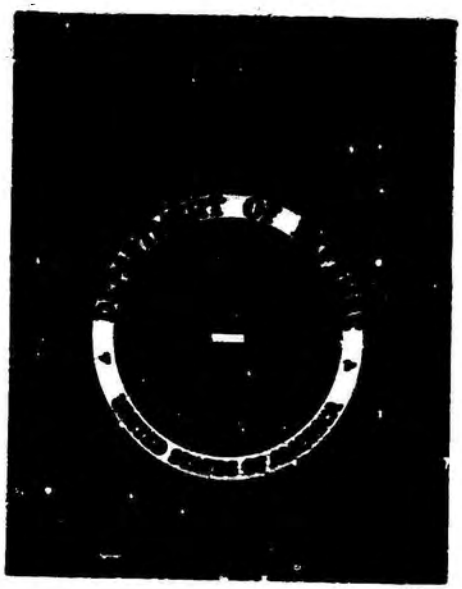

DEPARTMENT OF DEFENSE

ENVIRONMENTAL QUALITY PROGRAM

STATUS • 1 JAN 1972

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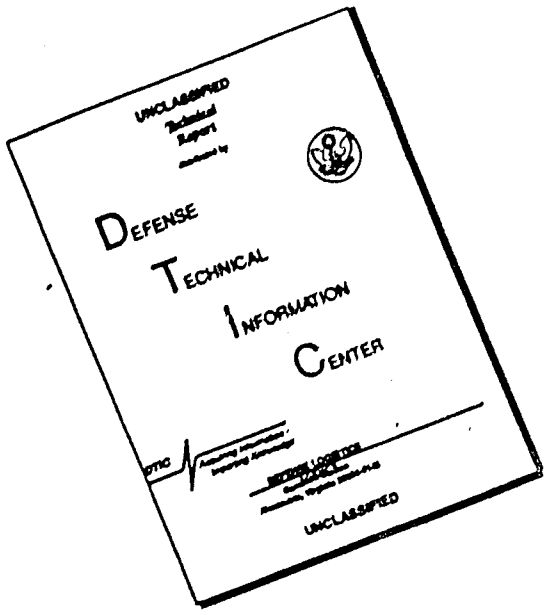

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13. ABSTRACT

This report provides the status of the Department of Defense Environmental Quality Program as of 1 January 1972. It discusses the overall Defense Department policy and programs for the protection and enhancement of the nation's environment and indicates the various organizational elements involved and their respective responsibilities. The specific programs of the Defense Supply Agency, Army (Military Activities), Army (Civil Works), Navy and Air Force are reviewed in separate chapters. These programs include those to abate air, water, noise, land and radiation pollution: solid waste, toxic and hazardous materials disposal; research and development activities, training programs, and the enhancement of the environment.

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DEPARTMENT OF DEFENSE

ENVIRONMENTAL QUALITY PROGRAM

STATUS

1 JANUARY 1972

Office of the Deputy Assistant Secretary of Defense
for Environmental Quality

FORWARD

This report replaces the Annual Report published in previous years by the Department of Defense Environmental Pollution Control Committee. The report provides information on the activities and accomplishments of the Military Departments in the Environmental Quality Program. It discusses the status of the Department of Defense pollution abatement programs, the items of continuing interest, and subjects that will require increased attention in the future.

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I

Department of Defense

A. Environmental Quality Organization

1. All DoD environmental quality policy and coordination activities have been consolidated under the Assistant Secretary of Defense (Health & Environment). A Deputy Assistant Secretary of Defense for Environmental Quality was appointed in October 1971 and a staff was established (see Figure 1) to provide coordination with the Council on Environmental Quality, the Environmental Protection Agency and other governmental agencies. The responsibilities of this office include:

a. Assuring effective coordination with other elements of the Office of the Secretary of Defense and with non-military agencies involved in environmental quality matters;

b. Identifying and evaluating on a continuing basis activities and conditions affecting environmental quality;

c. Insuring that environmental quality problems associated with the use and production of new materials are recognized and provisions are made for their abatement and control;

d. Implementing pertinent Executive Branch guidance concerning environmental quality programs;

e. Providing advice on the probable environmental consequences of major activities of DoD components affecting the quality of the environment; and

f. Management Control of the DoD Environmental Pollution Control Committee.

2. A DoD Environmental Pollution Control Committee consisting of representatives from OSD and the Military Departments provides a means for rapid coordination of requirements levied on the DoD by nonmilitary agencies and for developing and reviewing pollution abatement programs. An essential element of success in the DoD Environmental Pollution Control Committee is that the members are action officers of the agencies they represent. The Chairman and Executive Secretary of the Committee are Directors on the staff of the Deputy for Environmental Quality.

3. Concurrent with the reorganization of responsibilities and functions within the Office of the Secretary of Defense, each of the Armed Services and Defense Components, including the Organization of

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE (HEALTH AND ENVIRONMENT)

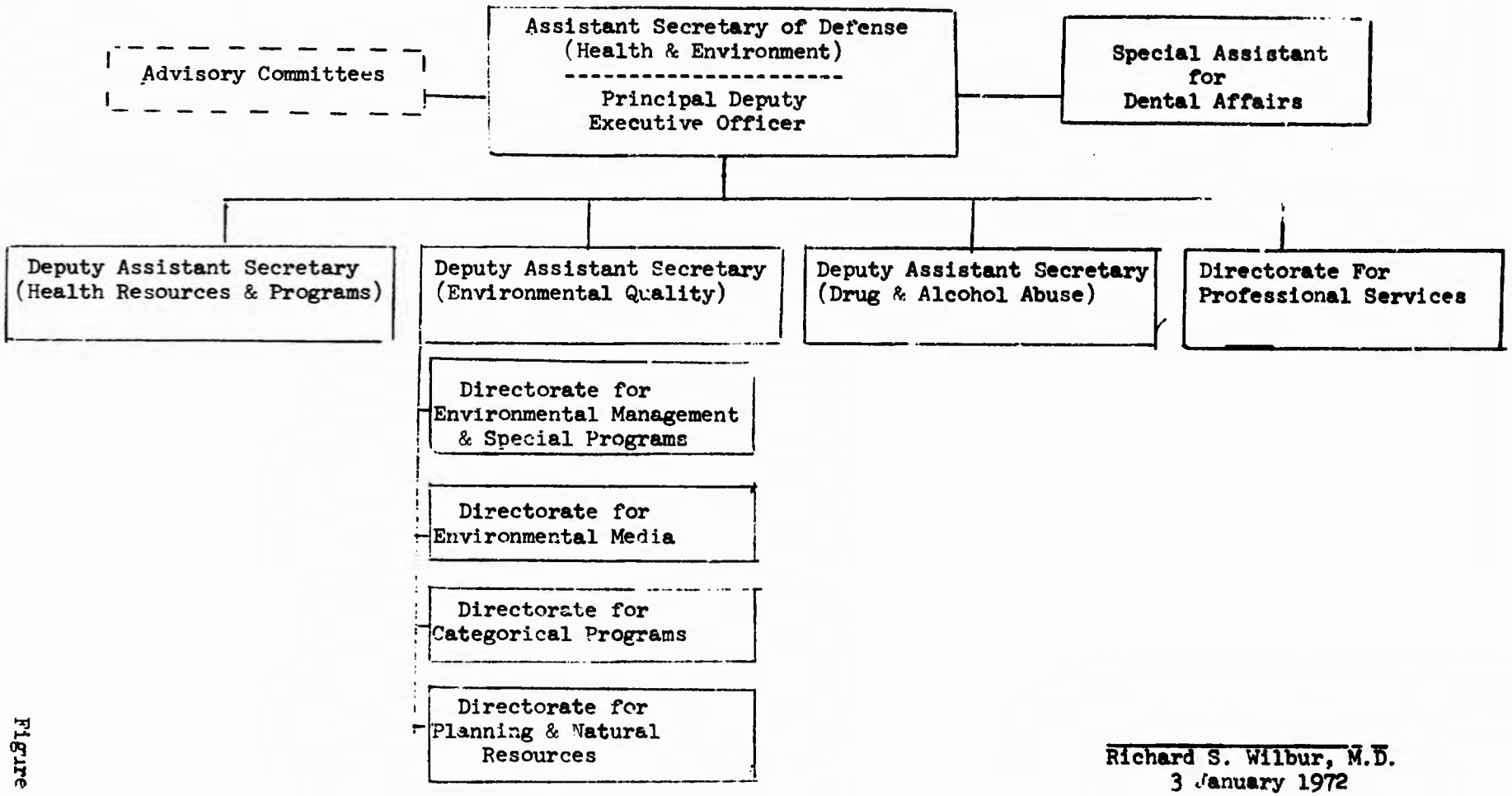

Figure 1

Richard S. Wilbur, M.D.
3 January 1972

the Joint Chiefs of Staff, has established an identifiable organization within its structure to deal specifically with environmental quality matters. These organizations are being staffed with officers and civil service employees long experienced in the fields of environmental quality - environmental engineers, biomedical specialists, entomologists, agronomists and others.

B. Environmental Quality Policy

It is the policy of the Department of Defense that:

1. Pollution of the environment by the installations, facilities, equipment, vehicles, and other property owned and/or operated by the DoD shall be controlled.

2. All Department of Defense components will demonstrate leadership in pollution abatement and will cooperate in the development of pollution abatement programs with local communities. Defense components will take positive action to accelerate the pace of corrective measures to conform to environmental quality standards.

3. Where resources to accomplish pollution control are limited, priority of effort will be afforded in accordance with the following order: (1) those situations which constitute a direct hazard to the health of man; (2) those having economic implications; and (3) those which affect the recreational and esthetic value of our natural resources.

4. Maximum effort will be made to incorporate environmental pollution preventive measures in the basic design for weapon systems, military materiel, tests and exercises, and projects for rehabilitation or modification of existing structures and new construction.

5. Department of Defense components will cooperate fully with the Environmental Protection Agency and other Federal agencies, and will comply with such published standards and criteria relating to pollution abatement for Federal agencies as are promulgated by those agencies or by State and local agencies.

