make excellent artificial fishing reefs and should be provided for when warranted.

5. We concur with the principle expressed in S.1238, whereby EPA will establish and apply criteria for evaluating permit applications. We prefer this discretionary process on this criteria more than formal regulations as in some other bills before the Committee.

6. We do not disagree with any provision which names the Department of Justice responsible for conducting any legal actions which may be necessary, or with surveillance by the Coast Guard. However, we do note a wide variance in the amounts of maximum fines to be applied to violators for each offense: $10,000 in S.1011, $1,000 per ton in S.192, $50,000 in S.1238, $25,000 in S.1286, and up to $100,000 in S.1082. Penalties should serve as deterrents and we question whether $10,000 is enough in some instances. On the other hand, penalties can be so severe that many courts would be reluctant to impose them. However, in our judgment, we do not feel that $50,000 is so severe as to impede such sentencing when this is a maximum.

7. We are in concurrence with and call the Committee's attention to provisions in H.R.3662 and H.R.4359 which would immediately suspend the dumping or disposal of radioactive wastes, toxic industrial wastes, and chemical or biological warfare materials.

8. We hope the Committee will give thoughtful consideration to two points in S.192: to public hearings on permit applications, and to having EPA decisions reviewed by the Council on Environmental Quality.

9. We think favorably of the provision in H.R.4359, proposed new section 7(g) to the Act of August 3, 1968, wherein: "The Administrator of the Environmental Protection Agency may by regulation prohibit the disposal or

dumping of any waste material which he determines may damage the ecology of the marine environment, and in making such determination he may rely upon whatever indicators are currently available to him, regardless of the fact that such indicators may not be conclusive.

10. We recommend that the Committee give consideration to proposed Section 7 in S.1082. This proposal would provide for determining means of recovering useful materials from wastes. Certainly, in our opinion, if a deleterious waste can be transferred into a positive value, the entire environmental movement will have been strengthened.

11. We note with particular interest that S.307 establishes the "National Oceanic and Environmental Research Act of 1971." We agree with an expressed policy of the Congress by this bill that the U.S. foster a program of oceanic and environmental research and development to provide an understanding of natural and manmade activities in the oceans, estuarine areas, and other waters. And, we would be pleased to see activated a comprehensive program of research and associated technological development. As we read S.307, no permit for disposals of wastes into oceanic or estuarine waters would be issued without a review of the findings of research in the impacts of ocean dumping and we most certainly hope and trust any program will take these factors into account. However, a few comments should be made about the program envisoned by S.307.

We note that Section 5 of S.1238 charges EPA with issuing permits on ocean dumping with the Administrator establishing and applying criteria for evaluation applications. These criteria include evaluations of the impact of proposed dumping. Before establishing the criteria, the EPA Administrator would consult with several Federal agencies, including Commerce. On the other hand, S.307 would make the Secretary of Commerce responsible for the research program and we have severe reservations about this provision.

Mr. Chairman, when establishment of the National Oceanic and Atmospheric Administration was proposed, we spoke out in opposition to actions which split off the Bureau of Commercial Fisheries—at least those activities which relate to protection and management of fisheries resources, and associated research. We believe these functions should remain in the same agency and coordinated with management of fresh water aquatic resources. For this reason, among others, we have endorsed establishment of a new Department of Natural Resources.

Other phases of the program envisioned by the proposed "National Oceanic and Environmental Research Act" relate to ocean environmental protection, enhancement of the marine environment, a national oceanic and environmental research laboratory system, technological research and development, and the establishment of estuarine sanctuaries, as well as research assistance, cooperative programs, and international cooperation. Many of these functions appear more directly to costal zone management, than to the issue of ocean dumping. While we are in accord with the principles in most of these proposals, we think the Costal Zone Management program belongs more properly in the proposed Department of Resources than in Commerce.

As a matter of fact, we are not convinced that the Environmental Protection Agency itself could not, or should not, develop its own information on the effects of ocean dumping, utilizing information gathered by units of State Governments or available through other resources. EPA has a National Marine Water Quality Laboratory at Narragansett, R.I., which could offer much pertinent information if it ever is funded and staffed as originally planned. In this connection, we have noted with particular interest the provisions in H.R. 3662 which would authorize and direct EPA to conduct research and investigation on the marine ecology, authorizing the appropriation of $1 million annually for this purpose.

Thank you, Mr. Chairman, for the invitation and opportunity of making these remarks.

Senator STEVENS. This hearing will be recessed until 2 p.m. tomorrow when it will be resumed in this room.

(Whereupon, at 12:25 p.m., the hearing was recessed, to reconvene at 2 p.m., Thursday, April 22, 1971.)

OCEAN WASTE DISPOSAL

THURSDAY, APRIL 22, 1971

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON OCEANS AND ATMOSPHERE,
Washington, D.C.

The subcommittee met, pursuant to recess, at 2 p.m., in room 5110, New Senate Office Building, Hon. William B. Spong, Jr., presiding.

Present: Senator Spong.

OPENING STATEMENT BY SENATOR SPONG

Senator SPONG. Today marks the fourth day of hearings by the Subcommittee on Oceans and Atmosphere on ocean dumping. As we move into the problems of dumping from the viewpoint of State and local governments, we find the lines being drawn sharply. No one has objected to the ending of unregulated ocean dumping. The marine environmental and human health values to be protected are too important to permit indiscriminate dumping to continue. But the question is how we should regulate, and by whom.

We have heard much testimony from the administration in favor of its proposal to invest the Environmental Protection Agency with new ocean dumping permit authority. However, it is clear that not all members of the executive branch agree, and some would call for strengthening of the Corps of Engineers' permit authority under the Rivers and Harbor Act of 1899. Still another possibility might be to give the responsibility to the Coast Guard, which already has significant resources to handle such a program.

Speaking personally, I am concerned about the proliferation of regulatory agencies, the delays that might be occasioned by having too many cooks stirring the pot. Stronger regulation is needed, but I wonder what we will have accomplished if all we get is rhetoric, reshuffling of responsibilities, and no results.

Nor is there complete agreement how to regulate ocean dumping. One of the bills before us would immediately halt all ocean dumping; others would phase it out over a period of time. The administration's bill would prohibit dumping except by permit, and would place the onus on the Envirnmental Protection Agency to establish and apply criteria for ocean dumping.

These are but a few of the tensions we must deal with as we move toward stronger regulation of ocean dumping. The problems are real. Landbased disposal sites are becoming exhausted. Nearly one-fifth of our Nation's shellfish beds are closed because of contamination—a loss estimated at $64 million annually, some of which is attributable to ocean dumping. Recreational areas are threatened—human health

is threatened in areas near the New York Bight; and economic loss results from oil spills on beaches such as Virginia Beach where 2 days ago over 4 miles of that superb beach were coated with oil. And they are still trying to find out where it came from.

In this context I am happy to welcome Dr. William Hargis, the distinguished director of our own Virginia Institute of Marine Science, who is representing the Coastal States Organization of the Council of State Governments and also the State of Virginia. With him is Dr. Leigh Hammond, deputy director of the Department of Administration of the State of North Carolina and representing the State of North Carolina. These gentlemen will speak to State problems.

Speaking to the problems facing cities will be Hon. Harry T. Kelley, mayor of Ocean City, Md., representing the National League of Cities. Mayor Kelley is accompanied by Mr. Peter B. Harkins, executive director of the Maryland Municipal League.

Concluding today's hearings will be Mr. James J. Reynolds, president of the American Institute of Merchant Shipping, a group vitally concerned with port development and maintenance, and directly affected by the pending legislation.

Dr. Hargis, Dr. Hammond, I understand that you gentlemen have separate statements. We will accept into the record your statements in their entirety and would ask you to testify from those parts of them that you wish to.

STATEMENT OF WILLIAM J. HARGIS, JR., PH. D., DIRECTOR, VIRGINIA INSTITUTE OF MARINE SCIENCE, GLOUCESTER POINT, VA.

Dr. HARGIS. Mr. Chairman, as you indicated in your introductory remarks, I am representing Governor Holton of the Commonwealth of Virginia this afternoon. The Governor would have liked to have been here himself but previous commitments prevented that.

I am also director of the Institute of Marine Science of the Commonwealth which has been involved in studies of ocean disposal problems relating to the waters of the mid-Atlantic off the Virginia Capes in which I served as chairman of the state task force of the Governor's Environmental Council.

The third role is as chairman of the Coastal States Organization which consists of gubernatorially appointed delegates from 25 to 33 costal States, Commonwealths and territories of the United States.

From all of these roles I appreciate the invitation to discuss this serious environmental problem with you.

As I stated, Virginia is greatly concerned about contamination of the environment in general, and special alarm is brought about by the growing threat of pollution of estuarine and costal waters and their bottoms.

Fortunately, the waters of the Chesapeake Bay and the coastal waters of Virginia are in reasonably good shape, but the problems of pollution are beginning to crowd in. Each year sees more and larger discharges, accidental and purposeful, and each year increased demands for disposal of solid and liquid wastes at sea develop.

Because we will be able to effect some measure of protection for our as yet productive and useful marine waters, the Commonwealth wishes to take such steps as are necessary to retain their

quality and utility, and we wish to do it in timely fashion while we still have waters and sediments of good quality.

Faced with two requests for permits to carry out ocean disposal operation, last year Virginia established a task force to study the problem before deciding. After a detailed review of these and earlier requests for dumping permissiion as well as of similar proposals from other States and consideration of all of the alternatives for disposal, we concluded that, though both of those requests for dumping permits disappeared before the study was over—and that is probably the best way to have these things solved, that is, before they get very far on—we concluded that ocean disposal of waste will become a significant factor in State environmental and resource management activities, and we recommended that the general operating policy of the Virginia Institute of Marine Science towards ocean dumping be considered for adoption as a State policy by the Governor's Council on the Environment, and the proposed policy statement which is presented on page 3 of the testimony is now under consideration for adoption.

In essence, the proposed statement indicates our strong concern and indicates the growing nature of the problem; it also urges that ocean disposal of wastes be discouraged, brought under control, but not necessarily eliminated from consideration as a reasonable alternative where such disposal is necessary.

To quote specifically:

> Since the capacity of the oceans to absorb, disperse or conceal wastes is surely finite (though it may be large—larger for some materials than others and in some geographical locations than others), it is clear that each request for ocean disposal must be carefully considered with all alternative possibilities and consequences carefully weighed and, unless the reasons for such disposal are convincing—even compelling, turned away.
>
> Only in this way can environmental quality be preserved retained for those uses which can only and must be handled by the oceans. Only thus can we do a responsible job of managing and preserving the quality of the oceanic waters and of other essential aspects of ocean environments and at the same time secure maximum benefit of environment and resources for the people and posterity. Caution is further required by the dearth of information available as to the ability of the oceans to tolerate and recover from insults.

These findings of the State task force coincide closely with those of the federal group that conducted the ocean dumping study and developed a report "Ocean Dumping—A National Policy."

It became clear during our study, as during earlier work, that effective standards for coastal water and for disposal of wastes in coastal waters are yet to be developed and this we consider a prime need.

As can be seen, while Virginia cannot justify or concur with an all out, indiscriminate ban on ocean dumping—feeling as we do that no avenue of disposal should be arbitrarily closed—we are strongly opposed to ocean disposal of wastes unless all other disposal sites have been carefully considered and ruled out for significant and compelling reasons.

Of special concern is disposal of those wastes which lose their integrity, that is which break up or dissolve, since the ocean is a flowing solute (almost a universal solute), and the movements and fate of such wastes are as yet difficult to predict accurately and yet inaccurately in many cases and places.

I am persuaded that most, if not all, of the coastal states would concur in these statements.

Speaking specifically to the three bills under consideration which directly relate to ocean dumping—S. 1982, S. 1238, and S. 1286—a point of concern to Virginia and to the States is the assigning of a major portion of the management and authority to a federal agency alone.

After much study we are persuaded that principal controls of coastal zone activities should rest with the States. This especially refers to activities in areas within State jurisdiction or those which could be. The reasons for this conviction are four.

One, actions requiring review and permit are numerous and widely dispersed and should be handled as locally as possible, and possible means practical as well as effective.

It is not possible to handle permits from Washington.

Two, local knowledge is generally required to effectively develop realistic appraisal of ecological impacts of such releases. Such knowledge usually resides in state agencies, or in local institutions.

Three, some of the alternatives to ocean disposal regularly available are local or at least within a State or adjacent States. Regular legal mechanisms exist, or should, for working with intrastate and interstate options.

Four, the entities requesting ocean disposal are generally subject to the jurisdiction of the States in many ways. The problem of regulating beyond the territorial seas or the contiguous fishing zones which would apply almost equally to the states as well as to the Federal Government have to be addressed in special fashion.

Virginia and probably most of the coastal States we work with are hopeful that ocean disposal and other matters, similar matters, can be handled in concert with the Federal Government, with the Federal Government establishing guidelines and responsibilities and offering the States opportunity to participate.

Of course, the Federal Government should be prepared to act as and if necessary, but it seems most logical and reasonable to arrange command action at the most feasible political and geographical level, which is at the State level.

We cannot support a total ban, either now or later, which would remove the oceans as an alternative disposal site. Total ban on some substances, yes—on all, no. Total ban should not be imposed unless scientific evidence and engineering findings make such action essential.

Discrimination and retention of options is necessary if for no other reason than the simple fact that Earth is a whole and must be understood and wisely managed as a whole, and in some instances the ocean option is the most reasonable option.

Under this circumstances there may be times when disposal at sea is the least costly, in terms of environmental damage, of the alternatives. A rational approach is absolutely necessary in adjusting man and his activities to the environment, and vice versa.

We would favor tighter controls, or even a partial or completely moratorium on some substances or some locations, as a reasonble conservative solution until improved scientific understanding and engineering capabilities makes a "tighter estimate" of the environmental and health hazards and the ecological and economic costs possible.

It is clear to us as it was to the Ocean Dumping Committee of the Council on Environmental Quality that more knowledge and technological ability is urgently required. A glaring gap exists in our understanding of many estuaries, and especially of coastal waters from the ocean beaches out to beyond the breaker zone from the breaker zone to the edge of the continental shelf and beyond.

I might interject here that despite the report of the Council on Environmental Quality and the Stratton Commission, there does not seem to be much movement towards careful investigations of continental shelf waters (and these are the areas which are of immediate concern to us today.

All of the bills except S. 1286 provide for additional research and development activity on these areas and disposal problems, an essential feature of any legislative action.

Regarding S. 307 which fosters oceanic and environmental research and development, among other things, I would like an opportunity to study it more carefully than has been possible prior to today's hearings.

We favor supporting the important oceanic and atmospheric programs of NOAA To this end we urge Congress to grant the money necessary to do so.

We also favor melding the existing federal laboratories which fall under the jurisdiction of NOAA into a more integrated system, such system to more effectively carry out the purposes of and responsibilities of NOAA and its parent department.

Favored also would be improved working relationships and integration with and support of existing State and institutionally supported marine laboratories which have similar purposes and responsibilities.

Whether new laboratories are necessary or even desirable, if the bill contemplates such action, is doubtful to unclear at this time. At this point in time we favor a laboratory system in which the informational needs of the principal managers, and they are the State governments, working in concert with the local governments and with the Federal Government, can be met effectively. This may or may not involve a Federal laboratory, depending upon the local or regional circumstances involved.

Further, we would not like to see competent non-Federal laboratories replaced or excluded, nor would we like to see less adequate units discouraged from becoming more adequate.

As you will recall, comments regarding coastal zone laboratories were made by several people from Virginia at the subcommittee hearing in Williamsburg last year, and we see no reason to change those expressions that were made then.

In general we favor the concept of estuarine sanctuaries which is included in the bill under discussion.

It is clear that more than a cursory review of the important concepts presented in S. 307 is deserved and required and we would like to express our support of the proposals in general and our willingness and desire to assist in its further development.

Marine science and engineering deserves a great deal more attention and support than it is now being accorded—especially in view of the importance of marine environments and their resources to the

United States and the future of man as an inhabitant and engineer on Spaceship Earth.

Senator SPONG. Doctor, if you will excuse me, I have to go to vote, and I will be right back. I have asked Mr. Miller to continue with the questioning while I am gone.

Mr. MILLER. Dr. Hargis, in Senator Spong's absence, I shall ask a few questions and we shall continue on with the hearing until he returns.

In your testimony you state that:

> We are strongly opposed to ocean disposal of wastes unless all other disposal sites have been carefully considered and ruled out for significant and compelling reasons.

This is apparently a conclusion that you have reached for Virginia.

Dr. HARGIS. That is correct.

Mr. MILLER. Or at least have recommended and have under consideration now for the State of Virginia.

Dr. HARGIS. That is correct.

Mr. MILLER. Would you recommend this for the Federal legislation since we have no such criteria written into any of the ocean dumping bills now pending?

Dr. HARGIS. Yes, I would. I think one of the things we have to keep in mind is that there are problems of disposal of waste in all environments, and this includes in subterranean disposal sites and, therefore, it is our considered opinion there will undoubtedly be times when the oceans are the most feasible place to dispose of waste.

In considering our commentary for today's hearings and in our earlier studies, it was perfectly apparent to us that a major problem is population and industrial activities, municipal activities and other things. But it was also clear to us that populational control is going to be a complex and long-term game, problem, and that in the meantime we would have increasing amounts of waste of different types to dispose of, and it was our feeling, our conviction, that when after investigation of alternatives the ocean seemed to be the most likely and least environmental costly site, then, it ought to be resorted to.

Mr. MILLER. Are you saying the least environmentally costly site?

Dr. HARGIS. That is correct.

Mr. MILLER. And you said there should be dumping only for significant and compelling reasons. Can you elaborate on that for the record? What would be a "significant and compelling reason," and what is "least environmentally costly"?

Dr. HARGIS. A significant and compelling reason would be a reason or a solution of a problem of disposal of a waste which would cause more damage, for example in underground disposal, than it would in underwater disposal, undersea disposal.

I cannot give you a good for instance right now. There are some.

Mr. MILLER. You are talking more in an ecological sense than an economic sense, is that not so?

Dr. HARGIS. Yes, in this case the compelling reasons would highly be a composite of ecological and economic reasons. But I was addressing myself particularly to the ecological aspects at the time, yes.

Mr. MILLER. Do I understand your testimony correctly that you are concerned at the omission in the Federal legislation of State participation in the establishment of criteria for ocean dumping, perhaps in the regulatory scheme itself?

Dr. HARGIS. That is correct.

Mr. MILLER. It is not my understanding of the bills as presently written that they preempt State regulation, at least in State waters. Of fourse, 3 miles would be the limitation, would they not, of State jurisdiction?

Dr. HARGIS. Yes, pending certain action that is before the court, on the east coast 3 miles would be the current territorial limit.

Mr. MILLER. Without anticipating what they are going to decide, 3 miles.

Dr. HARGIS. That is correct. But the options that are available, for example, within the territorial seas, include, of course, control at the loading site which two of the bills specifically are directed at, and, of course, you have involved in that State jurisdiction as well as national jurisdiction; by reason of State controls—constitutional controls—over territorial prerogatives of citizens and you also have involved Federal jurisdiction over certain aspects of international commerce and interstate commerce, and the national jurisdictional areas beyond the 3-mile limit, but I think it is perfectly obvious that neither the Federal nor the State Government has much control beyond the territorial seas, unless they do something different than what is being done right now, except insofar as perhaps as it relates to things that come into direct contact with the bottoms.

Mr. MILLER. You spoke in the course of your testimony about investigation of the continental shelf waters and didn't elaborate at the point why there is a need for such investigation. Could expand upon your comments?

Dr. HARGIS. Yes. We anticipate that the demands for disposal of wastes at sea, that the accidental releases of materials—which are extremely difficult to eliminate—on Continental Shelves, in Continental Shelf waters, will increase.

We are also aware, as are many other people, that the coastal Continental Shelf waters are recipients of all the wastes that come out of the estuaries in solution or in train, and it is necessary, therefore, we feel, in order to do a rational job of making decisions on coastal dumping problems, oceanic dumping problems, and also in order to understand such things as occurred recently at Virginia Beach that Senator Spong mentioned, oil spills, movements of spills, and furthermore to get a better handle, factual handle, on what is actually happening in the ocean and on the Continental Shelf waters, it is necessary to know more than we know now.

We have recently looked over—and we are in the process of doing it in the Coastal States Organization—we have recently looked over this problem in Chesapeake Bay, and we came to the conclusion that while there is need for more research in Chesapeake Bay—and we have urged this to be the Congress, the National Science Foundation also—the biggest gap at the present time in terms of practical information—practical scientific and engineering information—necessary to understand oceanic waters, is in the region from the beach out to 3 or 5 miles, and then from there on out to the edge of the Continental Shelf.

One problem is that many of the earlier oceanographic activities which yielded so much scientifically were essentially deep sea and a good deal of the State activities have been in the estuaries, a good deal of the Federal activity has been in the deep sea and the estuaries.

There is, therefore, not a complete void but as near a void as you can get in a situation like this, in our understanding the headlines and the beaches and the edge of the Continental Shelf.

It is interesting, then, that programs like the International Decade of Oceanic Exploration, which I think would like to devote more attention in this area, have been waiting on the reorganization of the EPA, for example, to make its activities and intentions known, and this, too, has added to a delay of solution of some of the problems, even though the ocean dumping report and the Stratton report urged quick attention to the area.

So, we are convinced that major scientific and engineering effort has to be made to this zone.

Mr. MILLER. And one additional question, if I may. In your testimony you state that you—

> would favor tighter controls now, or even a partial or complete moratorium on some substances or some locations, as a reasonable conservative solution until improved scientific understanding and engineering capabilities make a "tighter estimate."

Please elaborate on that as to what tyes of substances and what type of locations.

Dr. HARGIS. Yes. We would be especially concerned right at the present time with biological warfare materials, with chemical warfare materials. We are also especially concerned with unusual military wastes. That is solid wastes—and, furthermore, certain radioactive wastes. Those are four on which a moratorium could be clearly supported and justified at the present time.

The areas involved would depend upon the type. I would say that as far as solid waste disposal, we ought to eliminate dumping of solid wastes in all areas which are accessible to and used by the commercial fishermen, for example. We have had one or two unusual recoveries by fishermen recently and in one particular unfortunate accident, off the coast of Virginia, and Carolina in which a trawler did accidentally recovered a military device and exploded.

There are other areas. For example, the sludge disposal area off of New York which I think should not be pressed any further at the present time.

Mr. MILLER. Do you have anything additional that you would like to add?

Dr. HARGIS. No; I think that we have covered in the testimony and in the questioning is reasonably comprehensive. I would say that from all the studies of the Coastal States Organization and the various people involved and from some of the studies that I have been involved with as consultant to Federal and State government agencies, I have concluded that the general approach to control of quality in the oceans is to control what gets into estuarine waters. This, of course, is an obvious truism, but sometimes ignored. And the best place for control in fact is at the outfall or, even better, before it gets to the outfall or to the stack. And this is where—or it is at this control point that State and local authorities, working in concert with Federal agencies, with guidelines established by the Federal Government agencies responsible, based upon sound legislation, it is clear that the control of ocean quality will occur.

Mr. MILLER. Thank you very much, Dr. Hargis.

(The statement follows:)

STATEMENT OF WILLIAM J. HARGIS, JR., PH. D., DIRECTOR, VIRGINIA INSTITUTE OF MARINE SCIENCE, GLOUCESTER POINT, VA., RE RECOMMENDATIONS ON THE PROBLEMS OF OCEANIC DISPOSAL OF WASTES

INTRODUCTION

Mr. Chairman and Members of the Committee, it is my pleasure to appear today in three roles. One is as representative of Governor Linwood Holton of Virginia, who has asked me to present the current viewpoint of Virginia on this important matter of "dumping" or disposal of wastes into the marine and estuarine waters of the territorial seas and adjacent shelf waters of the United States. Governor Holton has asked me to express his regret at being unable, by reasons of previous commitments, to be here to personally discuss this important matter with the Committee. As you may recall, the Governor and I and several other state officials were privileged to appear on matters related to the coastal zone earlier this year before your subcommittee on Oceans and Atmosphere. He would have liked to be able to be with you today.

My second role is as that of director of a principal marine research, engineering and advisory institution which devotes its attention to matters relating to the estuarine and coastal waters of the seas and is especially concerned with the wise use of the environments and resources involved. In this capacity I, along with colleagues at the Institute, have given considerable attention to matters of pollution, possible environmental degradation and to preservation of the marine environment and its resources. A recent special project of ours was a study of ocean disposal problems relating to the waters of the mid-Atlantic off the Virginia Capes in which I served as Chairman of this Task Force of the Governor's Environment Council.

The third role is as Chairman of the Coastal States Organization which consists of gubernatorially appointed delegates from 25 of the 33 costal States, Commonwealths and Territories of the United States. From all of these roles, I appreciate the invitation to discuss this serious environmental problem with you.

Governor Holton, the governmental agencies as well as the people of Virginia are greatly concerned about contamination of the environment in general. Causing especial alarm is the growing threat of pollution of estuarine and coastal waters and their bottoms. Fortunately, our waters are in reasonably good shape but the problems of pollution are crowding in on us. Each year sees more and larger discharges, accidental and purposeful, and each year increased demands for disposal of solid and liquid wastes at sea develop. Because we will be able to effect some measure of protection for our as yet productive and useful marine waters, the Commonwealth wishes to take such steps as are necessary to retain their quality and utility. —And we wish to do it in timely fashion while we still have waters and sediments of good quality.

Faced with two requests for ocean disposal clearance, Virginia established a Task Force to study the problem in 1970. After a detailed review of these and earlier requests as well as of similar proposals from other areas and consideration of the alternatives, we concluded that, though both requests disappeared before the study was over, "ocean disposal of wastes will become a significant factor in state environmental and resource management" activities. We recommended that the General Operating Policy of the Virginia Institute of Marine Science be considered for adoption by the Governor's Council on the Environment. The proposed policy statement which is presented immediately below is now under consideration for adoption.

"OCEAN DISPOSAL

"(General Operating Policy Statement of the Virginia Institute of Marine Science)

"The Oceans are ultimate receptacles of all materials which are dissolved or suspended in or on water passes between headlands, i.e., the internal waters is growing, while 'receiving capacity' of those waters, and of inshore ocean waters as well, declines, it is clear that coastal and offshore oceanic waters are under increasing pressure from these sources.

"At the same time, demands for direct disposal of liquid and solid wastes into inshore (coastal) and offshore waters of the world oceans from vessels and outfalls increase rapidly as does danger of accidental release of wastes and hazardous materials of all sorts. Since the capacity of the oceans to absorb, disperse or conceal wastes is surely finite (though it may be large—larger for some materials than others and in some geographical locations than others), it is clear that each request for oceanic disposal must be carefully considered, with all alternative possibilities and consequences carefully weighed and, unless the reasons for such disposal are convincing—even compelling, turned away.

"Only in this way can environmental quality be preserved and options and 'carrying capacity' be retained for those uses which can only and must be handled by the Oceans. Only thus can we do a responsible job of managing and preserving the quality of the oceanic waters and of other essential aspects of ocean environments and at the same time secure maximum benefit of environment and resources for the people and posterity. Caution is further required by the dearth of information available as to the ability of the Oceans to tolerate and recover from insults."

As can be seen, while Virginia cannot justify or concur with an all out, indiscriminate ban on ocean dumping—feeling as we do that no avenue of disposal should be arbitrarily closed, we are strongly opposed to ocean disposal of wastes unless all other disposal sites have been carefully considered and ruled out for significant and compelling reasons. Of especial concern is disposal of those wastes which lose their integrity or are soluble since the ocean is a flowing solute and movements and fate of such wastes are as yet difficult to predict accurately. I am persuaded that most, if not all, of the coastal states would concur in these statements.

Speaking specifically to the three bills under consideration which directly relate to ocean dumping (S.1082, S.1238 and S.1286) a point of concern to Virginia is the assigning of the major portion of the management responsibility and authority to a federal agency. After much study we are persuaded that principal controls of coastal zone activities should rest with the states! This especially refers to activities within state jurisdiction. The reasons for this conviction are:

1. Actions requiring review and permit are numerous and widely dispersed and should be handled as locally as possible.
2. Local knowledge is generally required to effectively develop realistic appraisal of ecological impacts of such releases. Such knowledge usually resides in state agencies.
3. Some of the alternatives to ocean disposal regularly available are local or at least within a state or adjacent states. Regular legal mechanisms exist, or should, for working with intrastate and interstate options.
4. The entities requesting ocean disposal are generally subject to the jurisdiction of the states in many ways.

Virginia and probably most of the coastal states we work with are hopeful that this and other matters can be handled in concert with the Federal Government establishing its guidelines and responsibilities and offering the states opportunity to participate. The Federal Government should be prepared to act as and if necessary but it seems most logical and reasonable to arrange command action at the most feasible political and geographical level—the state level.

We cannot support a total ban, either now or later, which would remove the oceans as an alternative disposal site. Total ban on some substances, yes—on all—no! Total ban should not be imposed unless scientific evidence and engineering findings make such action essential. Discrimination and retention of options is necessary if for no other reason than the simple fact that Earth is a whole and must be understood and wisely managed as a whole. Under this circumstance there may be times when disposal at sea is the least costly, in terms of environmental damage, of the alternative. A rational approach is absolutely necessary in adjusting man and his activities to the environment, both ways.

We would favor tighter controls now, or even a partial or complete moratorium on some substances or some locations, as a reasonable conservative solution until improved scientific understanding and engineering capabilities makes a "tighter estimate" of the environmental and health hazards and the ecological and economic costs possible.

It is clear that more knowledge and technological ability is urgently required. A glaring gap exists in our understanding of many estuaries and especially of coastal waters from the ocean beaches out to beyond the breaker zone and from the breaker zone to the edge of the Continental Shelf and beyond. All of the bills except S.1286 provide for additional research and development activity on these areas and disposal problems, an essential feature of any action.

Regarding S.307 which fosters oceanic and environmental research and development, among other things, I would like opportunity to study it more carefully than has been possible.

We favor supporting the important oceanic and atmospheric programs of the National Oceanic and Atmospheric Administration. To this end we urge Congress to grant the monies necessary to do so. We also favor melding the existing federal laboratories into a more integrated system, such system to more effectively carry out the purposes of and responsibilities of NOAA and its parent department. Favored also would be improved working relationships and integration with and support of existing state and institutionally supported marine laboratories which have similar purposes and responsibilities. Whether new laboratories are necessary or desirable if the bill contemplates such action, is doubtful to unclear at this time. At this point we favor a laboratory system in which the informational needs of the principal managers, the state governments, can be met effectively. This may or may not involve a federal laboratory, depending upon the local or regional circumstances. Further, we would not like to see competent non-federal laboratories replaced or excluded nor would we like to see less adequate units discouraged from becoming more adequate.

In general we favor the concept of estuarine sanctuaries.

It is clear that more than a cursory review of the important concepts presented in S.307 is deserved and required and we would like to express our support of the proposals in general and our willingness and desire to assist in its further development. Marine science and engineering deserves a great deal more attention and support than it is now being accorded (especially in view of the importance of marine environments and their resources to the United States and the future of man as an inhabitant and engineer on Spaceship Earth).

Mr. MILLER. Dr. Hammond, we welcome you. In accordance with Senator Spong's request, we would like to continue on with your statement now, please.

STATEMENT OF DR. LEIGH HAMMOND, DEPUTY DIRECTOR, STATE DEPARTMENT OF ADMINISTRATION, RALEIGH, N.C.

Dr. HAMMOND. I appreciate the opportunity to appear before this committee to discuss the proposed legislation that would regulate the dumping of materials in the oceans or coastal waters and other waters of our Nation.

This legislation is of particular interest to North Carolina because of the commitment that our State has bade to develop the full potential of our coastal and marine resources.

Gov. Robert W. Scott, the present Governor of North Carolina, has given major attention to the formulation of State policies and programs to manage and develop our coastal resources. These State policies and programs give due recognition to the need for responsible leadership in maintaining a balance between development activities and activities to protect and preserve the fragile coastal environment.

The State of North Carolina is blessed with an essentially untapped potential along her coast. The State lays claim to some 10 percent of the shoreline of the 48 contiguous States. Only three

States—Texas, California, and Florida—surpass North Carolina in length of general tidal shoreline.

We have more than 2,500 square miles of salt water bays and sounds. There are over 15,000 square miles of Continental Shelf offshore, of which some 1,130 square miles fall within the legal boundaries of North Carolina.

The estuarine and coastal areas of our State are being used for a variety of purposes such as commercial fishing, sport fishing, recreation, mineral recovery, and water transportation.

The conflicting claims between these various uses represent some of the major problems that led Governor Scott to seek State legislative authority to establish, on a permanent basis, the Governor's Marine Science Council. The 1969 general assembly granted that authority, and the council has been actively pursuing an across the board evaluation of marine resource needs and opportunities facing North Carolina.

The council is charged with the task of pulling together the efforts of all agencies and institutions to identify and concentrate on specific problems and objectives. It is currently involved in the formulation of a detailed plan to relate research, educational, and regulatory functions to the practical needs of our coastal zone.

The formation of this council was a clear recognition that all interests can and must be served and that the great potentials represented by the ocean and coastal zone can be realized only through a coordinated and cooperative effort by all elements of the various private and public communities.

The general assembly, in 1969, also passed several other significant pieces of legislation dealing with coastal matters. An appropriation of $500,000 was made to purchase estuarine lands in an effort to preserve the quality of the marine environment. We do not intend to exploit our valuable resource base for the sake of short-term gains. The nursery grounds for marine life will be protected as we experience more and more commercial development along our coast.

The 1969 general assembly also passed a law which prohibits any dredging or filling operations within any coastal waters of North Carolina without first obtaining a permit for such operations from the State.

Another significant act called for a comprehensive study of the estuarine areas by State agencies and instructed our department of conservation and development to recommend a use plan, based on this study, to the 1973 session of the general assembly.

Governor Scott, on April 7, 1971, delivered an environmental message to a joint session of the North Carolina General Assembly. This was the first known instance where a State chief executive devoted an entire legislative message to environmental issues alone. The Governor offered five major environmental bills to the general assembly. One of these bills spoke exclusively to coastal problems.

This bill stiffens the existing law concerning dredging and filling of marshlands and tidelands, empowers counties and municipalities to levy taxes for coastal erosion and hurricane protection projects, provides for State regulations, on a countywide basis, regarding the alteration or pollution of North Carolina's coastal wetlands, and provides for State assumption of sand dune protection where counties or municipalities fail to do so.

I cite these details to demonstrate a few of the things that North Carolina is doing to protect its costal environment. There are many other North Carolina laws and regulations relating to water quality which speak to the issues covered in the proposed legislation now before this committee.

Regarding the proposed National Oceanic and Environmental Research Act of 1971 (S. 307), we concur in the need for a better understanding and knowledge of the physical, chemical, and biological processes that take place in the oceans, estuarine, and other waters. This understanding must undergrid the efforts of State, Federal, and local government to design and implement programs to more effectively manage our coastal zone.

However, we suggest that caution be exercised in any decision to create a National Oceanic and Environmental Research Laboratory System. The various coastal States are now supporting extensive oceanographic and marine science research programs. A National Laboratory System might well duplicate these efforts and result in unjustified expenditures of funds.

North Carolina is currently in the final planning stages on three marine science centers to be located on our coast. These centers will be administered by the State and will support the educational, research, and regulatory activities of all universities, State agencies, technical institutions, and public schools.

The programs conducted in these facilities will accomplish many of the objectives sought by a National Laboratory System. We would prefer to see the language of this act altered to support and supplement State efforts, or at the very least include a title that would provide this support.

We feel that creation of a limited number of estuarine sanctuaries should not detract from the need for a comprehensive program to manage the coastal zone in a manner that will protect the entire estuarine areas.

The proposed legislation on ocean dumping gives scant attention to the role of the States in regulating activities within their borders. This failure to recognize the efforts and responsibilities of State government causes us great concern.