6. Environmental pollution surveillance resources of each DoD component will be utilized to the extent that circumstances permit in interservice support of other DoD components.

7. The use of municipal or regional waste collection or disposal systems shall be the preferred method of disposal of liquid and solid wastes from DoD activities.

8. Pollution abatement at overseas installations will, to the extent practicable, conform to the foregoing policies particularly with respect to cooperation with community programs.

C. Program to Protect and Enhance the Environment

1. Executive Order 11507, dated 4 February 1970, which superseded Executive Order 11282 of 26 May 1966 and Executive Order 11288 of 2 July 1966, established the President's policy with respect to the protection and enhancement of the quality of the nation's air and water resources. The Executive Order requires that air and water pollution clean-up to meet existing standards be complete or underway by 31 December 1972 except for those situations where extensions are granted by the Office of Management and Budget (OMB). Extensions are considered where additional engineering study is required to determine the best corrective measure, the standards have not been established or established too recently to permit programming of funds, or to permit participation in a regional system.

2. In accordance with the Bureau of the Budget (now Office of Management and Budget) Circulars A-78 and A-81, both revised 18 May 1970, the Department submits an Annual Plan, with quarterly updates, to the OMB detailing its deficiencies and its plan of correction. Requests for funds to correct the deficiencies are then included in the Annual Budget. Congressional support for the DoD Environmental Program has been excellent. A summary of the funding plan follows.

($ millions)

	FY 68-71	FY 72	FY 73 (Budget)
MCP	191.9	112.1	172.2
O&M	22.3	15.9	20.4
PROC	25.2	18.8	46.1
	239.4	146.8	238.7

3. FY 1972 Air and Water Pollution Abatement Construction Program Funded by Congress.

See Appendix B

4. FY 1973 Air and Water Pollution Abatement Construction Program Submitted for Congressional Approval

See Appendix C

5. Future Programs

Although funds for the military construction program to abate air and water pollution on military installations have been increased for Fiscal Years 1972 and 1973 to meet the 31 December 1972 deadline

of E. O. 11507, the DoD will face even greater requirements in FY 1974-77. Costs will stem from a requirement for continued investment in water pollution abatement projects which have been delayed pending integration with municipal/regional systems, air pollution abatement projects to meet more restrictive air quality standards and compliance with requirements of the Water Quality Improvement Act of 1970 pertaining to discharge of wastes from ships.

D. Environmental Impact in DoD Actions

1. The DoD has historically considered the environmental effects of its actions on the health and safety of its people. The National Environmental Policy Act of 1969 (P.L. 91-190) and related laws and directives have expanded this base to include any major actions, i.e., weapons systems, construction activities, training exercises and policy directives, which could have significant environmental consequences. The environmental impact of such actions must now be assessed in accordance with P. L. 91-190 as a part of the decision-making process, and in appropriate cases environmental statements must be prepared. By virtue of the magnitude of its budgetary and other resource requirements and the scope of its actions, the DoD has been the focal point of scrutiny with respect to environmental issues.

2. The DoD is complying with P. L. 91-190 and related directives in a manner consistent with national security interests. Actions include:

a. Altering the staff structure in DoD and the Military Departments to provide focal points for environmental matters.

b. Issuing and complying with guidelines consistent with those published by the Council on Environmental Quality for implementing P.L. 91-190.

c. Educating personnel at all levels regarding the need for considering environmental factors in all decisions.

3. The Council on Environmental Quality published new guidelines for implementation of P.L. 91-190 in the Federal Register on 23 April 1971. The DoD issued DoD Directive 6050.1 "Environmental Considerations in DoD Actions" on 9 August 1971. (Appendix A) DoD is continuing to critically examine all of its programs to insure that proposed actions are consistent with national environmental policies and DoD is assessing these actions to identify potential environmental impacts. Where such impacts are evident, DoD is preparing environmental statements for review by other Federal, State and local agencies and the public.

E. Oil and Hazardous Materials Pollution Contingency Plan

DoD Directive 5030.41 "Implementation of the National Multi-Agency Oil and Hazardous Materials Pollution Contingency Plan, has been redrafted to reflect changes in the National Plan. The DoD is represented on the National Response team as well as the ten (10) regional response teams. Closely associated with this program is the DoD policy on Deballast Facilities which requires all Defense components to have adequate deballast capability by the end of CY 1976. Comprehensive oil and oily waste studies are underway to identify shipboard and shore needs to meet the President's "no intentional oil discharges" goal. Navy ships are in the process of being backfitted with controls and piping revisions to reduce accidental oil spills.

F. Noise Pollution Abatement

DoD has continued to stress the reduction of noise from aircraft while in flight and also during ground runup. Sound suppressors for power check pads and jet engine test stands have been installed at a number of CONUS and overseas bases and the schedule for next year will be accelerated. The DoD approach to reduction of aircraft noise in flight involves redesign of the engine itself (air inlets, ducting) and modifications in operational procedures. Complaints from sonic booms attributable to military aircraft operations have shown a decrease over previous years due primarily to changes in flight corridors but we are continuing to study the effects of such booms and methods of ameliorating the situation.

G. Deep Water Dumping

All deep water dumping of obsolete, unserviceable munitions has been suspended pending a study of all alternative methods of disposal. An intensive R/D program is also underway seeking alternative methods of disposal which will have minimal impact on the environment. It has been DoD policy not to dispose of biological warfare agents or munitions at sea.

H. Herbicides and Pesticides

DoD has stopped the production of biological or toxin material and the development or acquisition of biological or toxin weapons or weapon systems which might lead to an offensive capability. Existing stocks of those materials are being destroyed in accordance with a comprehensive plan and with due consideration for protection of the environment. Existing production and research facilities are being transformed into centers for support of human health, welfare and environmental programs. With one goal of reducing the environmental effects of the vegetation control program in South Vietnam, a ban on

the use of herbicide ORANGE for military operations has been imposed. Additionally, DoD has contracted with the National Academy of Science pursuant to P.L. 91-441, to perform a comprehensive scientific study to evaluate the physiological and ecological consequences of this program. This report will be made available to the Congress and the public when completed.

A DoD policy on the use and disposition of pesticides and herbicides has been promulgated. This policy places restrictions on the use of hard persistent pesticides and provides special handling guidance for the sale, transfer or donation of pesticides/herbicides excess to DoD requirements.

I. International Environmental Quality Program

The first United National Conference on the Human Environment will be held in Stockholm in June 1972. This meeting will focus world attention on environmental problems of the developing and the developed nations. Any new international controls or agreements are bound to impact on the world-wide activities of the Department of Defense, and the DoD is represented on the Inter-Agency Committee on International Environmental Affairs. In June 1971 a Defense Advisory Group on Matters of the Environment (DAGME) was established to assure thorough coordination of the views of all Defense elements on positions taken by our government in preparatory work for the Conference.

The Stockholm Conference agenda will include consideration of a Declaration of Principles together with action-oriented recommendations to be taken at national and international levels. The Conference may also have before it one or more proposed environmentally-oriented international conventions. Proposals provide for global monitoring of atmosphere and oceans, international information referral system, development of criteria for selected pollutant release limits, studies on critical sources of pollution and technical assistance to developing countries in connection with their environmental management programs, their national resources, etc.

Mindful of U.S. national security interests, Defense representatives have attended international preparatory meetings to assure that international proposals do not unduly conflict with the national security interest and, further, that matters touching upon controls or jurisdictional limits in the oceans are properly reserved for discussion and decision in the forthcoming Law of the Sea Conference or some other appropriate forum. But beyond these roles the DoD environmental quality representatives have assisted constructively in the preparation and revision of many of the action recommendations for the Stockholm Conference, drawing upon the environmental expertise which exists within the DoD.

II

Defense Supply Agency

A. Environmental Protection Organization

The Agency-wide Environmental Quality Program is administered by the Environmental Protection Office within the Office of the Director, Installations and Services, Field Support Division.

B. Air Pollution

1. Program Funding

($ millions)

	FY 68-71	FY 72	FY 73
MCP	.2	0	.0
O&M	0	.03	0
	.2	.03	.0

a. Emission Testing - Under the terms of an agreement between the Defense Supply Agency and the Department of the Army, emission testing is performed for DSA by the U. S. Army Environmental Hygiene Agency (USAEHA). Testing and evaluation by USAEHA ensures that DSA facilities are in full compliance with local and Federal air pollution standards.

b. Petroleum Fuels - DSA is continuing to exert leadership in the area of contracting for low sulfur heating fuels in cooperation with the national effort to reduce air pollution levels at DoD installations. In particular, all fuel oil and coal contracts for CONUS contain provisions which require contractors to supply fuels which meet either local, state, federal or DoD (self-imposed) restrictions whichever are most stringent. This DoD-wide program is progressing smoothly and DSA has achieved a high degree of success in obtaining fuels of the required low sulfur content. Several troublesome spots developed during CY 1970 because of the general fuel shortages which became particularly severe on the East Coast. In a number of cases it became necessary to waive sulfur requirements in both coal and residual fuel oil in order to meet supply requirements.

2. Automotive Vehicles

a. All new commercial motor vehicles, passenger carrying and cargo trucks purchased for official DSA use comply with the Environmental Protection Agency's requirements for exhaust emission control systems. DSA vehicles delivered in California comply with the state's requirements for exhaust emission control systems. While this Agency is not directly involved with the development of emission control systems, DSA keeps abreast of the latest developments in this area.

b. DSA has acquired vehicle exhaust emission testers for our maintenance shops. These testers are used to monitor the amounts of carbon monoxides and hydrocarbons emitted by internal combustion engines which power vehicles, Materials Handling Equipment (MHE), and other equipment. Exhaust emission testing has paid big dividends. Testing, which requires 3 or 4 minutes, determines if an engine needs a major "tune up," minor adjustment, or is operating at peak efficiency. Engine adjustments indicated by the emission tester have reduced hydrocarbon and carbon monoxide emissions by as much as 60% in specific instances.