The bills as now drafted will take the responsibility for regulating dumping activities one more step away from the level of most effective control. We have no argument against the provisions of these bills beyond the 3-mile jurisdiction of the States, yet we feel strongly that the States should be allowed to carry out regulatory activities on waters that are under State jurisdiction.

Perhaps a provision, similar to that in the Federal Water Quality Act, that should a State fail to develop and administer proper and sufficient control over dumping activities within its ocean and coastal waters, the administrator would initiate and enforce procedures and regulations. This sort of joint jurisdiction is much more acceptable to the States and prevents unnecessary duplication of efforts by State and Federal agencies.

Any ocean dumping act must provide for direct State involvement in the development of any procedures for implementing that act. The coastlines of the States are vulnerable to ocean dumping and the States have land and water areas through which the material to be dumped must be transported.

The Federal Government should not take unilateral action in authorizing the transportation and dumping of materials that might be adverse to the interests of one or more States.

S. 1082 proposes to regulate dumping activities for 5 years and then eliminate dumping entirely. We concur in the need for regulating dumping and in fact prohibiting the dumping of any materials that would adversely affect marine life.

However, this total elimination of dumping activities would prevent the creative dumping activities such as efforts to construct artificial reefs to provide a habitat that will increase the population of commercial and sports fish off our coast. The beneficial aspects of dumping to create artificial reefs far exceed any currently known damage to the marine environment. Regulation is agreeable, but a complete ban on dumping does not make sense to us.

Mr. Chairman, North Carolina strongly supports national legislation which would limit defilement of the oceans. We are deeply concerned, however, by procedures in the bills here under consideration which would almost completely bypass States in formulating rules and regulations.

Indeed, we are concerned whenever Federal legislation assumes a jurisdiction which is not only unnecessary, but ultimately disruptive of existing efforts at any level of government to carry out programs which protect the health and welfare of people. That responsibility is vested in State governments. We are taking that responsibility seriously in North Carolina.

Governor Scott has spoken to this need many times. He has assumed a national leadership role within State government and the National Governors' Conference in suggesting policies and programs to make wise use of our coastal zone. We would hope that the Congress will give due recognition to the role that state government has played and will continue to play in regulating and controlling any activity that adversely affects our coastal waters.

Senator SPONG. Thank you very much, Dr. Hammond.

Before I ask you a question or two, I would like to again apologize to my constituent for having to rush off and vote. I don't know if you were asked, Dr. Hargis, to submit your views to us on S. 307 in the future.

You indicated while I was here that you had not had an opportunity to give this the in-depth study that you would like, and I would like very much to have that.

Dr. Hammond, would you describe for me how North Carolina presently participates in the determination of dredge spoil disposal when applicants seek a permit from the Corps of Engineers?

Dr. HAMMOND. Anyone who wants to engage in dredge and/or fill operations, there is a regulation that they must get this permit from the corps. There is also a State regulation. We have worked out an arrangement with the corps where they apply to the State for the permit, the State reviews it and submits it to the other State agencies that might have an interest in this to get their opinion, and at that time they submit it to the Corps for their approval.

Essentially, it is a very smooth functioning process. But the permit initially comes to the State and then we work with the corps on it.

Senator SPONG. Is this how you envision the State participation would be within the 3-mile limit insofar as oil dumping is concerned?

Dr. HAMMOND. Yes, I think so. I think this makes the process of the individual who is seeking either a permit to dump something or to alter the estuarine waters by either dredging or filling much easier by giving them a place to go that they are more familiar with than searching out the Environmental Protection Agency or some such agency at the Federal level.

Senator SPONG. Should something comparable to this be written in by statute or left to regulation on the part of EPA in dealing with the State?

Dr. HAMMOND. I would like a specific recognition that the EPA has to deal with the State. As it is presently written the administrator can, if he deems it necessary and desirable, consult with the States on these regulations. We at the State level would much prefer that it be a requirement that we be involved in it rather than leaving it to the discretion of a single administrator.

Senator SPONG. Thank you very much.

Mayor Kelley, Mr. Harkins.

STATEMENT OF HON. HARRY W. KELLEY, MAYOR, OCEAN CITY, MD.; ACCOMPANIED BY PETER B. HARKINS, EXECUTIVE DIRECTOR, MARYLAND MUNICIPAL LEAGUE; AND DONALD ALEXANDER, LEGISLATIVE COUNSEL, NATIONAL LEAGUE OF CITIES AND U.S. CONFERENCE OF MAYORS

Mayor KELLEY. Mr. Chairman, I am Harry W. Kelley, mayor of that great resort city of Ocean City, Md.

I am honored to appear here today on behalf of the Maryland Municipal League, the National League of Cities, and the U.S. Conrefence of Mayors to support S. 1238 and related legislation to improve Federal controls over the dumping of waste materials in our oceans.

The prospect of a polluted ocean is a matter of grave concern in Ocean City and many other coastline communities. Our sanitary district and the mayor and city council are aware of the problem and are constantly checking for algae, residue, and odors. A report on ocean dumping by the President's Council on Environmental Quality noted:

> Marine pollution has seriously damaged the environment and endangered humans in some areas. Shellfish have been found to contain hepatitis, polio virus, and other pathogens; pollution has closed at least one-fifth of the nation's commercial shellfish beds, beaches and bays have been closed to swimming and other recreational use; lifeless zones have been created in the marine environment; there have been heavy kills of fish and other organisms.

If such diseases would happen around Ocean City, it will destroy our community. Our existence depends upon a clean ocean for tourists, for fishermen, for boaters. Thus, our interest in legislation to control ocean dumping is direct and immediate. We have not yet reached an emergency situation, but we hope this legislation can prevent an emergency from ever developing.

In recent years, as available land has been more scarce, there has been a rapid increase in use of the oceans for uncontrolled dumping of waste materials. Only the Federal Government possesses sufficient

authority and jurisdictional coverage to establish and maintain satisfactory control mechanisms. State jurisdiction is too limited to provide sufficient protection and it is difficult for one State to impose strict regulations upon industries, if others do not do so.

We have the problem of uncoordinated State regulation where some States allow fishing within the 3-mile limit which our own State of Maryland denies our fishermen. So here is your problem about State jurisdiction.

The quality of ocean waters in Ocean City can be directly affected by activities occurring along coastline controlled by four States: Delaware, Maryland, New Jersey, and your State, Senator, Virginia.

Further, it is generally accepted that authority of these States to regulate matters occurring on the oceans extends only to the 3-mile limit, while ocean dumping controls must, of necessity, extend to the limits of feasible ocean dumping activities.

S. 1238, the Marine Protection Act of 1971, establishes the necessary Federal authority to monitor and control ocean dumping activities through a system of permits. The very broad nature of material which is covered by the permit regulations assures reasonably comprehensive coverage once the enforcement mechanism has been established. Broad coverage is necessary to assure fair treatment of all those who may dump in the oceans and comprehensive oversight by the Federal Government to prevent ocean dumping from leading to ocean pollution.

We would only wonder why the legislation, while extending penalty provisions for noncompliance to all persons, States and localities, would exempt the Federal Government. Certainly assure comprehensive regulation, Federal activities must be included in the coverage, but there is no way to assure such coverage if the control mechanism—the permit system—is not backed by the penalty provisions when it comes to the Federal Government.

The largest single source of ocean dumping is material from dredging activities in which the U.S. Army Corps of Engineers plays a major role. The Federal Government also is involved in dumping radiological wastes and has some involvement in other dumping activities such as the dumping of oil sludge from barges which occurred off the Florida coast last November. S. 1238 should apply as fully to the Federal Government as it does to all others.

We recognize that municipalities would be affected by these regulations, but we do not object to this prospect. Municipalities engage in four significant activities in which ocean dumping may be involved:

1. The disposal of refuse accumulated from trash collection activities.

2. Disposal of debris from demolition of buildings and other structure in community development and urban renewal programs.

3. Creation and disposal of sewage sludge, the residue of sewage treatment plant activities.

4. Maintenance of outfalls for treated or untreated municipal sewage.

Presently there is little regulation over the first three. The fourth, sewer outfalls, is being regulated under the provisions of the Federal Water Pollution Control Act. To assure uniformity in Federal

regulations of sewage, primary emphasis for regulation of sewage outfalls should remain with the Federal Water Pollution Control Act. Thus, we support the exemption of sewage outfalls from the provisions in S. 1238.

Such controls as are imposed on the present or prospective ocean dumping activities of municipalities must be developed in a total context of Federal policies bearing upon the effected municipal activities. Quite bluntly, municipalities cannot be left with nowhere to dump their trash. If air quality controls prohibit incineration, if available landfill sites become too distant or too expensive, and if ocean dumping is prohibited, this becomes a very real prospect. Today, the economic pressures are such that ocean dumping of both municipal solid wastes and sewage sludge is becoming an increasingly attractive alternative for financially hard-pressed municipalities.

At this time, Mr. Chairman, we have a chart here, which I think you have a copy of. I will omit going through that with the exception of giving you on a cost per ton basis; sanitary landfill at nearby site, $16.25; incineration at central city site, $24.50; rail haul and landfill, at a radial of 50 to 150 miles, $21.35, $21.70, and $22.15; bailing and ocean dumping at a radius of 20 miles to 100, $18.80, $19.50, and $20.45; and incineration ship based, $24.89.

Note that for coastal cities, ocean dumping is already a cheaper method than anything but nearby sanitary landfills and in most metropolitan areas available land for sanitary landfills is fast disappearing.

The differences in cost for sewage sludge disposal by coastal cities is even dramatic as another chart, also prepared by the Council on Environmental Quality demonstrates.

There again I won't go into that. But on the land location and the method, it runs per ton from $22 to $60 and in the ocean from $3 to $36.

As pressures mount to improve efficiency in municipal sewage treatment, the amount of sewage sludge to be disposed of must rise dramatically. Thus, these are particularly important cost factors.

To forestall these heavy pressures to use the ocean dumping, while at the same time recognizing the heavy cost pressures municipalities face, Federal action is needed, in addition to the dumping permit program, to improve municipal solid waste and sewage sludge management capabilities and reduce disposal costs. The Resources Recovery Act of 1970, enacted with the strong support of the Nation's cities, established a major program to fund improvements of local solid waste management capabilities. As one element of the Federal effort to control ocean dumping, particularly ocean dumping from municipal sources, Congress must appropriate the full sums authorized under the Resource Recovery Act of 1970. Programs supported under this act can identify new methods of efficiently dealing with solid waste problems while minimizing the potential damage to our oceans or other air, water, and land resources.

A total Federal approach is needed to deal with the problem of ocean dumping and the more general problems of solid waste management. Enactment of S. 1238 will be a part of that Federal effort. I urge its adoption.

I thank you for your attention. I will be happy to answer any questions that you may have.

Senator SPONG. First of all, Mr. Kelley, I want to thank you on behalf of the subcommittee for your statement and commend you particularly for the information contained therein in so far as estimated solid waste disposal costs are concerned and estimated costs of land-base sewage sludge disposal. You credit this to the Council on Environmental Quality, but I wonder if either you or Mr. Harkins or the other gentleman with you, who I would ask you to identify for the record, know any further source for these figures? Who put them together?

Mr. ALEXANDER. I got those from the study of the Council on Environmental Quality as reprinted in some hearings of the Senate Public Works Committee. I don't know any source other than that particular study.

Senator SPONG. I want to comment on the statement you made with regard to what the Federal Government is doing about dumping. In asking the question, it is not asked in a fencing spirit, because I have been jumping on the Navy for a long time; but you made the statement that the Federal Government is also involved deeply in dumping radiological waste. I don't think that has been done in the last 7 or 8 years. Do you have any information that it has?

Mayor KELLEY. I think, Senator, too, in all fairness, I think they are tightening the reins very much. I don't think much concern was given a few years back where the silt was going in dredging activities, but through experience right in our own town, I will say that the U.S. Corps of Engineers is tightening the reins; yes, sir.

Senator SPONG. I would observe for the record, and I could be corrected, that the dumping of radiological waste has not taken place in recent years.

In your statement, you are somewhat contrary to the two gentlemen who preceded you, you state that only the Federal Government possesses sufficient authority and jurisdictional coverage to establish and maintain satisfactory control mechanisms. State jurisdiction is too limited to provide sufficient protection, et cetera.

Dr. Hammond and implicitly Dr. Hargis, if I understood them, believe that States should participate at some stage of the licensing permit procedure, certainly within the 3-mile limit. Are you objecting to that?

Mayor KELLEY. Well, sir; I respect those gentlemen very highly, respect their opinions, but having had experience in the fishing field where one State passes one law, your adjoining States passes another law, this is my reason for urging Federal control. I think State regulation wouldn't be uniform. Just like the fishing law now, it certainly isn't fair to prohibit the Maryland boys from fishing within the 3-mile limit, when they can just go over the Delaware line and fish in it. This is my reason and purpose. I think that Federal control would be fair to all, and I don't think with each State passing on it, it could be, yes, sir.

Mr. HARKINS. I think too often in the past the States have not been able to come to grips with problems. Perhaps what has just happened off of Virginia Beach is a good example of why Federal

jurisdiction is so important. No one particularly knows who dumped that oil. Too often, particularly in the case of Maryland, where we are immediately adjacent to two other States with only a short amount of coastline involved, it would be a very simple matter for all types of illicit activity to occur. Maryland would actually have no real power to do anything about it if the people doing this come from either Delaware or Virginia. I think it is quite obvious that the Federal Government does have a primary responsibility for jurisdiction in these matters.

Senator SPONG. Thank you.

I made the statement in my opening remarks that no one knew the source of the oil at Virginia Beach. I neglected to ask Dr. Hargis if he had any later information. I see him shaking his head, so I guess as of now it is not known. I have been in touch earlier with the Coast Guard about it.

We thank you very much for your testimony.

(The statement follows:)

STATEMENT OF HARRY W. KELLEY, MAYOR OF OCEAN CITY, MD., ON BEHALF OF MARYLAND MUNICIPAL LEAGUE, NATIONAL LEAGUE OF CITIES, AND U.S. CONFERENCE OF MAYORS

Mr. Chairman and members of the committee, I am Harry W. Kelley, Mayor of Ocean City, Maryland. I am honored to appear here today on behalf of the Maryland Municipal League, the National League of Cities and the U.S. Conference of Mayors to support S. 1228 and related legislation to improve Federal controls over the dumping of waste materials in our oceans.

The prospect of a polluted ocean is a matter of grave concern in Ocean City and many other coastline communities. Our sanitary district and council are aware of the problem and are constantly checking for algae, residue and odors. A report on ocean dumping by the President's Council on Environmental Quality noted:

"Marine pollution has seriously damaged the environment and endangered humans in some areas. Shellfish have been found to contain hepitatis, polio virus, and other pathogens; pollution has closed at least one-fifth of the nation's commercial shellfish beds, beaches and bays have been closed to swimming and other recreational use; lifeless zones have been created in the marine environment; there have been heavy kills of fish and other organisms."

If such disasters would happen around Ocean City, it will destroy my community. Our existence depends upon a clean ocean for tourists, for fishermen, for boaters. Thus, our interest in legislation to control ocean dumping is direct and immediate. We have not yet reached an emergency situation, but we hope this legislation can prevent an emergency from ever developing.

In recent years, as available land has been more scarce, there has been a rapid increase in use of the oceans for uncontrolled dumping of waste materials. Only the Federal government possesses sufficient authority and jurisdictional coverate to establish and maintain satisfactory control mechanisms. State jurisdiction is too limited to provide sufficient protection and it is difficult for one state to impose strict regulations upon industries, if others do not do so. The quality of ocean waters in Ocean City can be directly affected by activities occurring along coastlines controlled by four states: Delaware, Maryland, New Jersey and Virginia. Further, it is generally accepted that authority of these states to regulate matters occurring on the oceans extends only to the three-mile limit, while ocean dumping controls must, of necsssity, extend to the limits of feasible ocean dumping activities.

S. 1238, the Marine Protection Act of 1971, establishes the necessary Federal authority to monitor and control ocean dumping activities through a system of permits. The very broad nature of material which is covered by the permit regulations assures reasonably comprehensive coverage once the enforcement mechanism has been established. Broad coverage is necessary to assure fair treatment of all those who may dump in the oceans and comprehen-

sive oversight by the Federal government to prevent ocean dumping from leading to ocean pollution. We would only wonder why the legislation, while extending penalty provisions for non-compliance to all persons, states and localities, would exempt the Federal government. Certainly to assure comprehensive regulation, Federal activities must be included in the coverage, but there is no way to assure such coverage if the control mechanism—the permit system—is not backed by the penalty provisions when it comes to the Federal government. The largest single source of ocean dumping is material from dredging activities in which the U.S. Army Corp of Engineers plays a major role. The Federal government also is deeply involved in dumping radiological wastes and has some involvement in other dumping activities such as the dumping of oil sludge from barges which occurred off the Florida coast last November. S. 1238 should apply as fully to the Federal government as it does to all others.

We recognize that municipalities would be affected by these regulations, but we do not object to the prospect. Municipalities engage in four significant activities in which ocean dumping may be involved:

1. The disposal of refuse accumulated from trash collection activities.
2. Disposal of debris from demolition of buildings and other structures in community development and urban renewal programs.
3. Creation and disposal of sewage sludge, the residue of sewage treatment plant activities.
4. Maintenance of outfalls for treated or untreated municpal sewage.

Presently there is little regulation over the first three. The fourth, sewer outfalls, is being regulated under the provisions of the Federal Water Pollution Control Act. To assure uniformity in Federal regulations of sewage, primary emphasis for regulation of sewage outfalls should remain with the Federal Water Pollution Control Act. Thus, we support the exemption of sewage outfalls from the provisions in S. 1238.

Such controls as are imposed on the present or prospective ocean dumping activities of municipalities must be developed in a total context of Federal policies bearing upon the effected municipal activities. Quite bluntly, municpalities cannot be left with nowhere to dump their trash. If air quality controls prohibit incineration, if available landfill sites become too distant or too expensive, and if ocean dumping is prohibited, this becomes a very real prospect. Today, the economic pressures are such that ocean dumping of both municipal solid waste and sewage sludge is becoming an increasingly attractive alternative for financially hard-pressed municipalities.

The following chart, prepared by the President's Council on Environmental Quality, compares the cost of various approaches to solid waste disposal.

COMPARISON OF ESTIMATED SOLID WASTE DISPOSAL COSTS (ON A COST-PER-TON BASIS)

Unit process	Sanitary landfill at nearby site	Incineration at central city site	Rail haul and landfill			Baling and ocean dumping			Incineration ship based
			50 miles	100 miles	150 miles	20 miles	50 miles	100 miles	
Collection [1]	$15.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00
Transfer operation [2]	0	0	4.50	4.50	4.50	4.20	4.20	4.02	0
Haul	0	0	2.65	3.00	3.45	.60	1.30	2.25	0
Disposal [3]	1.25	10.50	.65	.65	.65	0	0	0	10.89
Total	16.25	24.50	21.35	21.70	22.15	18.80	19.50	20.45	24.89

[1] Higher cost of collection for nearby landfill due to lack of central city site.
[2] Higher cost of ocean baling due to higher density requirements.
[3] Lower cost of landfill operations due to baling.

Note that for coastal cities, ocean dumping is already a cheaper method than anything but nearby sanitary landfills and in most metropolitan areas available land for sanitary landfills is fast disappearing.

The difference in cost for sewage sludge disposal by coastal cities is even dramatic as the following chart, also prepared by the Council on Environmental Quality demonstrates.

Estimated cost of land-based sewage sludge disposal

Location and method:	Cost per ton
Land:	
Digestion and lagoon storage (Chicago)	$45
Digestion and land disposal [1]	22
Composting	$35–45
Processing into granular fertilizer (per cost)	35–50
High temperature incineration	35–60
Ocean:	
Barging undigested sludge	3–18
Barging digested sludge	8–36
Piping disposal	12–30

[1] At Chicago, with a 7-mile pipeline to the land disposal site.

As pressures mount to improve efficiency in municipal sewage treatment, the amount of sewage sludge to be disposed of must rise dramatically. Thus, these are particularly important cost factors.

To forestall these heavy pressures to use the ocean for dumping, while at the same time recognizing the heavy cost pressures municipalities face, Federal action is needed, in addition to the dumping permit program, to improve municipal solid waste and sewage sludge management capabilities and reduce disposal costs. The Resource Recovery Act of 1970, enacted with the strong support of the nation's cities, established a major program to fund improvements of local solid waste management capabilities. As one element of the Federal effort to control ocean dumping, particularly ocean dumping from municipal sources, Congress must appropriate the full sums authorized under the Resource Recovery Act of 1970. Programs supported under this Act can identify new methods of efficiently dealing with solid waste problems while minimizing the potential damage to our oceans or other air, water and land resources.

A total Federal approach is needed to deal with the problem of ocean dumping and the more general problems of solid waste management. Enactment of S. 1238 will be a part of that Federal effort. I urge its adoption.

I thank you for your attention. I will be happy to answer any questions that you may have.

Senator SPONG. Mr. Reynolds.

STATEMENT OF JAMES J. REYNOLDS, PRESIDENT, AMERICAN INSTITUTE OF MERCHANT SHIPPING; ACCOMPANIED BY O. LINCOLN CONE, ASSISTANT SECRETARY

Mr. REYNOLDS. Mr. Chairman, I am accompanied by an associate, Mr. Lincoln Cone of our staff, who is somewhat of an expert in the whole area of the maintenance of navigation channels and harbors. I think, Mr. Chairman, with your permission, probably rather than endeavor to paraphrase this, if I try to go through it quickly, it would be in the interest of time, if I may do that.

Senator SPONG. We would be pleased to receive your statement in its entirety for the record, and you may testify therefrom.

Mr. REYNOLDS. We can do that, Senator, and I will do it either way out of concern for your patience and time.

Let me just say, in the first place to identify myself, I am James J. Reynolds. I am president of the American Institute of Merchant Shipping. We are a national trade association representing the vast majority of the U.S.-flag vessels of the Nation.

These include dry cargo vessels, tankers, coastal and intercoastal vessels, and quite understandably we have a concern for the maintenance and improvement of harbors and channels, et cetera, which brings us right to the point.

The vessels that are being constructed, both dry cargo vessels and tanker vessels, particularly those which are projected under the new shipbuilding program which President Nixon put through last year will involve dimensions which will require constantly deepening and maintenance of depth of channels into our major harbors.

The responsibility for maintaining and for deepening these navigable waterways has always rested in the U.S. Corps of Engineers of the Department of the Army. We are, therefore, very much concerned, Mr. Chairman, that the administration bill; namely, S. 1238. contemplates removing from the Secretary of the Army the authority and power to issue permits for the disposal particularly of dredged spoil.

The corps has exercised this authority for almost 100 years, and we feel that they have exercised it responsibly and effectively, indeed deserve the appreciation of the country for the effective manner in which they have done this. In more recent years, as the growing concern over the ecology has become the concern of all of us and as there has been a deepening awareness that you and I and all of us are trustees of the environment for future generations, the corps has been required in the issuance of permits to contractors to deepen channels or indeed when they do it themselves to be mindful of all ecological considerations in the disposal of dredged spoil; dredged spoil, of course, being that material which comes from the bottom of waterways in order to deepen the navigable channels, et cetera, and that dredged spoil has to be deposited somewhere.

We are concerned that if the authority for its disposal is removed from the corps where for years the expertise has resided and has been exercised, we submit, air, with a high, commendable degree of responsibility, it would lead conceivably to delay and to added expense, and, in short, interfere with the orderly maintenance of the improvement of our navigable waterways.

Specifically, let me attempt to hypothecate a situation where the corps contemplates a project and after detailed considerations of the cost effectiveness of the project, which is required of them before they come before the legislature for funds to go ahead with that project, if in the contemplation of that project they determine that the massive quantities of the dredged spoil which will be taken from the bottom of the waterways is to be responsibly deposited in position A, B, and C, and their financial projections upon which they come to Congress are based on that decision, that then is a matter that can be considered with complete certainty.

However, if after the decision as to where that dredged spoil will be deposited and conceivably long after the project has been contemplated a decision is made not to deposit in location A, B, and C but rather in D, E, and F, the projected increased costs and so forth will highly complicate consideration of the Congress to determine whether the project should be authorized and indeed whether funds should be expanded for its completion.

I feel, Mr. Chairman, that the corps, as part of our Government, is certainly mindful of the policy of the Government, and indeed of the intent of the Congress at this time in history to be deeply concerned over the marine ecology as well as other forms of ecology with which we are all concerned, and certainly should be required in the implementation of their authority to follow yardsticks that might be established by EPA for the disposition of all kinds of waste;

industrial waste, municipal waste, et cetera, et cetera, but to take away the corps the actual authority to determine where that dredged spoil will be placed I think is not necessary and is not necessary for the implementation of the public concern and the congressional intent.

That is the burden of my case, Senator Spong.

Senator SPONG. Is it your impression that S. 1238 takes all primary authority away from the corps?

Mr. REYNOLDS. There seems to be some confusion with that quite frankly. I have talked to various counsel about it. Some have advised me that it does not but merely continues the authority in the corps but somewhat subject to, let us say, a veto power of the Administrator of EPA.

Others maintain that under section 7(c)(2) I think it is, it continues the authority of the corps. I think that should be cleared up, Mr. Chairman, and if indeed the judgment of the committee and the Congress coincides with my own, then it should be clearly stated that the corps with respect to dredged spoil retains that authority for the future which they have had in the past.

Senator SPONG. My impression is somewhat similar to your own. I heard testimony from the administration's witnesses the other day advocating the bill—of which I am a cosponsor incidentally—and it led me to the remarks that I made at the beginning of this hearing. There is a great deal of ambiguity in my judgment as to just what agency of the Government will have the permit authority in certain situations.

Now, if I understand your testimony, you favor all of it being retained with the corps.

Mr. REYNOLDS. Yes, I do, Mr. Chairman. But I emphasize particularly that field which has to do with disposal of dredged spoil. I think there the corps has a peculiar and particular expertise and experience of years and years, and it should continue there, indeed, acting under the admonition that where they dispose dredged spoil is a matter of concern in terms of the health of the Nation and of the marine ecology and all the other matters, but let them have the responsibility and let them exercise it.

If a may most respectfully suggest, I have some language here which is rather brief which I think would clarify the situation, and I would take the liberty possibly of leaving it with the committee, if I may. It would make very clear that the Chief of Engineers would have that authority to recommend, of course, to the Secretary of the Army, and in prescribing regulations and issuing permits relating to the disposal of dredged material, the Secretary shall consider the views and recommendations of the administrator of the Environmental Protection Agency and follow the criteria established by him for reviewing and evaluating permit applications as prescribed by section 5(a).

Senator SPONG. Are you not reciting what the present practice is?

Mr. REYNOLDS. Yes, yes, indeed. Indeed, I am.

Senator SPONG. Let me read this to you, and again let me say I am trying to get it in the hands of one responsible agency that we can always identify. This is dated April 16.

Army engineers authorized the Pfizer Chemical Company today to continue dumping waste products into the ocean from its plant in Groton, Conn. It stipulated that all dumping occur during hours of ebb tide. Colonel James

W. Barnett, District Engineer of the U.S. Army Corps of Engineers, said the dumping will be allowed under a Corps permit held by the company and due to expire June 30th. At the time he said the matter would be reviewed for possible further revision. The firm has been asked to explore alternative methods of disposal and report at the end of the year.

Gus J. Bennett, Regional Representative of the Environmental Protection Agency, said his agency "does not concur with the Corps decision, wanting more time to determine effects of the dumping."

There is no need for me to read further.

I am going to accept your amendment in the record, and I assure you that the subcommittee will give every consideration to it, so I only speak for myself, but I am not satisfied with the present situation.

Mr. REYNOLDS. May I say most respectfully, the language I read here refers only to the disposition of dredged spoil. I can understand quite frankly as a citizen of this Nation that a proliferation of authority for the disposal of industrial wastes, chemical wastes, municipal waste, sewage sludge, et cetera, could create real problems. I am talking most particularly and focusing in most particularly on the question of the disposition of dredged spoil.

The corps is responsible for taking it up. The corps should be responsible for where they put it. This isn't an outsider making the decision; it is the Government.

Senator SPONG. One of the reasons that you assign for this is the cost-benefit ratio under which the corps operates, you believe under S. 1238 they would be subject to having to dispose in other sites that had not been computed in advance of the project, is that it, or the permit?

Mr. REYNOLDS. It is very possible that could take place. Yet, I hasten to add that this does not mean that the corps would not act responsibly. There could be a very careful review of criteria set forth by two different agencies, and they might conceivably come to two different determinations.

The corps would very well determine that this does not seriously injure the marine ecology by putting it in one place where conceivably EPA will disagree with that. EPA, commendably, will be concerned with one consideration, and that is only the ecology—the air, the water—and the corps will have other matters to consider also, which does not mean that they would short circuit the one in behalf of the other, but would find an orderly compromise between the two.

I think that is a practical, logical way to handle this problem as far as dredged spoil is concerned. This is going to be, Mr. Chairman, an increasing problem as we get into these larger vessels, so that they can safely navigate into our ports and harbors.

There is no question about it as our commerce increases.

Senator SPONG. Staff would like to ask a question.

Mr. REYNOILD. I would be delighted to try to answer it.

Mr. MILLER. Mr. Reynolds, in trying to understand your position here which is in favor of the overall policy that the administration is trying to develop, as I understand it, your concern is primarily for the dredge spoil and the permits that will be issued for dredging.

As I recollect the Ocean Dumping Report of the Council on Environmental Quality, they said that dredge spoil makes up about 80 percent of the total waste products that are dumped in the ocean.

Mr. REYNOLDS. Yes.

Mr. MILLER. That leaves another 20 percent that we have to deal with that might be in the form of demolition debris and perhaps toxic chemicals. There has been nerve gas on which we had hearings last year.

If I understand you, then, you are saying we should leave the permit authority with the corps—that will handle 80 percent. Now what will we do with the remaining 20 percent? Would you recommend that the Congress enact a bill that deals only with that other 20 percent to give that permit authority to the EPA?

Mr. REYNOLDS. I think there are two things that have to be kept in mind in connection with your observation.

One is I believe you are talking in terms of total tonnage and you have neglected to point out that in that 80 percent the vast majority of that tonnage is uncontaminated dredge spoil which is just as harmless in the depths of the ocean as it would be where it was before, interfering with navigable waters.

So, you really narrow it down to possibly something like 23 or 24 percent of the total in tonnage volume that would be polluted dredged spoil.

So, it is that portion which I think is the moment of truth that we are talking about here, should the corps retain the authority to determine where that 23 or 24 percent goes, and not 80 percent, because the vast majority of dredged spoil is merely taking clean earth from the bottom of the water and taking it from that spot and putting it in another.

It is when you get to dredged spoil that has been contaminated by years of outrageous neglect by municipalities and all of us that the problem arises.

I think you have to keep this in proportion. I think we are talking about the corps having authority over not 80 percent of pollutants but of a relatively small percentage of the total. And the real mischief and the real concern, I submit, is not dredged spoil but the outrageous industrial waste and chemicals that result from industrial processes that in our society must be disposed of in some way. I think that those should be under the control of EPA quite frankly and would understand that.

Mr. Chairman, may Mr. Cone make a comment here?

Senator SPONG. Yes, indeed.

Mr. CONE. I would just like to point out that right now the Norfolk district engineer is studying the advisability of deepening the Hampton Road channels from their present depth of 45 feet to 55 feet, so that the U.S. coal export trade may remain competitive in relation to foreign-flag operators in exports to Japan and other places.

In other words, in order to retain our export trade with Japan and other foreign ports in the coal trade, we have to bring in and load the coil in deeper colliers, and in order for these deeper colliers to get into Hampton Roads, the channel will have to be dredged or deepened from 45 to about 55 feet.

However, as we know, no navigation improvement project can be recommended unless the benefits exceed the costs. If the disposal of the dredge spoil in the Hampton Roads project, if that is required to be taken out to sea instead of deposited in Craney Island or some other place like that nearby——

Senator SPONG. That is what they have been doing?

Mr. CONE. Yes, sir. If it is required to be taken out to sea which will increase the cost considerably of that project, it is conceivable that the benefits would not exceed the cost, and that would defeat the Hampton Roads dredging project.

Our only thought is whereas the Army engineers are trying to take an objective view of this thing, of all factors considered, we feel that the EPA Administrator, having only in mind the protection of the environment and under pressure in that respect, might demand or require all the spoil to be taken out to sea, and none to be put in nearby disposal areas, and thereby defeat the project.

Mr. REYNOLDS. I think that is just one example. I think it would have been more subtle to use an example in Vancouver or Washington State.

Senator SPONG. I am not all that sensitive.

Mr. REYNOLDS. I know, but I think it does demonstrate the problem. The real question is, and it seems to me what we have to all focus in on, will the corps exercise responsibly the decision as to where they put it. I think they will and I think this is particularly so if they are required to consider the criteria set forth under the bill by the administrator of EPA.

This is the Corps' business, they are experts at it.

Senator SPONG. Your present interpretation of the bill, and I am speaking of S. 1238, is they would tell them where to dispose of the dredged spoil?

Mr. REYNOLDS. Yes. Let me say we have had respectable legal opinion that that is so, Senator, although I confess I am confused on the way it is presently drafted. It is out of that confusion that my concern arises.

Senator SPONG. Well, I thank both of you gentlemen for your testimony.

As I have indicated, I am very much concerned for these authorities remaining divided and we end up in situations where it is so difficult to accomplish anything because of the bureaucracies involved.

I found it rather ironic and disappointing that those of us who for 2 or 3 years in the environmental fields have tried to encourage all of this to be put under one agency where we could understand it a little better. After listening to the testimony on S. 1238 I concluded that there was really no Federal agency that had formerly been in the picture that was really being eliminated; they would all continue in varying degrees. What we have done has been to add the EPA on top of what we already had, and this could result in the very proliferation that those of us who have been working for air and water pollution for years have been so discouraged about.

Mr. REYNOLDS. I don't think that would make any sense at all, and I say that in the face of what I am pleading for here. I think by and large it all should be in one agency, and I only plead that

this one particular area possibly should be divorced, and I think there is a good deal of logic for it.

I think in terms of the number of requests for permits from chemical plants, from municipalities, from other sources of waste, they will be tremendously greater than anything in the corps.

We know how long it takes one project to go through. Take Hampton Roads, Chesapeake Bay, it takes years.

Senator SPONG. Have you ever heard of Four Mile Run?

Mr. REYNOLDS. Yes, I have.

Senator SPONG. That is a little place over here in northern Virginia, but that is going to take centuries before they are able to do anything about that.

One of the distinctions that you and I have probably not discussed is the authority beyond the 3-mile zone and out into the contiguous zone, which is going to have to be dealt with. I can only promise you for my part in the subcommittee, I am just going to try to simplify this thing more than I think the present legislation does. We are appreciative of having your point of view.

Mr. REYNOLDS. Thank you very much, Mr. Chairman. You are very patient. I appreciate it.

(The statement and amendment follow:)

STATEMENT OF JAMES J. REYNOLDS, PRESIDENT, AMERICAN INSTITUTE OF MERCHANT SHIPPING

My name is James J. Reynolds. I am President of the American Institute of Merchant Shipping. AIMS is a national trade association composed of 34 United States companies which own and operate about 500 oceangoing vessels of all types registered under the U. S. flag. These vessels aggregate approximately 8,300,000 deadweight tons and are engaged in the foreign and domestic trades of the United States.

We are very grateful for the opportunity afforded us of appearing before the above Subcommittee and presenting this statement of our views and recommendations relative to S. 1238, the Administration's bill, cited as the "Marine Protection Act of 1971."

Section 2 of S. 1238 states that "it is the policy of the United States to regulate the dumping of all types of material in the oceans, coastal, and other waters and to prevent or vigorously limit the dumping into the oceans, coastal, or other waters of any material which could adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." Section 2 further states that to carry out the foregoing policy "it is the purpose of this Act to regulate the transportation of material from the United States for dumping into the oceans, coastal, or other waters, and the dumping of material by any person from any source if the dumping occurs in waters over which the United States has jurisdiction."

At the outset I wish to state that the AIMS and its member companies wholeheartedly support the above policy and purpose of S. 1238 and it is our desire to cooperate in the accomplishment of this policy and purpose. In order to accomplish this policy and purpose, S. 1238 would transfer from the Secretary of the Army and Chief of Engineers of the Department of the Army to the Administrator of the Environmental Protection Agency the authority to issue permits for the (1) transportation of material from the United States for dumping in the oceans, coastal and other waters and (2) dumping of material in ocean, coastal and other waters which are within the territorial jurisdiction of the United States i.e. within the three mile limit, except as provided in 33 USC 441. The term "material" is defined in section 3(c) of the bill to mean among other things dredged spoil, rock and sand which result from deepening and widening the nation's waterways.

For about 147 years the U. S. Army Corps of Engineers has, since 1824, studied, investigated, recommended, constructed and maintained waterway improvement projects authorized by Congress and the President. Needless to say, the Corps of Engineers has acquired a great amount of knowledge, understanding and experience during this period of time in respect to determining suitable, economical and safe areas for the disposal of dredged material resulting from waterway improvements. Under the terms of S. 1238, however, the Secretary of the Army and Chief of Engineers could no longer make the foregoing determination with respect to disposal of dredged material. This determination would be made by the Administrator of the EPA and the Secretary of the Army and Chief of Engineers would be required to obtain a permit from the EPA Administrator for disposal of such dredged material at locations to be determined by the EPA Administrator.

The American Institute of Merchant Shipping is unalterably opposed to the transfer of the permit authority from the Secretary of the Army and Chief of Engineers to the Administrator of the EPA for the above purposes. We do not believe this transfer of the permit authority is necessary to achieve the policy and purpose set forth in S. 1238.

As you probably know, one of the major activities of AIMS is the initiation and accomplishment of navigation improvements in Federal channels in U.S. ports and waterways to more adequately accommodate large vessels, particularly by tankers, dry bulk carriers, container ships and LASH (Lighter Aboard Ship). The deepening of channels enable these vessels to increase their cargo-carrying capacity and revenue earning capability, thereby achieving reductions in transportation costs. It is a well known fact that the cost of transportation is an important factor in determining the price of goods to consumers. Therefore, an increase or decrease in the transportation cost has a corresponding effect upon the consumer price structure.

The planning, construction and maintenance of the extensive and excellent system of waterways serving the transportation requirements of our country is a result of the expert and dedicated work which the Corps of Engineers has performed since 1824. The entire nation owes a great debt of gratitude for the fine job they have done and are still doing. For this reason, AIMS urges that no action be taken which would interfere with or delay the continued progress of the waterway improvement program under the direction of the Army Engineers.

Generally speaking, under existing laws and regulations all dredging, filling, erection of structures and depositing of refuse in the navigable waters of the United States is permitted only when recommended by the Chief of Engineers and authorized by the Secretary of the Army through issuance of a permit. The delegation of this permit authority to the Chief of Engineers and Secretary of the Army had its origin in the Act of June 29, 1888. The permit authority was considerably enlarged and extended by the Act of March 3, 1899. The Corps of Engineers has therefore been exercising this permit authority for a period of 83 years and has acquired extensive experience and expertise in this area which is indispensible to the administration of the permit authority.

For many years the Corps of Engineers administered its authority to issue permits taking into consideration only the effect of the proposed work on navigation. However, following the enactment of the Fish and Wildlife Coordination Act of 1956, consideration given by the Corps of Engineers in connection with permit applications was extended to include the impact of proposed waterway improvements and deposits on fish and wildlife.

As the problems of water pollution and maintenance of water quality became of increasing concern, they have become significant factors in the evaluation of permit applications. The regulations of the Chief of Engineers governing issuance of permits now include requirements for evaluation of effects of the proposed Federal and non-Federal works, including disposal of dredged material, not only on navigation but also on fish and wildlife, water quality, pollution, conservation, aesthetics, ecology and other environmental factors. We wish to point out that the policy and practice of the Corps of Engineers of evaluating many of the foregoing factors were initiated *prior* to the enactment of the National Environmental Policy Act of 1969, approved by the President January 1, 1970 (Public Law 91-190). This Act has served to confirm the policy and practices of the Corps of Engineers of giving due weight to the preservation and enhancement of the quality of the environment in connection with the

consideration of applications for permits for dredging, filling, erection of structures or depositing of refuse in navigable waters. Accordingly, the enactment of the National Environmental Policy Act is regarded as a strong affirmation of the administrative policy of the Chief of Engineers.

We wish to point out that section 123(a) of the River and Harbor Act of 1970 (Public Law 91-611) approved by the President December 31, 1970 provides that with respect to the Great Lakes and their connecting channels "the Secretary of the Army, acting through the Chief of Engineers, is authorized to construct, operate, and maintain * * * contained spoil disposal facilities of sufficient capacity for a period not to exceed ten years," and that "before establishing each such facility, the Secretary of the Army shall obtain the concurrence of appropriate local governments and shall consider the views and recommendations of the Administrator of the Environmental Protection Agency and shall comply with the requirements of section 21 of the Federal Water Pollution Control Act, and of the National Environmental Policy Act of 1969." Subsection (b) provides that the "Secretary of the Army, acting through the Chief of Engineers, shall establish the contained spoil disposal facilities authorized in subsection (a) at the earliest practicable date, taking into consideration the views and recommendations of the Administrator of the Environmental Protection Agency as to those areas which, in the Administrator's judgment, are most urgently in need of such facilities and pursuant to the requirements of the National Environmental Policy Act of 1969 and the Federal Water Pollution Control Act."

In addition, subsection (i) of section 123 of the River and Harbor Act of 1970 stipulates that "the Chief of Engineers, under the direction of the Secretary of the Army, is hereby authorized to extend to all navigable waters, connecting channels, tributary streams, other waters of the United States and waters contiguous to the United States, a comprehensive program of research, study, and experimentation relating to dredged spoil. This program shall be carried out in cooperation with other Federal and State agencies, and shall include, but not be limited to, investigations on the characteristics of dredged spoil, and alternative methods of its disposal. To the extent that such study shall include the effects of such dredge spoil on water quality, the facilities and personnel of the Environmental Protection Agency shall be utilized."

Accordingly, in view of the above provisions of section 123(i) of the River and Harbor Act of 1970, and for reasons set forth in this statement, the American Institute of Merchant Shipping strongly urges that S. 1238 be amended to provide that the authority to issue permits for the transportation and disposal of dredged material resulting from waterway improvement projects shall be retained by the Secretary of Army, acting through the Chief of Engineers, taking into consideration the views and recommendations of the Administrator of the Environmental Protection Agency in respect to criteria and guidelines to be followed in the selection of disposal areas.

Legislation similar to that contained in section 123(a) and (b) for the Great Lakes should also be enacted to authorize the Secretary of the Army, acting through the Chief of Engineers, to construct, operate and maintain contained land spoil disposal facilities on other U. S. waterways, taking into consideration the views and recommendations of the EPA Administrator.

Our proposal for retention of the permit authority in the Secretary of the Army and Chief of Engineers is in accord with the delegation of authority made by the President himself to the Secretary of the Army in Executive Order 11574 issued under date of December 23, and published in the Federal Register of December 25, 1970. Under the terms of this Executive Order, the President specifically delegated to the Secretary of the Army the authority to administer the permit program under section 13 of the Act of March 3, 1899, commonly known as the Refuse Act (33 USC 407). Section 2(a) (1) of the President's Executive Order stipulates that the Secretary of the Army "after consultation with the Administrator [of the EPA] respecting water quality matters, issue and amend, as appropriate, regulations, procedures, and instructions for receiving, processing, and evaluating applications for permits pursuant to the authority of the Act." Paragraph (2) provides that the Secretary of the Army "shall be responsible for granting, denying, conditioning, revoking, or suspending Refuse Act permits." It is the position of AIMS that the foregoing procedure prescribed by the President in his Executive Order 11574 should be fol-

lowed as the most practicable and expeditious method of considering and acting on dumping permit applications.

To transfer from the Secretary of the Army and Chief of Engineers to the Administrator of the EPA complete authority to issue permits for the disposal of dredged material resulting from waterway improvement projects, including dredging of access channels and berths to private facilities, would in our opinion seriously jeopardize the economic justification and progress of essential waterway improvement projects now under study or recommended by the Army Engineers and those which have been authorized by Congress, including perhaps those projects for which funds have already been appropriated.

While the Corps of Engineers has consistently endeavored throughout the years to develop and maintain a balanced evaluation of the effects of a waterway improvement project on navigation, industrial and economic growth, fish and wildlife, water quality, pollution, conservation, aesthetics, ecology and other environmental factors, we are of the opinion that because it is the primary function and concern of EPA to preserve the environment EPA will not be in a position to evaluate on an impartial and equitable basis all the foregoing factors related to a waterway improvement project. It is logical to conclude that from the standpoint of EPA environmental considerations will outweigh all others by far and influence the EPA Administrator to require that dredged material be transported for disposal far at sea or to inland locations. In either case, the effect of such a requirement on projects under study or recommended by the Corps of Engineers or authorized by Congress would be to greatly increase the cost of such projects and thereby jeopardize their economic justification by adversely affecting the benefit-cost ratio. We have been reliably informed that for each 30 miles the dredged material is transported the cost of spoil disposal is doubled, thereby substantially increasing the cost of the waterway improvement project. If the material is ordered to be disposed at sea, it would be necessary to use oceangoing barges. Most of the barges now in use for transporting spoil disposal are not constructed for oceangoing operation. The cost of constructing oceangoing barges for spoil disposal at sea would be very substantial and would of course be added to the cost of the project.

Should the EPA Administrator take the above action with respect to disposal of dredged material, this would also seriously affect the continued maintenance of channels at their authorized project depths since the cost of such channel maintenance would be greatly increased. If equivalent appropriation increases are not provided annually in the President's budget and by Congress in Public Works Appropriation Acts, the maintenance of channels at their authorized project depths will not be possible and the estimated return to the Federal Government on its original investment in deepening of the channels, based primarily on savings in transportation costs, will not be realized. It is axiomatic that if channels are not maintained, the cargo-carrying capacity of vessels will be reduced due to reductions in draft occasioned by lack of channel maintenance, thereby causing an increase in transportation cost per ton of cargo. Such increased transportation costs are usually reflected in increases in the prices of goods and services to consumers. Thus it is the general public that will ultimately bear the burden of higher costs involved in the construction and maintenance of waterway improvements that may be caused by requirements imposed by the EPA Administrator for disposal of dredged material far at sea or at inland locations, rather than at far more economic waterway or shore locations adjacent to or in the vicinity of the river and harbor construction or maintenance projects, which for the most part is the present practice. The Corps of Engineers has endeavored to follow the latter practice in the interest of maintaining the cost of waterway improvement and maintenance projects at a minimum, thus helping to achieve a favorable benefit-cost ratio so as to establish the economic justification of improvement projects. We could not be sure that the Administrator of the EPA would give appropriate consideration to project cost factors in the event the authority to issue dumping permits is transferred from the Secretary of the Army and Chief of Engineers to the EPA Administrator.

A case in point, which is typical of other projects, is the Baltimore Harbor and Channels, Maryland and Virginia, navigation improvement project which would primarily provide for the deepening of the channels through Chesapeake

Bay into Baltimore Harbor from 42 to 50 feet mean low water. As you are aware, this project was authorized by the River and Harbor Act of 1970 with the stipulation, however, "that construction shall not be initiated until approved by the Secretary of the Army and the President." This project has not yet been cleared by the Office of Management and Budget, including the Bureau of the Budget. Until it is, the Secretary of the Army and the President cannot be expected to approve the project for construction.

We wish to call attention to the fact that one of the conditions of local cooperation stipulated by the Chief of Engineers, which has been accepted by the states of Virginia and Maryland, is that these States will "provide without cost to the United States * * * suitable areas *determined by the Chief of Engineers* to be required in the general public interest for initial and subsequent disposal of spoil, and also necessary retention dikes, bulkheads, and embankments therefor, or the costs of such retaining works" (italics supplied).

The Baltimore District Engineer in his report (page 53) on the Baltimore Harbor and Channels project states as follows: "Disposal in deep water in the Atlantic Ocean is planned for the material dredged from the Cape Henry Channel while disposal in deep water in Chesapeake Bay is planned for the York Spit and Rappahannock Shoal Channels." The Board of Public Works of the State of Maryland "has given assurance, * * * that disposal areas will be provided in the waters of Chesapeake Bay opposite Kent Island, or in overboard or diked areas near Baltimore Harbor, or in combinations of the two areas. * * * *The cost estimates for the plans of improvement in Baltimore Harbor are based on disposal of the dredged material in Chesapeake Bay opposite Kent Island below the William Preston Lane, Memorial Bridge.* This area is considered to be economically equal to and representative of all the potential disposal areas, both diked and overboard. A final determination will be made at the time of preparation of plans for the dredging, both as to the disposal areas to be used and the method of dredging" (Italics supplied).

According to the report of the District Engineer, the above plans for disposal of dredged spoil have been coordinated with the proper Federal agencies and concerned agencies of Virginia and Maryland.

The total estimated cost of the Baltimore Harbor and Channels improvement project is about $100,000,000 resulting in a benefit-cost ratio of 2 to 1. I would like to point out, however, that if S. 1238 is enacted in its present form, the Administrator of EPA would then have the authority and power to revise the above spoil disposal plans outlined in the report of the Baltimore District Engineer as approved by the Chief of Engineers, and require that some or all of the dredged spoil be transported for disposal at sea or some other more costly location. The effect of such action would be to substantially increase the cost of the project. This would adversely affect the benefit-cost ratio and might endanger the economic justification of the project. This could create a problem with respect to clearance of the project by the Office of Management and Budget for approval by the President and Secretary of the Army for construction.

As I have previously stated, the U.S. Army Corps of Engineers is making every effort in consultation with the Environmental Protection Agency, Department of the Interior, Maritime Administration and other Federal, State and local government agencies to determine suitable locations for the disposal of dredged material resulting from waterway improvement projects. In our opinion, there is nothing to be gained and much to be risked from the standpoint of the formulation and progress of the waterway improvement program if the authority to determine spoil disposal sites is transferred from the Secretary of the Army and Chief of Engineers to the Administrator of the EPA. We therefore strongly reaffirm our recommendation that S. 1238 be amended to provide that the authority to issue permits for transportation and disposal of dredged material resulting from waterway improvement projects shall be retained by the Secretary of the Army and Chief of Engineers.

The Lake Carriers Association, representing companies operating U. S. Flag ships on the Great Lakes, has endorsed our position and recommendation with respect to S. 1238.

The favorable consideration of our views and recommendations will be most helpful and appreciated.

AMERICAN INSTITUTE OF MERCHANT SHIPPING,
Washington, D.C., April 22, 1971.

Re S. 1238, Marine Protection Act of 1971.

Hon. ERNEST F. HOLLINGS,
Chairman, Subcommittee on Oceans and Atmosphere,
U.S. Senate, Washington, D.C.

DEAR SENATOR HOLLINGS: Further to the statement of the American Institute of Merchant Shipping which I have just presented at the hearing which you held today on S. 1238, I recommend that consideration be given to the following proposed amendments of the bill. These amendments are designed to retain in the Secretary of the Army and Chief of Engineers the authority to issue permits for the transportation and disposal of dredged material resulting from the improvement and maintenance of waterways, including the Great Lakes.

Add the following proviso clause at the end of section 4(b):

"Provided, however, that the provisions of this section shall not apply to or prohibit the issuance of regulations and permits by the Secretary of the Army, acting through the Chief of Engineers, in connection with the transportation and disposal in the ocean, coastal and other waters of dredged material resulting from the improvement and maintenance of navigable waters, including the Great Lakes. In prescribing regulations and issuing permits relating to disposal of such dredged material the Secretary shall consider the views and recommendations of the Administrator of the Environmental Protection Agency and follow the criteria established by him for reviewing and evaluating permit applications as prescribed by section 5(a)."

Amend section 11(e) by inserting the following prefacing clause before "section 13" on line 17: "Except as provided in the first proviso clause therein."

The favorable consideration of the above or similar amendments will be appreciated.

Sincerely,

JAMES J. REYNOLDS, *President.*

Senator SPONG. Dr. Hammond, I would like to just ask you an informal question. In your statement, you mention creative dumping activity that involves artificial reefs. How much of that is taking place off of North Carolina?

Dr. HAMMOND. Not very extensively at this time. There are several experimental programs on this that we are monitoring very closely to see not only the effects it will have on increasing the fishing activity but also the effects it will have on the basic ocean processes.

Senator SPONG. How much do we have in Virginia waters, Dr. Hargis?

Dr. HARGIS. There have been about 10 reefs established to my knowledge over the last 10 years, some fairly long life and some short life, and there is in prospect right now an additional seven. There were some vessels sunk off in the lower end of Chesapeake Bay just a few days ago by the successive group to the Tidewater Artificial Reef Development Association which promises to have a fair amount of activity in the next couple of years.

Senator SPONG. How much success have they had?

Dr. HARGIS. Reefs are not too successful in increasing the total number of fish. They are successful in concentrating and putting them together in known spots where fishermen can get at them.

In general, our attitude at Chesapeake Bay and the contained waters is that reefs are not too successful because they make up a very minuscule surface area in relation to other things like oyster shells and things of that nature, but off of the Virginia Beach area and in fact even along Ocean View and Willoughby, there is some justification for increasing substrate.

Senator SPONG. What permits have they had?

Dr. HARGIS. They have had to clear with Navy, with Coast Guard, and with the corps. Furthermore, State permits that have been required have been those from the marine resources commission which is responsible to the State.

One of the things that has to be considered in all these matters is that disposal of soil or solid waste covers the bottom which, of course, can have impact on certain of the useful resources, so in this case the marine resources commission is involved.

Senator SPONG. Thank you very much.

Mr. Miller has one more question he would like to ask.

Mr. MILLER. Dr. Hargis, with regard to your statements about S. 307 and the National Oceanic and Environmental Laboratory System, it was not the intention, as I understand it, in that bill to preempt in any way existing laboratory systems, but rather, to find additional Federal funding that could be channeled both to Federal, to State, and to other laboratories for oceanic research.

Would I understand from your testimony, though, that it might be desirable to try to clarify that the money could go to the State laboratory systems? This question is also addressed to Dr. Hammond, who made similar remarks?

Dr. HARGIS. I don't want to sound too partisan in this, Mr. Miller. The only thing that I have to say or what I have to say along those lines is that after having studied carefully, both as a consultant to the now expired or soon to expire National Council on Marine Resources and Engineering Development and having been involved at the State level and having been involved as a consultant to the Department of the Interior on this problem of coastal zone laboratories, and understanding that my chief entry point into this is to first ask the question what source of information, scientific information and engineering advice that a coastal zone management unit, whoever it may be, whether it is State, Federal, or bistate and Federal, would have to come to the conclusion, that I have come to the conclusion specifically that the management units by and large, with certain exceptions, have to be local, and in this case the least practical political subdivision for management is the State or whatever in a State arrangement a State may make and this within Federal guidelines, working with Federal agencies, and using information generated from Federal laboratories.

Proceeding from that upward, then one comes to the conclusion that the information system that is necessary—and that is why I am calling a laboratory right now—also has to be reasonably local, reasonably responsive, reasonably available to the managers.

I think that out of the melange of laboratories that now exist, and these are academically supported laboratories, deriving quite a large part of their support from the Federal Government and State and local governments—for lesser amounts—or State laboratories or Federal laboratories, that the efforts should be to bring those together in an effective working relationship.

My chief fear is that by having unclear wording, such as I think exists in S. 307 at the present time, we will be encouraging the establishement of yet additional laboratories when in fact we have got more laboratory capability than we can support.

There are, for example, Federal laboratories which were built to my knowledge for from 20 to 40 people, and they have six or ten in them. Furthermore, and Dr. Hammond can speak more specifically to his own point on this, the State and academic programs are attempting now to move into this need, encouraged in fact by the sea grant program and IRRPOS and now RANN and other things.

I think my major concern right now is that section of S. 307 which refers to this national system is not clear enough, that is my major concern, and this against the background of having dealt with the Berman report which, as you recall, was issued a couple of years ago, and followed along certain lines that the Stratton Commission report recommended, and that was in fact the establishment of a system of national laboratories and of national coastal zone laboratories.

I think now that original concept is no longer necessary. There has been a lot of action in the interim. So, I think that what we have to do is clarify the wording.

Senator SPONG. Dr. Hammond, would you like to add anything to that?

Dr. HAMMOND. I think that makes fairly clear the same point I was making.

We in North Carolina looked at the research activities that have been going on for years within the university campuses, and we have a number of those, both publically supported and private universities. Duke University has had a basic research effort in oceanography and ocean engineering and ocean chemistry for years.

Our effort was to look at these research results and try to design a series of marine centers on the coast that would be directed toward the applied use of a lot of this information that has been essentially sitting on the shelf and yet has never been translated into practical problem-solving-type research; so that the people in the coastal areas could make use of this.

My point was to superimpose a system of Federal laboratories on this might well be wasteful. I think perhaps there are gaps within basic research that need to be filled and could best be filled by Federal laboratories. We just indicated that we felt caution should be exercised in approaching this.

It might well be there are existing activities at the State level which could be supplemented and strengthened rather than additional systems.

Senator SPONG. Thank you very, very much.

(Whereupon, at 3:45 p.m., the hearing was adjourned, subject to the call of the Chair.)

OCEAN WASTE DISPOSAL

WEDNESDAY, APRIL 28, 1971

U.S. SENATE,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON OCEANS AND ATMOSPHERE,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:10 a.m., in room 1318, New Senate Office Building, Hon. Daniel K. Inouye presiding.

Present: Senator Inouye.

OPENING STATEMENT BY SENATOR INOUYE

Senator INOUYE. The hearing will come to order.

The Subcommittee on Oceans and Atmosphere concludes its hearings on ocean dumping this morning. I am pleased that on this final day we have representatives of two interest groups vitally affected by this proposed legislation, the Manufacturing Chemists' Association and the American Association of Port Authorities. Normally, committee procedure would have representatives of Federal agencies testify on the first days of the hearings. Schedule conflicts prevented the Administrator of the Environmental Protection Agency from being with us until today, and perhaps that was fortunate. Many questions have arisen during our hearings and we hope that the additional time available for preparation will assist both Mr. Ruckelshaus and the committee in answering some of these questions.

Our record is still not too clear on the respective roles of the corps and the EPA under the administration's bill, S. 1238. We want to discuss today the particular problem areas that have led to the pending legislative proposals. We want to look into the respective roles of the States and other Federal agencies. And we want to discuss the overall objectives of ocean-dumping regulation, particularly in relation to our national water quality improvement programs.

I am pleased to welcome on behalf of the subcommittee the Honorable William D. Ruckelshaus, Administrator of the EPA; Mr. James H. Rook, representing the Manufacturing Chemists Association; and Mr. Edward Langlois, representing the American Association of Port Authorities. Two other gentlemen originally scheduled to appear today have been unable to attend because of the press of other business, and have been invited to submit written statements for the record. I might add that the record will remain open for at least another 2 weeks, and the subcommittee will welcome receipt of written statements for inclusion in the record.

I am pleased to welcome at this time once again, Mr. Ruckelshaus, the administrator of the Environmental Protection Agency, who will be our first witness.

STATEMENT OF HON. WILLIAM RUCKELSHAUS, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY; ACCOMPANIED BY DAVID DOMINICK, ACTING COMMISSIONER OF THE WATER QUALITY OFFICE

Mr. RUCKELSHAUS. Thank you, Mr. Chairman.

I have with me today to assist in the answering of any questions that you or the committee might have, Mr. David Dominick, who is the Acting Commissioner of the Water Quality Office of the EPA.

I am pleased to have the opportunity to meet with you today to discuss the administration's proposal for the control of ocean dumping, S. 1238, "The Marine Protection Act of 1971." This is my first appearance before this distinguished subcommittee as Administrator of the EPA, and we look forward to a very close and continuing association with you in your concern for the quality of the ocean and atmospheric environments.

S. 1238 has been introduced in recognition of the critical need for a national ocean dumping policy and is the product of an intensive and comprehensive study of the problems of ocean disposal. That study and the recommendations for a strong policy of preventive and remedial measures were reported to the Congress in the report on ocean dumping prepared by the Council on Environmental Quality. I understand that Dr. MacDonald of the Council has already discussed the study and its recommendations with you.

I believe we are all in agreement as to the need for a strong bill to control ocean dumping. We endeavored in the drafting of our proposal to translate the recommendations of the ocean dumping report into law. Our purpose here is to recommend to the committee and to the Congress the creation of the farthest reaching and strongest authority that law and technology will allow.

Members of this committee and other Members of Congress have sponsored bills which, in many cases, are similar to our own proposal. Other proposals take somewhat different approaches.

Mr. Chairman, we wish to work with you and the committee to develop the most effective legislation possible.

Our proposal, S. 1238, would vest regulatory authority over ocean dumping in the Administrator of EPA. As that Administrator, I propose to administer S. 1238, if it is enacted, in a way that will fully implement the recommendations of the Council on Environmental Quality as set forth in its ocean dumping report.

I would like to describe briefly the principal provisions of our bill and our thinking about it.

The purpose of S. 1238 is to regulate the dumping of all types of material in the oceans, estuaries, and the Great Lakes, and to prevent or strictly control the dumping into such waters of any material which could adversely affect human health or welfare or the marine environment. These objectives would be carried out by means of a permit system established and administered by EPA.

An important feature of the bill is that it would require a permit for two different kinds of activity. In the first place, persons desiring to transport materials from this country for dumping into ocean or coastal waters, anywhere, whether or not within our territorial jurisdiction, would be required to obtain a permit. This requirement is based on the authority of the United States to control the disposition of materials transported from U.S. territory. Second, a permit would be required for the dumping of materials—whether transported from this country or not—in waters covered by the bill which are within our territorial jurisdiction, including the 3-mile territorial sea, or in waters of the 9-mile contiguous zone beyond the territorial sea where the dumping may affect our territory or territorial sea. Both requirements would apply to foreign nationals and foreign governments, as well as to U.S. citizens and to all agencies and instrumentalities of Federal, State, and local government. Thus, the bill would utilize the regulatory authority of the United States to its fullest extent consistent with established principles of international law.

The bill would apply to any disposition of material with several exceptions, the most important of which is the disposition of effluents from outfall structures. The bill is aimed at intermittent dumping as opposed to continuous discharges from fixed sources. This is an important distinction. Continuous discharges from outfall structures into territorial waters covered by the act are already subject to regulation under the Federal Water Pollution Control Act. Amendments to that act proposed by the administration would extend its coverage to outfalls in the contiguous zone which discharge matter originating within U.S. territory.

The Administrator, in issuing permits to dump materials or to transport them for dumping, would be required to determine that such activity will not unreasonably degrade or endanger human health, welfare or amenities, or the marine environment, ecological systems, or economic potentialities. He would be required to establish criteria for evaluating permit applications to include:

The likely present and future impact of the dumping on human health and welfare and the marine environment.

The possible persistence or permanence of the effects of the dumping.

The volume and concentration of the materials involved.

The proposed location for dumping.

Alternative locations and methods of disposal, including land-based alternatives.

The probable impact on the public interest of either issuing or denying a permit or of requiring alternative locations or methods of disposal.

These criteria would be refined as additional knowledge is gained about the environmental impact of ocean dumping and about the acceptability and feasibility of various land-based alternatives.

The Administrator would be permitted to impose restrictions in permits relating to the type and amount of materials to be dumped, the place of dumping, and the period of validity of the permit. He would be authorized to deny the issuance of a permit where he finds

that the materials in questions cannot be dumped consistently with the criteria established for the issuance of permits, as well as to alter or revoke permits upon such a finding.

The Administrator would be authorized to require applicants for permits to provide such information as he considers necessary to evaluate the application. Information required by the Administrator might include detailed plans for conversion to land-based disposal. The Administrator would also be authorized to prescribe reporting requirements for actions taken pursuant to permits.

Any person who violates the act or the provisions of any regulations or permit issued thereunder would be liable to a civil penalty of up to $50,000 per day of violation, to be assessed by the Administrator. In addition, knowing or willful violations would invite criminal fines of up to $50,000 per day, imprisonment of up to 1 year, or both. The Attorney General would be authorized to bring actions for equitable relief to redress any such violations, and the Administrator would be authorized to revoke or suspend a violator's permit. The bill would require the Coast Guard to conduct surveillance and other enforcement activity.

No permit would be suspended or revoked, or a civil penalty assessed, without notice and opportunity for a hearing.

An important aspect of the bill is the clear definition of its relationship with other Federal laws related to ocean dumping and water pollution control. As I have already indicated, the bill would be applicable to internal navigable waters, except for estuarine areas and the Great Lakes, and would be inapplicable to effluents discharged from outfall structures. Overlap with the Federal Water Pollution Control Act and the Refuse Act of 1899, which between them deal with discharges of all types into navigable waters, is avoided by specific provisions which would prevent duplication or conflict with the provisions of these other laws.

The Refuse Act requires a permit issued by the Army Corps of Engineers for the discharge of wastes other than municipal sewage into navigable waters. Duplicate permit requirements for the disposal of wastes into waters covered by both acts would be avoided, since S. 1238 would expressly supersede the Refuse Act in areas in which both apply.

With respect to the Federal Water Pollution Control Act, under which water quality standards are established and enforced, S. 1328 provides that no permit may be issued for dumping of material which would violate such standards. Under another administration proposal relating to standards and enforcement (S. 1014), the Administrator of EPA would be given authority to establish water quality standards for the contiguous zone, and also for ocean waters beyond the contiguous zone with respect to the discharge of matter originating within U.S. territory. Such standards, as well as the standards already established by joint Federal-State action for coastal waters out to the 3-mile limit, will be of great assistance in implementing S. 1238 should it be enacted.

Except as I have just indicated with respect to the Refuse Act, all existing authorities and actions taken under the Rivers and Harbors Act of 1899 would be preserved. The authority of the Atomic Energy

Commission to regulate the disposal of radioactive materials would not be affected.

In implementing S. 1238, EPA would rely on assistance provided by other Federal agencies. In establishing or revising criteria for the issuance of permits, the Administrator would consult with the Secretaries of Commerce, of the Interior, State, Defense, Agriculture, Transportation, and Health, Education, and Welfare, and with the Atomic Energy Commission. He would consult with the Secretary of the Army where such criteria may affect the civil works functions of the Department of the Army. He would consult with interested Federal and State agencies in reviewing individual permit applications, and would be precluded from issuing a permit where the Secretary of the Army determines that it would cause an unreasonable impairment of navigation.

In administering the act, EPA would be guided by the ultimate objective of terminating all ocean dumping which is damaging to the marine environment.

We would adopt a precautionary, preventive approach, aimed at terminating all dumping not clearly demonstrated to be safe. Ocean dumping of materials clearly identified as harmful would be stopped as soon as possible. Where existing information on the effects of ocean dumping of particular materials is inconclusive, yet the best indications are that such materials may create adverse conditions when dumped, the dumping of these materials would be phased out. If further information conclusively proves that such dumping does not damage the environment, it could be allowed to continue under regulation.

The dumping of some materials, such as chemical warfare materials and toxic industrial wastes, would be stopped immediately. The dumping of other materials, such as sewage sludge and solid waste, would be discontinued as soon as possible, and no new sources of such dumping would be allowed. It might prove unnecessary to discontinue the dumping of some inert, nontoxic materials, such as unpolluted dredge spoil and construction and demolition debris, although the dumping of such materials would be strictly regulated to prevent damage to estuarine and coastal areas.

As one example of how S. 1238 might be implemented, consider the case of ocean disposal of sewage sludge. Some communities have a substantial financial investment in facilities and equipment for the barging of digested sewage sludge to sea. To impose an immediate ban on ocean dumping by these communities would be uneconomic and possibly self-defeating where acceptable land-based disposal methods are not immediately available. In such cases, EPA would temporarily allow the dumping to be continued but would require it to be phased out entirely within a reasonable period of time. No new sources of ocean disposal of sewage sludge would be permitted. This would mean that communities already dumping at sea would not be allowed to increase the volume of such dumping over current levels or what existing barging facilities will accommodate. In the case of municipalities which do not currently dump sewage sludge at sea, they would not be allowed to start.

S. 1238 would not place an absolute ban on the dumping of specified classes of materials, nor would it ban the dumping of materials in specified waters within the coverage of the bill. Instead, the Administrator would be authorized, based on criteria developed by him in consultation with other agencies, to permit, limit, or ban the dumping of particular materials, in all or portions of the waters covered by the bill, depending on all the circumstances of a particular case.

It would not be feasible to ban all ocean dumping at once. In some instances, waste disposal methods which are less damaging to the environment than ocean dumping are not immediately available. Research is needed on the recycling of wastes and the development of other alternatives to ocean dumping. Conversion to land-based disposal methods will require a substantial reallocation of resources by municipalities and others presently disposing of wastes at sea.

EPA is making every effort to develop solutions to the often very complex problems of recycling and alternate disposal of wastes which otherwise would find their way into inland and ocean waters.

Some of the projects now underway include an examination and demonstration of the recycling of solid wastes, an examination of the feasibility of mixing municipal sewage sludge and solid waste into a composting material, the location of national land disposal sites for the disposition of hazardous and toxic industrial wastes, the incineration of solid waste as a fuel for power production, and the use of sewage sludge for soil enrichment or as landfill—especially in strip-mined areas.

We are also making an intensive effort through our grant and contract authority to develop and demonstrate practical industrial waste water recycling and byproduct recovery as well as industrial methods which minimize the production of pollutants.

In addition to the technological problems, we face an array of social, legal, and economic problems when we seek answers to the puzzle of waste disposal sites and waste transportation.

A great deal of research is necessary.

With regard to marine research, S. 307, presently before this subcommittee, would direct the Secretary of Commerce to initiate a comprehensive research and development program on the effects of man's activities on the ocean environment, the effects of ocean contaminants upon ocean life and marine ecology, and the potential effects of waste disposal or pollution on the physical and chemical properties of ocean waters. The bill would direct the Secretary to initiate a program for the enhancement of the marine environment, to include studies of environmental modifications to protect coastal and offshore physical structures, improve beaches, increase biological productivity, and the like, as well as testing to demonstrate the feasibility and consequences of proposed environmental modification.

The research program authorized by S. 307, insofar as it relates specifically to pollution would largely duplicate research authorities and programs already being carried out by EPA under the Federal Water Pollution Control Act. Pursuant to the broad research authority contained in that act, EPA is engaged in research to determine the effects of pollutants on fresh water, estuarine, and marine organisms as well as on aquatic ecosystems generally. EPA's objec-

tive is to develop water quality criteria for all legitimate water uses including the water quality needs of aquatic life. EPA's existing research and monitoring authorities would be duplicated by the provisions of S. 307.

While EPA recognizes the need for much more research and does not claim to have exclusive jurisdiction over oceanic environmental research, EPA does have a continuing and increasing need for research to carry out its responsibility in this area. The research activities of EPA and the Department of Commerce should be coordinated to insure that duplication of effort is avoided and that data and information are freely exchanged. The results of research carried out by Commerce would be of great value to EPA in carrying out its regulatory and enforcement activities under ocean dumping legislation proposed by the administration.

Consultations between the Department of Commerce and EPA are underway to insure (1) that the marine environmental research programs of the two agencies are coordinated, and (2) that in carrying out its own program the Department of Commerce will take into account the research needs of EPA as the Agency charged with regulatory and enforcement responsibilities for ocean dumping.