3. Materials Handling Equipment

All DSA MHE is tested and adjusted with emission testing equipment to minimize emission of hydrocarbons and carbon monoxide into the atmosphere. DSA uses two types of MHE, electric and gas operated. The latter type of MHE is run on 91 octane, no lead gasoline wherever possible. The use of emission testers and no/low lead gasoline significantly reduces the amount of air pollution that would be caused by operation of this type of equipment.

4. Other

Unleaded Gasoline - In January 1971, DSA ran an operational test of unleaded gasoline at the Defense Construction Supply Center in Columbus, Ohio. This test verified that 91 octane no lead gasoline could be used in all DSA operating equipment (except fire trucks and ambulances) without sacrificing engine performance. The Defense Fuel Supply Center (DFSC) located at Cameron Station, Alexandria, Virginia, is soliciting for low/no lead gasoline for all Federal agencies in the United States. It is estimated that most Federal agencies will be using low/no lead gasoline by early fall.

C. Water Pollution

1. Program Funding

($ millions)

	FY 68-71	FY 72	FY 73
MCP	.8	1.3	0
O&M	0	0	0
	.8	1.3	0

2. Purchase of Detergents

DSA purchases detergents to comply with specifications prepared by the General Services Administration (GSA).

D. Land Pollution

1. Herbicides

DSA as a service/supply agency has the responsibility for procuring, storing and supplying herbicides for the Military Departments, Defense Agencies and other Governmental entities. Under normal circumstances, only those herbicides which are identified in the Federal Supply Classification are procured.

2. Pesticides

a. DSA has the same function with regard to pesticides as herbicides. DSA is currently storing a large quantity of pesticides such as DDT awaiting disposal instructions from higher authority. A decision has not been reached as to the disposal method for these stored pesticides.

b. DSA is represented on the Armed Forces Pest Control Board and is keeping abreast of the latest developments in the area of pest control.

E. Noise Pollution

DSA has completed noise surveys at several field installations to assess and lower noise levels, etc. We plan to extend surveys to all field activities completing these surveys by the end of FY 1972.

F. Solid Waste

1. Garbage - Refuse. DSA disposes of the refuse and garbage in a variety of ways. Incineration is currently the method used by

several DSA field activities and plans are being developed for installation of pollution controlled incinerators, or improvement of existing facilities, at certain locations. Disposal in sanitary landfills, often in conjunction with commercial contract, is the disposal method used at several DSA activities. In all cases, disposal procedures comply with local, state and Federal pollution requirements.

2. Defense Depot, Tracy, California, has developed a program for recycling used lumber. A commercial contractor reduces the scrap lumber to chips and sawdust which he then sells. This recycling program has proved most successful from a financial, as well as a pollution prevention standpoint, and is being considered for utilization at other DSA activities.

3. DSA has a vigorous wood reclamation program at Centers and Depots. This program segregates reuseable lumber, thus, eliminating the necessity of disposing of the reuseable lumber and reducing the requirements for lumber procurement.

4. The Defense Supply Agency is required to dispose of numerous types of dangerous and hazardous materials, occasionally in large quantities. Various arrangements have been made for disposal of these items. Items are neutralized locally or, in some cases, shipped to local private specially constructed incinerators and burned. Disposal in all cases is within local, state, and Federal guidelines for pollution control.

G. Toxic and Hazardous Materials

1. DSA has the responsibility for the storage, handling, transportation and often the disposal of many toxic and/or hazardous materials. These items are stored carefully often in separate warehouses, and are disposed of where necessary with extreme caution.

2. DSA has made local arrangements at several locations to dispose of dangerous or hazardous materials in private incinerators constructed for this purpose. In all instances, DSA stringently observes local, state, and Federal regulations.

3. DSA occasionally disposes of dangerous and/or toxic materials by selling to selective qualified purchasers who have been certified as being capable of handling and processing these materials.

H. Research and Development Activities

The Defense Documentation Center (DDC) has the responsibility for, and is the central DoD repository for DoD funded technical research and

development information. This information is available to the Military Departments and Government agencies and their contractors and grantees. At the present time, DDC is preparing special compilations of abstracts of reports generated by DoD Research and Development Programs in the area of environmental pollution and protection. All reports which do not require special protection for reasons of security, or ethical or proprietary considerations, are announced and made available to the scientific community immediately.

'I. Procurement Policies

The Defense Supply Agency is governed by policies established by the Armed Services Procurement Regulation Committee. A suggested Armed Services Procurement Regulation Change is currently under study which would require contractors to comply with all local, state and Federal requirements and regulations, however, a final decision has not been reached.

III

Department of the Army

Military Activities

A. Environmental Protection Organization (See Figure 2)

The Deputy Chief of Staff for Logistics is responsible for:

1. Exercising primary Army Staff responsibility for the coordination of environmental preservation and improvement activities within the Army.

2. Establishing a central point of contact for the coordination of environmental control and abatement actions, and

3. Conducting, on a continuing basis and in coordination with appropriate Staff agencies, a comprehensive review of Department of the Army statutory authority, administrative regulations, policies, and procedures - including those relating to loans, grants, contracts, leases, licenses, or permits to identify deficiencies or inconsistencies which prohibit or limit full compliance with the provisions of the National Environmental Policy Act of 1969 (NEPA) and Executive Orders 11507 and 11514.

The other Army Staff agencies are responsible for designating points of contact (by name) for environmental protection and enhancement activities and to:

1. Establish a planning capability for environmental pollution control and assure its consideration in the discharge of agency functional responsibilities, and

2. Coordinate planning and actions which impact on environmental quality control with DCSLOG.

Within the Office of the Deputy Chief of Staff for Logistics, the office of the Director of Installations was charged with the DCSLOG responsibility and to establish an organization for that purpose. The Army established an Environmental Office within the Office of the Director of Installations in early 1971. Figure 2 is an organization chart which indicates organizational responsibilities for environmental protection and enhancement activities within the Department of the Army.

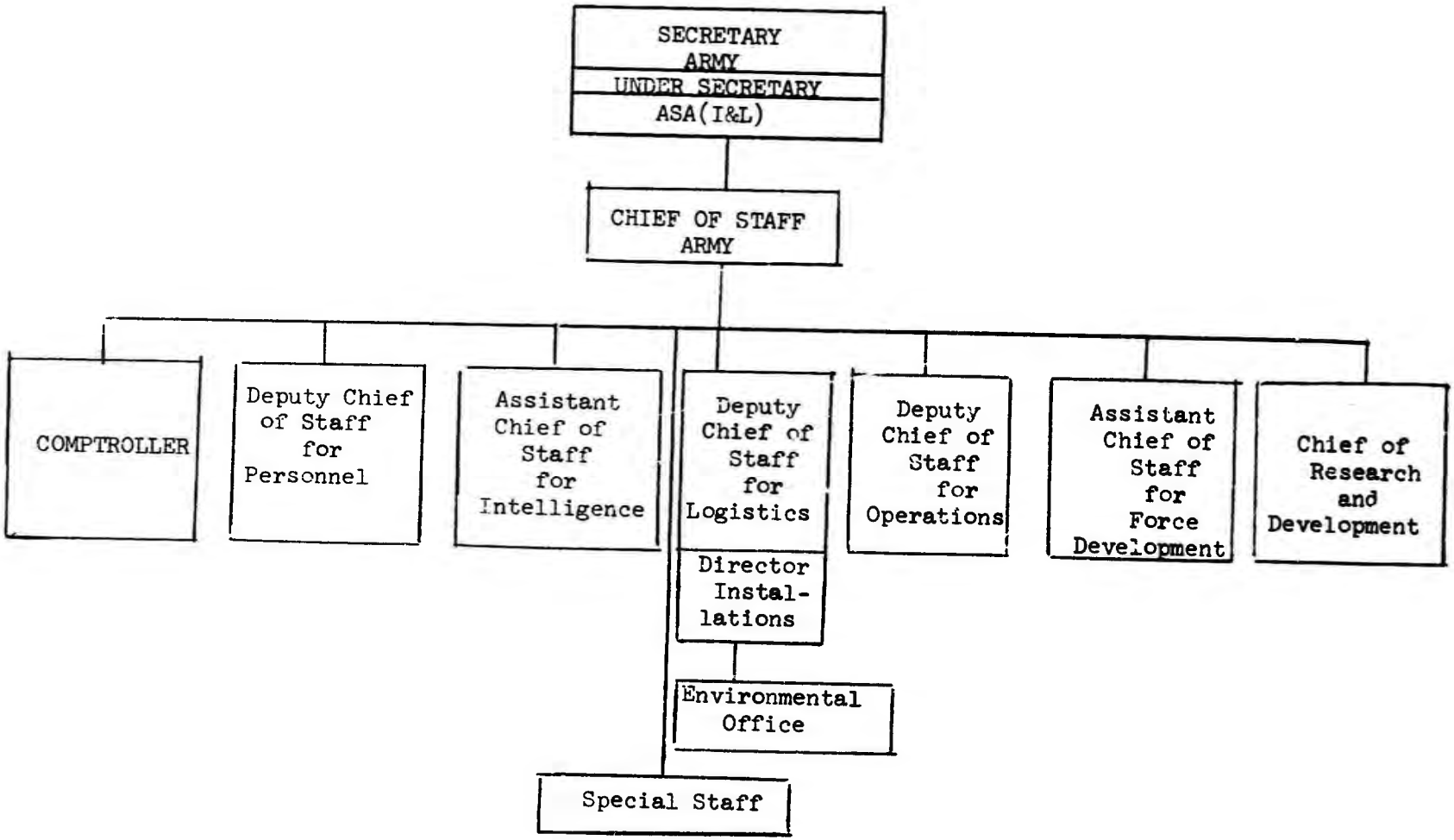
SECRETARY
ARMY
UNDER SECRETARY
ASA(I&L)
CHIEF OF STAFF
ARMY
COMPTROLLER
Deputy Chief of Staff for Personnel
Assistant Chief of Staff for Intelligence
Deputy Chief of Staff for Logistics
Director Instal-lations
Environmental Office
Special Staff
Deputy Chief of Staff for Operations
Assistant Chief of Staff for Force Development
Chief of Research and Development