S. 307 would also provide that no permit to dredge materials or to dispose of waste materials which deteriorate or cause adverse changes in the oceans may be issued by any officer or employee of the United States without having first consulted with and received findings from the Secretary of Commerce concerning the impact of the proposed activity on the ocean environment and on human health and welfare.

EPA does not favor this provision. The Administrator of EPA will be well qualified to make these same determinations, and would be required to do so in administering S. 1238, both in establishing criteria for ocean dumping, which he would do in consultation with interested agencies including the Department of Commerce, and in evaluating individual permit applications.

S. 1286, also pending before this subcommittee, would place an immediate ban on the loading of materials on vessels in U.S. ports for dumping in ocean waters pending the publication of regulations by the Administrator of EPA to control such dumping.

This approach has a certain appeal when you look at it out of its full context. But the problem of ocean dumping must be examined in the broad context of the staggering problems of waste disposal experienced by many communities. The provision for an immediate ban simply does not take into account the problems which communities and others presently dumping materials at sea would face in attempting to convert immediately to alternative disposal methods. We believe the administration bill takes account of such problems.

In addition, S. 1286 wold not apply to dumping of material in the U.S. territorial sea or contiguous zone which is not loaded on vessels in U.S. ports. This is a loophole which the administration bill has closed tightly. Although most of the material dumped in ocean waters adjacent to this country is transported from U.S. ports, the United States has authority to regulate the dumping of materials originating elsewhere into waters within its control, and that is what we propose to do in S. 1238.

S. 1082, also pending before this subcommittee, would likewise be limited in its application to loading of vessels in U.S. ports, but would altogether prohibit such loading for dumping after a period of 5 years. We seriously question the need for or benefit of this prohibition. EPA favors the phasing out of all dumping which in harmful to the ocean environment, but in some cases it may take more than 5 years to accomplish this. Furthermore, there is no apparent justification for requiring that ocean dumping be discontinued altogether in cases where it is determined not to be detrimental.

Several of these bills would prohibit the issuance of permits for dumping of any material in the U.S. territorial sea, or in waters over our Continental Shelf. EPA has reservations about such provisions. There is no necessary correlation between the environmental impact of the dumping of particular materials, and the location of the dumping in terms of whether it is carried out within or beyond the territorial sea. More relevant locational factors would be the presence or absence of fishery resources, the state of tides and currents, the depth of the water, and the like. A flat ban on dumping within the territorial sea or over the Continental Shelf would mean, in some cases, more onerous transport requirements with no corresponding benefit in terms of reduced environmental impact. EPA would not allow dumping of most materials within the 3-mile limit and would prohibit all dumping in areas of critical environmental concern. But some carefully planned and controlled near-shore disposal of waste materials may actually be beneficial, for example, the sinking of car bodies or other similar material to serve as shelters for fish.

Mr. Chairman, I wish to emphasize again our intention to cooperate with the committee to the fullest extent.

We will be pleased to provide you with more detailed information on any of the matters I have dealt with here today, and to make such information a part of the record of these hearings.

We will endeavor to answer now any questions you may have.

Thank you.

Senator INOUYE. Thank you very much, Mr. Ruckelshaus.

In your testimony there is reference to the dumping of chemical warfare materials. This is the only item which the administration has indicated would be stopped immediately. I note that on all other potential pollutants provisions are made to stop within a reasonable time or when other alternative areas have been discovered, but in the case of chemical warfare materials the administration indicates that it would be stopped immediately. I gather from this that the administration has concluded that the dumping of nerve gases and such would be extremely dangerous to mankind and the ocean, and if that is the case I am just curious as to why the Government insisted upon dumping nerve gas less than a year ago.

Mr. RUCKELSHAUS. Mr. Chairman, it would be difficult for me to answer that question as I was not in my present position and was not imminently involved in that decision. The EPA had not come into existence until December of last year. We do include, in addition to chemical warfare materials, toxic industrial wastes as those that we would ask for an immediate halt to. I think this bill represents an increase in the awareness not only on the part of the administration but on the part of many in the country that we have got to be very careful

about the disposal of toxic materials or chemical warfare agents of any kind in the ocean or for that matter on the land—that we have got to take into account the environmental impact of the disposal of these toxic substances wherever we think about disposing of them.

To put them in the ocean involves the problem of attempting to seal them off long enough so that no matter when they were sealed if the seal was eventually broken they would not be toxic. We do not believe at this point we have any reliable method of doing that.

Senator INOUYE. In other words, you are stating there is a possibility at some later date the container in which the nerve gas is stored may break and contaminate the ocean?

Mr. RUCKELSHAUS. I think there is always that possibility, Mr. Chairman, and that is one of the things obviously that concerns us about the dumping of toxic materials in the sea, no matter how they are sealed, because of the difficulty of insuring that these seals will never be broken.

Senator INOUYE. In your reference to chemical warfare materials do you also include biological warfare materials?

Mr. RUCKELSHAUS. Well, I would think, Mr. Chairman, any time that we had a substance, regardless of its nature, that was toxic and represented a danger either to human life or to the marine life that it would be included in the same area of concern.

Senator INOUYE. Mr. Ruckelshaus, at the present time the corps, as you stated, has authority to issue permits on the dumping within navigable waters. Why would you object to granting the corps authority to supervise the dumping of material in oceans, just extending this authority from navigable waters to ocean waters?

Mr. RUCKELSHAUS. Well, there are two kinds of permits that the corps is concerned with. One is the navigation or so-called dredge and fill permits that have to do with areas in which they are particularly concerned. The second are the permits under the Refuse Act of 1899, which is the program we are presently attempting to implement starting the first of July of this year. That program and the permits that would be issued under here intimately involve questions of water quality. Since the Federal Water Quality Administration was transferred from the Interior Department into the EPA and our primary responsibility is the protection of the environment, whether it is water or air or whatever, and the purpose of this bill is to protect the oceans and the Great Lakes and estuarine areas from the uncontrolled dumping as we now have it of all kinds of substances into those areas, it seems more logical to place the permit granting authority in the agency which already has the responsibility for the protection of not only the ocean but the Great Lakes and the estuarine areas.

Senator INOUYE. Yet, in your statement you indicate that another agency, the Coast Guard, will have the responsibility of enforcing or patrolling the oceans to see that these provisions are carried out. What would you say to the granting of authority to the Coast Guard to carryout this job of issuing permits?

Mr. RUCKELSHAUS. My response would be the same as my response to the question whether it would be logical to lodge the authority in the corps. The Coast Guard has no particular expertise in the area of water quality, and the Coast Guard would have enforcement responsibilities because they have the ships and the ability to monitor

and exercise surveillance over dumping at sea when that is done without a permit. This would not mean that we would not also have enforcement responsibilities if it came to our attention that violations of this act, if it passes, were taking place, but the Coast Guard's activities in terms of enforcement are primarily those of monitoring and surveillance which follows directly in line with their present responsibilities relating to our coastal zones.

Senator INOUYE. Throughout these hearings witnesses have expressed concern over the proliferation of agencies relating to the matter of pollution and pollution control, and these witnesses have suggested that this proliferation would add only confusion to the present confusion. For example, if a port authority wishes to apply for a permit to dredge for port and harbor improvements, where should this authority go, to the State, the corps, or to your agency, or to all three?

Mr. RUCKELSHAUS. Under the provisions of the act, Mr. Chairman, there is a section which provides that one permit, one Federal permit at any rate, will be sufficient for any single individual who desires to dump material at sea, whether it is dregding material or something else, so that the cooperation between the corps and the EPA would be necessary to insure that there was a one-stop request and one-stop administrative procedure for any individual or corporation or port authority which desired to receive the permission to dump materials at sea.

As far as a State imposing on top of the Federal responsibility an additional regulation, this would not be any different than it is now in terms of the State's responsibility out to the edge of the territorial sea.

Senator INOUYE. Precisely what authority would be taken away from the corps if S. 1238 is enacted as requested by the administration?

Mr. RUCKELSHAUS. That same question came up in the House committee in which we have already testified, and it is a rather detailed answer. We have provided to the House, specifically, the authorities that are involved in the legislation, in the proposed legislation that would be taken from the corps and other agencies and lodged in the EPA by this act. It might be easier just to submit that to this committee so it would be perfectly clear just exactly what authorities we are talking about.

Senator INOUYE. If you will submit that it will be included in the record at this point.

(The following information was subsequently received for the record:)

Section 7 of S. 1238 deals with the relationship of this legislation to other laws. Generally, except as provided in subsections 7(b) and 7(c), it provides that after the Act's effective date, existing licenses, permits, or authorizations would be terminated to the extent they authorize activity covered by this proposal, and that further licenses, permits, or authorizations of a similar nature could not be issued.

Subsection 7(b) maintains present responsibility and authority contained in the Atomic Energy Act of 1954, and provides that the provisions of Sections 4 and 7(a) of the bill do not apply to actions taken under that Act. However, the AEC must consult with the Administrator before issuing a permit to conduct any activ-

ity otherwise regulated by this proposal. Moreover, the AEC must comply with the radioactive-material standards set by the Administrator, and the Administrator is directed to consider the policy expressed in subsection 2(b) of this proposal along with the factors stated in subsections 5(a)(1) and 5(a)(2) in setting such standards for the waters covered by this proposal.

Subsection 7(c) relates to authorities contained in the Rivers and Harbors Act of 1899, respecting dredging, filling, harbor works, and maintenance of navigability. The powers are exercised for the most part by the Secretary of the Army and the Chief of Engineers. Except for the limited supersession found in subsection 11(e), the Rivers and Harbors Act authorities are not negated or abrogated, nor are existing licenses or permits issued under the Act terminated. Rather, in situations where this bill and the Act of 1899 both would apply to dumping of material in connection with a dredge, fill or other permit issued by the Corps of Engineers, issuance of the permit requires a certification by the Administrator of EPA that the activity is in conformity with this proposal and any regulations issued under it. The Administrator will not issue separate permits in such cases.

The Corps does considerable dredging of its own as a part of navigation projects which it itself conducts. To the extent that these operations involve oceanic or estuarine disposal of the dredge spoils, the Corps would be required by S. 1238 to go directly to EPA for a permit to make the disposal.

Subsection 11(e)'s limited supersession of the Rivers and Harbors Act pertains only to Section 13 (the "Refuse Act"). Nonetheless, after this Act becomes effective, the Department of the Army's permit program under the Refuse Act, which is administered in close cooperation with EPA on all water quality matters, will continue to regulate the disposition of any effluent covered by the Refuse Act from any outfall structure regardless of the waters into which this disposition occurs. In addition, the Refuse Act will continue to apply to all depositing of material into these navigable waters of the United States or their tributaries which are not covered by subsection 4(b) of this Act.

The objective of the limited supersession is to remove a double permit requirement in the area of overlap between S. 1238 and the Refuse Act. To achieve this objective, subsection 11(e) supersedes the Refuse Act only insofar as it applies to dumping as defined in subsection 3(f), of material in the waters covered by subsection 4(b).

One further consideration deserves mention. Simple supersession of part of the Refuse Act's coverage would leave an accompanying gap in protection of navigation. Accordingly, subsection 6(d) provides for consultation by the Administrator of EPA with the Secretary of the Army in cases where the Administrator finds that proposed activity regulated by the ocean dumping system may affect navigation or create an artificial island on the Outer Continental Shelf.

Besides the provision relating to Refuse Act, Section 11 contains a number of other repeals or supersessions. Subsections 11(a) and 11(b) repeal the Supervisory Harbors Act of 1888, as amended (33 U.S.C. §§ 441–451b), and the provision of the Rivers and Harbors Act of 1899 (33 U.S.C. § 418) which preserved the Supervisory Harbors Act from supersession by the 1899 Act. The Supervisory Harbors Act provides a special authority to control transit in and from the harbors of New York, Baltimore, and Hampton Roads, Virginia. This authority has been used to regulate ocean dumping. The proposed Act would replace that authority. Subsection (c) repeals Section 2 of the Act of August 5, 1886 (33 U.S. § 407a), which pertains to deposits of debris from mines and stamp works. These deposits are covered by this bill or the Refuse Act. Lastly Section 4 of the Rivers and Harbors Act of 1905 (33 U.S.C. § 419), which has been used to buttress the Corps of Engineers' authority to regulate ocean dumping, is superseded, insofar as it authorizes action that would be regulated by this proposal.

Senator INOUYE. During one of our hearings a witness in behalf of the several States noted that no provisions are made for State participation in the administration's bill. Do you have any comment to make with respect to this?

Mr. RUCKELSHAUS. Mr. Chairman, the States and the Federal Government have joint responsibility throughout the pollution laws of this country, both in air and in water. For instance, in any area in which we are involved in interstate streams, the State and Federal Government set joint Federal-State standards. We have intimate relationships with the States involving enforcement procedures under the Water Pollution Control Act as they now exist.

In terms of the granting of a permit for dumping or the denying of a permit, obviously we would have to cooperate very closely with the States and with the other agencies of the Federal Government in determining what the guidelines would be, what the criteria would be for granting or denying a permit and in understanding the interest of a particular State in administering this program.

To bring the States into the actual administration itself, such as would be suggested to the Commerce Department, for instance, under S. 307, it seems to me would unduly complicate the issuance of the permit itself, and make, for instance, in your previous question, a port authority, if they desired to apply for a permit, have to go through incredible delays while the agency which ultimately issues the permit got clearance from all the other agencies, both State and Federal, to issue that permit.

It seems to me more logical to mandate this kind of cooperation between levels of government, but to finally locate the responsibility for the issuance of the permit in one administrative agency. What the administration is suggesting in this bill is that responsibility be lodged in EPA.

Senator INOUYE. Would the States have any role in establishing criteria for dumping? Would they participate in discussions with you?

Mr. RUCKELSHAUS. Yes, I think they obviously would. We would have to in adopting guidelines and criteria, criteria in particular as our mandate under the bill. We would have to cooperate closely with the coastal zone States and the States surrounding the Great Lakes in order to get their ideas as to how we might best implement this act to achieve its purposes.

Senator INOUYE. What resources are presently available to your agency to administer S. 1238, if enacted?

Mr. RUCKELSHAUS. There would be a need, Mr. Chairman, for additional resources to implement the act. We have provided again to the House committee at their request a detailed budget analysis of just what we believe it would cost in the first six years of the bill's implementation, both in terms of money and manpower.

Senator INOUYE. Will you submit that for the record?

Mr. RUCKELSHAUS. Yes, we will.

Senator INOUYE. Without objection, so ordered.

(The following information was subsequently received for the record:)

WATER QUALITY—PROJECT PROGRAM, MARINE PROTECTION ACT OF 1971

[In millions of dollars]

	Fiscal year—					
	1972	1973	1974	1975	1976	1977
Budget authority:						
Permit program	0.5	0.5	0.5	0.3	0.2	0.2
Disposal research:						
In-house	.1	.4	.3	.2	.2	.2
Contracts	1.0	1.1	.7	.5	.5	.5
Subtotal	1.1	1.5	1.0	.7	.7	.7
Technical studies and monitoring:						
In-house	.1	.4	.6	.6	.6	.6
Contracts	.3	1.6	2.4	2.4	2.4	2.4
Subtotal	.4	2.0	3.0	3.0	3.0	3.0
Total	2.0	4.0	4.5	4.0	3.9	3.9
Obligations:						
Permit program	.5	.5	.5	.3	.2	.2
Disposal research:						
In-house	.1	.4	.3	.2	.2	.2
Contracts	1.0	1.1	.7	.5	.5	.5
Subtotal	1.1	1.5	1.0	.7	.7	.7
Technical studies and monitoring:						
In-house	.1	.4	.6	.6	.6	.6
Contracts	.3	1.6	2.4	2.4	2.4	2.4
Subtotal	.4	2.0	3.0	3.0	3.0	3.0
Total	2.0	4.0	4.5	4.0	3.9	3.9
Outlays:						
Permit program	.25	.40	.45	.3	.2	.2
Disposal research:						
In-house	.05	.32	.27	.2	.2	.2
Contracts	.65	.88	.43	.4	.7	.6
Subtotal	.7	1.20	.70	.6	.9	.8
Technical studies and monitoring:						
In-house	.05	.32	.55	.6	.6	.6
Contracts	.2	1.28	1.6	2.2	2.7	2.6
Subtotal	.25	1.60	2.15	2.8	3.3	3.2
Total	1.2	3.2	3.3	3.7	4.4	4.2
Positions	70	100	110	90	79	79

Cost of Implementing the Marine Protection Act of 1971

Introduction

In a message to the Congress on April 15, 1970, the President directed the Council on Environmental Quality to work with other Federal Agencies and with State and local governments on a comprehensive study of ocean disposal that would result in research, legislative, and administrative recommendations. Their report was issued in October 1970 and a legislative proposal has been prepared by the Administration for submission to the Congress.

If the proposal is adopted, the transportation and dumping of all materials in the oceans, estuaries, and the Great Lakes will be regulated by the issuance of permits. The Administrator would be authorized to establish criteria which would consider the possible detrimental effects of ocean disposal and the impact of the use of alternative locations and methods; to ban ocean dumping of specific materials and to designate safe sites; and to issue permits where the applicant presents information indicating that proposed transportation and/or dumping will not unreasonably degrade or unreasonably endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities.

Implementation of this legislation will require the development of criteria and regulations for the granting of permits. This development must recognize both the characteristics of the materials to be dumped and their potential impact on receiving waters. To accomplish this will require not only an augmented research effort and understanding on the effects of different waste materials on the marine environment but also a series of baseline technical investigations of existing water quality conditions in present and potential dumping areas.

As a continuing effort it will be necessary to continuiusly evaluate and up-date the impact of ocean dumping on the marine environment. While the act specifically assigns surveillance and enforcement functions to the Coast Guard, it will be necessary for EPA to work closely with the Coast Guard in carrying out those functions and in modifying permit requirements and regulations as environmental requirements or conditions change.

EPA already has available staff expertise on marine pollution problems and has laboratory capabilities of running a wide variety of laboratory tests. It must be recognized, however, that EPA does not presently have any ocean-going ship capabilities; it is therefore anticipated that EPA will make full use of the Coast Guard, National Ocean Survey, and Corps of Engineers' ocean-going equipment and personnel to carry out environmental investigations of marine pollution problems. It may also be anticipated that the services of private contractors will be utilized for this purpose under the supervision of EPA personnel. (A contract for establishing the organizational framework of an overall coastal monitoring network, which will include monitoring of ocean dumping zones, will be negotiated during FY 1971. The report from this study should be available about the middle of FY 1972.)

It should also be recognized that extension of water quality standards to the contiguous zone will require the same type of technical investigation and monitoring as will be required by the Marine Protection Act specifically for ocean dumping problems. The program outlined here is directed specifically toward implementation of the Marine Protection Act; however, it should be recognized as part of an overall attack on coastal and marine pollution problems.

Staffing

A supervisory headquarters staff will be required to initiate the program, to supervise its operations, coordinate efforts within EPA and all other Federal and State agencies concerned with the program. The staff would control final granting of permits. After development of criteria, regulations, and guidelines for the granting of permits had been developed, some of the authorities for the granting of permits will be delegated to the regions.

Headquarters staff will also be required to coordinate research efforts on a continuing basis and to assist in the continuing review and up-dating of criteria and regulations. It is anticipated that much of the research necessary will be carried out by grants or contracts or integrated into the surveillance and monitoring programs and baseline technical investigations of environmental conditions.

Development of a broadly based technical staff to supervise the technical investigations necessary to provide a viable program with the ultimate goal of stopping ocean dumping completely is a necessary part of the overall research and monitoring effort. A broadly based headquarters technical staff is needed to work with the Coast Guard, NOAA, Corps of Engineers, and other Federal and State agencies whose facilities will be used to carry out monitoring and surveillance functions and to make full use of the facilities of other agencies in carrying out ocean disposal research programs. It is expected that each coastal region will develop its own specialized technical expertise to deal with the overall problem as well as problems unique to the region.

Ocean disposal permit program

FY 1972:
Positions: 48
Budget: $500,000

The law as proposed will become effective 6 months after passage. Within this time interim criteria and regulations for the granting of ocean disposal permits must be established and guidelines for permit evaluation must be developed and promulgated.

The headquarters staff will convene an advisory committee and set up a task force of in-house personnel to develop the necessary criteria, regulations, and

guidelines. The work of this group should be closely coordinated with the setting of water quality standards for the contiguous zone if such laws are enacted. An approximate $100,000 is required for the operation of this advisory committee, and $100,000 for the salaries of eight headquarters personnel for an average of 6 months during FY 1972. A total of 40 personnel will be placed in the eight EPA coastal regions: Boston, New York, Philadelphia, Atlanta, Dallas, San Francisco, Seattle, and Chicago. The tasks of these personnel will be to: coordinate input from all EPA offices; develop working relationships with all Federal and State agencies concerned; receive and review applications for permits; issue permits where applications fall within established criteria or send to the headquarters control group those applications having unusual problems that cannot be resolved locally; coordinate permit information with the enforcement and surveillance agency (Coast Guard); establish a time schedule with other existing or proposed regulations; coordinate and select suitable interim disposal sites with NOAA and the fisheries agencies; and coordinate with State and Federal agencies selection of alternative methods of disposal. Approximately $300,000 will be required for salaries of regional personnel during FY 1972.

FY 1973:
Positions: 48
Budget: $500,000

During this fiscal year, the permit regulations and guidelines will be re-evaluated in terms of actual practice and a stronger set of criteria will be developed to discourage ocean disposal except of the most innocuous materials. It is anticipated that during this fiscal year, the initial results of research and technical studies will become available and consideration can be given to the elimination of some ocean disposal areas and relocation of others.

FY 1974:
Positions: 48
Budget: $500,000

During this fiscal year, a solid environmental data base on the impact of ocean dumping on the environment should begin being available and the thrust of the ocean disposal permit program will be toward the elimination of ocean disposal where possible and the relocation of dumping grounds to areas of small ecological significance.

FY 1975:
Positions: 35
Budget: $300,000

By fiscal year 1975, research and technological development should have advanced to the point where ocean dumping as a disposal technique can begin to be phased out. The reduced staff allocation to this part of the program during this year assumes this condition.

FY 1976 and 1977:
Positions: 24
Budget: $200,000

By this time, ocean disposal should be eliminated except for demonstratively innocuous materials and the criteria and guidelines should be developed to the point where only the most routine permit granting efforts are required. It is expected that a regional staff of twenty people will be maintained in this part of the program with a supervisory staff of four in headquarters.

Ocean disposal research

FY 1972:
Positions: 11
Total Budget: $1,100,000
Contracts: $1,000,000

During this fiscal year, a major effort will be initiated to evaluate the impact of ocean disposal on the marine environment and alternative methods of disposal of material presently being dumped. A combination of 11 new personnel and $100,000 for their salaries during fiscal year 1972 and grants, contracts, and interagency agreements totaling $1,000,000 in fiscal year 1972 will be required. Much of the work will be integrated into technical studies, monitoring, and baseline studies for surveillance; the bulk of this work will be done in cooperation with the Coast Guard, NOAA, the Corps of Engineers, and various

fisheries agencies. Specific research projects to be initiated during this fiscal year are:

1. Alternative methods of disposal $400,000
2. Environmental impact studies 300,000
3. Beneficial use of wastes in the marine environment 300,000

FY 1973:
Positions: 22
Total Budget: $1,500,000
Contracts: $1,100,000

During this fiscal year, $1,100,000 wil lbe used in contracts, grants, and reimbursable agreements for ocean disposal research. This money will be spent between developing technical and alternative methods of disposal to eliminate ocean dumping and toward determining environmental impacts of continuing ocean disposal in the past. Research activities during this fiscal year will begin being channeled into the beneficial uses of wastes in enhancing the marine environment. Some funds will also be allocated toward the solution of ocean disposal problems of particular concern in certain regions and an increase of regional staff is indicated to support this action.

FY 1974:
Positions: 22
Total Budget: $1,000,000
Contracts: $700,000

This fiscal year research efforts specifically directed toward ocean dumping should decrease as problems are solved It is not anticipated that additional efforts in new directions will be initiated, but that funds will be directed toward the more difficult problems as found during the preceeding two years

FY 1975, 1976, and 1977:
Positions: 15
Total Budget: $700,000
Contracts: $500,000

During these years, a continuing research effort will be maintained directed toward eliminating the environmental impact of past dumping and toward the solution of specific regional problems.

Technical studies and monitoring

FY 1972:
Positions: 11
Total Budget: $400,000
Contracts: $300,000

Contractual or reimbursable agreements will be negotiated with Federal agencies, such as the Coast Guard, or with private contractors for carrying out studies of specific dumping areas as an interim guide for the granting of permits. In carrying out such studies, it is anticipated that EPA personnel will be very closely associated with the survey efforts, either as on-board observers, as project officers or both EPA laboratories will be required to provide some laboratory support, particularly in the more difficult types of determination. Therefore, studies of the dumping grounds of the New York Bight and the New Jersey coast will be in the first order of priority.

During this year, the mechanism needed for continued surveillance of ocean disposal sites and the continued laboratory support of surveillance operations will be developed. The ocean disposal surveillance program will be integrated into the overall EPA coastal and ocean monitoring network.

FY 1973:
Position: 30
Total Budget: $2,000,000
Contracts: $1,600,000

During this fiscal year, and intensive series of studies of ocean dumping grounds will be carried out, with particular emphasis being given to the development of disposal sites with small ecological significance. Part of the work carried on will be of a research nature and will absorb funds from the research part of the program. Much of the contract money will go for vessel support and laboratory facilities. Sixteen personnel will be distributed among the regions and will provide technical expertise on specific regional problems. It is antici-

pated that these personnel will participate in surveys and will assist the Coast Guard in its surveillance activities.

FY 1974:
Positions: 40
Total Budget: $3,000,000
Contracts: $2,400,000

By FY 1974, the Coast Guard should be maintaining a full scale surveillance of all dumping activities with close support from EPA personnel and laboratories. Additional personnel will be needed in the regions to deal with specific local problems.

FY 1975:
Positions: 40
Total Budget: $3,000,000
Contracts: $2,400,000

During this fiscal year, a major effort will be made on the overall impact of ocean dumping on the coastal and marine environment The bulk of the contract money will go to reimbursable agreements or contracts or ship support to assist in these activities. By the end of this fiscal year, all the important areas of the coastal environment subject to dumping impact will have been evaluated in terms of their ecological significance and usability for continued ocean disposal.

FY 1976 and 1977:
Positions: 40
Total Budget: $3,000,000
Contracts: $2,400,000

By this time, a continuing program of surveillance can be carried out by contract or reimbursable agreements with the major EPA effort going into Laboratory support and studies of particular local or regional programs. The personnel and budget indicated are those which it now appears necessary to commit to have a sustained surveillance program through the Coast Guard to meet EPA objectives. It should be noted, however, that this surveillance program and the studies associated with ocean disposal will probably be intergrated into an overall coastal and oceanic monitoring network and that the personnel and budget indicated specifically for the ocean dumping programs will also continue toward this overall effort.

COST OF IMPLEMENTING THE MARINE PROTECTION ACT

[In millions of dollars]

	1971	1972	1973	1974	1975	1976	1977
Budget authority	0	2.0	4.0	4.5	4.0	3.9	3.9
Obligations	0	2.0	4.0	4.5	4.0	3.9	3.9
Outlays	0	1.2	3.2	3.3	3.7	4.4	4.2
Man-years	0	70	100	110	100	79	79

Senator INOUYE. Can you give the committee some idea as to how large the budgetary request will be?

Mr. RUCKELSHAUS. The request as best we can determine it for fiscal year 1972 would be $500,000. This would remain constant in fiscal 1973 and 1974 and then start to diminish in fiscal 1975, 1976, and 1977 to $300,000 and $200,000 in those 2 years for a total of the 6 years involved of $3.9 million.

Senator INOUYE. Would your agency delegate some of its duties to other agencies?

Mr. RUCKELSHAUS. Mr. Chairman, I have used just one figure here. Let me amend that figure. It would start at $2 million in fiscal year 1972, go to $4 million in 1973, $4.5 million in 1974, and then start to diminish down to $3.9 million in fiscal year 1977.

Senator INOUYE. If funds are not available and if S. 1238 is enacted, what sort of responsibilities or authorities would you delegate to other agencies?

Mr. RUCKELSHAUS. Well, obviously under the act we are given some authority to make delegations. If we did not have the resources to carry out the functions of the act itself we would make every effort to delegate those authorities. I would hope, however, that we would not be given the responsibility to implement this act without being given the resources to carry out those responsibilities. That might well put us in a very difficult position.

Senator INOUYE. Do you in any way anticipate delegating the permit issuing authority to the Coast Guard, using your Agency-established criteria?

Mr. RUCKELSHAUS. We have no present intention of doing that.

Senator INOUYE. Or to the corps?

Mr. RUCKELSHAUS. Nor do we have any intention of doing that; no.

Senator INOUYE. What do you perceive would be the relationship of ocean dumping to the total national water quality improvement program?

Mr. RUCKELSHAUS. Well, we are asking in our amendments to the Water Pollution Control Act which are presently pending before the Public Works Committee of both the Senate and the House for the authority to set water quality standards in the contiguous zone, the area between 3 and 12 miles, and in the high seas where that impacts our territorial sea or the contiguous zone for the purpose of giving the Agency the control over water quality not only in the interior, both lakes and rivers, but also in the oceans.

This act meshes in very carefully with our request for authority under the Water Pollution Control Act to set standards, because any permit that we issued for dumping would have to be judged against the potential violation of those water quality standards which we set.

So, it would not only apply to the dumping, but the water quality standards would also apply to ocean—land-based ocean outfalls as they now exist.

Senator INOUYE. Why are Government employees and agencies exempt from the penalty provision in your bill?

Mr. RUCKELSHAUS. I take it, Mr. Chairman, the reason is that traditionally it has been felt sufficient for the Federal Government or any governmental level to control the activities of its employees through its usual personnel mechanisms.

So, if a governmental employee violated any law or any activity that was within his particular responsibility, he could be dealt with through the personnel mechanism of the Federal Government itself. This particularly would apply to civil violations, where an employee would be subject to discharge by the Federal Government if he violated some regulation or law of that governmental body.

We obviously don't have this kind of control over either State employees or civilians in general. Where we get into the question of a criminal violation, it becomes a more difficult exemption, it seems to me, and one that gives me some trouble, because clearly a governmental employee is subject to criminal laws just as any other individual in society is, and to the extent that this exemption might apply

to some criminal provisions of the act, I must confess I have some difficulty.

Senator INOUYE. As a member of this Government, I am sure you are aware that disciplinary actions against civil servants may not be the easiest things to carry out.

Mr. RUCKELSHAUS. Yes; I certainly am aware of that.

Senator INOUYE. I am presently chairman of the District Committee on Appropriations, and, for example, the sanitary engineer has testified that he is well aware of the many violations on trash collections, that trash collectors are not pulling in full loads but getting credit for full loads.

When I asked him about disciplinary action—over all these years—he said, "Yes; we have a procedure." How many have been suspended? None. How many have you fired? None.

If we are going to be fining civilians and other non-Federal employees $50,000 and a year in prison, we may find a similar violation by a Federal employee with a slap on a wrist; do you think that is fair?

Mr. RUCKELSHAUS. As I say, Mr. Chairman, when we get into the criminal violations, which is certainly what a year in prison involves, it gives me some difficulty.

Senator INOUYE. Would you recommend that there be no exemptions?

Mr. RUCKELSHAUS. Well, I can see the rationale for the exemption where we are talking about a civil violation, where the control over the governmental employees has been traditional, and that is the way most legislation now reads in terms of this exemption. But I certainly can have no strong objection to applying criminal sanctions across the board.

Senator INOUYE. Would you be in favor of public hearings involving the public in establishing criteria?

I notice that in your bill the only participants are officials of some sort, either State, local, or Federal.

Would you also include interested parties of nongovernmental activities?

Mr. RUCKELSHAUS. We certainly would, and would be derelict in our responsibilities if we didn't.

As to whether the best way to carry out those responsibilities is through a public hearing, I certainly have no objection to that mechanism as a means of insuring that everybody has a chance of their say before the criteria are adopted.

Senator INOUYE. Would you favor citizens' rights or citizens' actions in contesting dumping permits?

Mr. RUCKELSHAUS. When an application is made for a permit, it would be our intention to make that application a matter of public record, so that any citizen could contest the application itself to the grantor, the EPA—the Administrator of the EPA—and in the event that the permit were about to be granted arbitrarily and capriciously, I would take it the citizen would have the right to attempt to enjoin that in court whether it was put in the act or not.

Whether we should go from an administrative procedure where the Agency itself, at least in theory, has the expertise and the balance

needed to determine whether a particular permit should be granted to having that decision—that exercise of discretion—constantly reviewed by the courts, I think presents a different question.

It is my own belief that the citizens' rights would be adequately permitted by their right to comment on the application for a permit and the right to enjoin any arbitrary or capricious exercise of discretion.

Senator INOUYE. Is it the ultimate object of your Agency to eliminate all ocean dumping?

Mr. RUCKELSHAUS. Not necessarily. Certainly all harmful ocean dumping or even ocean dumping which is arguably detrimental to any of the features of human health or marine environment that we are attempting to protect. But there are some who argue very persuasively that some forms of the dumping of some materials in the ocean can in fact be beneficial to the ocean, and I don't think we should by statute close the door completely to the possibility of the utilization of the ocean as a disposal ground if it can be shown clearly that that is a benefit to the ocean.

Senator INOUYE. By ocean dumping I gather from the language of your bill that you are covering oceangoing vessels.

Do you also cover aircraft?

Mr. RUCKELSHAUS. Yes; we do.

Senator INOUYE. Is there language covering that?

Mr. RUCKELSHAUS. I can't point to the section of the bill itself.

Senator INOUYE. I am certain you are aware that aircraft are also guilty of dumping.

Mr. RUCKELSHAUS. Yes; I am aware of that, and in our report to the chairman of this subcommittee relating to some of the other bills that have been submitted, we point out that our bill at least purports to cover this and that the others do not. I can't point to the exact section of the bill where it is covered, but it does cover it.

Senator INOUYE. Do you have any quantitative figures on the total waste generated in the United States, the quantities that are dumped into the ocean?

Mr. RUCKELSHAUS. The best figures that are available are in the report to the President by the Council on Environmental Quality, and that report, as I understand it, is a part of this record before this hearing.

We are constantly trying to assess just how much material is being dumped in the ocean, and our assessments are at best I think estimates, but I believe that clearly with a bill of this nature and with the authority in an agency to control ocean dumping through the issuance of permits we would have a clear, exact fix on what is going into the ocean.

Senator INOUYE. In your testimony you have indicated that a very important feature of your bill is the one that would require permits for two different kinds of dumping activity. I can well understand the issuance of a permit for dumping into the ocean anywhere the disposition of materials generated in the United States. I am certain the courts will uphold this provision.

But there is another kind of activity you speak of, the one covering all vessels, foreign and otherwise, within the 3-mile territorial limit and 9-mile contiguous zone beyond the territorial sea.

At the present time the United States is involved in lengthy discussions with other countries to set a uniform territorial sea limit for all nations. Some nations have 200 miles, some have 12, we have 3.

By inserting this 9-mile contiguous zone jurisdiction, would you not be in conflict by another Government agency's quest for uniformity?

Mr. RUCKELSHAUS. In suggesting this limit in the bill, we have discussed the legality of our requested authority with the State Department and with the Justice Department, and it is their joint opinion that the authority we are requesting is legal.

The question of whether we are interfering with the efforts of this country to come up with a uniform treatment throughout the world of the limits of territorial jurisdiction I would leave to people more expert in international diplomacy than I. The Assistant Secretary of State did testify before the House committee on this very question, and I think in his testimony he indicated that he did not see anything inconsistent with their efforts at this time and the provisions of this bill.

Senator INOUYE. I am aware that we are shooting for the 12-mile limit, but at the present time officially ours is a 3-mile limit.

How effective do you believe your Agency can be in enforcing the law?

At the present time, for example, Soviet fishing trawlers operate just beyond the 3-mile limit. Would you be able to stop these ships from dumping?

Mr. RUCKELSHAUS. Well, I would not for a minute indicate that there would not be some difficulties in enforcing this law. Our Agency, of course, in this case would have to depend on the Coast Guard to see that there were no violations of the law. If the dumping in the contiguous zone impacted our territorial sea, there would be a violation of the law.

It seems to me our alternative is even less acceptable, and that is no law at all against their doing that, and at least where we have a clear statement of legal purpose on the part of this Nation, we would be in a position to bring whatever pressures we could to bear, including the direct enforcement of the law on countries which were violating it.

Senator INOUYE. In order to avoid confusion, would it not be well for your Agency to strongly recommend to the administration that we establish as soon as possible a 12-mile territorial sea limit?

Mr. RUCKELSHAUS. Mr. Chairman, we are in negotiation with several countries in the world in an effort to get a uniform ocean dumping policy.

Last week at Brussels, representatives of this administration, both involving Chairman Train from the Council on Environmental Quality and representatives of my Agency, met in Brussels under the auspices of the Committee on Challenges to a Modern Society and discussed there with the member nations of NATO the possibility of an international agreement against ocean dumping.

We did not get such an agreement. We did get a further study of the problem and a promise to come to grips with it in the future. We are going to continue to push as hard as we can internationally to insure that the oceans not only adjoining this Nation but the oceans of the

world are protected from further environmental degradation caused by dumping.

The question of whether we should extend the jurisdiction from the 3-mile limit to the 12-mile limit, again I think is a question relating not only to the problem of ocean dumping but to a much broader problem of international relations that may lay beyond the scope of this Agency.

Senator INOUYE. At the present time does the Defense Department have authority to dump materials into the ocean?

Mr. RUCKELSHAUS. They have no authority to dump any toxic materials into the ocean, and it is my understanding that the Secretary of Defense has just recently ordered an absolute halt to any further dumping of toxic materials into the ocean.

Senator INOUYE. What about waste materials?

Mr. RUCKELSHAUS. The question of authority, there really isn't anything prohibiting——

Senator INOUYE. I ask this question because in your bill the authority of the AEC to regulate the disposal of radioactive materials is not affected at all.

My question is: Will the standards which you have prescribed for all citizens of the United States also apply to the AEC?

Mr. RUCKELSHAUS. I think clearly they would, Mr. Chairman, and should. I think the reason for the exemption is the expertise relating to these materials which is possessed by the AEC.

There was some confusion in the testimony in the House as to just what the position was of the AEC, and we are discussing this with them now in an attempt to iron out exactly any differences of opinion that might exist between our two agencies relating to their responsibilities.

Senator INOUYE. There seems to be some confusion at the same time you have indicated you are certain that their standards are equal to yours. If that is the case, why would you exempt the AEC from your regulations? Why not include them also?

Mr. RUCKELSHAUS. Assuming the standards are the same, I think the reason for the exemption is their traditional possession of this expertise in this area relating to radioactive materials.

Senator INOUYE. Even with the possession of the expertise, would you not wish to have general control on supervision over the dumping of waste material, toxic or otherwise, into the ocean?

Mr. RUCKELSHAUS. That certainly is the main purpose of this bill. I can't quarrel with that.

In our discussions with the AEC, we are trying to go over this very question, as to just what the logic is for the exemption in the bill.

Senator INOUYE. I notice that the corps is not exempt, and I presume that overall these many, many decades they must have acquired some expertise in dumping of sludge and otherwise?

Mr. RUCKELSHAUS. There is no question but what they have expertise in dumping of sludge, Mr. Chairman. The question is their expertise in the quality of water that is affected by the dumping. That I believe is where we think the expertise rests in our Agency.

Senator INOUYE. I have some concern about exempting agencies such as the AEC and exempting Federal civil servants from this con-

trol. You would have harsh treatment for private citizens, $50,000 and a year in jail, and for the civil servants a possibility of a letter of reprimand in his jacket or a possible suspension for 1 week. Very seldom have civil servants been fired.

The AEC may possess the expertise in the disposal of radioactive materials, but I do not see why they should be exempted from being clearly within the objectives of this law if we are going to have this law. I for one would suggest to my subcommittee that they should be included.

What do you mean, sir, when you speak of a reasonable period of time to phase out the dumping of material into the ocean? You have spoken of communities that have traditionally disposed of their waste into the ocean and it would be uneconomical for them to stop it suddenly, and that you would give them a reasonable time. What do you mean by reasonable time?

Mr. RUCKELSHAUS. Maybe I can explain it by being specific. If you take the city of New York, which is in the circumstances that have arisen from the dumping of their digested sewage sludge off the New York bight, as one of the kinds of situations which has given rise to the ocean dumping report of the Council on Environmental Quality and our suggestions in this bill. There is a tremendous amount of sewage sludge dumped daily off the New York bight by the city of New York.

To say tomorrow that you can no longer dump it there, you can no longer put it on the barges which in the past the Federal Government has paid a portion of the cost of the barges to put the sewage in the ocean, and to say tomorrow you can no longer do that would present to New York an impossible situation. There is no place else where they could put it.

We are in the process of reviewing in our solid waste office 17 separate proposals that New York has made for the disposal of their sewage sludge and other waste, ranging from landfills to huge incineration projects. Without a suitable alternative for the disposal of this sludge which would cause an even more difficult environmental problem, it seems to me an absolute ban is not reasonable or in the best interest of the environment.

A reasonable time I think implies that they have got to figure out something else to do with the sludge, because the present practice is simply unacceptable environmentally. So we would in this case make every effort to insure that as quickly as possible the city of New York found an alternative method of disposal of their sewage sludge that was environmentally sound and that they not be put to some tremendous expense immediately to do something with the sludge such as ship it inland and put it in some landfill of some kind when that same money could be spent in an effort to determine what might be done with it in a way that would be environmentally sound and at the same time solve the problem.

Senator INOUYE. I agree with you that it would be unreasonable to require the city of New York, especially with their fiscal problems, to stop this disposal program, immediately, but I was just curious to know what you meant by reasonable time. Would it be 6 months or 6 years?

Mr. RUCKELSHAUS. It is difficult to say because of the varying circumstances that exist. In the case of New York, after some study I think we can come up with a date that most reasonable men could agree was a reasonable time for them to dispose of it. I think the trouble with putting a deadline in the act—and we discussed this in the House committee—is you have so many varying circumstances around the country where the reasonableness of the deadline might vary greatly depending on those circumstances, and that it is difficult to set a specific time limit within which this has to be done.

If you look at the Clean Air Act of 1970 where the automotive companies were given the deadline, there is a lot of advantage environmentally in giving them a deadline. But we are aiming at essentially five manufacturers of automobiles in the country, and it is much easier to talk about a deadline in terms of that one industry than it is to talk about a deadline in terms of the dumping of all kinds of materials regardless of their detriment to the environment and the ability to dispose of them in other ways throughout the country into the ocean. That is the reason why we have spoken of the deadline in terms of reasonable time.

Senator INOUYE. In my brief experience in government I have found that you will provide a much more effective incentive if you set a definite date, because once you set a provision of reasonableness, experience has shown that it could go on for decades. If we set a date here saying within 12 months, we find on the 11th month that some people are having extraordinary problems, maybe amendments could be made.

My final question, sir. I am certain you are aware that our Government is planning to detonate a multimegaton nuclear device in the Aleutians, and many experts have indicated that this explosion might well cause a rift or crack in the ocean surface and thereby causing an escape or emission of deadly radioactive materials, in addition to tidal waves, et cetera. In your position as Administrator of the EPA, what would you say to that, sir? This affects the ocean, it emits deadly radioactive materials and thousands of people including Senators and Representatives are concerned about this. Scientists have indicated the serious possibility of the escape of radioactive material happening in the ocean. Your statement says very clearly we should stop immediately the dumping of chemical warfare materials.

Mr. RUCKELSHAUS. Our agency obviously is concerned with the Amchitka projected detonation which I think you are referring to, and we are presently studying the environmental impact reports and statements that have been issued by the Atomic Energy Commission, and it would only be after a rather exhaustive study by the agency that I could give you a very definitive answer to your question.

Obviously as the Administrator of this agency I share your concern and share your desire to be sure that the oceans and environment in general are protected from any unwarranted intrusion by radiation or any other toxic material. In an effort to discharge that responsibility and concern we will certainly examine very closely the evidence as we see it of what the impact of this explosion might be.

Senator INOUYE. I appreciate your concern, sir.

I have been asked by the Senator from Michigan, Mr. Griffin, to ask you two questions, sir. The first: with regard to the Great Lakes,

there is a significant problem involving the dumping by vessels of refuse and garbage other than sewage. Can you advise the subcommittee as to how this problem would be treated under the act? Would it be completely prohibited? Or would general permits be issued under Section 5(e)? Also, how would EPA go about issuing permits in such cases? Would such authority be delegated to the Coast Guard?

May I suggest because of the passage of time that I submit these questions to you and that written responses be provided for the record.

Mr. RUCKELSHAUS. Fine, we would be glad to do that, Mr. Chairman.

(The following information was subsequently received for the record.)

The criteria established by the Administrator for the issuance or denial of permits would be applied to determine whether the dumping should be allowed to continue, and if so, on what terms. If, as the inquiry suggests, the pollution problem caused by such dumping is a serious one, and if it would be feasible to require vessels to refrain from such dumping, then the practice would be phased out. General permits could be issued for such dumping only if the Administrator determines that the dumping will have a "minimal impact." It is not anticipated that authority for the issuance of permits would be delegated to the Coast Guard.

Senator INOUYE. Our staff counsel has a technical question to ask.

Mr. MILLER. Thank you, Senator. Mr. Ruckelshaus, questions have arisen as to why the administration has chosen a regulatory technique, that would regulate transportation for dumping as opposed to other forms of regulation. Would you state for the record what the rationale is for choosing to regulate transportation for dumping, and state what alternatives were investigated in looking at a handle from which you could regulate?

Mr. RUCKELSHAUS. We looked at every alternative we could conceive of for establishing regulatory power over dumping in the ocean which was adverse to the environment. What we finally decided upon was the dual system of regulating not only transportation but dumping itself in both cases in the ocean, because legally it gave us the broadest authority to control dumping in the ocean that was adverse to the ocean environment or the estuarine areas or the Great Lakes. We can control legally any ship leaving this country which has as its purpose the dumping of any material into the ocean. We can also control within our territorial jurisdiction the dumping of material even when the ship does not originate in this country.

To the best extent possible in the legal research that we have done, this seemed to us to give us the broadest authority to control dumping.

Mr. MILLER. Both the broadest and I assume then the most effective authority for the regulation?

Mr. RUCKELSHAUS. Yes.

Mr. MILLER. Why has a separate bill on ocean dumping been submitted, as opposed to a separate title in the Federal Water Quality Act?

Mr. RUCKELSHAUS. It is certainly possible to put it under the Water Quality Act, but it did seem to us that the problem of ocean dumping was so serious and needed highlighting in a way that only an individual bill could provide, and the more omnibus act, the Water Pollution Control Act, where we have suggested several amendments already may well have swallowed up the problem of ocean dumping

and we would have been unable to focus in on this specific problem even if we are not able to get the amendments through under the Water Pollution Control Act.

Mr. MILLER. So your preference is to go with a separate act?

Mr. RUCKELSHAUS. If we get the authority or some facsimile of the authority we are requesting, I do not have any unalterable attachment to the mechanism by which we have introduced it, but this seems to us to have the best opportunity for success.

Mr. MILLER. Thank you. That is all.

Senator INOUYE. Thank you very much, Mr. Ruckelshaus. Your participation this morning has been extremely helpful.

Our next witness will be Mr. James H. Rook, representing the Manufacturing Chemists Association.

Welcome to the committee, sir.

STATEMENT OF JAMES H. ROOK, MANUFACTURING CHEMISTS ASSOCIATION

Mr. ROOK. Thank you.

Mr. Chairman, I have a rather brief statement which I would like to read to you.

My name is James H. Rook. I am before you today representing the Manufacturing Chemists Association, a nonprofit trade association of 171 U.S. member companies, large and small, which account for more than 90 percent of the production capacity for basic industrial chemicals in this country. I am presently chairman of the association's solid wastes management committee's subcommittee on ocean barging. I am professionally employed by a member company of the association with direct responsibility in my employer's environmental management group.

The vital importance of the ocean environment to our total ecological well being is an undisputed scientific fact. It is important to recognize, however, that the oceans are the ultimate sink in the hydrologic cycle. An inquisitive child might ask the question, "Why are the oceans salty?" The answer is not so apparent. The oceans receive, concentrate, and to a degree provide natural treatment to water-borne substances. Natural and manmade, water-borne substances eventually find their way to the oceans where the water evaporates. Rains then fall over the land and fresh water resources are replenished.

We are faced with a dichotomy. On the one hand, oceans are the source of life, vital to ecological well-being, and a significant economic factor in many parts of the world. On the other hand, oceans are the natural and ultimate depository for water-borne residues of man and nature.

Decisive action must be taken to regulate and control the practice of dumping deleterious wastes into oceans and coastal waters. In some instances serious problems have arisen from irresponsible dumping practices—primarily dredging spoils and municipal sewage sludges in coastal waters where the contaminating materials have washed shoreward or affected commercial and sport fishing. Such practices should be prohibited or strictly controlled. We submit, how-

ever, that there are instances where ocean disposal, if responsibly and conscientiously performed, is justified and that this disposal method should not be categorically prohibited.

We would like to put forth for consideration some basic regulatory concepts and then comment specifically on the proposed Marine Protection Act of 1971. I am referring specifically to S. 1238.

The hydrologic cycle is an element in a complex ecological system which must be balanced to serve mankind's needs. How we go about maintaining this balance is the central issue. It is our view that control of ocean disposal practices should not be totally divorced from protection of coastal and estuarine waters or inland fresh water lakes, streams, and ground waters. The interplay between all aspects of water pollution control dictates that a flexible grant of authority be given to the regulatory agency. The agency should have latitude to determine within reasonable bounds the control strategy and alternatives most appropriate in a particular instance.

It should be recognized that there are technical limitations on what can be accomplished in waste water treatment and control. It is not always possible, with today's state of the art, to adequately treat and control all waste waters to a degree which would allow the safe discharge to surface waters. Some waste waters are presently untreatable; others may be treatable, but where treatment does not result in complete destruction, residuals may have adverse environmental consequences.

The diversity and scope of the chemical industry present a wide range of waste residuals that must be disposed of. The industry has been forced to seek various disposal alternatives when such wastes cannot be safely or economically recycled. These alternatives are deep well injection, land application, incineration, and ocean dumping. Each has its place if properly selected and conscientiously performed. The central question is which disposal alternative poses the least risk of environmental harm. In certain instances ocean disposal may be the only responsible alternative.

We reiterate that indiscriminate ocean dumping should be outlawed, but maintain that ocean disposal should be allowed under strict regulation. It is appropriate that a Federal agency, specifically the Environmental Protection Agency, be given regulatory authority in this matter. EPA is the only agency at either the Federal or State governmental level with broad authority for waste water control. Other Federal agencies, such as NOAA, Corps of Engineers, and the Coast Guard, along with State agencies, may very well play an active role in the regulatory process or surveillance, but we recommend that ultimate responsibility be centered at the Federal level in EPA.

Regulatory control should take into account the quantity as well as type of material to be disposed of, the disposal site, and method of disposal. The environmental risks of various alternative disposal means should be weighed, taking into consideration technically feasible control methods and the possible effect of onshore disposal.

We envision that certain potentially toxic materials which can be practically treated should not be allowed to be discharged into the oceans, whereas other potentially toxic substances which might create

greater hazards of land, air or surface water pollution be disposed of at sea under strictly controlled conditions. Disposal areas should be carefully selected and monitored for any adverse effect. Marine sanctuaries should be maintained, and fishing and recreational areas protected for present as well as future generations.

The issue is not simply one of ocean disposal, since wastes eventually find their way to the ocean, if not by direct disposal then by conveyance in surface streams and subsurface waters. Rather it is a matter of farsighted waste water control management, soundly and effectively administered. The controlling agency must have a broad grant of authority, alternative choices, flexibility of action, and the resources to fully implement its program.

We have reviewed the various legislative proposals presently pending and feel that the Marine Protection Act of 1971, S. 1238, offers the more complete and appropriate approach to regulatory control. Our recommendations in reference to it follows:

Recommendation 1: Incorporate regulation of ocean disposal as a separate title of the Federal Water Pollution Control Act.

Control of ocean disposal should be regarded as simply one element of water quality management. Accordingly we suggest that control of ocean disposal would most appropriately be provided for as a separate title of the Federal Water Pollution Control Act.

Recommendation 2: Subject agencies of the Federal Government to injunctive proceedings for violations.

As the proposed act now reads, departments and agencies of the Federal Government are exempt from the penalty provisions of section 6. Ocean dumping, significantly the dumping of dredging spoils, has been practiced by a number of Federal agencies with alleged detriment to the environment. We believe Federal agencies should be subject to injunctive proceedings brought by the Administrator, and recommend the exception provided under section 3(e) be limited specifically to those penalties provided in subsections 6 (a) and (b), for example, fines and imprisonment.

Recommendation 3: Criteria establishment under section 5 should afford interested persons an opportunity for written comment.

The development of ocean disposal criteria will affect a large number of interested parties, including other agencies of the Federal Government, State control officials, conservation and economic interest groups, permit applicants, et cetera. On matters as important and complex as this, criteria should be published as a proposed regulation with reasonable time given for interested persons to submit written comments thereon.

Valuable assistance and added expertise can be made available when Government fosters a common spirit of cooperation and coordination in the resolution of environmental problems.

Recommendation 4: Clearly delineate between responsibility for (*a*) the nature of the material to be disposed of and (*b*) the proper deposition of such material at the permitted site.

Many barging activities are conducted by independent waste haulers who are under contract to the waste-generating party. A barge may contain wastes from a number of different sources and a party turning his wastes over to the independent hauler may not have con-

trol over other types of wastes included with the load, the exact disposal location, or the actual disposal technique practiced.

We feel that the various responsibilities of the waste generator and the waste hauler should be specifically delineated. A possible approach would be to issue permits for various types of waste materials specifying the zone or area in which the material could lawfully be discharged. The waste generator would certify the quantity, nature of the waste material, and the permitted disposal area when the waste material was loaded upon the barge.

It would then be the responsibility of the waste hauler to dispose of the material in the permitted disposal area. This could be checked by requiring reports of the log of the barge's activities including copies of the waste certificates of the barge load. This system is in accordance with the realities of most ocean disposal activities, and would provide a workable and enforceable system of control.

Recommendation 5: Include a provision to allow continued ocean disposal pending implementation of the permit system.

The reasons for not categorically banning all ocean disposal of waste materials were stated earlier. Similarly, a precipitious moratorium on ocean disposal pending the implementation of the permit system would be unwise and could result in adverse environmental and economic consequences. We suggest 2 years as an appropriate and realistic leadtime for obtaining the requisite permits. Interim measures such as prohibiting the discharge of waste materials within a 30-mile limit could be initiated if thought necessary or desirable.

Recommendation 5: Provide funding to initiate and support fundamental scientific and social research related to ocean disposal practices.

Existing knowledge of effects of ocean disposal on the actual physical, chemical, and biological properties of the oceans is sadly lacking. Active research in this area should be sponsored by the Federal Government. We recommend that a system of Federal grants be established to initiate and support fundamental scientific and social research related to ocean disposal practices.

In conclusion, the chemical manufacturing industry shares the national and international concern over indiscriminate ocean dumping practices. We urge recognition that ocean disposal has its place in a sound and comprehensive water management program. We support strict regulatory control of ocean disposal of waste materials.

Senator INOUYE. Thank you very much, Mr. Rook.

Rather recently a chemical manufacturing concern attempted to dispose industrial waste in the ocean that contained toxic arsenic, and because of the press pressure and public pressure decided not to go through with this. In your statement you indicate that there should not be an absolute ban on the disposition of any material, whether it be toxic or nontoxic because the ocean may be the only place to dispose of it.

What sort of toxic industrial waste are you speaking of that cannot be disposed of in abandoned oil wells or strip mine areas.

Mr. ROOK. Well, I think this term "toxic" is a relative term. Ordinary table salt is toxic if improperly used or taken into the body. Other things may very well be toxic if a concentration is such as to cause harm, either in the human body or in any animal.

Senator INOUYE. I realize it is a relative term and even aspirins can be very toxic. Let's take something where there is no confusion as to being toxic: Arsenic, cyanide, mustard gas.

Mr. ROOK. You cited the situation in the arsenic case. I do not know the specific details of the particular situation that you mentioned. Done in a proper location with proper dispersion so that this does not cause harm and facts are backed up to support that position, I think that sort of thing could be conducted without really any material damage to the ocean environment.

Senator INOUYE. Is it not correct that industry has used the ocean as a dumping ground for waste materials, whether they be toxic or otherwise, because this has been the cheapest way of disposing of waste?

Mr. ROOK. Not necessarily. We have used this and it has been used in a number of areas for disposal of waste, but it isn't necessarily the cheapest way.

Senator INOUYE. The cheapest way of dumping it is into the Mississippi or the Potomac.

Mr. ROOK. But in many other cases we have no other alternative. The state of the knowledge has not developed to the point where we have feasible means of treating this to the point where we can render it as being safely disposed on a land fill or any other area on land surface.

So we must take this to sea.

Senator INOUYE. Could you furnish this committee some memo indicating the type of toxic material which you feel must under the present state of the art be disposed of in the ocean?

Mr. ROOK. I think we might get from some of our member companies certain materials that they are now disposing and the reasons why we must dispose these at sea.

Senator INOUYE. I think it would be of some interest to the committee to know what sort of poisons must be disposed of at sea.

(The following information was subsequently received for the record:)

Unmarketable by-products from the manufacture of certain organic phosphate wastes and certain unusable or unmarketable spent acids from chemical processing are among the substances best disposed of in the oceans.

The presently known alternatives for the ultimate disposal of organic phosphate wastes are incineration, deep well injection, and ocean dispersal. Incineration will virtually destroy the waste, however, the resulting gaseous emissions and internal incinerator deposit problems have shown the method to be questionable from the air pollution standpoint and not technically or operationally feasible. Deep well injection might be an operationally feasible. Deep well injection might be an acceptable method of disposal in certain locales but totally impossible in other geological areas. Considering the alternatives, properly monitored dispersal in deep water areas is frequently the best method of disposal.

The alternative methods of disposal of an unusable and non-marketable spent acid might be neutralization, deep well injection, or ocean dispersal; and in some special cases, regeneration and reuse of the acid. Neutralization may result in a waste liquid of acceptable quality for discharge to surface waters, however, the resultant sludges from neutralization may be most difficult to dewater and objectable in land application disposal. As in the case of organic phosphate, deep well injection might or might not be a technically or operationally feasible alternative depending on geological factors. Ocean dispersal of spent acids, in many cases is the most efficient and environmentally sound

procedure yet known. Most acids are chemically compatable with ocean waters and are neutralized by them. Ocean dispersal has been practiced successfully for a number of years and in some cases has proven beneficial to the ocean environment. In the disposal of acids, the practice of uniform dispersal over a wide area is important, hence the discharge technique is as important as the disposal location and character of the waste.

Senator INOUYE. In the matter of selecting the ocean, you indicated the possible greater danger of disposing of it in wells or land fills, and you also noted the high economic cost involved.

I would like to know on the so-called high economic cost involved in the alternative disposal possibilities. It is not necessary to give me that information now.

Mr. ROOK. You are asking that we submit this as part of the response. Yes, sir.

(The following information was subsequently received for the record:)

Although costs vary with location, the cost of ocean disposal of spent acids can be generally compared to alternative methods on the following basis:

When available, the injection well method is the lowest in the overall disposal cost (capital and operating) per unit of waste acid. Utilizing this as a base, ocean disposal costs may range 1.5 to 2.2 times and neutralization costs 1.7 to 2.5 times the costs of well disposal.

Some actual capital and operating costs for ocean disposal of a liquid waste acid are contained in the attached abstract of a technical paper presented at the October 1970 Conference of the Water Pollution Control Federation.

(The following is an abstract of a paper given at the 43rd Annual Conference of the Water Pollution Control Federation, October 4-9, 1970, Sheraton-Boston Hotel, Boston, Mass.)

BARGING INDUSTRIAL LIQUID WASTES TO SEA

(By Samuel W. Fader)

In past decades, the Delaware River served as a source of cooling water and as a receiver of liquid wastes for the industrial plants and municipalities located in the estuary. The Du Pont plant, at Edge Moor, Del., was one such plant. By the 1960's waste loads had greatly increased, and degradation of river water quality was becoming of concern to both industry and Government. Du Pont announced it would cut its acid discharge in half.

Several alternatives were studied, and barging was found to be the most practical and economical. The barge cost $1.1 million and had a carrying capacity of one million gallons. When operating at capacity, disposal costs average $2.50 per 1,000 gallons or $.50 per ton of waste for the 200 nautical mile round trip.

The barge was designed with several unique features: it is unmanned, discharges by gravity, and operates by radio control from the tug. The barge is discharged about 38 nautical miles offshore and in about 140 feet of water.

A study of the discharge area is being conducted in cooperation with the Federal Water Quality Administration. Preliminary results show that (a) initial dilution behind the barge is very rapid—at least 2,000-fold within a few moments after release at normal barge speeds; (b) barge speed is known to affect the dispersion pattern by influencing the density of the waste-sea water mixture. A mathematical model of the dispersion process is being formulated. The model will be three dimensional and consider depth-density structure of the sea and the dispersing waste.

Senator INOUYE. Once again I thank you very much for your participation this morning, and please be assured that your statement will be very seriously considered, sir.

Mr. ROOK. Thank you.

Senator INOUYE. Our final witness will be Mr. Edward Langlois, representing the American Association of Port Authorities.

Welcome to the committee, gentlemen.

STATEMENT OF EDWARD LANGLOIS, AMERICAN ASSOCIATION OF PORT AUTHORITIES; ACCOMPANIED BY PAUL A. AMUNDSEN, EXECUTIVE DIRECTOR

Mr. LANGLOIS. Good morning, Mr. Chairman.

With me this morning is Paul A. Amundsen, executive director of the American Association of Port Authorities. We have a prepared statement. We have submitted it. If you would like, if it would please the chairman, we could summarize our statement.

Senator INOUYE. Your statement will be included in the record in total.

Mr. LANGLOIS. My name is Edward Langlois, and I am appearing before this committee in my capacity as chairman of the committee on environmental affairs of the American Association of Port Authorities. I am regularly employed as general manager of the Maine Port Authority whose principal office is at Portland, Maine.

We tell you in our statement who we are and who we represent. We tell you in our statement our contribution toward the economy of the country and what we have spent in terms of providing facilities to handle port cargo compared to what the Government expense in terms of dredging and providing channels for our use.

We tell you in our statement that we unquestionably support the total of improving water quality standards, and we have a long record in participating in this. We tell you that we oppose the transport of dredged spoil disposal permits from the Corps of Engineers, U.S. Army, wherein it was reaffirmed as recently as Friday, December 25, 1970, with the President's Executive Order 11574.

Senator INOUYE. Is it your feeling that the corps can do a better job than the EPA?

Mr. LANGLOIS. Yes. This is the context of our statement. We base our statement on our feeling through its experitse and through the history of its performance that the corps should continue to have the authority to grant permits——

Senator INOUYE. As I recall, one of the major reasons for this type of legislation has been the corps' rather indiscriminate dumping of sludge material into the Great Lakes, one of the major causes of pollution in that area.

Would you consider this expertise on the part of the corps?

Mr. LANGLOIS. I would have to zero in on our coastal participation with the corps.

But back to your question; if it has been proven that their judgment in granting permits to dump dredged spoils in the lakes has been detrimental, in this instance their expertise would have to be questioned, and I believe that this would probably be one of the reasons that all of this attention is now being focused on further and more close attention to the detriment to the environment in granting of these permits.

Senator INOUYE. You are just opposing the transfer of this authority; however, do you oppose the thrust of this bill to halt ocean dumping?

Mr. LANGLOIS. No, we do not.

Senator INOUYE. So, as long as the corps is required to abide with the policy requirements and the requirements set forth in the provisions, you would be satisfied?

Mr. LANGLOIS. Yes, sir.

Senator INOUYE. Proceed, sir.

Mr. LANGLOIS. We state that the Congress has resolved this matter as recently as December 31, 1970, in Public Law 91–611, the River and Harbor Act of 1970, which states:

> The Chief of Engineers, under the direction of the Secretary of the Army, is hereby authorized to extend to all navigable waters, connecting channels, tributary streams, other waters of the United States, and contiguous to the United States, a comprehensive program of research, study, and experimentation relating to dredged spoil.
>
> This program shall be carried out in cooperation with other federal and state agencies, and shall include, but not be limited to investigations on the characteristics of dredged spoil, and alternative methods of its disposal. To the extent that such study shall include the effects of such dredge spoil on water quality, the facilities and personnel of the Environmental Protection Agency shall be utilized.

We go on to say, Mr. Chairman, that we feel this is an engineering matter and requires concentration in terms of the expertise of the corps in engineering matters. There are two basic considerations, where the material is to be placed, and how it is to be handled to placement.

Location of disposal is primarily a planning problem and increasingly a long-range planning problem for the community. We state that large land areas are needed, that we do have to revert to wetlands and the concern that they have, and we state that some areas are earmarked for recreational or residential use which lend themselves to spoil disposal under carefully managed fill conditions.

In port areas faced with problems such as these, progress toward locating, obtaining and condemning, or helping to finance the construction of land containment areas must be measured against very patient long-range standards.

Such problems cannot be ordered to be solved according to the regulations of a policing-oriented body focused on regulating the outfall of new material and effluents into the waters.

The handling of spoil material from the dredging site to the containment of disposal area, like planning, is an engineering function. Local conditions and the distance the material to be transported must be weighed on the basis of economics. This is a thoroughly integrated decision having a strong bearing on the overall cost of the project.

We believe this function should remain with the U.S. Army Corps of Engineers as it has historically. The environmental safeguards are built into the corps procedure, including a requirement for local approval, and we see no useful purpose in retaining "dredged spoil" under the definition of "material" in this proper legislation.

Senator INOUYE. May I interrupt at this point? Taken by itself, I would suppose the scientists would say mud, clay, rock, and sand would not be considered pollutants; but if mud, clay, rock, and sand are dumped into an ocean environment where you have living organisms, fishing grounds, coral beds, would not these materials—rock, clay, mud, and sand—become a dangerous pollutant to that

type of environment, and kill all the fish, kill all the plants just as effectively as you would with chemicals?

Mr. LANGLOIS. Mr. Chairman, the question is a good one, and may I relate several instances off the coast of Maine where we have very good harbors with lobsters and other fish life. During the past 12 years I have served in my capacity with the Maine Port Authority, we have participated in many—we will say 20 permitting—projects where spoils were dumped off the coast of Maine; and as I speak to you today, I have had no reports of any detrimental action from the fishermen or the lobster men as a result of the dumping of these spoils.

I must say because of the corps' expertise and because of the safeguards built in, in public hearings, the dumping grounds that were selected were not dumping grounds that were detrimental to our fishing industry.

Senator INOUYE. If you consider the life cycle of these living organisms, you would not expect to get results in 2 months. I am certain you are well aware that dredged spoil represents about 80 percent of all materials dumped into the ocean taken by weight.

Mr. LANGLOIS. Yes, sir, that is correct.

Senator INOUYE. I think the record would indicate that we are dumping about 50 million tons of dredged spoil per year. It is inconceivable to me to conclude that this type of dumping is not in any way hurting the ocean environment.

I would think this has been shown by the drop in our fishing industry, it has been shown by the color and texture of our waters, the beaches.

I am not going to name the beaches, because I am from a tourist area and some of these States might object to my saying nasty things about their beaches. But some of our beaches now are unfit not only for human use but any other use. I would think that the strongest provision should be made in disposition of spoil when one considers that it represents 80 percent of all the rubbish we dump into the ocean by weight.

So, I am certain that your agency supports strong control over this.

Mr. LANGLOIS. We do, sir.

Senator INOUYE. And it is your feeling that the corps will provide this strong control?

Mr. LANGLOIS. It is, sir.

Senator INOUYE. You don't think that the EPA would provide strong control?

Mr. LANGLOIS. We feel that transferring the responsibilities after the historic participation by the corps would be detrimental in slowing up many of the projects that now face development at the ports that were continuing to participate, in the movement of the new vessels which are entering into our field and a continuation and expansion of trade which is so important to the future of this country and the future of our ports.

With the introduction of a new agency, the transfer could well be so hazardous to our growth that it would be very difficult to recover if the length in time in granting permits is held up longer than it is help up at this time.

Senator INOUYE. You would have to somehow bring about a balance to the hazard to your industry and the hazard to this world of mankind.

Mr. LANGLOIS. Yes, we agree.

Senator INOUYE. I gather in the history of dredging and spoil disposal you have almost always dumped the spoil into the ocean, this has become traditional?

Mr. LANGLOIS. Yes, sir.

Senator INOUYE. Have you ever seriously considered alternate disposal means?

Mr. LANGLOIS. Yes, sir. Many of the port areas have been able to retain the spoils to build up additional lands for use particularly in the southern areas where they could provide bulkheads and with the spoils provide additional facilities for building and constructing not only port facilities but other useful facilities on the port line.

The longstanding practice of the corps has been challenged on the grounds that silt from centers of population tends to be highly polluted and that its transfer to open waters would present a new source of pollution.

In most cases the actual risk is debatable, since the handling process may very well tend to minimize the pollutants and transfer from one point to the other may not really affect the total situation.

Nevertheless, the environmental viewpoint has prevailed and the placement of this kind of spoil into designated containment areas has become widespread practice in the last several years. A growing number of approaches have been carefully worked out as between the corps and local authorities on a planned basis.

These approaches involve designated containment areas tied in as before stated with area development planning and spoils management techniques.

It seems obvious to we who are directly dealing with the problem that contaminated spoil, where it exists, is a result rather than a cause. The approach, therefore, should be, and is, a careful technological cooperation between Federal and local expertise on an economic basis.

Current regulatory safeguards and permitting procedures are more than adequate, and we do not approve of the intrusion of yet another permitting agency in the spoil disproval program. We would hope that such an agency would be directed to concentrate its efforts upon causative effects, such as sewage outfall and industrial effluents. Development of adequate treatment or recycling, in which the Federal Government should play a positive role, would greatly simplfy spoil disposal, eventually, in heavily populated areas.

Man's overlay would be eliminated, leaving us to deal only with mud, clay, rock and sand.

Thank you, Mr. Chairman.

Senator INOUYE. I thank you very much, sir. You may be assured that your statement and your recommendations will be given our most serious consideration.

As you may have noted in my questioning of Mr. Ruckelshaus, we have many questions in our mind as to the propriety and the feasibility and advisability of continuing with the proliferation of agencies.

Mr. LANGLOIS. I compliment you, sir, on your questions. It was an experience to me to participate in listening to your questions of Mr. Ruckelshaus.

Senator INOUYE. So, you may be assured that your statement will be given very serious consideration.

Mr. LANGLOIS. Mr. Chairman, I would like to submit, if I may, a statement from Mr. Henry Douglas, chief of planning of the Maryland Port Authority in regard to this subject.

I believe that this information will be of great value to the committee.

Senator INOUYE. Without objection, that statement will be made part of the record, sir.

(The statement follows:)

STATEMENT OF EDWARD LANGLOIS, CHAIRMAN, COMMITTEE ON ENVIRONMENTAL AFFAIRS OF THE AMERICAN ASSOCIATION OF PORT AUTHORITIES

My name is Edward Langlois and I am appearing before this Committee in my capacity as Chairman of the Committee on Environmental Affairs of The American Association of Port Authorities. I am regularly employed as General Manager of the Maine Port Authority whose principal office is at Portland, Maine.