Figure 2

B. Air Pollution

1. Facilities.

a. The Army has had a program underway for the elimination of air pollutant emissions from facilities since Fiscal Year 1968. A summary of the funding levels for this program is as follows:

	($ Millions) FY 68-71	FY 72	FY 73
MCP	14.4	5.7	31.4
O&M	6.1	1.7	.2
PROC	7	-	.5
	21.2	7.4	32.1

b. Emission Testing. The medical and engineering agencies of the Department of the Army have special expertise in environmental assessments to determine those projects or operations for which controls are required, to design controls and to assure efficiency of controls applied. The medical department and its Environmental Hygiene Agency has the capability of entering any Army installation and preparing studies, based on measurements, of the environment, including air and water emission baselines, to determine the necessity of revising controls to protect the environment and the preparation of criteria upon which to base the design of the controls. The Chief of Engineers maintains the capability of designing and installing the necessary facilities to provide the required protection. Additionally, the Chief of Engineers is emphasizing the need for more and better monitoring equipment at each installation to assure compliance with all air and water standards.

c. Petroleum Fuels. To minimize the emission of sulfur dioxide from boiler plant stacks, petroleum fuels for boilers are now required to contain a lower sulfur content than previously permitted by Army specifications. The Army is using low sulfur oils wherever necessary.

d. Industrial Type Plants. The Army, in its program[1/] to modernize its production facilities, is "closing" its production processes to constrain the emission of gases from its lines and to reduce its operating costs. Some of the processes now used permit gases to escape

1/ The guidance for the Production Base Support Modernization Program levels, FY 72-76, established first priority to modernize facilities which are major pollution sources.

during production. This increases the cost of production and causes undesirable pollution of the air. When the lines are modernized, the gases in many cases will be recycled to the production process with reduction in cost and elimination of pollution. Similar constraints in the modernized production lines will reduce or eliminate water pollution. In addition, through its manufacturing techniques and technology program, the Army is seeking improvements to further reduce losses to its processes. In those cases where the improved production lines do not remove all of the pollution, the Army is constructing special pollution abatement facilities.

2. Automotive Type Vehicles

a. All new commercial types including passenger and cargo vehicles purchased for the Army, comply with applicable emission standards.

b. In October 1970 the Army published a requirement that required pollution control characteristics be included in the qualitative material Development Objective, the QM Requirements and the Small Development Requirement. The impact of the Army's decision should be reflected in tactical wheeled vehicles coming off the production line in early 1972. In addition, the Army has under development a hybrid internal combustion engine that is expected to meet the emission standards for the late 1970's.

3. Ships.

Many of the Army's vessels are towed; many are small gasoline/diesel craft and some are driven by outboard propulsion units. However, the Army is developing a program which is expected to assure that the Army's water craft comply with all air pollution control standards.

4. Aircraft.

The Army is looking at the Air Force as the lead agency for aircraft and to determine the appropriate course of action to be followed. In the meantime, Army research and development programs to eliminate or reduce the signature from aircraft are assisting in the elimination of some pollution. An example of this type of program is the Army's on-going program to reduce helicopter noise. In the meantime, the Army is examining emission from Army peculiar type aircraft to determine the course of action required, if any, to reduce emissions. The Army has a program to provide sound and other emission reducing test cells wherever required.

5. Construction Equipment.

There has been no coordinated industry work on this problem. Some large companies are doing research work. The Construction Equipment Manufacturers Association and the Society of Automotive Engineers, Construction Equipment Division have begun work with certain segments of the industry. This is in the initial stage. General Provision 12 of Standard Form 23A, General Provisions, Construction Contracts, makes the contractor responsible for compliance with all Federal, State and local laws in connection with the prosecution of the work. This would be applicable to air pollution by contractors' construction equipment. In addition, a Special Provision as follows is included in applicable contracts: "SP-48. AIR POLLUTION CONTROL: The Contractor shall conduct his operations, including the disposal by burning of debris, trees, logs, stumps, and other combustible material, in accordance with the purposes of Clean Air Act, as amended (42 U.S.C. 1857), as implemented by E. O. 11507, 5 February 1970. Disposal by burning shall be in accordance with the air pollution standards prescribed by the State, Community, or installation where the burning is performed." AR 11-21 requires Army agencies to use maximum effort to incorporate environmental pollution preventative measures into the basic design of military materiel. This would include tactical construction equipment to be used in the United States.

6. Materials Handling Equipment.

Much of the Army's materials handling equipment is of the low emission type. This is caused by the normal safety standards which dictate the requirement to avoid explosions or reduce the health hazards to Army personnel working in buildings or other enclosed structures where materials handling equipment is used. Much of this type equipment operates on liquefied petroleum gas (LPG) or with electric power. In the case of the gasoline driven equipment, it is expected that the Army will follow applicable standards as they are determined and the lead of the commercial manufacturers of this type of equipment.

7. Specifications for paints, varnishes and other volatile substances.

The Army's Surgeon General identifies and sets tolerance limits on toxic, hazardous or dangerous materials used in the Army's operations. These include toxicity, flash point and flammability considerations. Currently, in the use of these volatile substances, the Army's air pollution control program considers pollution emission from paint shops and laundries (dry cleaning) and is eliminating this pollution wherever required. In the case of paints used on the Army's

fixed facilities, the Army follows the lead of the General Services Administration who has overall responsibility in this area. In the case of military specification type paint, the Army Materiel Command is the responsible Army agency. Army Materiel Command has an on-going program to eliminate or reduce air pollution caused by this type of paint.

8. Unleaded Gasoline.

The Army is revising the Federal specification for automotive gasoline which will limit the lead content in gasoline used by DoD. The Army has distributed low lead/no lead gasoline to all Army installations and is using it in all automotive equipment where it has been determined that fuel will not damage the equipment. However, for most of the Army's tactical fleet, it is necessary to operate a test program to assure that the fuel is compatible with the equipment. The Army has an on-going program to determine the applicability of this fuel to its tactical fleet and will use the fuel wherever possible. Additionally, all retail outlets on the Army's installations have available for resale low lead/no lead fuel. The necessary modification which had to be accomplished for the installations to accept this type of fuel cost the Army and Air Force Exchange Service about $1.6 million.

C. Water Pollution

1. Installations.

a. Military Type Installations/Activities.

(1) The Army has been active in abating water pollution for many years. Even prior to and during World War II the Army constructed numerous sewage treatment facilities. Although these facilities were constructed primarily to protect the health of the Army's military personnel, they also provided direct benefit for the general public. As a direct result of Executive Order 11258 (November 1965) the Army initiated an overall plan for a Five-Year program to improve its waste treatment facilities and, in a few cases, provided treatment facilities where none existed. The first major funding of corrective construction projects was received in Fiscal Year 1968 and together with funds received in Fiscal Year 1969, 1970 and 1971, now totals approximately $83 million. With adequate funding support, it is expected that actions necessary to correct discharges will be completed or underway (as required by EO 11507) by 31 December 1972. However, it is anticipated that upgrading of State and Federal standards in the future will cause many new projects to become evident even though the concerned installations may be in compliance with current standards.

(2) Funding Levels

($ millions)

	FY 68-71	FY 72	FY 73
MCP	49.0	33.6	36.5
O&M	.3	.2	-
PROC	6.5	1.1	-
	55.8	34.9	36.5

b. Production Type Facilities.

The Army's modernization program to improve the manufacturing process and reduce the cost of the end items also has caused lessening of pollution from those facilities. Where pollution exists after modernization or the modernization is planned too far in the future, the Army has taken steps within the military construction program to abate that pollution. It should be noted that the modernization program has recycled many formerly wasted products with attendant lowered production costs and pollution abatement.

2. Ships

Inasmuch as the Navy is the lead service concerned with vessels, the Army will closely monitor the Navy's program and will install all necessary equipment as the state of the art permits.

3. Oil

Army Responsibilities. Within the Army, responsibilities for dealing with oil spill problems have been established as follows:

The Chief of Engineers is responsible for the technical requirements in the design and construction of fixed installations, including deballast facilities, to assure against oil spills at those installations. The Chief of Engineers is also responsible for technical advice and assistance to the field and monitoring the Army's overall program to assist in abating damage from spills caused by others. The Army Materiel Command is responsible for implementing requirements to assure proper design of Army vessels and small craft to the end that we will have no oil spills from those vessels. In

the operation of our vessels, the masters have been charged with the responsibility to assure that the vessels do not pump bilges containing oil or other contaminants into harbors, lakes, rivers, bays or within other prohibited waters.

4. Purchase of Detergents.

a. Army Laundries.

The cleaning compounds used in Army laundries contain little phosphates when compared to the cleaning compounds for home use. The Army is monitoring commercial laundries and industrial advances and, as the state of the art permits, will eliminate the small amounts of phosphates currently coming from our laundries.

b. For Resale Use.

In the case of detergents purchased for resale on Army installations, the Army and Air Force Exchange Services makes available for resale those commodities which the military personnel and their dependents demand. The Army is not taking any action to prohibit the resale of high phosphate soaps on its installations but is encouraging its personnel and their dependents to desire to eliminate high phosphate detergents from their household use.

D. Land Management, Conservation, Herbicides and Pesticides

1. General Program and Soil and Water Conservation.

The Land Management Program in the Army began during World War II. The principal function was to establish and maintain dust and erosion control in newly established military installations by revegetation of thousands of acres of land that had been graded for construction of airfields and new training facilities. Wood products were in short supply; consequently, a number of sawmills were established to produce lumber on installations with sufficient timber for this program. After World War II, the Land Management Program was continued and includes Land, Forestry, Fish and Wildlife. The program includes approximately 317,000 acres of improved grounds, and 12,900,000 acres of unimproved grounds. The various programs consist of multiple use of the land in conjunction with the primary military mission. Maintenance of improved grounds includes turf grass management, maintenance of trees and shrubs, and erosion control. Agricultural leases are administered under AR 405-80 and the Army is revising internal regulations to provide that land use regulations incorporated in all agricultural leases be designed to maintain and increase soil fertility and avoid soil erosion and other types of agricultural pollution. Compliance will be accomplished through the annual compliance inspections. AR 420--74, Natural Resources -- Land, Forest and Wildlife Management, TM 5-630, Grounds Maintenance and

Land Management, and TM5-631 Woodland Management, prescribe policies in connection with conservation, fish and wildlife, and natural beauty.

2. Herbicides.

The Army recognizes herbicides as valuable materials for economical control of unwanted vegetation and that mishandling of herbicides can result in damage to valuable vegetation, domestic animals, birds, fish, wildlife and man. Only standard issue herbicides are normally used. Where substitutes are proposed for those listed in the Federal Supply Catalog, they must be approved in accordance with applicable Army regulations. These regulations outline responsibilities and establish policies to provide maximum efficiency and safety in control operations.

3. Pesticides.

a. In June 1970 the Army advised all commands of the DoD restrictions on the use of DDT. During the fall of 1970 the Army initiated changes to AR 420-76 that are intended to limit all permissable uses for DDT and the other chlorinated hydrocarbon insecticides. The AR will permit those persistent pesticides to be used only for those essential purposes for which there are no reasonable substitutes.

b. President's Committee on Pesticides. A working group of the Environmental Quality Council (CEQ) includes a Program Review Panel. This Panel is studying the pest control program of all Federal agencies in order to provide recommendations concerning pest control to the working group of the CEQ. The Army also provides representatives to several other panels of the working group.

c. Armed Forces Pest Control Board. The Armed Forces Pest Control Board (AFPCB) was established by DoD Directive 5154.12 of 12 August 1968 as the coordinating agency for the DoD in all phases of pest control. The Board provides technical consultation, guidance, and coordination among the military departments in pest control operations, logistical management, and RDT&E programs. The Chief of Engineers and the Surgeon General provide Army representatives for this Board and from time to time find it appropriate to request that the DCSLOG, DA provide representatives at special meetings of the Board.

E. Noise Pollution.

The Army has had noise pollution abatement requirements in the design, construction and operation of its facilities and equipment

for a significant number of years in the past. However, much of this effort has been directed as a hearing conservation program to protect Army personnel. Additionally, in the construction of facilities to be located adjacent to civilian communities, such as the Army's NIKE sites, the design of the facilities included consideration of noise pollution and its impact on the civilian communities. The Army's Technical Bulletin TBMED 201, subject: Noise and Conservation of Hearing, 25 January 1965, specifically addresses the problem as do various construction criteria documents published by the COE, DA. Following comments include information concerning some of the Army's R&D work in this area.

1. Specific Research and Development Work.

a. In FY 1970 the Army awarded a contract for "A Review of the Adverse Biomedical Effects of Sound in the Military Environment." This one-time contract primarily addresses noise-induced hearing loss and the many variables that may affect the onset, nature, and severity of such hearing loss. Consideration is being given to the adverse effects of noise on the efficiency of the soldier in performing his duties and the potentially adverse effects of excess sound on other than hearing loss.

b. The Chief of Engineers is planning to do initial research work concerning environmental protection during construction activities. This work will seek to identify causes and effects of pollution (including noise) during and, as a result of, construction operations and to provide economical and reliable control criteria. Other R&D activity in the past permitted the Army to publish Technical Manual TM 5-805-4, Noise Control for Mechanical Equipment, during September 1970.

c. The Surgeon General is developing or has underway research and development projects covering "Traumatic Origins of Hearing Loss," "Auditory Perception and Psychophysics," "Acoustical Environment of Army Aviation Personnel," "Vibration" and other matters. The desired end result is to abate noise pollution hazards involving Army personnel as well as the general civilian population.

d. The Army Materiel Command is expending major effort in R&D of noise to improve health conditions, decrease signature of equipment (i.e., lessen detection time and distance) and to improve communications, fire accuracy and operator capability. All of this work has spin offs to lessen noise pollution.

e. In addition to its own efforts, the Army is closely monitoring the work being done by the other military departments and other Federal agencies to assure that we incorporate up-to-date criteria in the design of our equipment and facilities.

F. Thermal Pollution

The several large power plants operated by the Army were designed and are operated in compliance with current standards relating to thermal pollution of the water.

G. Radiation Pollution.

The Army has a significant amount of equipment or facilities that could possibly be considered as sources of radiation pollution. The primary possible source would be our radars. Other possible sources, all carefully controlled, are our laboratories, power plants, weapons systems, luminous gages, ovens and X-ray equipment. However, the Army maintains a rigid system to provide for the protection of the health and welfare of Army personnel as well as of the civilian population. The Surgeon General of the Army is responsible to and does ensure that Army Regulations prohibit significant radiation hazards. In the case of our radars, safety distances are rigidly determined and adhered to. Additionally, locks and stops, standard operational procedures are all aimed at preventing the radars from causing hazards. Insofar as nuclear power sources are concerned, the Army has several of these plants. Each plant was designed in accordance with the state of the art and the applicable AEC regulations. In the case of our nuclear weapons, the Army has a strong and continuing nuclear safety program both to protect the weapon system itself and to insure that no accidents occur. For all of these items and for our ovens, laboratories and other possible sources of radiation, we maintain a careful system of checks and balances which are based on the medical requirement to protect the health and welfare of our own personnel as well as that of the general population. AR 11-21, Environmental Pollution Abatement, provides basic Army policy on radiation pollution. Additionally, AR 40-583, radiation from microwave energy, provides procedures for control of potential hazards to health of personnel. Similar regulations provide procedures relating to control of hazards from other type emitters.

H. Solid Waste

1. AR 11-21, Environmental Pollution Abatement, and AR 420-47, Refuse Collection and Disposal, provide basic Army policies on solid waste disposal for real property facilities.

2. Nonindustrial Activities.

a. Recovery and Sales Operations.

(1) Organic Material - Waste Food, etc. In the cases where there is a market, the Army segregates waste food and disposes of it by sale as edible garbage or for rendering into reusable material. In its nonsegregated condition, where there is no demand for the material, it is disposed of as trash.

(2) Organic Material - Paper, Cardboard, etc. In those cases where markets are available, the Army segregates this material and disposes of it by sale.

(3) Inorganic - Metal. In many instances this material is also disposed of through sale.

(4) Inorganic - Glass. The economics involved in the reuse of this material have prevented its sale.

b. Disposal as Trash. The Army disposes of its waste trash, which is not suitable for sale or donation to authorized organizations, by the conventional methods used throughout the services. First emphasis is placed upon local community trash collection systems. The Army also uses on base sanitary land fills or incinerators or the trash is removed and disposed of by private contractors. However, in all instances, the Army bases the method used upon the economics of the local situation, the availability of satisfactory land for the sanitary land fill or of a municipal service or private contractor. However, regardless of the method chosen, the Army is careful to assure that local, State and Federal standards for air and water pollution abatement are not violated.

3. Industrial Activities.

At the Army's manufacturing plants there is a significant amount of waste generated in the production processes itself or as a result of these processes. The question relating to these production facilities has customarily been how can we dispose of our wastes? This question is no longer satisfactory to the Army. Accordingly, prior to modernization of our production facilities, we must ask ourselves: How may the objectives for which our product is manufactured be best met? The answer to this question immediately suggests that manufacturing processes might be changed to produce less waste, that waste produced be recycled into the process wherever possible and that remaining waste be converted to a useful and salable product. We are currently doing all of these in the plant modernization programs and through these programs, we

hope to minimize waste from our plants. The nonrecyclable, nonsalable trash will remain a problem to us. However, because of on-going research and development in the incineration of explosives wastes, we will shortly have available the technical capability of burning waste explosives without polluting the air. The Army's plans include the construction of incinerators for this purpose during FY 1972 and FY 1973.

4. Recycling.

The Army recycles some wastes in its production processes and is investigating the problem on an Armywide basis. Currently, the Army does not prohibit the procurement of any item just because its container is glass, aluminum, steel or any other permissible material. The Army, in some cases, is returning its crates for reuse. We are also using palletization, large demountable container vans for economic and environmental reasons. Recent studies have concluded that about 75 percent of the Army's tire replacement requirements can be satisfied by using retread tires. The Army's policy now requires maximum use of retreads and we are saving significant sums through this recycling process. In addition to the above items, the Army is saving hundreds of thousands of dollars by repairing and reclaiming items that were formerly discarded. A few of these items are listed below:

a. Recovering of brass content of spent ammunition,

b. Rebuilding of turbine engine power shafts which were previously discarded when the bearing area became pitted,

c. Reconditioning of metal containers for reuse,

d. Welding and reclaiming of damaged engine crankcases,

e. Reclamation of damaged 5-Ton truck frames by low-heat weld process,

f. Reclamation of damaged gas turbine compressor blades,

g. Reclamation of damaged gas turbine combustion liners,

h. Reclamation of damaged tank race ring assemblies, and

i. Reclamation of damaged worn internal combustion engine crankshafts.

I. Toxic and Hazardous Materials.

AR 11-21 provides basic DA policy regarding possible pollution from this type of material. AR 385-14, Safety, Accidents Involving Commercial Shipment of Explosives and Dangerous Materials; AR 385-10, Army Safety Program; provide general policy regarding safety in transportation as well as storage and handling. AR 755-15 governs the safe disposal of radioactive wastes in accordance with Title 10, CFR, Part 20. Other similar regulations cover other aspects of this subject.

1. Common Use Materials.

This subject treats many materials that are used by local, State and Federal agencies as well as by the general public. Such materials as herbicides, pesticides, chlorine, ferric chloride and alum as well as other materials for purifying water or sewage plant effluents are in use throughout the United States and do not appear to be worthy of much consideration in this section. However, it should be noted that the Army, in its application of herbicides and pesticides and in its use of other chemicals necessary for the operation of its facilities or equipment, is careful to assure that local, State and Federal standards for the use of the material are carefully followed. Also, the Army agencies are required by regulation to assure that air and water pollution standards are met.