The AAPA is a corporate body whose membership includes all of the public port agencies, boards, commissions or authorities responsible for the planning, development, operation and maintenance of the seaports and seaport facilities along the coasts, bays, rivers and Great Lakes of the United States and its insular possessions. Our United States voting members are variously formed as state, city or district bodies responsible to the public for the development of commerce and navigation.

In 1970 the nation's seaports handled 559 million tons of foreign trade (as versus 417 million in 1969) plus heavy volumes of coastal and insular trade and defense shipments. To help do so efficiently and economically, over 3 billion in non-Federal funds have been invested by local port interests in terminal and cargo handling facilities since the end of World War II.

AAPA interest in S. 1238 is based largely on the fact that seaport facilities are totally dependent on Federal and private channel and pierside dredging, which, in turn, would be affected by the new spoils disposal permitting requirement contained in the subject legislation. The port industry unquestionably supports the goal of improving, to appropriate standards, the quality of the water of the nation's harbors, and would approve of strict regulation of dumping of materials such as garbage, sewage, munitions, chemical and various other deletorious commodities and agents into the waters, navigable or otherwise, of the country. We do wish to question, however, the inclusion of dredged spoil in this category and oppose the transfer of dredged spoil disposal permitting from the Corps of Engineers, United States Army, wherein it was reaffirmed as recently as Friday, December 25, 1970 with the President's Executive Order 11574. The Corps issued its Refuse Act Permitting Procedures on April 7, with a clear distinction as between permits for dredging operations and permits for discharges and deposits.

Further, the Congress has resolved this matter as recently as December 31, 1970 in Public Law 91-611, River and Harbor Act of 1970, which states (Sec. 123 (i)):

"The Chief of Engineers, under the direction of the Secretary of the Army, is hereby authorized to extend to all navigable waters, connecting channels, tributary streams, other waters of the United States, and contiguous to the United States, a comprehensive program of research, study, and experimentation relating to dredged spoil. This program shall be carried out in cooperation with other Federal and State agencies, and shall include, but not be limited to investigations on the characteristics of dredged spoil, and alternative methods of its disposal. To the extent that such study shall include the effects of such dredge spoil on water quality, the facilities and personnel of the Environmental Protection Agency shall be utilized."

These are wise actions by both Congress and the Administration. The handling and disposition of dredged spoil is an engineering matter and should continue to reside with the Engineers, for the better protection of the nation's environmental well being. There are two basic considerations: (1) where the material is to be placed and (2) how it is to be handled to placement.

Location of disposal is primarily a planning problem and increasingly a long range planning problem, for the community. Large land areas as are needed for the receipt of spoil, particularly along harbor waterfronts, are both exceedingly scarce and costly in many of the nation's older, highly urbanized and heavily populated areas. Some available areas are wetlands which are prohibited for disposal. Some areas are earmarked for recreational or residential use which lend themselves to spoil disposal under carefully managed fill conditions.

In port areas faced with problems such as these, progress toward locating, obtaining and contemning or helping to finance the construction of land containment areas must be measured against very patient long range standards. Such problems cannot be "ordered" to be solved according to the regulations of a policing-oriented body focused on regulating the outfall of new material and effluents into the waters.

The handling of spoil material from the dredging site to the containment or disposal area, like planning, is an engineering function. Local conditions and the distance the material is to be transported must be weighed on the basis of economics. This is a thoroughly integrated decision having a strong bearing on the overall cost of the project. We believe this function should remain with the U.S. Army Corps of Engineers as it has historically. The environmental safeguards are built into the Corps procedure, including a requirement for local approval, and we see no useful purpose in retaining "dredged spoil" under the definition of "material" in this proposed legislation.

Procedures are adequately and effectively regulated now from the standpoint of the environment and of marine transportation. We further respectfully suggest that this distinguished Committee look with great care at the growth of world dependence on merchant shipping, as it views this legislation.

It has been estimated that back in the year 1900, comparing total world population with total tonnage of merchant shipping, there was approximately 200 pounds of shipping for each person. Today that figure has grown to 600 pounds for each individual, reflecting a three-fold dependence, and this continues to grow. World population, meanwhile, is growing also. The world fleet could reach a billion gross tons of shipping by the year 2,000.

Reflecting the demands of world shipping on our nation's harbors, total local public investment in marine terminals had reached 861 million by 1941 and adding the previously cited investments post World War II, amounts to almost 4 billion today.

This nationwide harbor development has been done in partership with a Federal investment in ports, mainly in the form of deepwater channels, the U.S. Army Corps of Engineers being responsible for the nation's navigable waterways.

So that we may visualize this partnership, the Federal investment in channels since 1824 totals almost 1.5 billion including maintenance. Comparing this to the historic local public investment in marine terminals means that competing local port authorities have invested more than $2.00 for every Federal dollar.

The resulting plant, a product of the forces of competition, is considered to be the finest port system in the world. We estimate that our current seaport waterfronts occupy 1,650 miles in the aggregate, or 2% of the national shoreline which, measured point to point on a 100-foot unit basis, totals 93,653 miles. This may have to be increased to as much as about 5% over the next three decades, to meet the demands of world interchange of goods. This leaves 95% of the shoreline as the national playground or for perpetuation of the ecocycle, or for other healthful uses. We suggest to the Committee, and the Congress, that the above ratio offers a certain sense of balance and proportion in the area of dredge spoil disposal as in many other areas required balanced considerations.

This entire port structure has been developed, of course, with the movement and redeposit of countless tons of dredged spoil. We ought now to take a look at the material itself.

Mud, clay, rock and sand are reportedly not major, lasting or widespread "pollutants", even under the most severe definition of that flexible word, when stirred up by dredging activities. Only when man has added a coating of his own ingredients do they become carriers of pollutants. For that type of dredged spoil, at issue is one long-standing practice of dredging harbors, either for maintenance or improvement, and disposing of the silt by hauling it to designated dumping grounds in deep open waters.

This long-standing practice has been challenged, on the grounds that silt from centers of population tends to be highly polluted and that its transfer to open waters would present a new source of pollution. In most cases the actual risk is debatable, since the handling process may very well tend to minimize the pollutants and transfer from one point to another may not really affect the total situation. Nevertheless, the environmental viewpoint has prevailed and the placement of this kind of spoil into designated containment areas has become widespread practice in the last several years. A growing number of approaches have been carefully worked out as between the Corps of Engineers and local authorities on a planned basis. These approaches involve designated containment areas tied in as before stated with area development planning and soils management techniques.

It seems obvious to we who are directly dealing with the problem that contaminated spoil, where it exists, is a result rather than a cause. The approach, therefore, should be, and is, a careful technological cooperation employing Federal and local expertise on an economic base. Current regulatory safeguards and permitting procedures are more than adequate, and we do not approve of the intrusion of yet another permitting agency in the spoil disposal program.

We would hope that such an agency would be directed to concentrate its efforts upon causative effects, such as sewage outfall and industrial effluents. Development of adequate treatment or recycling, in which the Federal Government should play a positive role, would greatly simplify spoil disposal, eventually, in heavily populated areas. Man's overlay would be eliminated, leaving us to deal only with mud, clay, rock and sand.

Senator INOUYE. Thank you very much, and this ends our hearing. I do have a statement from Congressman Vigorito of Pennsylvania to put into the record.

(The statement referred to follows:)

STATEMENT BY HON. JOSEPH P. VIGORITO, U.S. REPRESENTATIVE FROM PENNSYLVANIA

Mr. Chairman, I am pleased to testify before this subcommittee on the subject of waste disposal in oceans. I have co-sponsored a bill on the subject in the House, H.R. 4360, and it is gratifying to see your interest in a problem which, I believe, is of utmost importance. The need for legislation to stop pollution of coastal waters is one which more people must see and to which they must respond. We, the Congress, must take special recognition of the legislative remedies open to us.

The natural resources of this land once seemed unlimited. Exploitation of them has taught us, however, that they are not. Slowly but steadily the farmlands, forests, and inland waterways have deteriorated. Now even the vast oceans which cover three-fourths of the earth are headed for destruction. This is because the offshore dumping of industrial wastes, sewage, and refuse has progressed to such alarming proportions. Since 80% of saltwater fish are taken from these shallow coastal waters, pollution of them can destroy all marine life.

Some scientists have estimated that if the present rate of water pollution continues the oceans will be virtually dead within fifty years. One has set the deadline much sooner, frighteningly soon—1979. The danger is real and urgent, and the time to stop pollution by regulating dumping of wastes is now.

If action is not taken, the probable effects are staggering. As marine life declines, the livelihood of many people will disappear. Others will have to leave

their homes as the garbage takes over. The great value of the coastal waters as recreation centers will be ruined. No less important is the peace millions have drawn from the beauty of the ocean, a beauty which can be marred forever.

In all of these respects, I am especially interested in the plight of the Great Lakes. As a Representative from the Lake Erie area, I am aware of the importance of that lake to the people I represent. The Great Lakes are in immediate and grave danger of total pollution. It is essential that legislation be enacted to protect them. When 30 billion gallons of sewage and industrial waste are dumped into our lakes and oceans every day, only blindness can prevent our seeing the disastrous consequences for them.

I recommend further that efforts be channeled toward setting aside sanctuaries in the most valuable areas of the marine environment. There marine life will be completely protected from the polluting of man. This approach will be more effective than spending time and money to determine which areas *can* be used for dumping.

The oceans are the last frontier of this globe. The ever-expanding population is beginning to demand more food, more homes, more jobs. Having exhausted the potential for all of these on land, we will soon have to turn to the sea. But unless this Congress acts now to insure the continued productivity of the oceans, they will have nothing to offer us. The time for turning our heads and ignoring the situation is gone. Not only the homes, livelihood, recreation, and even survival of this generation are at stake, but, even more, those of our posterity. The destruction can still be halted. Soon it may be too late.

(Whereupon, at 12 noon, the hearing was adjourned, subject to the call of the Chair.)

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

A DESCRIPTION OF THE SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT

58-452 O—71——20

A DESCRIPTION OF THE SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT

Southern California Coastal Water Research Project
10845 Lindbrook Drive, Suite 105
Los Angeles, California 90024

September 17, 1970

SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT

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PROJECT MANAGER

To the Reader:

The Southern California Coastal Water Research Project (SCCWRP) is a part of today's evaluation of human activities in terms of the reactions between man and his environment. The project is directed toward the protection, conservation, and enhancement of marine resources along the Southern California coast through a better understanding of the ecological systems of the coastal waters in this area.

Since the federal and state governments had not yet initiated such a project and it was felt to be urgently needed, this project was started and initially sponsored by five agencies of local government in 1969. These agencies were responsible for the major discharges of treated wastewater into the Pacific Ocean in the region and were much concerned about the present and future impact of such discharges on the ocean.

The sponsors entered into a Joint Powers Agreement which established a Commission to assume control of the project and to be responsible to the public. This arrangement provides complete freedom from control by any other agency including the sponsors. Thus the project has the advantages of independence and an unbiased viewpoint. Furthermore, to assure an adequate scientific basis for the project, the Agreement specified that a Consulting Board of internationally recognized experts be appointed to play a major role in the supervision of the project.

This brochure serves as an introduction to the Southern California Coastal Water Research Project. The booklet is designed primarily for the general public, although the final portion is a discussion of the program that is oriented to the technically trained reader interested in details. I hope you will find the brochure interesting.

Very truly yours,

George E. Hlavka

George E. Hlavka, Ph.D.
Project Manager

A DESCRIPTION OF THE SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT

OBJECTIVES

The general goals and objectives of the Southern California Coastal Water Research Project are

1) to attain a substantial understanding of the ecology of the Southern California coastal waters in present and recent times, in order

2) to gain insight into man's past, present, and predicted effects on the ecology, principally from wastewater discharge, and

3) to advise on policy, procedure, research, and techniques for monitoring and for limiting or reversing the harmful effects of the various wastewater discharges in the future.

The project differs from previous efforts in several respects. The primary objectives in the past were often the confirmation of engineering design criteria for waste treatment and ocean disposal, as well as the demonstration that governmental requirements on the quality of receiving waters were met. There were usually limitations in the funding and time period available for more fundamental ecological and oceanographic research. Furthermore, some of the ecological questions now being raised were not considered earlier. This project is to have a broader and more fundamental approach. The founders realized that this type of approach was necessary and that the nature and form of the conclusions might not be obvious a priori. They also realized that a time period of at least three years would be required to thoroughly accomplish the study.

ORGANIZATION

The organization of SCCWRP is illustrated on the accompanying chart. The Joint Powers Agreement creating the Southern California Coastal Water Research Project Authority involved Ven-

tura County, the Cities of San Diego and Los Angeles and County Sanitation Districts in Orange County and Los Angeles County.

The Consulting Board shown in the chart was named by the Commission and is composed of experts in the fields of oceanography, marine biology, marine chemistry, public health, and environmental engineering. Dr. George E. Hlavka, the Project Manager, is a mechanical engineer from the University of Wisconsin who received his Ph.D. from the California Institute of Technology. In addition to over twenty years of engineering experience, Dr. Hlavka has an extensive background in the analytical sciences and in project administration which should be of great value to this project with its wide spectrum of technical disciplines. The other staff members presently include a biologist, an oceanographer/engineer, a sanitary engineer, and a chemical oceanographer, as shown.

RESEARCH PLAN

The area to be studied extends primarily from the Ventura-Santa Barbara County line in the north to the border of the United States and Mexico in the south. However, surrounding areas which affect the primary study area will also be investigated.

The coastal region of Southern California supports one of the largest and most rapidly expanding urban developments in the United States. This condition is reflected in the number and in the extent of the demands made upon the area's marine resources. Such demands include those of municipal waste disposal, oil and power production, industry, transportation, commercial and sport fisheries, aquatic sports, recreation, and aesthetics. Within the next forty years, a one-hundred percent increase in the size of the present population of the region, already approximately ten million, is anticipated. And concomitant with this increase in population, there will be an increase in the demands on the marine resources. These facts in conjunction with the recent upsurge in awareness of the dangers of environmental damage have underscored the need to understand the ecological systems of the coastal waters.

The research plan for the SCCWRP, devised jointly by the Project Manager and the members of the Consulting Board, will serve to guide the work of the project toward the objectives stated earlier. The work will be divided into three phases. Phase I, provisionally continuing until the end of 1970, will involve the review and evalua-

tion of all pertinent existing data. Phase II, planned for 1971, will involve the acquisition of new data where it is considered necessary to complete the ecological evaluation. This second phase is expected to involve the largest expenditures in this approximately one million dollar program, since the use of oceanographic vessels, chemical laboratories, and data processing equipment are envisaged as shown on the chart. Phase III, tentatively scheduled for 1972, will concern the analysis of all the data and the preparation of a final report. The report is expected to suggest alternate solutions for the problems of total environmental usage, to recommend criteria for wastewater discharge, and to outline further research to assure protection of the environment.

The remainder of this discussion of the research plan is directed primarily to the technically oriented reader. It is a more detailed discussion of Phase I only.

A series of tasks have been created to implement Phase I. The approach has been to provide for the Southern California coastal waters, an inventory of the organisms, the physical-chemical-geological aspects, and the human influences, as well as to investigate the interactions of these factors. Typical tasks are outlined below.

Inventory of Organisms

1) To report on the marine organisms of significance; to describe them as to temporal and spatial variability; and to examine how data concerning them is acquired.

2) To determine the desirability of examining the relationships within and among marine communities to study the effects of wastewater discharge.

3) To determine the importance of substances, for example phosphates, that stimulate or suppress the growth of marine organisms.

Inventory of Physical, Chemical, and Geological Aspects

1) To record the general nature of the circulation patterns of the Southern California Bight and its contributing waters, including near-shore transport as affecting wastewater discharges.

2) To determine the nature and transport of substances which enter the marine environment from the land, the air, and from ships.

3) To determine the physical and chemical characteristics of all water masses that contribute to the Southern California coastal waters and to describe the manner in which these contributing waters are distributed.

4) To study the marine sediments.

Inventory of Human Influences

1) To investigate the types, amounts, management, and monitoring of waste discharges resulting from human activities.

2) To assess the presence and importance of pathogenic viruses and bacteria and other toxic substances in coastal waters and their relationship to human health.

3) To investigate the aesthetic aspects of wastewater discharge.

Interactions Between Organisms and Oceanographic Factors

1) To establish the general range of irregularly occurring changes in water temperature, circulation, and chemistry; and in the abundance and composition of marine populations for the purpose of differentiating these from the effects of wastewater discharge.

2) To report on the biological, physical, chemical, and geological processes which influence the appearance and composition of the ocean bottom.

Interactions Between Human and Oceanographic Factors

1) To identify and assess parameters for the measurement of pollutants.

2) To determine the energy inputs and the oxygen requirements of the organic elements of wastewater discharge.

Interactions of All Factors

1) To report on the background of major pollutants and the methods by which pollution problems have been treated.

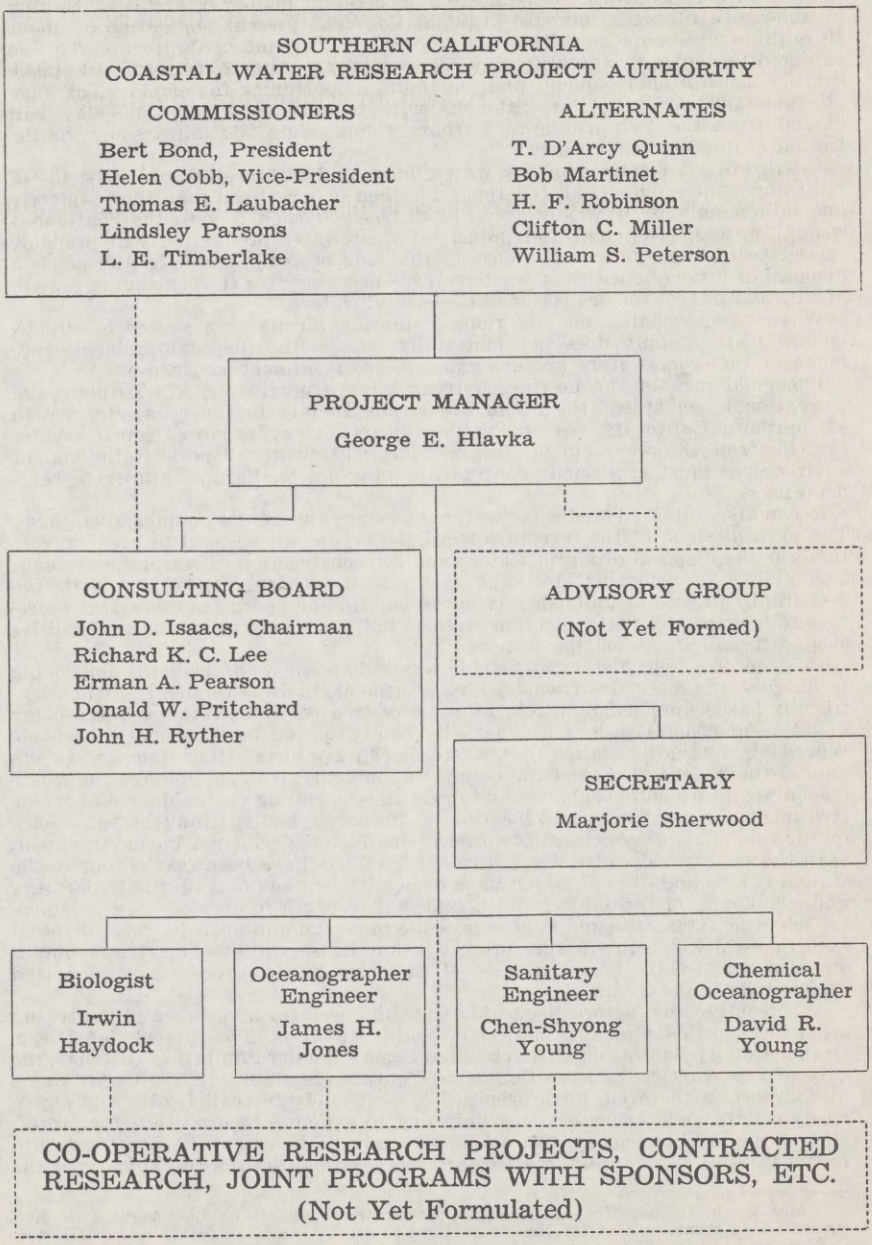
2) To elucidate the importance of surface circulation and surface organisms on the transport of pollutants.

3) To review, recommend, and act on the problems of toxic metals in the sea as related to wastewater discharge.

4) To review, recommend, and act on the problems of toxic organic materials as related to wastewater discharge.

As this type of information is gathered during Phase I and is organized and evaluated, more specific plans will be formulated for Phases II and III of the project.

ORGANIZATION CHART
SOUTHERN CALIFORNIA
COASTAL WATER RESEARCH PROJECT



Southern California Coastal Water Research Project

(By John D. Parkhurst*)

Introduction

The Southern California coastal area has a recent history of and is continuing to undergo a fantastic increase in population. The present population of about 10 million represents more than 50 percent of the total in California. This is expected to double by the year 2010. The temperate climate, recreational opportunities, coastal environment, and expanding opportunity for employment have all combined to create a megalopolis with boundaries which some day will extend from the Ventura-Santa Barbara County line 200 miles south to the United States-Mexican border.

Intelligent management of the water, land, and air resources has become of vital importance. This is all too apparent when it is realized that approximately one billion gallons of wastewater are discharged each day to the contiguous coastal waters. Municipal and industrial wastewater production will probably exceed two billion gallons per day by the year of 2010. The safe and efficient disposal of large quantities of wastewater is necessary for the continuing growth and is essential for the protection of the coastal waters.

Wastewater reclamation and reuse while significant as a source of supplemental water supply does not materially change the disposal problem since much of the wastewaters are not amenable to treatment and reuse.

Beneficial uses of the marine environment are invaluable. The esthetic and recreational benefits of the ocean are strong factors in the economic growth of Southern California. Advancing marine technology promises much greater rewards from the oceans in the future. Since wastewater disposal to the marine environment must necessarily continue, it must not be disruptive to these beneficial uses.

Ocean disposal of treated wastewaters has many inherent economic advantages. The natural slope of the terrain toward the ocean can be used to great advantage for the disposal of storm waters and for construction of sewerage systems. The ability to construct drainage facilities in general conformity with the topography presents significant savings in capital and operation costs. It is therefore to be expected that collection systems will terminate at treatment facilities located proximate to marine waters.

In spite of a long history of marine waste disposal with gradually improving techniques and methods of wastewater treatment, there is relatively little scientifically based knowledge on the influence of treated wastewater on the ecoolgy of adjacent coastal waters. In fact, the true situation has frequently been obscured by conflicting claims that waste discharges have either damaged or enhanced the beneficial uses of the ocean. Undoubtedly, it is possible for the waste discharges to do both—enhance and degrade—depending on the degree of waste treatment, the conditions and location of discharge, and the influence of wastes on the fundamental ecological factors which affect a specific marine environment.

In the past two decades, limited research efforts have been carried out in the United States and abroad which have been sufficient to point up the importance and complexity of the subject. With sufficient research to develop the fundamental scientific facts, it would appear possible to design and operate waste disposal facilities which not only assure protection and conservation of marine resources but also enhance the beneficial uses of these resources by promoting increased productivity in the ocean.

As a result of the factors discussed above, the need for updating and improving scientific knowledge on this subject is readily apparent. The City of San Diego, Orange County Sanitation Districts, Los Angeles County Sanitation Districts, the City of Los Angeles, and the County of Ventura, representing five major waste dischargers in the area, have proposed a joint study to realistically and objectively collate and review existing data and to examine future needs for protection of the marine ecology. The proposed study, to be called the Southern California Coastal Water Research Project, has been offered the full support of the

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*Chief Engineer and General Manager, Sanitation Districts of Los Angeles County. Presented at Seminar, Coastal Resources Development, State of California. Long Beach, California, June 24, 1969.

State Water Resources Control Board and the Federal Water Pollution Control Administration.

BACKGROUND

The area to be studied includes the near-shore ocean area from the Ventura-Santa Barbara county line on the north to the United States-Mexico border on the south. Approximately 230 miles of coastline and four counties (Ventura, Los Angeles, Orange, and San Diego) are included in the area. Estimates indicate that the present population of about 10 million will probably double during the next forty years.

The two major sewerage authorities in Los Angeles County are among the largest agencies in the world discharging treated wastewater into coastal waters. The City of Los Angeles discharges approximately 340 million gallons per day (mgd) into Santa Monica Bay and the County Sanitation Districts of Los Angeles County discharge approximately 360 mgd into the ocean off Whites Point.

In Orange County, the Orange County Sanitation Districts discharge approximately 120 mgd into the ocean near the Santa Ana River. In addition, five smaller discharges within Orange County originate from the Sunset Beach Sanitary District, the City of Laguna Beach, the South Laguna Sanitary District, the City of San Clemente and the Dana Point Sanitary District.

The major marine discharge in San Diego County emanates from the City of San Diego system, which discharges approximately 80 mgd through a submarine outfall located at Point Loma.

In Ventura County, treated wastewater is discharged by the City of Ventura, the U.S. Navy at Port Hueneme, the Port Hueneme Sanitary District, and the City of Oxnard. These discharges total approximately 17 mgd.

In addition to the aforementioned discharges in the four-county area, isolated industrial wastes are discharged to the marine waters. Although the research project is specifically oriented toward an evaluation of the effects of the major dischargers upon the marine environment, cognizance must also be given to the effect of individual industrial discharges at random locations.

Boundaries of the research project study area will include waters of the mainland shelf and adjoining slopes as far offshore as the study might reveal necessary, but excluding estuaries and enclosed harbors. The study zone incorporates the major biological environment of the near-short coastal area of Southern California in terms of both biomass and diversity of species. It constitutes the zone of minimum water interchange where physical boundaries limit water quantities and create the localized ecological systems toward which this study is directed. It includes all waters influenced by the several agencies marine waste disposal systems.

PROJECT OBJECTIVES

The principal objective of this program is to increase the scientific knowledge of the ecological systems of the near-shore coastal waters and to establish the interrelationships between these systems and treated wastewater discharges. More definite information is urgently needed if future decisions concerning waste discharge into this particular oceanic area are to be based on scientific knowledge rather than speculation. To achieve this goal the following specific objectives have been proposed:

1. The collation and evaluation of presently available data on the ecology of near-shore coastal waters and marine disposal practices. It is anticipated that this evaluation and analysis will lead to the classification of existing environments on the basis of the interrelationship between waste discharge, ecological factors and dependent biological species.

2. The collection of supplemental field and laboratory data as dictated by the results of the evaluation and analysis discussed above.

3. The presentation of findings and conclusions; recommendations on modifying present marine waste disposal and environmental monitoring practices, where required.

ORGANIZATION

The project will be responsible to a commission composed of five members. They will be selected from the governing body of each of the sponsoring agencies.

The commission will appoint a consulting board of five members, one of whom shall be appointed chairman, and all of whom shall have specialized education

and training in the disciplines essential to the study. These disciplines include, but are not necessarily limited to:

Marine Biology
Oceanography
Environmental Engineering
Organic Chemistry
Public Health

The commission will also appoint a project manager under whose general supervision and control the research project will be conducted. This appointment will only be made after the commission has received the recommendation of the consulting board.

Among the duties of the consulting board will be to confer with the project manager and to present to him and to the commission, at their request, procedures for the prosecution of the study. In addition, the consulting board will render to the project manager such technical assistance as may be needed.

Upon recommendation by the project manager and the consulting board, the commission may employ such sanitation experts, marine experts and other staff as may be needed to carry out the project.

COSTS

The cost of the research project shall be borne by the five organizations involved in the venture in direct proportion to the wastewater flow actually discharged to the Pacific Ocean during the previous calendar year by each organization.

It is anticipated that a part of the costs of the research project shall be defrayed by a grant or grants from the Federal Water Pollution Control Administration. The receipt or non-receipt of any such grant or grants, however, will not affect the undertaking of the program.

The total estimated cost for the three-year study period is $1,133,000. Of this total, the expense by study year is broken down as follows:

Study year:	*Cost*
1st	$287,000
2d	448,000
3rd	398,000
Total	1,133,000

It is anticipated that expenditures for personnel will reach about 75 percent of maximum during the first year since the project staff will not be employed until the project term (3 years) has started. Other phases of the work will also be somewhat below peak effort during the first year while a specific work plan is being formulated. Expenditures for data collection will also decline during the third year as more emphasis is placed on preparation of the final report.

PROJECT PLAN

Once the existing data have been assembled, systems analysis and computer processing methods will be used to aid in the identification of ecological factors characteristic of localized oceanic environments. Such factors may include temperature, salinity, dissolved oxygen, nutrient levels, turbidity, currents and bottom characteristics. These ecological factors will be correlated with biological data, such as standing crop and productivity rates, to determine their interrelationship in specific oceanic areas affected and unaffected by waste discharges. The need for systems techniques and electronic data processing is dictated by the mass of data presently available as well as that to be collected during this project. For example, the marine study program of just one of the sponsoring agencies, the City of Los Angeles, includes weekly sampling at twenty-four stations in Santa Monica Bay. Samples of temperature, salinity, plankton, dissolved oxygen, ammonia nitrogen, water color, and several other minor indices have been taken over the past ten years. In addition, the City operated a quarterly trawling program at some 40 stations in Santa Monica Bay for a six-year period from 1957 to 1963. The City of Los Angeles alone can supply more than one million data bits which have not been thoroughly collated. It is anticipated that this evaluation and analysis will lead to recommendations of needed research, changes in existing data collection techniques, and classification of existing environments on the basis of the relationships between waste discharge and ecological factors.

The next step, which will comprise the bulk of the study, is the collection of supplemental field and laboratory data as dictated by the results of the evaluation and analysis. In the labortory, toxicity studies will be conducted to determine cumultive and collective effects of toxicants found in municipal and industrial wastes. Programs will also be run to evaluate the effect of wastewaters with different degrees of treatment on seleced ecological systems.

Field studies will produce data on and evaluate the influence of treated wastewater on the overall productivity of plant and animal life in the ocean. Comparative data on the effects of waste discharges of different types and quantities on defined ecological systems will permit correlation of cause and effects. Elements of importance in the marine environment which must be investigated include, but are not limited to, temperature, light, turbidity, salinity, water movement, nutrients, biological species, primary productivity (plants) and associated food chains (animals) and sediments.

FACILITIES AVAILABLE

The agencies sponsoring this project each maintain marine waste disposal systems. Shore and shipboard monitoring programs and laboratories for analysis of samples from the monitoring program are currently functioning. These facilities will all be available for data collection and analysis. Experienced personnel that have been responsible for the monitoring, research, and survey programs will be available for the project. The Los Angeles County Sanitation Districts, City of Los Angeles and City of San Diego each own and operate marine survey vessels. The County Sanitation District of Orange County regularly charter a local vessel.

SUMMARY

The ever-expanding demands on coastal waters for recreation and valuable commodities have made it necessary to acquire more scientific knowledge in the area of waste disposal to the marine environment. The Southern California Coastal Water Research Project is the first attempt to acquire this knowledge on a regional basis. The findings of the project should provide a basis for evaluating current programs and also a planning guide for the future. The program represents a positive step in the protection of the marine resource.

PROSPECTUS

SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT

A. Introduction

One of the largest and most rapidly expanding urban complexes in the United States is located along the Southern California coastal area. Within a relatively few years development along the coastal plain will be continuous from Ventura County to the Mexican border. The coastal environment, the temperate climate, dependable water supply, and adequate waste disposal and other services all combine to assure continued dynamic growth, and even today approximately 10 million people, or about 50% of the population of California, reside in this area. Intelligent management of the water, land and air resources of the area is of vital importance. The marine environment as part of the water resource is of great value to this area and must be properly managed as must our other resources.

B. Need for research project

In spite of a long history of marine waste disposal with gradually improving techniques and methods of wastewater treatment, there is relatively little scientifically based knowledge on the influence of treated wastewater on the ecology of adjacent coastal waters. In fact, the true situation has frequently been obscured by conflicting claims that waste discharges have damaged or enhanced the beneficial uses of the ocean. Undoubtedly it is possible for the waste discharges to do both—enhance and degrade—depending on the degree of waste treatment, the conditions and location of discharge, and the influence of wastes on the fundamental ecological factors which affect a specific marine environment.

In the past two decades, beginning research efforts have been carried out in the United States and abroad which have been sufficient to point up the importance and complexity of the subject. With sufficient research to develop the fundamental scientific facts, it should be possible to design and operate waste disposal facilities which not only guarantee protection and conservation of marine

resources but also enhance the beneficial uses of these resources by promoting increased productivity in the ocean.

As a result of the factors discussed above, all concerned with the discharge of treated wastewater to marine waters have recognized the need for updating and improving scientific knowledge on this subject. Despite the extensive research studies already completed or in progress, the present situation may be described as confusing and in urgent need of a comprehensive collation and evaluation of the state of existing knowledge. The results of such an evaluation will undoubtedly point out areas in which additional research is needed.

The urgency of this investigation is apparent. A rapidly expanding population will inevitably result in increased disposal of treated wastewater to the marine environment. The intelligent planning, design and operation of disposal systems is dependent on the extent of scientific knowledge available.

C. Background

The area to be studied includes the near-shore ocean area between the Ventura-Santa Barbara county line on the north to the United States-Mexico border on the south. Approximately 230 miles of coastline and 4 counties (Ventura, Los Angeles, Orange, and San Diego) are included in the area. Estimates indicate that the present population of about 10 million people will probably double during the next 40 years.

The two major sewerage authorities in Los Angeles County are among the largest agencies in the world discharging treated waters into coastal waters. The City of Los Angeles discharges approximately 340 million gallons per day (MGD) into Santa Monica Bay and the County Sanitation Districts of Los Angeles County discharge approximately 360 MGD into the ocean off Whites Point.

In Orange County, the Orange County Sanitation Districts discharge approximately 120 MGD into the ocean near the Santa Ana River. In addition, five smaller discharges within Orange County originate from the Sunset Beach Sanitary District, the City of Laguna Beach, the South Laguna Sanitary District, the City of San Clemente and the Dana Point Sanitary District.

The major marine discharge in San Diego County emanates from the City of San Diego system, which discharges approximately 80 MGD through a submarine outfall located off Point Loma.

In Ventura, County, treated wastewater is discharged by the City of Ventura, the U.S. Navy at Port Hueneme, the Port Hueneme Sanitary District, and the City of Oxnard. These discharges total approximately 17 MGD.

A complete listing of municipal discharges within the boundaries of the study area is attached as Appendix "A".

In addition to the aforementioned discharges in the four-county area, numerous industrial wastes are discharged to the marine waters. Although the research project is specifically oriented toward an evaluation of the effects of treated municipal wastes upon the marine environment, cognizance must also be given to the effect of industrial discharges both in areas affected by municipal discharges and in areas regarded as unaffected by municipal discharges.

Boundaries of the research project study area will include waters of the mainland shelf and adjoining slopes as far off-shore as the study might reveal necessary, but excluding estuaries and enclosed harbors. This water zone incorporates the major biological environment of the near-shore coastal area of Southern California in terms of both biomass and diversity of species. It constitutes the zone of minimum water interchange where physical boundaries limit water quantities and create the localized ecological systems toward which this study is directed. It includes all waters influenced by marine waste disposal systems.

The area has been studied by many oceanographers, biologists, and engineers during recent years. Considerable data on the physical, chemical and biological characterists of this area can be obtained from the agencies involved. In addition, many other organizations have conducted studies which should provide background data. A preliminary listing of such organizations is attached as Appendix "B". Other prominent data sources will undoubtedly be found during the course of the preliminary investigation.