2. Noncommon Materials.

a. The Army carefully controls the handling, transportation, and use of radioactive material in strict accordance with applicable standards, including the standards of the Atomic Energy Commission. Material to be disposed of is also governed by those standards and the Army spares no expense to assure that we do not cause pollution by our use or disposal of this material.

b. As previously noted, our industrial modernization programs are intended to constrain pollutants within the production system to minimize the cost of the production. Where this is not feasible, the Army, through its construction programs, has constructed special air and water pollution abatement facilities to preclude such pollution. Our current construction program is intended to assure that action is completed or underway by December 1972 to abate pollution at all of our industrial facilities.

J. Research and Development Activities and Requirements.

AR 11-21 provides basic DA policy regarding pollution from this type of activity. Public Law 91-121, Section 409, governs lethal chemical

agent open-air testing. Under this law all tests are coordinated to insure safe testing presenting no hazard to persons or environment.

1. Development of New Equipment, Hardware, Weapons Systems, etc.

a. Executive Order 11507 states in part that "... it is the intent of this order that the Federal Government, in the design, operation and maintenance of its facilities, shall provide leadership in the national effort to protect and enhance the quality of our air and water resources." The Army Regulation AR 11-21, Environmental Pollution Abatement, requires all Army agencies to demonstrate this leadership. The same regulation also requires "... maximum effort will be made to incorporate environmental pollution preventive measures into basic design for weapons systems and into materiel, tests and exercises." Beyond the basic regulation, the Army took action in October 1970 to direct that all Army agencies exert maximum effort to include environmental pollution controls into proposed materiel objectives/requirements documents and into proposed revisions to approved documentation.

b. Research Programs for Pollution Control. DA is committed to making known to all activities under its control, both in-house and extra-mural, the need to reduce environmental pollution. The development of a consciousness for combating pollution by R&D activities is being undertaken by means of internal laboratory memoranda, and conversations with laboratory commanders. The Army's R&D program will be mainly directed to resolving the parochial problems involved in the Army's missions and will depend greatly upon existing and future programs required to reduce or eliminate signature from the Army's equipment. Many Army R&D programs can be expected to have "spin-off" benefits that will help to resolve pollution problems. Examples of this type of project, previously noted, are the hybrid gasoline engine and the quieter helicopter. However, the Army is also planning to develop new monitoring methods, technology and instrumentation for measuring water, air, soil and noise pollution that deal with uniquely military pollutants or with pollutants which originate chiefly from Army installations. The Army hopes to develop new and to modify existing environmental pollution control processes and disposal systems for pesticides, hospital wastes, and waste water peculiar to Army installations. The Army also plans to develop nonpolluting ingredients for pyrotechnics and explosives, alternate nonpolluting substitutes for heavy metals and to do further work on alternates to the internal combustion engine. Further, the Army plans to develop and test advance waste treatment and reclamation plants, nonchemical methods of pest control and other necessary items that will permit the Army to be "clean" in its operations.

K. Training Programs

AR 11-21 requires that maximum effort be made to incorporate environmental pollution preventive measures into exercises.

1. Nuclear.

Comprehensive training is carried out to assure that the Army's personnel who handle or maintain nuclear weapons or power plants protect these systems from accidents or incidents.

2. Sewage Treatment Plants.

The Army has a voluntary program to upgrade its sewage treatment plant operators. This program provides the individual with transportation, per diem and tuition to permit him to attend State short course schools for water and sewage treatment plant operators. Additionally, the Army encourages the operators to belong to associations and keep up-to-date with current technical literature in this field.

3. Pollution Monitoring.

The Surgeon General of the Army provides training in this area through grants for professional degrees, miscellaneous State short courses and in-house schools.

L. Enhancement of the Environment.

1. During May and June of 1970 all Army Staff agencies reviewed the Army's statutory authority, administrative regulations, policies and procedures that were within their responsibility to determine whether any policies or limitation precluded the Army's compliance with the National Environmental Policy Act of 1969. On 27 July 1970 the review was completed, and it was determined that no known limitations precluded the Army's compliance.

2. On 11 September 1970 the Army directed all Army Staff agencies and major CONUS commands (including those commands responsible for activities in Hawaii, Alaska, Puerto Rico, Guam and the Virgin Islands) to make detailed assessments of their on-going and proposed programs to assure that the programs did not adversely impact on the environment and that an impact statement was submitted. All concerned were advised that this requirement was a continuing requirement.

3. On 28 September 1970 the Army emphasized to all commands the requirement to assure that no delays occur in the Army pollution abatement program. The commanders were requested to give their personal attention in the matter to keep the program on schedule.

M. Public Information.

The Army's policy is that the local commanders will assure good community relations and provide the public with newsworthy information concerning our operations. At Headquarters, Department of the Army, the Chief of Information is charged with the dissemination of information to the public whenever newsworthy information of national interest is available. All Army information officers are interested in "the Army and the Environment" and as noteworthy information becomes available, present it to the public through the appropriate news media.

N. Materiel Storage.

1. Army TM 743-200, concerning storage and materials handling, contains directives to insure against water and air pollution and establishes emergency plans and procedures for dealing with accidental pollution. Other Army Regulations also deal with safety in storage for specific items and relate directly to prevention of pollution. These regulations are continually being up-dated and strengthened.

2. A specific example of materiel storage is noted in petroleum operations. All petroleum operating procedures and instructions are aimed at preventing leaks in storage tanks and pipelines. The procedures are promulgated not only to reduce losses, but to prevent the contamination of ground water streams or sewage with petroleum. In construction of petroleum facilities, emphasis is placed upon the proper installation of gas/water separators. These separators are installed to prevent the accidental discharge of petroleum products into streams or ground water sources. Storage tanks are equipped with the proper pressure vacuum release valves so as to minimize the expansion and contraction of product in the tank and we have an on-going program to install submerged inlets to prevent air pollutants. All these precautions are applied to bulk chemicals as well as petroleum products.

O. Other Areas.

1. Leases, Licenses, Permits and Easements to use Army Real Property.

These outgrants are administered under AR 405-80. The Army is revising internal regulations to provide that all outgrants will

contain a comprehensive provision prohibiting environmental degradation. The provision will cover water and air pollution, noise emissions, soil erosion, and solid waste disposal. Compliance will be accomplished by the annual compliance inspections.

2. Land Acquisition.

AR 405-10 governs land acquisition in the Army. The Army is revising internal regulations to provide that the National Environmental Policy Act of 1969 will be adhered to in preparing acquisition planning reports and other acquisition planning. Compliance will be accomplished by administrative review at Headquarters, DA.

3. Real Property Disposal.

AR 405-90 governs real property disposal actions in the Army. The Army is revising internal regulations to provide that the National Environmental Policy Act will be adhered to in disposals accomplished by the Corps of Engineers and that reports of real property to the General Services Administration will include recommendations on environmental considerations where appropriate. Compliance will be accomplished through administrative review in Headquarters, DA, and through periodic inspections of the appropriate field offices.

IV

Department of the Army

Civil Works

A. Authorities for Pollution Abatement

The statutory responsibilities of the Corps of Engineers Civil Works program for flood prevention, navigation, beach preservation, protection from hurricanes and other marine storms, and regulatory management have a major impact on the terrestrial and marine environments. These activities range from an evaluation of projected engineering works of the Corps program to issuance of permits for construction and dumping of wastes in our nation's waterways and maintaining and operating the various facilities of the several water resource projects and/or activities.

The regulatory program has received increased emphasis since the passage of the National Environment Act which increased the Corps authority under Section 13 of the River and Harbor Act of 3 March 1899 relative to discharging of refuse into navigable waters of the United States or their tributaries. This act has been further augmented through recent court actions.

Air environment also experiences an impact from the Civil Works program but to a lesser degree than that for water.

Authorities for these various activities vary from Resolutions of House and Senate Public Works Committees to implementation of Executive Orders and Public Laws. The more important of these are: Executive Order No. 11507, the Federal Water Pollution Control Act, Water Quality Act of 1965, Clean Water Restoration Act of 1966, the Fish and Wildlife Coordination Act; and the many Rivers and Harbors Acts and Flood Control Acts such as R&H Act of 1899; Public Law 189, 55th Congress; Public Law 84-660; Public Law 86-645; Sec 107 & 302 of Public Law 89-298.

B. Air Pollution

1. Installations

a. Program Funding

($ millions)

	FY 68-71	FY 72	FY 73
MCP	.1	--	-
O&M	2.8	1.0	-
	2.9	1.0	-

b. The Civil Works Directorate has the expertise in environmental assessments to determine those projects or activities requiring design of controls and to verify the efficiency of the controls applied. The Directorate cooperates with other Federal agencies in the application of air quality criteria and water pollution control. It further has the capability to make measurements of the environment including air emission baselines to determine the necessity of revising controls to protect the environment, to apply these measurements to the criteria established for the area and to design such corrective measures which when in operation will not exceed the established criteria. A capability is present to design and install the necessary facilities to provide the required protection.

c. Emission Testing. Civil Works Directorate cooperates with other Federal agencies in the application of air quality criteria and water pollution control. Within the Directorate the capability exists to make environment measurements and study or cause studies to be proposed which will determine criteria as well as need to revise or provide controls to protect the environment.

d. Petroleum Fuels. Civil Works Directorate is in compliance with the requirement that petroleum fuels for boilers have a lower sulfur content than that previously specified in order to minimize sulfur dioxide emissions from boiler plant stacks.

2. Automobiles purchased with Civil Works funds comply with applicable emission standards.

3. Ships.

Civil Works Directorate will take the necessary action as may be required to be made to Civil Works vessels by individual states. No complaints to date have been received regarding air pollution from Civil Works vessels, low sulfur fuel being used in steam powered vessels.

4. Unleaded Gasolines.

Civil Works Directorate has advised Districts to utilize low lead fuels in motor vehicles subject to the availability thereof.

5. Construction Equipment.

Certain segments of the construction industry are engaged in research whereby contractors' construction equipment would be in compliance with Federal, State and local laws. Construction contracts

contain special provisions as may be applicable requiring the contractor to conduct his operations, including the disposal by burning of debris, trees, logs, stumps and other combustible material in accordance with the purposes of the Clean Air Act, as amended (42 U.S.C. 1857) as implemented by E.O. 11507, 5 February 1970. Disposal by burning shall be in accordance with the air pollution standards prescribed by the State, community, or installation where the burning is performed.

Guide specification CE-1300 for environment protection requires that control of air pollution originating and/or caused by construction operations or parts of operations will be included in contract specifications where reasonable procedures can be readily specified.

C. Water Pollution

1. Installations

a. Civil Works Directorate has been engaged for many years in abating water pollution in accordance with the accepted practices in vogue at the time of construction of the water resource project. In some cases untreated discharges were made to the watercourse and in others primary treatment was provided, each method was acceptable at the time. Population increases and development along waterways gave rise to more sophisticated treatment of sewage waste. As a direct result of Executive Order 11258 (November 1965), waste treatment facilities were improved and some provided where none had existed. The first major funding toward this end was received in Fiscal Year 1968 and approximately $6.3 million has been provided through Fiscal Year 1971. Dependent upon the amount of funding made available, it is expected that remedial measures to correct the discharges will be completed or underway by 31 December 1972 in accordance with EO 11507. Toward this end an additional amount of about $10.6 million is planned for corrective measures for Fiscal Year 1972. It is to be realized that upgrading of State and Federal standards, currently and in the future, will give birth to many new project corrections even though the projects may be in compliance or have met the existing standards.

b. Program Funding

($ millions)

	FY 68-71	FY 72	FY 73
MCP	.5	5.5	1.6
O&M	5.7	5.1	3.8
	6.2	10.6	5.4

2. Ships.

As of the beginning of FY 1972 the Corps of Engineers Civil Works Directorate had installed sewage units on board over 200 Corps vessels. These units represent the most efficient and advanced designs available from commercial sources. In the Great Lakes area, holding tanks are incorporated into the systems. These tanks are pumped out periodically into approved municipal systems, since no overboard discharge is permitted in this area.

3. Civil Works Directorate is responsible for the technical requirements in the design and construction of features of projects and installations to assure against oil spills thereat. In addition technical advice and assistance to the field are provided. The CONARC is responsible for Army military activities and the Chief of Engineers for Corps activities in connection with support of the National Oil and Hazardous Substances Pollution Contingency Plan in abating damage from spills caused by others. Masters of vessels are charged with the responsibility to not pump bilges containing oil or other contaminants into harbors, lakes, rivers, bays or within other prohibited waters.

D. Land Management. Conservation, Herbicides and Pesticides

1. General Program and Soil and Water Conservation.

The Land Management Program on Civil Works water resource projects is accomplished both directly by the Corps and by State and local governmental agencies through lease and license agreements for fish and wildlife and park purposes. Recently additional emphasis was given to the land management function with the publication of ER 1130-2-400, Recreation-Resource Management of Civil Works Water Resource Projects. This regulation provides for Management Plans for each project dealing with forest or range resources, fish and wildlife management, fire protection and other project resources. The principles of forest management, fish and wildlife management and related disciplines will be applied on a coordinated basis with end objective of total ecological management. A data collection and rational system is currently going into operation to provide a sound basis for systematic application of management techniques on project lands with emphasis on areas of major priority needs.

2. Forest Management Program.

Forest resources at Corps of Engineers, Civil Works water resource projects are managed to increase their value for recreation and wildlife habitat and to promote natural ecological conditions by following accepted conservation practices. A Forest Management Plan

is being prepared for each project in accordance with ER 1130-2-400. These plans will include inventories species, types and age class identifications, description of treatments required and proposed procedures to accomplish the objectives of the plan.

3. Fish and Wildlife Management Program.

Lands designated for fish and wildlife purposes are generally managed directly by either the Bureau of Sport Fisheries and Wildlife or the appropriate State fish and wildlife agency in accordance with a General Plan signed by the Secretary of the Army, the Secretary of the Interior and the head of the State fish and wildlife agency. General Plans are prepared in accordance with the Fish and Wildlife Coordination Act of 1958 (PL 85-624), as amended, and instructions for their preparation are contained in ER 1120-2-401. On lands designated for fish and wildlife and not directly managed by another agency this function is performed by the Corps by implementation of the Fish and Wildlife Management Plan in accordance with ER 1130-2-400. Fish and Wildlife habitat management activities are consistent with other activities and are an integral part of the overall management program aimed at achieving the objectives of multiple use of the project.

4. Civil Works Projects Operations

Pesticides

a. Public Concern. Recent increasing public concern over the long term persistence of certain pesticides such as DDT has re-emphasized Civil Works efforts for reducing such uses. The use of DDT has been phased out almost entirely from use at Civil Works projects.

b. ER 1130-2-332, assigns responsibilities and prescribes procedures concerning the use of chemicals in the Civil Works pest control program at all Civil Works projects. It also presents guidance for the preparation and submission of an annual report to the working group on pesticides for their review and further guidance.

E. Noise Pollution

Instructions in CE-1300 Civil Works Construction Guide Specifications for Environment Protection require that noise pollution by construction operations and equipment be studied and preventive measures be covered specifically in the specifications. Adequate design features covering noise pollution on Civil Works floating plant and the accomplishment thereof are under the control of Marine Design Division located in the Philadelphia District.

F. Toxic and Hazardous Materials

Many materials such as herbicides, pesticides, chlorine, ferric chloride and alum as well as other materials for purifying water or sewage plant effluents are used by local, State and Federal agencies as well as the general public. Suffice it to mention that the Corps, in applying herbicides and pesticides and in the use of other chemicals necessary to operate its facilities or equipment, follows carefully the applicable standards of local, State and Federal authorities.

1. Common Use Materials.

There are many common use materials used by local, State and Federal agencies as well as by the general public. Such materials as herbicides, pesticides, chlorine and many others that are of common interest. However, it should be noted that Civil Works in its application of chemicals for the operation of its facilities and equipment is careful to assure that local, State and Federal standards for the use of materials are carefully followed. Civil Works is required by regulations to assure that air and water pollution standards are met.

2. Non Common Materials.

Suppliers of toxic and other hazardous materials are required to provide specific disposal instructions on all containers.

3. Complete environmental statements are scheduled to be prepared for the operation and maintenance of Civil Works projects. These statements will be fully coordinated with local, State and Federal agencies.

G. Water and Air Pollution. Research and Development Efforts.

1. Collection and Study of Basic R&D Data.

To meet data requirements for R&D investigations of the impact of Corps water resources projects on ecological systems; physical, chemical, geological and biological parameters are being monitored at specified river stations, reservoirs, lakes, estuaries and coastal waters.

2. Mechanical Aeration of Lakes.

The large, deep multipurpose impoundments used for flood mitigation, hydropower, recreation, navigation, fish and wildlife propagation, water supply and water quality control are of major

importance in the Corps water resource development program. In order to reduce the impact of seasonal stratification and thermal variations as well as the dissolved oxygen content of the stored and released waters on the ecosystems of the impoundments, downstream riverine and marine environments the Corps is investigating the use of underwater air diffusion techniques. Results to date indicate that this methodology improves the dissolved oxygen content and other water quality parameters. Continued investigations will reveal the amount of energy required to completely mix the reservoir in order to reduce the impact of summer stratification and provide an evaluation of the effects of aeration on water quality parameters (physical, chemical and biological).

3. Nitrogen Supersaturation.

A seasonal cycle of supersaturation of dissolved nitrogen occurs annually in the Columbia and Lower Snake Rivers. The degree of supersaturation varies with the quantity of water discharged over dam spillways. Research to date indicates that this problem is magnified when the power plant is unable to pass the streamflow and the surplus must be wasted over a spillway or through conventional outlets. As this water enters a stilling basin, nitrogen goes into solution under hydrostatic pressure and causes a supersaturation. When fish come into contact with areas of low hydrostatic pressure nitrogen leaves the solution and causes small bubbles in their circulatory system. This situation has resulted in an attempt to develop a mathematical model for prediction of nitrogen levels and design criteria for relating spillway and outlet geometry to remedy this problem. Other studies related to this ecological problem include tests of prototype dams and hydraulic models to ascertain optimum flow conditions as related to entrained air.

4. Regulatory Discharge Research.

In order to develop remote sensing technology which would expedite collection of information on the discharge materials into the waterway system two experiments were conducted. In the first experiment Grumman Aircraft utilized newly developed electronic sensors for identifying the location of outfalls. The second experiment, conducted by Cornell Aeronautical Laboratories, was an evaluation of photographic interpretation methodology to identify outfalls by indications from geographical areas.

5. Air Pollution.

The Corps of Engineers program in this area includes R&D aimed at designing and constructing an incinerator that will be used to burn the drift collected in New York Harbor. The project includes

the design and fabrication of an overfire air pit-type incinerator to meet air pollution abatement standards and requirements.

H. Land Pollution.

The Civil Works program related to land pollution is investigated from two major aspects, sedimentation and dredging operations. Because of its statutory responsibilities related to navigation the Corps is responsible for assuring that channels remain open for transportation. As a result dredging operations must be conducted in some areas to remove sedimentation deposits which would hinder ship operations. In the Great Lakes region, studies have been conducted to dispose of the spoil without affecting the water quality. In addition the Corps is conducting studies to determine the usefulness of the unpolluted spoil to create marshlands. To investigate factors governing the movement and deposition of sediment in streams and reservoirs requires development of equipment and methods for collection and analysis of suspended sediments. Toward this effort the Corps of Engineers supports the Federal Interagency Sedimentation Project at the St. Anthony Falls Laboratory of the University of Minnesota. Sediment studies include the collection of suspended and bed load data, degradation data, aggradation and delta formation, investigations of sediment transport, and basic laboratory studies. One major effort is an interagency project for measuring and analysing sediment load in streams and for developing new sediment sampling equipment.