D. Project objectives

The principal objective of this program is to increase the scientific knowledge of the ecological systems of the near-shore coastal waters and to establish the interrelationships between these systems and treated wastewater discharges. More definitive information is urgently needed if future decisions concerning

waste discharge into this particular oceanic area are to be based on scientific knowledge rather than speculation. To achieve this goal the following specific objectives are proposed:

1. The collation and evaluation of presently available data on the ecology of near-shore coastal waters and marine disposal practices. It is anticipated that this evaluation and analysis will lead to the classification of existing environments on the basis of the interrelationship between waste discharge, ecological factors and dependent biological species.

2. The collection of supplemental field and laboratory data as dictated by the results of the evaluation and analysis discussed above.

3. The presentation of findings and conclusions: recommendations on modifying present marine waste disposal and environmental monitoring practices, where required.

E. Plan of operation

A governing body of elected officials will be established to oversee the project. They will appoint a consulting board comprised of persons who are competent in the related disciplines to provide objective guidance, conceive specific goals and procedures, review findings and author a final report. Related disciplines should include but not necessarily be limited to marine biology, oceanography, marine chemistry, resources management, and environmental health and engineering. Consulting board members will be selected on the basis of experience, competency and objectivity who are not members of sponsoring agencies.

The governing body, based on the recommendations of the consulting board. will appoint a project manager and supporting professional staff to conduct the study. This group will be supported by the existing staffs and oceanographic data collecting resources of the sponsoring agencies.

The study will be prosecuted in the following three phases:

Phase I—Collation and evaluation of existing data

a. The data sources mentioned in a previous section and listed in the Appendix will be utilized as sources for existing data. Once the existing data have been assembled, systems analysis and computer processing methods will be used to collate the data and aid in the identification of ecological factors characteristic of localized oceanic environments. Such factors may include temperature, salinity, dissolved oxygen, nutrient levels, turbidity, currents, bottom characteristics, etc. These ecological factors will be correlated with biological data, such as standing crop and productivity rates, to determine their interrelationship in specific oceanic areas affected and unaffected by waste discharges. The need for systems techniques and electronic data processing is dictated by the mass of data presently available as well as that to be collected during this project. For example, the marine study program of just one of the sponsoring agencies, the City of Los Angeles, includes weekly sampling at twenty-four stations in Santa Monica Bay. Samples of temperature, salinity, plankton, dissolved oxygen, ammonia nitrogen, water color, and several other minor indices have been taken over the past 10 years. In addition, the City operated a quarterly trawling program at some 40 stations in Santa Monica Bay for a 6-year period from 1957 to 1963. The City of Los Anges alone can supply more than one million data bits which has not been thoroughly collated.

b. After reviewing the existing data findings will be presented, and recommendations of needed research and changes in existing data collection techniques will be made.

Phase II—Collection and evaluation of new data

a. Refine and complete the classification of ecological systems in terms of dependent biological species and the physical characteristics of the environment as described in Phase 1. This is expected to identify the indicator organisms which can be used to determine the effect of treated wastewater upon the marine environment.

b. Evaluate in the laboratory the effect of wastewaters with different degrees of treatment on the ecological systems of interest.

c. Collect data on and evaluate the influence of treated waste water on the overall productivity of plant and animal life in the ocean. Comparative data on the effects of waste discharges of different types and quantities on gradually defined ecological systems will permit correlation of cause and effects. Elements of importance in the marine environment which must be investigated include, but are not limited to, temperature, light, turbidity, salinity, water movement, nutri-

ents, biological species, primary nutrients, biological species, primary productivity (plants) and associated food chains (animals) and sediments.

d. Revise data collection program as new information becomes available.

Phase III—Preparation of findings and recommendations

a. A final report of findings and recommendations will be prepared by the consulting board. In addition, progress reports will be submitted to each of the agencies sponsoring the project on a schedule to be determined, but at intervals of not more than one year.

F. Facilities available

The agencies sponsoring this project each maintain marine waste disposal systems. Shore and shipboard monitoring programs and laboratories for analysis of samples from the monitoring program are currently functioning. These facilities will all be available for data collection and analysis. Experienced personnel that have been responsible for the monitoring, research, and survey programs will be available for this research project. The Los Angeles County Sanitation Districts and City of Los Angeles each own and operate marine survey vessels. See Appendix "C".

G. Cost estimate

The total estimated cost for a three-year study period is $1,133,000. Of this total, the expense by study year is broken down as follows:

Study year:	Cost
1st	$287,000
2d	448,000
3d	398,000
Total	1,133,000

It is anticipated that expenditures for personnel will reach about 75 percent of maximum during the first year since the project staff will not be employed until the project term (3 years) has started. Other phases of the work will also be somewhat below peak effort during the first year while a specific work plan is being formulated. Expenditures for data collection will also decline during the third year as more emphasis is placed on preparation of the first report. Details of the cost estimate are included in Appendix "D".

Appendix A—Marine Discharges From Municipalities in Southern California

[Flow in million gallons per day]

	Depth (feet)	Length (feet)	1968 estimated flow (MGD)
VENTURA COUNTY			
1. City of Ventura	35	3,000	2.0
2. U.S. Navy—Port Hueneme		500	1.0
3. Port Hueneme Sanitary District	50	4,400	2.0
4. City of Oxnard	65	6,000	12.0
LOS ANGELES COUNTY			
5. City of Los Angeles (Hyperion)	195	26,000	340.0
	320	37,000	
6. Los Angeles County sanitation districts	110	5,000	360.0
	165	7,500	
	210	10,400	
	190	11,900	
ORANGE COUNTY			
7. Sunset Beach Sanitary District	15	1,300	0.2
8. Orange County sanitation districts	55	6,800	120.0
	195	27,400	
9. City of Laguna Beach	80	3,000	2.0
10. South Laguna Sanitary District	60	1,700	0.5
11. Dana Point Sanitary District	20	2,000	0.7
12. City of San Clemente	15	800	1.6
SAN DIEGO COUNTY			
13. Canyon De Las Encinas (Joint power)		5,300	3.0
14. San Elijo (Joint power)		4,000	1.0
15. City of San Diego	210	14,200	80.0

Appendix B—Data Sources for Coastal Water Research Project

1. Allan Hancock Foundation—University of Southern California.
2. Scripps Institution of Oceanography.
3. California Institute of Technology.
4. University of California.
5. Los Angeles City, Bureau of Sanitation.
6. Los Angeles County, Department of Recreation and Parks.
7. Los Angeles County Sanitation Districts.
8. Orange County Sanitation Districts.
9. City of San Diego.
10. California Department of Fish and Game Laboratory, Terminal Island.
11. California Water Resources Board.
12. Navy Electronics Laboratory, San Diego.
13. U.S. Navy Pacific Missile Range, Point Mugu.
14. U.S. Army Corps of Engineers.
15. U.S. Coast and Geodetic Survey.
16. U.S. Weather Bureau.

Appendix C—Ocean Survey Vessels Available to Project

Los Angeles County Sanitation Districts Survey Vessels

1. PAM-A-LEE II (existing vessel—to be replaced). Length—42 ft., beam—15 ft., draft—5 ft. Displacement—48,000 lbs. Speed—8.5 knots. Radar, recording fathometer, radio.

Survey equipment:

a. Hydraulic winches, 3,000 ft. capacity.
b. Bathythermographs (0–200 & 0–450 ft.).
c. Frautchy bottles.
d. Sediment corer.
e. Paravane (for in motion sampling of water from depths down to 200 ft.).
f. Temperature probe, recording.
g. Transmissometer probe, recording.
h. Salinometer.
i. Savonius current meter with deck read out of direction and velocity.
j. Portable savonius current meter with portable read out of direction, velocity and water temperature.
k. Two independent insitu savonius current meters with integral data logging systems.
l. Secchi disc.
m. Directional anemometer.
n. Humidity meter.
o. Barometer.
p. Under water closed circuit TV system.

2. Launch: length—16′ 7″ equipped with outboard motor.
3. Replacement vessel for PAM-A-LEE II. Length—65 ft. beam—19 ft. Speed—14 knots. Survey equipment to be transferred from PAM-A-LEE II.

City of Los Angeles Survey Vessel

4. Marine Surveyor. Length—65 ft., beam—19 ft. Displacement—92,000 lbs., speed—12 knots. Radar, depth finder, radio.

Survey equipment:

a. Sampling winch.
b. Frautchy bottles.
c. Bathythermograph.
d. Secchi disc.
e. Bottom corer.
f. Bottom snapper.
g. Ekman current meter.
h. Savonius current meter.
i. Plankton net.

APPENDIX D—ESTIMATED ANNUAL COSTS FOR COASTAL WATER RESEARCH PROJECT

	1st year, July 1, 1969 to June 30, 1970	2d year, July 1, 1970 to June 30, 1971	3d year, July 1, 1971 to June 30, 1972	Total
1. Consulting board (fees and expenses)	$20,000	$20,000	$20,000	$60,000
2. Project manager (salary and expenses)	20,000	30,000	30,000	80,000
3. Professional staff (salaries and expenses)	50,000	90,000	90,000	230,000
4. Professional support (agencies) (salaries)	33,000	35,000	35,000	103,000
5. Support technicians (salaries)	20,000	30,000	30,000	80,000
6. Special consultants (fees and expenses)	5,000	5,000	20,000	30,000
7. Vessels (fully operated)	35,000	105,000	53,000	193,000
8. Equipment (new and rental)	30,000	20,000	10,000	60,000
9. Laboratory services (salaries and supplies)	14,000	56,000	28,000	98,000
10. Computer services (salary and rental)	15,000	10,000	20,000	45,000
11. Secretary and reports	10,000	10,000	25,000	45,000
12. Office (rental and supplies)	5,000	7,000	7,000	19,000
13. Travel and mileage	10,000	10,000	10,000	30,000
14. Clerical (salary)	20,000	20,000	20,000	60,000
Total	287,000	448,000	398,000	1,133,000

JOINT POWERS AGREEMENT CREATING AN AGENCY TO BE KNOWN AS THE SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT AUTHORITY

This agreement, made and entered into this 20th day of October, 1969, by and between the City of Los Angeles, a municipal corporation, (hereinafter called "Los Angeles"), the County Sanitation District No. 1 of Orange County organized and existing by virtue of the laws of the State of California, to-wit: Division 5, Part 3, Chapter 3, Article 1 (commencing with Section 4700) of the Health and Safety Code, (hereinafter called "Orange County District"), the City of San Diego, a municipal corporation, (hereinafter called "San Diego"), County Sanitation District No. 2 of Los Angeles County organized and existing by virtue of the laws of the State of California, to-wit: Division 5, Part 3, Chapter 3, Article 1 (commencing with Section 4700) of the Health and Safety Code, (hereinafter called "Los Angeles County District") and Ventura County, a body corporate and politic of the State of California, (hereinafter called "Ventura"):

WITNESSETH:

Whereas, each of the foregoing public agencies is empowered to survey, study and report concerning sanitation and matters relating to sewage treatment and disposal;

Whereas, each of the foregoing public agencies is desirous of jointly organizing, funding and conducting such a study;

Whereas, each of the foregoing public agencies is desirous hereby to exercise jointly a power common to all.

Now, therefore, in consideration of the mutual promises, covenants and conditions hereinafter contained, the parties agree as follows:

1. PURPOSE

The purpose of this Agreement is to create an agency as a public entity separate and apart from the parties to this Agreement to administer and exercise such Agreement, the purpose of which is to increase the scientific knowledge of the ecological systems to insure protection and conservation of the marine resources and to study the interrelationships of treated waste water discharges with the ecology, all leading to the enhancement of the marine environment.

2. CREATION OF AUTHORITY

Pursuant to Chapter 5, Division 7 of Title 1 (commencing with Government Code Section 6500 et seq.,) there is hereby created an agency as a public entity, separate and apart from the signatories of this Agreement to be known as "The Southern California Coastal Water Research Project Authority", herein called Authority. Such agency shall administer and execute this Agreement.

3. PHYSICAL BOUNDARIES

The physical boundaries of the study contemplated by this Agreement shall include coastal waters from the Ventura-Santa Barbara County line to the Mexican border, excluding the tidal prisms of estuaries. The off-shore boundary shall extend to, but shall not necessarily be limited to, the outer edge of the coastal shelf.

Within this contemplated study area, waters presently exist which are either unaffected by treated waste discharges or where varying amounts of treated waste waters are being discharged.

4. ORGANIZATION

Such Authority shall be a Commission composed of five (5) members serving in their individual capacities as members of such Commission. The governing body of each such entity which is a party to this Agreement shall appoint one person as a commissioner and one person as an alternate to act as a member of the Commission in the absence of the commissioner appointed. The Commission at its first meeting and thereafter at its first meeting in July of each succeeding year shall elect a President and a Vice-President from its members.

Vacancies in the membership of the Commission shall be filled promptly by the governing body of the signatory parties to this Agreement for the unexpired term of the vacancy. All Commissioners shall be appointed for a term of three (3) years or until this Agreement is terminated, whichever first occurs to serve at the pleasure of the appointing Authority.

The Commission shall adopt rules for conducting its meetings and other business and any action taken by the Commission shall be taken by at least three (3) members entitled to act. Three (3) members shall constitute a quorum.

The members of the Commission and each alternate attending shall receive as expenses $50 per meeting not to exceed $100 per month where permitted by law.

The Commission shall meet at least twice in each calendar year and at such appropriate intervals as is necessary to conduct the business of the Authority; and all meetings shall be subject to the Ralph M. Brown Act commencing with Section 54950 of the Government Code of the State of California.

5. CONSULTING BOARD

a. The Commission shall appoint an Advisory Board to be known as the Consulting Board consisting of five (5) members all of whom shall have specialized education and training in the disciplines essential to the study contemplated hereby. Without limiting its power to appoint any individual deemed qualified to discharge the duties of a member of the Consulting Board, the Commission, whenever possible, shall make a reasonable effort to provide a Consulting Board containing members educated and experienced in the following fields of study:

Marine Biology
Oceanography
Environmental Engineering
Organic Chemistry
Public Health

b. The Commission shall fix the amount of compensation per day to be paid each member of the Consulting Board for his services provided that such compensation shall not exceed $250 per day. In addition, each member of the Consulting Board shall be entitled to reimbursement for actual expenses reasonably and necessarily incurred by him and as approved by the Commission.

c. It shall be the duty of the Consulting Board to confer with the Project Manager and to present to him and to the Commission at their request procedures for the prosecution of the study contemplated hereby. In addition, the Consulting Board shall render to the Project Manager and the Commission such technical assistance as may be agreed upon and directed by the Commission.

The Commission may from time to time request of the Consulting Board reports relating to any aspect of the study being conducted in accordance with

this Agreement at a cost to be agreed upon in writing by the Commission and the Consulting Board prior to commencement of any such report.

d. The members of the Consulting Board shall serve during the term of this Agreement subject to the right of the Commission to remove any such member with or without cause.

6. PROJECT MANAGER

The Commission shall appoint a Project Manager under whose general supervision and control the research project shall be conducted. Such appointment shall only be made after the Commission has received the recommendation of the Consulting Board, although such recommendation will not limit the Commission in its powers of apponitment.

Such Project Manager shall be appointed subject to the right of the Commission to remove him at any time with or without cause. The Commission shall fix his compensation; provided, however, that said compensation shall not exceed $30,000 per year.

7. STAFF

Upon recommendation by the Project Manager, the Commission may employ or contract for such sanitation experts, marine experts and other staff as may reasonably be necessary to carry into effect the purposes of this Agreement.

8. RESPONSIBILITIES, SIGNATORY PARTIES

Los Angeles, Orange County District, San Diego, Los Angeles County District and Ventura each recognize that the benefits to be derived from the research project contemplated hereby will not be realized for an indeterminate period; and that it is presently impossible to determine the extent to which each of the foregoing public agencies shall be benefited thereby. It is therefore agreed that the costs of the research project shall be borne, except as hereinafter provided, by Los Angeles, Orange County District, San Diego, Los Angeles County District, and Ventura in direct proportion to the flow from the sewage treatment plants under the authority of each signatory to this Agreement actually discharged to the Pacific Ocean during the previous fiscal year.

Flows, fiscal year 1967–68:	*Million gallons*
Los Angeles County District	124, 107
Los Angeles	118, 305
Orange County District	42, 757
San Diego	29, 106
Ventura	6, 213

It is anticipated that a part of the costs of the research project shall be defrayed by a grant or grants from the Federal Water Pollution Control Administration. The receipt or non-receipt of any such grant or grants, however, shall not affect the validity of this Agreement nor any of the obligations imposed hereby.

The Commission shall yearly on or before the first Monday of March, adopt and issue a financial report projecting the funds necessary to maintain and operate the research project for the forthcoming fiscal year being from July 1 to and including June 30 of the following calendar year. Said report shall be made and presented to the governing bodies of Los Angeles, Orange County District, San Diego, Los Angeles County District, and Ventura. The report shall, among other things, contain a statement of anticipated revenue from outside grants for the forthcoming fiscal year.

Los Angeles, Orange County District, San Diego, Los Angeles County District, and Ventura shall on or before the first day of July of the then current fiscal year use its best efforts to pay to the Authority the net funds requested, the contribution of each agency being determined on the basis of flow as prescribed in paragraph 8 hereof. None of the public agencies signatory to this Agreement shall be required or requested to expend in any one fiscal year more than its prorated share based on a total annual Commission budget of not to exceed $500,000.

In the event that any of the signatories is unable to pay its pro rata share of the budget expense of the Commission, then this Agreement shall terminate upon notification of such inability to the Commission and to the other signatory

parties by the disabled signatory; and this provision shall be a limitation upon the Commission's right to contract beyond any one fiscal year.

9. SCOPE AND CONDUCT OF STUDY

It is contemplated that the research program provided hereby shall be accomplished over a period of three (3) fiscal years and shall be prosecuted in three (3) phases as follows:

Phase I—Review of Existing Data;

Phase II—Collection of New Data;

Phase III—Report and Recommendations.

The Commission shall from time to time but not less than once each year submit progress reports to the governing bodies of each of the signatories of this Agreement and provide ten (10) copies to each signatory to this Agreement.

Upon completion of the research project, the Commission shall submit a final report to each signatory to this Agreement and provide ten (10) copies to each signatory to this Agreement; and all right, title and interest in said report and all materials prepared relative thereto shall pass and belong to the signatories as property in common and may be produced, reproduced and distributed by each signatory without limitation.

10. AGENCIES OF AUTHORITY

Los Angeles County District is appointed the contracting and purchasing agent for the project. Said District shall set up a special account against which will be charged all costs to said District incurred for materials, services, rentals, or other expenses of the project.

Said District shall bill the Authority for its expenses quarterly and all such billing shall be paid within ten (10) days of receipt.

Los Angeles County District shall furnish all accounting, secretarial, purchasing and administrative services.

The administrative procedures and policies of Los Angeles County District are hereby adopted as the administrative policies and procedures of the Authority.

The Secretary of Los Angeles County District is appointed ex-officio Secretary, the County Auditor as ex-officio Auditor, the County Treasurer as ex-officio Treasurer.

Legal assistance shall be provided by the attorney for the Los Angeles County District.

Said Los Angeles County District along with the Authority shall be strictly accountable for all funds received, held and disbursed by each and shall render an annual report as to the same not later than August 1 of each year during the term of this Agreement.

11. TERM

The terms of this Agreement and of the research project contemplated hereby shall be three (3) calendar years from the date hereof.

12. ACCOUNTING

The Auditor of the Authority shall establish and maintain such funds and accounts as may be required by good accounting practice. The Treasurer of the Authority shall have custody of the funds of the Authority, and disbursement shall be made by the Auditor in accordance with procedures therefor prescribed. Funds of the Authority in the custody of the Treasurer thereof shall be deposited in the County treasury and shall be kept separate and apart from the funds of County and the District. Any earnings on the funds of the Authority shall be credited to and be a part of the funds of the Authority.

The fiscal year of the Authority shall begin on the first day of July of each year and shall end on the thirtieth day of June of the following year.

13. POWERS AND DUTIES OF THE AUTHORITY

The Authority shall and is hereby authorized in its own name to do all things necessary and desirable (subject to the limitations provided in this Agreement)

to carry out the purposes of this Agreement including but not limited to the following:

a. To make and enter contracts;

b. To employ agents and employees;

c. To acquire, construct, manage, maintain or operate any buildings, works or improvements;

d. To acquire, hold or dispose of property;

e. To incur debts, liabilities and obligations which shall not constitute the debts, liabilities or obligations of any of the signatories to this Agreement; and

f. To sue and be sued in its own name.

The Authority is limited from issuing revenue bonds or otherwise incurring indebtedness as provided in Article 2, Chapter 2, Division 7, Title 1 (commencing with Section 6540 of the Government Code).

14. DISPOSITION OF PROPERTY AND SURPLUS FUNDS

At the termination of this Agreement, any and all property, funds, assets and interests therein of the Authority shall become the property of and be distributed to the signatories to this Agreement in the same proportion as the signatories have contributed to the total cost of the project except as otherwise herein provided.

15. PRIVILEGES AND IMMUNITIES

All of the privileges and immunities from liability, exemptions from laws, ordinances and rules, all pension, relief, disability, workmen's compensation, and other benefits which apply to the activities of officers, agents or employees of any of the public agencies which are signatories to this Agreement when performing their respective functions within the territorial limits of their respective public agencies, shall apply to them to the same degree and extent while engaged in the performance of any of their functions and duties extra-territorially under the provisions of this Agreement.

16. MISCELLANEOUS

The section headings herein are for convenience only and are not to be construed as modifying or governing the language in the section referred to.

17. PARTIAL INVALIDITY

If any one or more of the terms, provisions, promises, covenants or conditions of this Agreement shall to any extent be adjudged invalid, unenforceable, void or voidable for any reason whatsoever by a court of competent jurisdiction each and all of the remaining terms, provisions, promises, covenants and conditions of this Agreement shall not be affected thereby, and shall be valid and enforceable to the fullest extent permitted by law.

18. SUCCESSORS

This Agreement shall be binding upon and shall inure to the benefit of the successors of the parties.

19. INDEMNIFICATION LIABILITY AND INSURANCE

a. Third Party liability insurance naming each signatory as an additional insured party, shall be carried during the entire term of this Agreement in kind and in such amounts as is presently being carried by the Los Angeles County District; the premiums shall be paid by the Commission.

b. Each signatory agrees to indemnify and hold harmless every other signatory to this Agreement and each of their officers, agents and employees free from any cost or liability imposed upon any other signatory, their officers, agents or employees arising out of any acts or omissions of its own officers, agents or em-

ployees, or imposed upon any other signatory or Authority by virtue of Government Code Section 895.2.

Approved as to form and legality: October 17, 1969.

ROGER ARNEBERGH, *City Attorney.*
By ———, ———, *Deputy.*
THE CITY OF LOS ANGELES,
By ———, ———,
President City Council.

Attest:

Rex E. Layton, *City Clerk.*
By ———, ———, *Deputy.*

Approved as to form and legality:

———, ———.
COUNTY SANITATION DISTRICT
NO. 1 OF ORANGE COUNTY,
By Lorin Griset, *Chairman.*

Attest:

FRED A. HARPER, *Secretary.*

Approved as to form and legality:

JOHN W. WITT, *City Attorney,*
By STUART H. SWEET, *Deputy City Attorney.*
THE CITY OF SAN DIEGO,
By Walter Hahn Jr.,
City Manager.

Approved as to form and legality:

———, ———.
COUNTY SANITATION DISTRICT
NO. 2 OF LOS ANGELES COUNTY,
By Burton W. Chace, *Chairman.*

Attest:

J. R. Foster, *Secretary.*

Approved as to form and legality:

J. W. Wissinger.
VENTURA COUNTY
By J. N. Appleton,
Chairman, Board of Supervisors.

STATE UNIVERSITY OF NEW YORK AT STONY BROOK,
OFFICE OF UNIVERSITY RELATIONS,
Stony Brook, N.Y.

(Newsletter from the Florida Coastal Coordinating Council, Randolph Hodges, Chairman, Vincent D. Patton, Joel Kuperberg, Tallahasse, Fla.)

(The purpose of this newsletter is to provide a clearing service for Florida coastal zone matters by disseminating pertinent information to organizations and individuals involved in coastal activities.)

COASTAL COORDINATING COUNCIL ACTIVITIES

The preliminary study on "Escarosa" has been received from the printer and is now being distributed to members of the Cabinet, the Legislature, state agencies and other interested parties.

The CCC planning staff is at work on a number of projects associated with the in-depth "pilot" Coastal Zone Management Plan for Escarosa. Dr. Lee Guernsey is compiling population and housing patterns based on the 1970 Census statistics; Tom Walker is writing the chapter on Coastal Geomorphology in cooperation with the Bureau of Beaches and Shores; and Louis Burney is completing an "inventory of inventories" on Florida's natural resources by counties and regions.

Assignments are being made for various other chapters of the plan. For example, Dr. Robert Vernon, state geologist, has agreed to write the section on Physiography as well as advise on the Geology chapter, most of the data for which already has been summarized by his bureau. Kenneth Woodburn, head of the Survey and Management branch of the Department of Natural

Resources, will write the text for Protection and Preservation of Bays, Estuaries and Wetlands. The Game and Fresh Water Fish Commission has agreed to assign Gordon Spratt to compile the chapter concerning wildlife ecology, and Dr. Alva Burkhalter (DNR) has taken on the assignment of composing the appendix on Aquatic Weeds. The Climatology chapter has been accepted by James Bradley of the National Weather Service in Lakeland.

THE CCC LOOKS AT RESEARCH

The coastal areas of Florida are among the most productive areas for both nature and man. Conflicts between man's activities and the natural environment are becoming commonplace. It is now critical that we attain a balanced development, providing for man's diverse and often conflicting coastline demands while obtaining the greatest long-term social and economic benefits. Of principal consideration must be the maintenance or improvement of food productivity and environmental quality. Coastal development projects, public and private, should be evaluated in terms of need to be waterfront sited.

Research is necessary to provide background data for answers to coastal management policy questions and to indicate options for management decisions in protecting and developing Florida's coastal lands and waters. Included in the duties of the Coastal Coordinating Council is the charge "to coordinate and organize a continuous program of research into problems relating to the coastal zone." In the initial research coordination effort, the CCC is acting as a broker—bringing together those with research needs, capabilities and monies.

During the past three months, Fred Barloga of the CCC staff has been meeting with the designated coastal zone liaison representatives for each state agency in an effort to formulate their research needs. The stated needs have been consolidated into approximately one hundred statements of research and informational requirements: "Florida Coastal Zone Applied Research Needs, A Cursory Review."

Coordination of research efforts is continuing with the CCC staff meeting with representatives of the research community. By early summer, research requirements will be finalized, research proposals from the research community incorporated and the "Coordinated Coastal Zone Research Projects of Florida" published.

For the future of Florida, we can no longer afford to leave problems unresolved or to overlook any problems that are pertinent to our future. The time lag between environmental research and its practical management application has been estimated by various authorities to be between five and twenty years. Such a lag is no longer acceptable. The purpose and the intention of the Florida Coastal Coordinating Council is to make every effort to assure that our outstanding environmental problems are resolved and the findings applied in the shortest possible time.

STATE ACTIVITIES

A report recently released by the State Chamber of Commerce indicates nearly two-thirds of Florida's permanent residents occupy coastal areas comprising only 23 per cent of the state's land, according to a United Press International news story. Other findings announced by C of C Executive Vice President Ronald S. Spencer, Jr., revealed the following statistical increases: (1) The rate of population expansion has spiraled to 45 per cent along Florida's coastal areas in the past ten years, resulting in a current estimated average of 359 persons per sq. mile, as opposed to a calculated 247 in 1960. (2) In Pinellas County, the most densely populated region in the coastal zone, the figure rises to an estimated 1,979 persons per sq. mile, with Dade (1,213), Broward (1,015) and Escambia (819) counties reflecting the next greatest densities. (3) During the last decade, coastal population has climbed from 3.0 million to 4.4 million, compared to a growth of only 23 per cent in the inland areas from 1.8 million to 2.3 million.

The first ENFO Newsletter published by the Environmental Information Center was distributed in mid-April. The Environmental Information Center was established in February 1971 to disseminate information concerning environmental matters in Florida. Initially, the Center is financed by a grant

from the Conservation Foundation of Washington, D.C., and operates under the directorship of William M. Partington, who was formerly with the Florida Audubon Society and the Florida Defenders of the Environment. On April 6, Dr. Lee Guernsey of the CCC staff conferred with Mr. Partington in his Winter Park headquarters, for the primary purpose of establishing effective coordination between efforts of the Center and the CCC. Much of their work is performed by local volunteers who assist in gathering, storing and mailing out materials. At present, the Center is seeking both more volunteers and more materials to facilitate their service capabilities.

The laws controlling coastal zone land use are among the most complex in the entire scope of government. Protection of these productive lands requires a massive review of present legal entanglements. Under the aegis of the University of Miami's Sea Grant Program, decisions on coastal region law are undergoing systematic and extensive research. A preliminary, analytical report on the diverse and interrelated legal problems of the coastal zone has been prepared by Dennis M. O'Connor of the U of M Law School ("Coastal Region Law: A Preliminary Analysis," Dallas, Texas: Offshore Technology Conference, Paper No. OTC 1182). O'Connor pinpoints the most urgent problems of the coastal region requiring public concern as follows: shoreline use and development; inclusive or common uses of water areas; exclusive uses (mainly of seabed); and environmental protection of the shoreline, water quality and atmosphere. One of O'Connor's graduates, Thomas E. Kane, now ocean law consultant for North Carolina, has produced a comprehensive review of the legal implications of the new aquaculture technology (*Aquaculture and the Law*, Miami, Florida: U of M Sea Grant Program, Sea Grant Tech. Bull. #2).

ACTIVITIES IN OTHER STATES

Washington

For the benefit of individuals and organizations who are planning construction in navigable waters, the Seattle District, Army Corps of Engineers, has issued specific guidelines to be met by applicants for structural permits. These guidelines, listed below, pertain to all construction seaward of mean high water:

"Any activities located in water areas (waterward of mean high water line) should require water for their functioning. Such structures as piers, marinas, erosion protection structures and marine shipping facilities fall in this category. Each request for a permit will be judged on its own merit and must meet the criteria of not being contrary to the general public interest.

"Activities which do not require water for their functioning should be located on dry land. Department stores, businesses, restaurants, factories, residences, apartments, offices and similar uses fall in this category."

The above guidelines are significant because initial research by the CCC staff indicates it will be advisable to restrict our remaining unused waterfront land to only those uses absolutely requiring a waterfront location in the public interest. Otherwise, we will soon deplete the remaining shoreline in uses which could have been planned and zoned for in inland locations.

Rhode Island

A study of the Narragansett Bay shoreline, completed at the University of Rhode Island, discloses that only approximately 11 per cent of the shoreline remains available for further development. Professor Harlan C. Lampe, a resource economist and chief investigator for the Sea Grant-financed project, contends that the authority to alter shoreline use in coastal areas is essential for an effective coastal management program. Lampe also recommends that a coastal management program should provide for periodic review of current uses, with the possibility of reimbursing owners of shoreline land when an altered use is deemed advisable. This project is one segment of a larger study of the Rhode Island coastal zone, designed to develop mathematical systems models of Narragansett Bay which would prove relevant to future planning and decision-making on uses of the Bay.

CONGRESSIONAL ACTIVITIES

In a concerted effort to compensate for Budget Office cuts which have reduced significantly the original National Oceanic and Atmospheric Adminis-

tration requests for FY-72 Sea Grant monies, Congressional supporters have introduced legislation adding another $5 million to the $15.2 million asked by the Administration. Leading the movement to maintain insofar as possible the initial funding request level is Rep. Alton Lennon (D-N.C.), aided by 20 cosponsors including Rep. Robert L. F. Sikes (D-Fla.). Sikes is the second ranking Democrat on the House Appropriations Subcommittee to which the legislation has been referred.

SIGNIFICANT PUBLICATIONS RECEIVED BY THE COASTAL COORDINATING COUNCIL IN APRIL

Alberts, J., H. Mattraw, R. Harriss, and A. Hanke, July 1970. *Studies on the Geochemistry and Hydrography of the Charlotte Harbor Estuary, Florida.*

Amidon, Elliott L., 1966. *MIADS2 . . . An Alphanumeric Map Information Assembly and Display System for a Large Computer.*

Conservation Foundation, 1968. *Rookery Bay Area Project.*

Division of Technical Assistance, Dept. of Community Affairs (Tallahassee, Fla.), 1970. *Comprchensive Development Plan for Putnam County, Florida.*

Florida Dept. of Health & Rehabilitative Services, 1971. *State of Florida Solid Waste Management Plan.*

Florida Dept. of Natural Resources, June 1970. *Marine Research Laboratory: List of Publications.*

Florida Development Commission, 1968. *The Changing Face of Florida.*

Godell, H.G. and W. Reed, March 1971. *The Potential of Remote Sensing as a Data Base for State Agencies: The Virginia Model.*

Harvard University Graduate School of Design, November 1967. *Three Approaches to Environmental Resource Analysis.*

Healy, Henry G., 1971. *Water Levels in Artesian and Non-artesian Aquifers of Florida, 1967-68.*

Heath, Richard C. and E. Turner Wimberly, 1971. *Selected Flow Characteristics of Florida Streams and Canals: Summaries of Flow Duration and of Low and High Flows at Gaging Stations.*

Joyce, Edwin A., Jr., April 1965. *The Commercial Shrimps of the Northeast Coast of Florida.*

Joyce, Edwin A., Jr. and Bonnie Eldred, November 1966. *The Florida Shrimping Industry.*

Lindsey, A. A., D. V. Schmelz and S. A. Nichols, 1970. *Natural Areas in Indiana and their Preservation.*

Morgan, W. H., July 1970. *Florida Water Resources Research Center, University of Florida—Gainesville: Annual Report 1970.*

Nugent, Richard S., Jr., August 1970. *The Effects of Thermal Effluent on Some of the Macrofauna of a Subtropical Estuary.*

Oceanic Library and Information Center, March 1971. *Oceanic Citation Journal, with Abstracts.*

Odom, H. T., A. F. Chestnut, et al., May 1970. *Studies of Marine Estuarine Ecosystems Developing with Treated Sewage Wastes.*

Plager, Sheldon J. and F. E. Maloney, 1968. *Controlling Waterfront Development.*

U.S. Dept. of the Interior, April 1971. *Selected Water Resources Abstracts.*

Wanless, Harold Rogers, August 1969. *Sediments of Biscayne Bay—Distribution and Depositional History.*

Any suggestions of informational items to be included in the newsletter are solicited from our readers. Please contact the Costal Coordinating Council, Room 682, Larson Building, Tallahassee, Florida 32304.

AMERICAN INSTITUTE OF MERCHANT SHIPPING,
Washington, D.C., May 6, 1971.

Re. S. 1238, Marine Protection Act of 1971.

Hon. ERNEST F. HOLLINGS,
Chairman, Subcommittee on Oceans and Atmosphere, Committee on Commerce, U.S. Senate, Washington, D.C.

DEAR SENATOR HOLLINGS: At a conference held by Congressman Alton Lennon and John D. Dingell at the Capital April 29, with representatives of the American Institute of Merchant Shipping, including myself, American Association of Port Authorities, Chief of Engineers' Office of the Department of the Army, Environmental Protection Agency and Council on Environmental Quality relative

to H.R. 4723, companion bill to S. 1238, Congressman Dingell asked AIMS and AAPA to coordinate their views and submit identical amendments of the bill.

As a result of discussions between AIMS and AAPA after the April 29 meeting, the following proposed amendments of H.R. 4723 were submitted by AIMS and AAPA on this date to Congressmen Dingell and Lennon. These amendments should be deemed to supersede those contained in my letter to you of April 22, for incorporation in the Senate companion bill, S. 1238.

(1) Delete the following clause at the end of paragraph (2) of section 7(c): "unless the Administrator has certified that the activity proposed to be conducted is in conformity with the provisions of this Act and with the regulations issued hereunder."

(2) Add the following proviso clause after "hereunder" in section 7(c)(2): "*Provided, however*, That the provisions of this Act shall not apply to or prohibit the issuance of regulations and permits by the Secretary of the Army, acting through the Chief of Engineers, in connection with the transportation and disposal in the ocean, coastal and other waters of dredged material resulting from the improvement and maintenance of navigable waters, including the Great Lakes, or the deposit in such waters inside the United States pierhead line of fill material. In prescribing regulations and issuing permits relating to disposal of such dredged material or the deposit of fill material the Secretary shall consider the views and recommendations of the Administrator of the Environmental Protection Agency and follow the criteria established".

(3) Insert following new paragraph (3) immediately after paragraph (2) of section 5(a):

"(3) effect upon navigation, economic and industrial development and foreign and domestic commerce of the United States."

In the event the above amendments are not adopted, we would then recommend elimination of "dredge spoil" from the definition of "material" in section 3(c) and insertion of the words "dredge spoil or" after the words "does not mean" in the proviso exclusion clause in subsection (c).

We strongly urge favorable consideration of our proposed amendments of sections 5(a) and 7(c) of S. 1238 for the reasons set forth in the AIMS statement which I presented at the hearing held April 22, by Senator Spong.

Sincerely,

JAMES J. REYNOLDS, *President*.

EVALUATING WASTE DISPOSAL AT SEA—THE CRITICAL ROLE OF INFORMATION MANAGEMENT[1]

(By Robert P. Brown,[2] Bissett-Berman Corp., San Diego, Calif., and Edward H. Shenton[3])

ABSTRACT

An evaluation is presented of a 1971 re-survey of present and projected U.S. ocean dumping activities in terms of proposed Congressional legislation. A drastic reduction in ocean dumping volume has occurred along the Pacific Coast. Anticipated termination of the dumping of toxic materials and other wastes will significantly change the national status of dumping activities. The results of the study show that although adequate information on the subject is available, the latest projections for funding future regulatory surveillance and environmental monitoring of dumping operations are based on 1968 data which do not describe the current situation.

The foregoing situation reflects the present lack of an effective ocean dumping information system. Potential values to be derived from an improved system are described and the status of ocean dumping for 1972 is projected.

PURPOSE

The purpose of this report is to describe the urgent need for accurate, current information on ocean dumping operations to assist persons in government re-

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sponsible for making decisions. Examples are presented which demonstrate the inadequacies of the present system and the potential values to be derived from an improved system.

BACKGROUND

An appraisal of the national status of ocean dumping of solid and liquid wastes was conducted for the U.S. Bureau of Solid Waste Management (BSWM) of the Environmental Protection Agency (EPA) in 1969 (Smith and Brown, in press). The results of this study showed that an estimated 48 million tons of dredge spoils, industrial wastes, sewage sludge, construction and demolition debris, solid waste, explosives, chemical munitions, radioactive wastes, and other miscellaneous wastes were dumped via barges and ships into coastal waters during the calendar year of 1968. These wastes originated from twenty U.S. cities including: Seattle, Portland (Oregon), San Francisco, Los Angeles, San Diego, Galveston, Texas City, Houston, Port Arthur, Beaumont, New Orleans, Pascagoula, Mobile, St. Petersburg, Charleston, Norfolk, Baltimore, Philadelphia, New York, and Boston.

Current National Policy

Significant changes in national policy affecting ocean dumping operations have taken place since the BSWM study was concluded in 1969. The catalyst for these changes was the publication by the President's Council on Environmental Quality report entitled *Ocean Dumping—A National Policy* (1970). Recommendations for banning or curbing future ocean dumping activities contained in this report were strongly endorsed by President Nixon and subsequently have formed the basis for the proposed Marine Protection Act of 1971. Both Administration and Congressional leaders are in accord for the need for strong ocean dumping legislation. Hearings being conducted at the time of this writing in both the Senate and House have focused on the details of which types of wastes will be banned or phased out, permit granting procedures, surveillance, and research requirements for assessing the environmental effects of ocean dumping. Regardless of the details, passage of some form of Marine Protection Act seems a certainty before Congress convenes in 1972.

Need for Improved Information Management

From the results of the BSWM study it is apparent that regardless of the type of legislation that is enacted by Congress, proper record preparation and maintenance by the agencies responsible for regulating ocean dumping is an essential first step in enforcement and environmental monitoring of the operations. Equally important is a formalized reporting system which results in the preparation of regional and national summaries on an annual basis. In addition to the basic data on dumping operations, information available from each region regarding the legal aspects, research performed or in progress, and information on specific procedures established for regulating and enforcing dumping operations should also be included in any proposed information system.

STATUS OF THE NATIONAL OCEAN DUMPING INVENTORY

Current legislative action and governmental agency planning activities regarding ocean disposal are based on the BSWM study results presented in the President's Council on Environmental Quality report (1970). As nearly as can be determined, the status of ocean dumping has been assumed to be either static at the 1968 figure of 48 million tons, or increasing at some unknown rate. This is the direct result of the lack of an annual inventory of ocean dumping activities.

Re-Survey of Pacific Coast Dumping Operations, 1971

To assess the accuracy of these assumptions the author has re-surveyed the status of ocean dumping for the Pacific Coast on the basis of his original BSWM study contacts. Dredging spoils, explosives, and radioactive wastes have been excluded from this 1971 inventory because of the limited time available. The results of this survey are shown in Table 1 along with the reported 1968 BSWM dumping totals.

From Table 1 it can be seen that ocean dumping (excluding dredging spoils) for the Pacific Coast has decreased from a reported 1,007,500 tons in 1968 to

23,860 tons in 1971, or approximately a reduction by 50 times. The major factors associated with this dramatic decrease are (1) the banning of ocean dumping by the Regional Water Quality Control Boards (RWQCB) in the cities of San Francisco and San Diego, and (2) the "voluntary" cessation of several large-volume dumping operations such as filter cake in San Diego, oil drilling wastes from Los Angeles, and paper mill wastes and waste oil from Seattle.

In addition to disclosing a marked decline in ocean dumping activities off the Pacific Coast, the present study confirmed previously unsubstantiated reports (American Petroleum Institute, 1969) regarding the disposal of refinery wastes by crude oil tankers beyond 50 miles from the California Coast. Operations of this nature in San Francisco are under a RWQCB "cease and desist" order to terminate activity by the end of 1971. Based on knowledge regarding ocean dumping of refinery wastes gained during the 1969 BSWM survey, it is clear that the extent of this practice should be investigated and documented on a national basis.

Information Exchange

During the BSWM study it was found that although many governmental agencies were involved in one way or another in ocean dumping activities in a particular city, rarely did more than one of these have a comprehensive picture of the total dumping activities in their city. The present re-survey of the West Coast dumping operations revealed that this picture has improved slightly on the local level, primarily because of the publicity given the subject over the past year. However, with respect to knowledge and exchange of information of ocean dumping operations on a regional basis (i.e., state, coast), the 1969 picture is unchanged. The ramifications of this are discussed later in this report.

PROJECTED STATUS OF OCEAN DUMPING—1972

Based on the findings of the BSWM study and the Council on Environmental Quality's report it is no exaggeration to state that the environmental effects of past and present dumping operations are, with the exception of those dumped in the New York Bight (sewage sludge, waste acid, dredge spoils) and off Cape May, Delaware (waste acid, sewage sludge) not even qualitatively known, much less measured accurately. It is obvious that if ocean dumping of wastes were to continue at the 1968 level without causing harmful effects to man or the environment, a major research effort in this area would be essential. A smiliar conclusion can be drawn in terms of the need for improved regulatory and surveillance procedures.

Study Assumptions

However, before research money is appropriated and spent, it is advisable to carefully examine all of the information (including various recommendations made by numerous individuals and agencies) available to date on ocean dumping. As in most cases, assumptions must be made. For the purpose of this paper the recommendations of the President's Council on Environmental Quality, which have been endorsed by the President and the Environmental Protection Agency (Air/Water, 1971), provide the basic guidelines for the following assumptions:

General ocean dumping of industrial wastes will be phased out as soon as possible.

Ocean dumping of toxic industrial wastes will be terminated immediately, except in those cases in which no alternative offers less harm to man or the environment.

Continued dumping of digested/undigested sewage sludge is considered an interim measure and will be phased out as soon as possible and no new sources allowed.

Ocean dumping of polluted dredge spoils and solid wastes will be phased out as soon as possible.

Ocean dumping of radioactive, explosive, and chemical warfare agents will be banned.

With the foregoing guidelines it is appropriate here to examine the projected national status of ocean dumping with respect to the major areas requiring expenditures for future regulatory monitoring and environmental research. The first question that arises is how much, how many, and what kind of ocean dumping activities will be in operation if the foregoing recommendations become law?

Pacific Coast

Let's consider the Pacific Coast first. From Table I it can be seen that at the close of 1971 only four (4) of the original thirteen (13) 1968 dumping activities are currently in operation, namely, cannery wastes (San Francisco), toxic industrial chemicals (Los Angeles), and commercial vessel refuse and garbage (Los Angeles). The latter two activities fall within the categories subject to near-term phase-out. Thus, it is anticipated that within a short period of time (ca. 1972) the only Pacific Coast dumping operation (excluding dredge spoils) with any possibility of being continued consists of about 20,000 tons of cannery wastes which are dumped at sea on a seasonal basis (June–October).

TABLE 1.—SUMMARY OF THE TYPE, AMOUNT, AND NUMBER OF INDIVIDUAL OCEAN DUMPING OPERATIONS FOR THE PACIFIC COAST, 1968 AND 1971 [1]

Type of waste	1968 annual tonnage	Number of individual dumping operations, 1968 [2]	1971 annual tonnage	Number of individual dumping operations, 1971
INDUSTRIAL [3]				
Spent steel pickling acid (sulfuric and hydrochloric).	41,700	1	----------	Discontinued February 1971.
Refinery wastes	164,160	2	2,160	To be discontinued December 1971.
Toxic chemicals [4]	506	3	500	2.
Papermill wastes	116,534	1	----------	Discontinued 1970.
Oil drilling muds	653,100	1	----------	Discontinued December 1970.
Waste oil	5,300	1	----------	Discontinued 1970.
Cannery wastes	20,000	1	20,000	1.
Vessel refuse and garbage	6,200	3	1,200	1.[5]
Filter cake				Discontinued 1970.[6]
Total, all wastes	1,007,500	13	23,860	4.

[1] Based on 1968 BSWM data (Smith & Brown, in press) excluding dredge spoils, explosives, and radioactive wastes.
[2] Based on private survey conducted in May 1971.
[3] Includes bulk and containerized wastes.
[4] Includes cadmium, copper and cromium cyanide, laboratory wastes, and other unidentified industrial wastes.
[5] U.S. naval dumping operations were discontinued in 1968 and 1970 for San Diego and Long Beach, respectively.
[6] 346,480 tons of filter cake were dumped in 1969–70.

Atlantic and Gulf Coasts

A breakdown by waste category (excluding dredge spoils) for the Gulf and Atlantic coastal areas is presented in Table 2. These wastes have been categorized in terms of the guidelines presented previously (i.e., industrial, sewage, etc.) From Table 2 it is clear that, on the basis of the study assumptions, of the thirty-eight (38) known individual disposal operations represented by the summary figures, only six (6) would be in existence in the near future. These include sewage dumping (New York, Philadelphia), waste titanium processing acid (New York and Delaware), and construction and demolition debris (New York). Based on the results of past environmental research, only the dumping of waste acid and construction debris have a chance of continuing on a regular long-term basis.

TABLE 2.—SUMMARY OF THE TYPE, AMOUNT, AND NUMBER OF INDIVIDUAL OCEAN DUMPING OPERATIONS FOR THE ATLANTIC AND GULF COASTS, 1968 [1]

Type of waste	Atlantic coast		Gulf coast		Total	
	1968 annual tonnage	Number of individual dumping operations	1968 [1] annual tonnage	Number of individual dumping operations	Annual tonnage	Number of individual dumping operations
Industrial: [2]						
Spent acid wastes (sulfuric and hydrochloric)	2,673,790	3	5,000	1	2,678,790	4
Refinery wastes	124,850	2	273,850	5	398,700	7
Pesticide wastes	67,120	4	261,215	9	328,335	13
Papermill wastes			35,000	1	35,000	1
Others [3]	163,237	3	116,170	7	279,407	10
Municipal:						
Sewage sludge	4,477,000	[4] 2			4,477,000	2
Construction and demolition debris	574,000	[5] 1			574,000	1
Total all wastes	8,079,997	15	691,235	23	8,771,232	38

[1] Based on 1968 BSWM data (Smith & Brown, in press), excluding dredge spoils, explosives and radioactive wastes.
[2] Includes bulk and containerized wastes.
[3] Includes noxious chemicals, sodium and cyanide sludge, "ammonium sulfate," "mother liquor," and tetraethyl lead sludge tanks.
[4] Several different municipalities dump sewage sludge in the two designated New York and Delaware sewage dump sites,
[5] Numerous independent contractors utilize the one designated New York dump site.

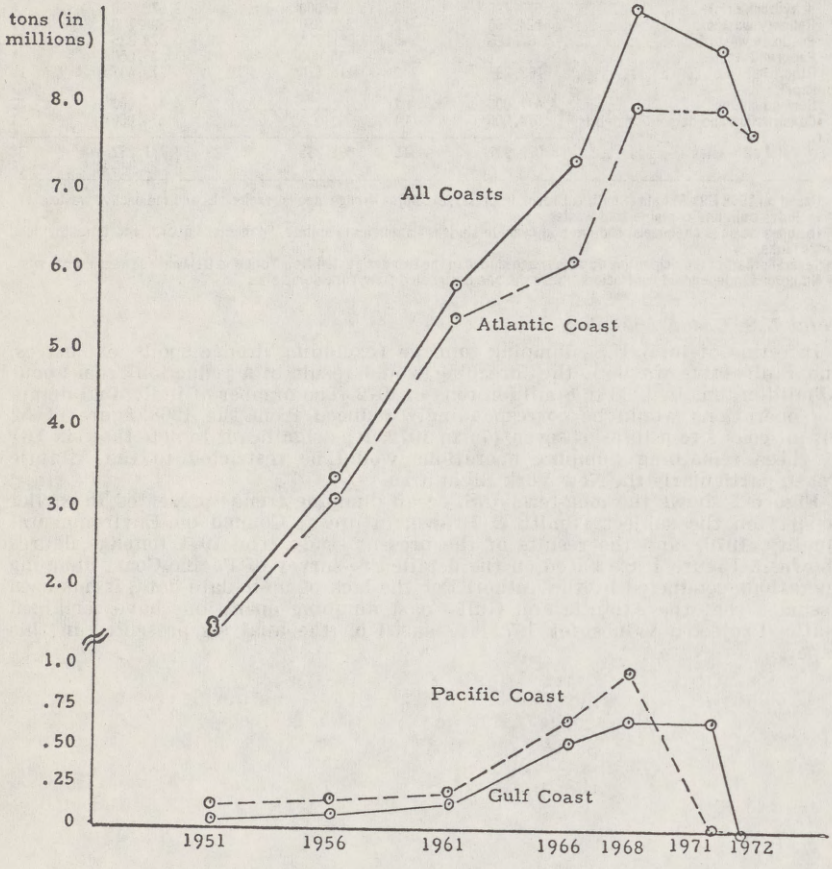
Total U.S. Ocean Dumping

In terms of total U.S. dumping tonnage (excluding dredge spoils, explosives, and radioactive wastes), the foregoing would result in a reduction from about 10 million tons in 1968 to 8 million tons in 1972. The number of individual dumping operations would be correspondingly reduced from the 1968 figure of 52 for all coasts to a total of seven (7) in 1972. It is significant to note that six (6) of these remaining dumping operations would be restricted to the Atlantic Coast, particularly the New York Bight area.

Figure 1 shows the long-term U.S. ocean dumping trends presented in earlier reports on the subject (Smith & Brown, in press; Council on Environmental Quality, 1970) and the results of the present study. The 1971 tonnage figures shown in Figure 1 are based on the detailed re-survey of Pacific Coast dumping operations conducted by the author. For the lack of up-to-date data, it has been assumed that the Atlantic and Gulf Coast dumping operations have remained static. Projected values for 1972 are based on the analysis presented in this paper.

Figure 1. Average Annual Tonnage Dumped at Sea -- by Coastal Area

Source: Council on Environmental Quality, 1970 (a)



(a) See text for explanation of 1971-72 tonnage projections.

From the data shown in Figure 1 and Tables 1 and 2 it should be apparent that future appropriations of funds designated for new research and improved regulation and surveillance procedures of ocean dumping must be carefully weighted in terms of the actual scope and number of dumping operations involved. To allocate funds solely on the basis of the 1968 BSWM survey data would clearly be in error.

EVALUATION OF PROPOSED FY 1972 FUNDING FOR REGULATORY AND ENVIRONMENTAL MONITORING

To this point this paper has been concerned primarily with documenting the inadequacies of the present practices of maintaining accurate, current information on ocean dumping activities for the purpose of detecting trends in U.S. coastal waters. The discussion presented in this section will assess future requirements for funding of ocean dumping research and surveillance based on the observed and projected trends.

Proposed Funding

The Environmental Protection Agency has stated that it expects to spend $2 million in fiscal 1972 on ocean dumping matters if the Administration bill to control marine disposal is enacted this year (Oceanology Weekly, April 30, 1971). About $1.5 million of this is designated for research and development and the remainder is for setting standards and enforcing them. Similarly, the U.S. Coast Guard estimates that about $1.3 million should be added to its budget next year if the dumping bill is passed (Oceanology Weekly, April 23, 1971). This amount would be for surface and aircraft surveillance of dumping operations. Thus, the combined funding proposed for FY 1972 for regulatory and environmental monitoring of ocean dumping would be approximately $3.3 million *based solely on the 1968 BSWM assessment of the dumping situation.*

Regulatory Monitoring Requirements

If the status of ocean dumping is viewed in terms of the projections presented in this paper only six (6) individual dumping operations off the Atlantic Coast and one (1) off the Pacific Coast would require routine regulatory monitoring in 1972. At the present time the dumping of sewage sludge, waste acid, and construction debris in the New York Bight is under rigid control by the U.S. Corps of Engineers. The disposal of cannery wastes at sea off San Francisco is under similar strict control by the San Francisco State Regional Water Quality Control Board.

Buelow (1968) has reported that the size of the present dumping ground for sewage sludge off Cape May, New Jersey is incompatible with the present methods of discharge. Under the present system, a brage operator must either discharge his load within 10 minutes at full speed, or reverse course and make another run through the dumping ground. In one dumping operation observed by Buelow, approximately two-thirds of the load was dumped outside of the designated area. Unless the regulatory situation has changed since 1969 no routine on-site inspection of dumping operations is conducted by any regulatory agency of the sewage and acid dumping operations.

If the foregoing situation regarding proposed funding and projected disposal operations proves to be correct, then, as proposed presently, $1.8 million will be available in FY 1972 for the enforcement of seven (7) dumping operations, four of which are apparently under adequate regulatory control.

Environmental Research Requirements

As mentioned earlier, $1.5 million is proposed by EPA for research and development on ocean dumping for FY 1972. A considerable amount of research has already been done on the dumping of sewage sludge and waste acid at sea.

Sewage sludge

Conclusive evidence has been presented by Buelow (1968), Buelow et al (1968[a]), the Sandy Hook Sport Fisheries Marine Laboratory (1970), and Ketchum (1970), that present practices of sewage sludge disposal off New York Harbor have destroyed the quality of the environment over a substantial area of sea bottom and caused contamination of valuable living marine resources adjacent to the dumping grounds. Similar evidence has been presented by Buelow et al (1968[b]) for the sewage dumping grounds 12 miles off Cape May, New Jersey; however, this point has been contested by others (Air/Water News,

April 5, 1971). Because of the large-scale nature of the sewage dumping operations and lack of better alternative methods, no near-term banning of these operations can be expected. Future work in these areas should be directed towards minimizing future environmental damage by continued monitoring of the dumping grounds coupled with better treatment of the sewage sludge prior to disposal (Council on Environmental Quality, 1970).

Acid-iron wastes

Studies of the dispersion and environmental effects of acid-iron wastes dumped in the New York Bight area have been conducted by Redfield and Walford (1951), Ketchum and Ford (1952), Ketchum et al (1958), and most recently by the Sandy Hook Sport Fisheries Marine Laboratory in Sandy Hook, New Jersey (1970). The disposal of similar wastes occurs about 45 miles southeast of the mouth of Delaware Bay and has been investigated by the Dupont Corporation in cooperation with EPA (Fader, 1970). To date, the sum of the results of these investigations show that the toxic effects of acid-iron wastes disposed of at sea are apparently minimal (Dr. Jack Pearce, Sandy Hook Sport Fisheries Marine Laboratory, personal communication). Future work on the acid dumping ground is open to question, however, the establishment of a routine environmental monitoring network for this area is desirable.

Construction and demolition debris

The environmental effects of the dumping of construction and demolition debris at sea has not been investigated in the New York Bight Area. However, recent studies conducted by the Sandy Hook Sport Fisheries Marine Laboratory (1970) and related studies by the California Department of Fish and Game (1969) have shown that properly constructed artificial fishing reefs are a very effective means in congregating the available fish from a given area. With both the great increases in the numbers of sportfishermen each year (Winslow and Bigler, 1969) and when most of the Continental shelf within their reach from small craft is an unproductive, flat, lifeless, sandy desert, the utilization of "clean" solid waste material for the purpose of developing artificial fishing reef offers a huge potential for deriving real benefits. Commercial fishing operations in the coastal zone might also benefit from such a program. It has been postulated that artificial reefs constructed from solid waste materials could serve to increase the populations of migratory fish by providing additional spawning sites for adults and protection and food for the juveniles (U.S. Bureau of Sport Fisheries and Wildlife, 1968). Although it has proven possible to construct artificial fishing reefs from certain classes of solid wastes (i.e., tires, cars, rubble, etc.), present practice favors disposal in landfills or recycling as scrap steel. Clearly, there is an immediate and continuing need for research and development in this area.

Cannery wastes

The Pacific Coast cannery waste dumping operation (San Francisco)is currently the subject of a research investigation by the National Canners Association, Berkeley, California (National Canners Asociation, 1971, personal communication). This is to be a three-phase study to determine (a) the detailed characteristics of the wastes, (b) their toxicity, and (c) the mixing and dispersion of the wastes at sea.

Other wastes

It has been proposed by various individuals testifying before House and Senate committees concerned with proposed dumping legislation that dumping of "compatible" wastes in the ocean is "highly desirable" (Oceanology Weekly, April 23, 1971). Examples of compatible wastes were construction and demolition debris, various agriculture and cannery wastes, oil well drill cuttings, effluent (but not sludge) from sewage treatment plants, materials hazardous to man such as obsolete, non-chemical munitions, and municipal refuse and garbage. Various aspects of the first two classes of waste have been discussed in this paper.

Oil drilling wastes.—The disposal of oil well drill cuttings and mud in 1968 consisted of a single operation on the Pacific Coast (Table 1). This operation was voluntarily terminated in 1970. Detailed information from an independent investigation of this operator was obtained from the files of the Los Angeles Regional Water Quality Control Board (LARWQCB, 1971). Based on the operators' logs of travel time to and from the dump site, there were ninety-eight (98) specific

violations noted when the operator could not possibly have been in the official dumping ground. Additionally, these logs showed instances when considerable amounts of oil were noted in the wastes dumped which was in direct violation of the dumping permit. In view of the foregoing and the fact that the dumping of oil drilling wastes was a "special" type of operation and alternate disposal methods are available, the authors believe that no further research or initiation of new dumping operations should be considered for this category.

Sewage effluent.—The disposal of sewage effluent at sea is currently a common practice using submarine outfalls. There have been suggestions of barging this sewage farther offshore. One has only to consider the volume of these wastes generated daily to realize that a barging operation is out of the question. For example, the combined discharge from the Los Angeles Area outfalls is close to one (1) billion gallons per day or about 1,000 barge (1×10^6-gallon capacity) loads.

Explosives and radioactive wastes.—Both the Department of Defense (San Diego Union, February 25, 1971) and Atomic Energy Commission (Oceanology, Weekly, April 9, 1971) have announced the banning of ocean dumping of obsolete gas, explosives, and radioactive wastes. Secretary of the Navy John H. Chafee has directed that an intensive program of research and development be conducted to seek alternative disposal methods. Low-level radioactives formerly dumped at sea will be land-buried, and high-level wastes will be sealed in salt mines and solidified.

Municipal refuse.—Another item on the list of "compatible" wastes proposed for future sea disposal is organic municipal refuse. Several schemes have been proposed for this including at-sea incineration, bailing, and other containerized methods (Silverman, 1964; Dunlea, 1967; Balbi, 1968; Smith, 1968; and National Industrial Pollution Control Council, 1971). The most recent of these by the National Industrial Pollution Control Council recommends conducting a research investigation of baled refuse in 7,500 feet of water just beyond the edge of the New England Continental Shelf. The utilization of deep-ocean trenches for waste disposal has also been proposed (Bronson and Sherif, 1970). The closest such deep trench to the West Coast cities is off the Aleutian Islands. East Coast and Gulf Coast cities would be required to transport their wastes to the Caribbean area for disposal. The authors favor none of these methods, but concur regarding this matter with the recommendations of the Council on Environmental Quality (1970, p. vi) : "Ocean dumping of existing sources of solid wastes should be stopped as soon as possible. No new sources should be allowed, i.e., no dumping by any municipality that currently does not do so, nor any increase in the volume by existing municipalities."

From the foregoing evaluation of past research conducted in connection with the ocean dumping activities projected to be in operation in 1972, the most promising areas for expenditures of proposed research funds appear to be in the enhancement of the marine environment (reef building) and establishing adequate environmental monitoring systems. With regard to the latter there is an urgent need for the establishment and monitoring of marine research preserves to serve as baselines from which man-made changes of the environment can be evaluated (Commission on Marine Science, Engineering and Resources, 1969; Council in Environmental Quality, 1970).

CONCLUSIONS

A drastic reduction in ocean dumping volume occurred on the Pacific Coast in 1971. Anticipated termination of the dumping toxic material and other wastes will significantly change the national status of ocean dumping activities in 1972.

Current Governmental projections for funding future regulatory surveillance and environmental monitoring programs for ocean dumping activities are based on 1968 BSWM data and do not reflect the current situation.

There is an urgent need for the establishment of an effective ocean dumping information system to assist Governmental decision makers in correctly assessing trends, research needs, and current activities associated with ocean dumping.

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WASHINGTON PUBLIC PORTS ASSOCIATION,
Olympia, Wash., April 26, 1971.

Hon. WARREN G. MAGNUSON,
Senator Office Building,
Washington, D.C.
Attention of Norman Dicks.

DEAR SENATOR MAGNUSON: We are aware that S. 1238 and its companion measure, H.R. 4723 are being considered in committees of Congress.

We would like you to be informed that members of this Association oppose certain aspects of that legislation and hope you will try to influence the necessary changes in language.

This Administration proposal, dubbed "The Marine Protection Act of 19971" would invest all regulatory authority over *all* ocean dumping in the administrator of the Environmental Protection Agency. It would require a permit for dumping *anything, anywhere* in territorial waters with limitations, restrictions, plus study and reporting requirements.

The measure would provide that the EPA would supercede the Refuse Act administered by the Army Corps of Engineers, and it has an avowed objective of terminating all ocean dumping. Even the disposal of unpolluted, inert, nontoxic dredging spoils would be terminated or very strictly regulated.

Our concern lies in the fact that our marine terminal facilities future is absolutely dependent upon maintaining appropriate water depths in channels and at pierside. Without such provision we go out of business. That would be a blow to our local, state and national economy that we can ill afford. For the last few years Washington ports have provided sufficient foreign trade to account for more than 30% of the nation's trade surplus.

To provide proper channel and pierside water depths periodic dredging is required. It is an unfortunate fact of our technical life that this dredged material sometimes has to be disposed of in coastal waters. Without impossible and economically fatal expenditures much of the dredged material cannot be disposed of on land.

The function of providing for channel maintenance, dredging, etc., has historically rested with the U.S. Army Corps of Engineers. Theirs is the authority to deal with our navigable waters and to treat them accordingly. We must get our permits from them for such projects, and they make the determination as to disposal of dredged spoils. Let it remain so. We work closely with them, have learned that they objectively evaluate each proposal, and we are confident that this objectivity does not sacrifice environmental or ecological goals. They, too, must satisfy many masters.

The provisions of the proposed legislation would put port operation and existence at the mercy of an agency that is patently *not* objective. Our dealings with them and other environmentally-oriented agencies (Bureau of Sports Fisheries and Wildlife, for instance) have convinced us that the narrow approach to contemporary problems which they follow has no place for consideration of any other goal or project.

We cannot and will not quarrel with strict regulation on the dumping of material known to harmfully degrade the quality of our waters. Toxic elements, certain organic sludge, domestic sewage, chemicals, and other pollutants must be kept from waters used by man. But we do seriously question the inclusion of

dredged spoil disposal in these measures. We sincerely oppose the transfer of the permitting authority from the U.S. Army Corps of Engineers.

We hope you will give our views consideration.

Sincerely,

LEWIS R. HOLCOMB,
Executive Director.

PORT OF GRAYS HARBOR,
Aberdeen, Wash., April 26, 1971.

Hon. WARREN G. MAGNUSON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR MAGNUSON: We were most pleased to have you visit Grays Harbor on April 17th and participate in the formal dedication of the new fish protein concentrate plant. Certainly, this event was another milestone in your long and continuing support of the American fishing industry.

The Port of Grays Harbor's Bowerman Field facility was utilized by your aircraft during your visit. We welcome the opportunity to provide ground transportation and the occasion to review with you the forty year history of this particular area. The field itself was developed by dredge spoils. Maintenance spoils from the Grays Harbor-Chehalis River deep water navigation channel have historically been deposited in the vicinity. As we indicated at that time, we are aware of certain objections being voiced in opposition to continuing this practice in the future.

As local sponsors of the Grays Harbor navigation facilities, we are required to provide dredge spoil disposal areas and provide a hydraulic suction dredge, at our cost, to do maintenance dredging as required under direction of the Corps of Engineers. To fulfill the Port of Grays Harbor's commitment to the federal government, we have acquired some 2,400 acres in the Bowerman Field area for the disposal of dredge spoils.

On April 19th and 20th, I attended the American Association of Port Authorities Board Meeting in Washington, D.C. I found these meetings to be most informative and productive. One issue of particular concern to ports all over the United States is H.R. 4723 and its companion bill, S. 1238. They are presently the subject of congressional hearings. The proposed legislation would shift the authority of issuing dredge disposal permits from the Corps of Engineers to the Environmental Protection Agency.

Mr. Edward Langlois, as Chairman of the Committee on Environmental Affairs for the American Association of Port Authorities, has testified before the House Committee on Merchant Marine and Fisheries in opposition to the proposed legislation. Mr. Langlois will be appearing before your Senate Commerce Committee's Sub-Committee on Oceans and Atmosphere on Wednesday of this week.

While in Washington, D.C., I took the opportunity of reviewing our concern of the proposed legislation with Norman Dicks in your office. We are also aware that the Washington Public Ports Association is communicating in regard to the concern of other ports in our State.

We feel that past practices of maintenance dredging and spoil deposits have played a most significant role in the growth of waterborne commerce and industrial activity on Grays Harbor. It is our opinion that the National Environmental Policy Act of 1969, Public Law 91–190, provides the safeguards for proper spoil disposition in the future. We feel that dredge spoils are not a pollutant and passage of S. 1238 would not be in the best interest in maintaining our navigation facilities.

Kindest regards,

H. E. SOIKE,
Manager, Industrial Development.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., June 21, 1971.

Hon. WARREN G. MAGNUSON,
Chairman, Committee on Commerce,
U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This responds to your request for Departmental comment

on S. 307, a bill "To foster oceanic and environmental research and development, and for other purposes".

We recommend against the enactment of S. 307.

This bill would amend the Marine Resources and Engineering Development Act of 1966 (33 U.S.C. 1101 *et seq.*) by adding a new Title IV, the "National Oceanic and Environmental Research Act of 1971". Consistent with a declaration that it is United States' policy "to foster a program of oceanic and environmental research and development . . .", S. 307 would direct the Secretary of Commerce to establish a National Oceanic and Environmental Research Laboratory System, charged with responsibility for (1) a program of research on changes in ocean environmental conditions, (2) development of information and warning systems, and (3) a program for the enhancement and improvement of the marine environment. In addition, S. 307 would make unlawful the issuance of any Federal permit to dredge or dispose of waste materials in ocean or estuarine waters without having first received comment from the Secretary of Commerce.

Section 410 of the new Title would authorize the Secretary of Commerce to assist coastal States in their acquisition, development and operation of not more than 15 "estuarine sanctuaries". Federal grants not to exceed 50% of costs would be authorized for this purpose, provided that the Federal share for any one sanctuary did not exceed $2 million. Section 416 would provide unspecified appropriation authority for each of the four separate programs (research, environmental information, enhancement, and estuarine sanctuaries) encompassed by S. 307.

We object to the enactment of S. 307 both because it would duplicate specific program responsibilities already exercised by several Federal agencies, including the Department of the Interior, and because it is not consistent with the plan for environmental organization advanced by this Administration. The consequence of enactment, we believe, would be a dispersal, rather than a consolidation of Federal activity in the areas of environmental management and research. The need for a comprehensive approach to the protection and preservation of our Nation's natural resources is well recognized by the President's proposal for creation of a Department of Natural Resources, now pending before the Senate as S. 1431. Section 201(c) of that bill would establish within the new Department an Oceanic, Atmospheric and Earth Sciences Administration. S. 1431 also provides for transfer to the Department of Natural Resources "such of the functions of the Secretary of Commerce, the Department of Commerce, and officers and components of that Department, as relate to or are utilized by the National Oceanic and Atmospheric Administration". Said transfer would, of course, affect any new such program assigned to the Secretary of Commerce, including those envisaged by S. 307.

Two other Administration proposals relate quite closely to the objectives of S. 307. The proposed "Marine Protection Act of 1971", now pending before your Committee as S. 1238, would vest in the Administrator of the Environmental Protection Agency authority to control dumping of waste material in oceans, coastal and other waters through issuance of permits and enforcement of a prohibition against the unauthorized transport or dumping of such material. A provision for consultation between the Administrator and the Secretaries of Commerce and Interior, among others, concerning criteria for the issuance of permits resembles a similar authority contained in S. 307. Section 405 of S. 307 would require, however, that the Administrator receive findings from the Secretary of Commerce prior to issuance of a dumping permit. Because S. 1238 would authorize consultation with several interested agencies, including Commerce and Interior, and because section 405 would impede effective administration of a permit program, we prefer EPA's proposal for coordination of agency views.

S. 922, our proposed "National Land Use Policy Act of 1971", includes coastal zones and estuaries as among those areas of critical environmental concern to which participating States must direct their attention. Further, it would be required that State laws affecting land use in the coastal zone and estuaries take into account the esthetic and ecological values of wetlands and the susceptibility of wetlands to permanent destruction. This proposal for coastal zone management as an integral part of comprehensive land use planning, coupled with existing authority under the so-called Estuary Protection Act of August 3, 1968 (82 Stat. 627; 16 U.S.C. 1222 *et seq.*) would militate against the authorization of another program, such as that contained in section 410 of S. 307, "to gather data and other long-term studies of the estuarine zone of the United States".

Thus, while we share the general objectives of S. 307, we do not believe that

enactment would contribute to their being attained. Rather, we recommend strongly the enactment of S. 1431, S. 1238, and S. 992 as a means to achieve the coordinated effort urged by President Nixon in his Environmental Message of February 8.

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

Sincerely yours,

NATHANIEL B. REED,
Assistant Secretary for Fish and Wildlife and Parks.

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