I. Solid Wastes.

The Civil Works research related to solid wastes was for the purpose of designing and constructing an appropriate type of incinerator for burning the drift collected in harbors. In addition, the Civil Works program has been performing research in collaboration with the Coast Guard to combat oil pollution.

J. Pesticides

The Civil Works "Aquatic Plant Control Program" was designed to deal with infestations of obnoxious aquatic plants, which are found in the Atlantic Gulf States, because of their impact on commercial ship operations. A research program has been developed to obtain definitive answers to aquatic plant control problems. This program has been developed in three elements in order to find techniques for minimizing and controlling the use of pesticides and lessening their impact on the ecosystem. These three elements are biological control, mechanical control and chemical control.

1. Biological Control.

Under the biological control the Corps evaluates the use of aquatic plant insects and pathogens and herbivorous fish. The objective of the study of plant insects is to determine which ones could be of value in attacking the various aquatic plants. Since microorganisms are one of the most significant factors in maintaining a balance in ecosystems, investigations are being made to determine which ones can be utilized for controlling aquatic plant growth. A major consideration of this study is that plant pathogens are virtually not known to attack man or animals, and will not contribute to ecological problems. Research accomplished at various academic institutions has indicated that herbivorous fish provide an excellent means for controlling aquatic plants. A cooperative program between the Corps of Engineers, Department of Agriculture Auburn University is investigating this technology as a possible solution.

2. Mechanical Control.

This Civil Works program element is subdivided into control and potential utilization. Under control, investigations are being made in a joint program with the US Army Missile Command and several academic institutions to use lazer energy to eradicate aquatic plants. While the program indicates some success in application, daughter plants require a second treatment. This concept is being developed into a field prototype model by the Corps Waterways Experiments Station. The second part of this program element is directed at developing techniques to convert aquatic plants to a resource through harvesting. While technology exists to harvest aquatic plant, no economical application has been developed. A cooperative program is being developed between the University of Florida, the State's Game and Fresh Water Commission and the Corps.

3. Chemical Control.

Since the primary success in controlling aquatic plants in the past has been through the use of 2, 4-D, investigations of slow-release herbicides has been to develop technology for applying, and to select those which will not adversely affect the ecosystem. To control the release of herbicides, plastic carriers are under development and will be field tested by the Department of Agriculture. This program also includes studies of the environmental effects on biological organisms.

K. Thermal.

Civil Works study of thermal effects on rivers and lakes includes monitoring of temperature regimes, thermal destratification, and water quality. Monitoring of temperature regimes is accomplished prior to and after impoundment to determine the project's effect on the ecological balance and the natural processes on the regional environment. The thermal destratification investigations have evaluated

the use of air diffuser systems or submerged wiers on temperatures in stratified lakes, effects of temperature variations on water quality and sedimentation, and the design of structural modifications to permit water releases to offset thermal impacts. Remote sensing techniques are being evaluated to develop techniques for expediting collection and analysis of data on water temperatures. An experiment between EPA, NASA and the Corps is presently being conducted on Trinity Bay area utilizing remote sensing to gather data for operations of a physical model verification of mathematical model predictions.

L. Enhancement of the Environment.

The Civil Works program element related to enhancement of the environment is subdivided into the four elements, stated below. This program element encompasses a study of the physical processes, the impact of man's engineering activities on the environment and the ecosystem, and the interaction and man's activities and the natural processes.

1. Ecology and Other Environmental Research.

Terrestrial and marine ecological systems of various geographic regions are investigated to determine the impact of engineering works and to develop technology and methodology for minimizing the impact on the ecosystem and environment but permitting national economic growth.

a. Biological and ecological research will provide an improved understanding of the effects of CE's activities upon the total environment of coastal areas, especially the vast complex of highly sophisticated and intricately interrelated ecological systems that provide benefits to man in the form of harvestable fishery resources and recreational opportunities.

b. Studies are carried out on water quality in reservoir releases and impoundments. Fisheries engineering investigations are undertaken to fill voids in fisheries information needed for water resource projects. This program is aimed at improving the efficiency of fish collection and passage systems at existing and new dams, to learning more about the response of fish to changed conditions.

c. Increased flow of water from the Chesapeake Bay to Delaware Bay resulting from the channel enlargement has raised ecological questions that are under study. A hydrologic model is being utilized to study the physical processes.

d. Ecological studies are underway on the effects of offshore engineering works and coastal works, the dynamics of inlets and actuaries, and special studies on the Louisiana Coast, offshore dumping, the Tennessee-Tombigbee Waterway, pollution of the Texas Gulf Coast, a study of the Northeastern United States water supply, the North Atlantic Regional Water Resources, a special study of the south end of Lake Michigan, and a San Francisco Bay and Sacramento-San Joaquin Delta Waste Water Management Investigation.

2. Environmental Observation and Prediction.

The CE studies wind-wave relationships, wave activities, storms, general hydrology, and streamflow, and rainfall data as they affect design criteria and construction technology in the Coastal Zone and inland.

The wind-wave action in coastal waters is studied to gain an improved understanding of the characteristics of ocean surface wind-waves, their generation, propagation, transformation, breaking, and action on shores and shore protection. Long period waves and surge are studied to provide an improved understanding of the characteristics of long waves, particularly seiches, storm and hurricane surge, and tsunamis. In storm studies, data are accumulated on the most important past and current storms to evaluate flood-producing potentialities of river basins as related to the accomplishment of the Civil Works mission. General hydrologic studies include hydrology analysis of rainfall-runoff relationships, snowmelt studies, flood forecasting, analysis of past floods, infiltration indices, unit hydrographs, development of flood hydrographs, and other studies of related hydrologic nature.

3. Impact of Environment on Man.

The CE investigates environmental values as they affect the development of water resources and their impact on man. This includes recreation demand and esthetic evaluation. Systems analysis, operations research, and physical and mathematical modeling techniques were developed and mathematical models were used to evaluate the (1) demand for various potential water resource uses to meet man's needs and (2) relationship between man's needs and impact on the ecological systems.

4. Locating and Describing Natural Resources.

Under the Inner Continental Shelf sediment and structure study, the effort is directed toward searches for new unexploited deposits of sand. The search is focused offshore with the intent to explore and inventory deposits suitable for future fill requirements and subsequently to develop and refine techniques for transferring offshore sand to the beach as a part of the Corps' beach erosion

and hurricane shore-line protection program.

5. Surveys to Describe the Physical Environment.

The research is conducted to gain an improved understanding of the processes involved in the interaction of the natural shore with the wind, wave, tide, current, and surge forces imposed upon it; and the reaction of the shore and shoreline to these forces and processes.

Data are obtained on environmental factors related to coastal engineering. This includes waves, water level (with regard to storm surges), littoral materials on the beaches, suitable sand movement, quantity and characteristics of material made available to the shore area (whether by streams or shore or bluff erosion), and the economic life of various construction materials.

Assessment of beach and shore erosion problems is being made to appreciate the Nation's erosion problems considered in conjunction with economic, industrial, recreational, agricultural, demographic, ecological, and other relevant factors.

M. Licenses, Leases, Permits and Easements to Use Corps of Engineers Civil Works Real Property.

Outgrants are administered under ER 405-2-800 series. Internal regulations are being revised such that all outgrants will contain a comprehensive provision prohibiting environmental degradation. The provision will cover water and air pollution, noise emissions, soil erosion and solid waste disposal. In addition, the revision will cover the need for obtaining a discharge permit from the Corps if necessary.

By Executive Order 11574, dated 23 December 1970, the Secretary of the Army was directed to establish a Federal discharge permit program pursuant to Section 13 of the River and Harbor Act of 3 March 1899 to regulate the discharge of pollutants and other refuse matter into navigable waters of the United States or their tributaries. Department of the Defense Installations that are discharging refuse into a navigable water or tributary are not exempted from the requirements of the permit program by virtue of their status as a Federal Installation. Therefore, the installation should apply to the appropriate Corps of Engineers District for a permit. While the discharge of domestic waste has been specifically excluded from the requirements of the program, the applicability of the permit program to a particular discharge will be determined by District Engineer upon inquiry. In connection with the furtherance of the Executive Ofder,

the Corps is conducting a program of investigation of industrial and manufacturing plants to determine whether an effluent is being discharged which would make its way to a watercourse. Those so identified are informed by letter of the requirement to apply for a permit under the Act.

V.

Department of the Navy

A. Environmental Protection Organization. (See Figure 3)

A Deputy Under Secretary of the Navy for environmental matters was established in the Office of the Secretary of the Navy to coordinate Navy and Marine Corps programs. The Environmental Protection Division (OP-45) was established in the Office of the Chief of Naval Operations to direct and coordinate the pollution abatement and environment protection matters for the Navy. A focal point of contact for environmental matters has been established in each major naval command. The Navy has issued four instructions setting forth Policy and Objectives:

1. OPNAVINST 6240.2B implements procedures and assigns responsibilities for preparation and processing Environmental Impact Statements.

2. OPNAVINST 6240.3A sets forth policy and assigns responsibilities for the Navy's Environmental Quality Program.

3. OPNAVINST 6240.4 assigns responsibilities for containing and removing oil spills and hazardous materials from internal waters.

4. SECNAVINST 5305.1 and OPNAVINST 5305.1 establish an annual awards program to recognize Navy activities that have demonstrated leadership in environmental matters.

B. Air Pollution

1. Funding Plan

($ million)

	FY 68-71	FY 72	FY 73
MCP	11.7	16.3	24.8
O&M	.6	.8	4.0
PROC	5.5	7.8	7.1
Total	17.8	24.9	35.9

2. Shore

a. Funded air pollution abatement projects involve several categories of work including elimination of open burning of solid waste materials, construction of sanitary landfills and incinerators,

NAVY ENVIRONMENTAL PROTECTION ORGANIZATION

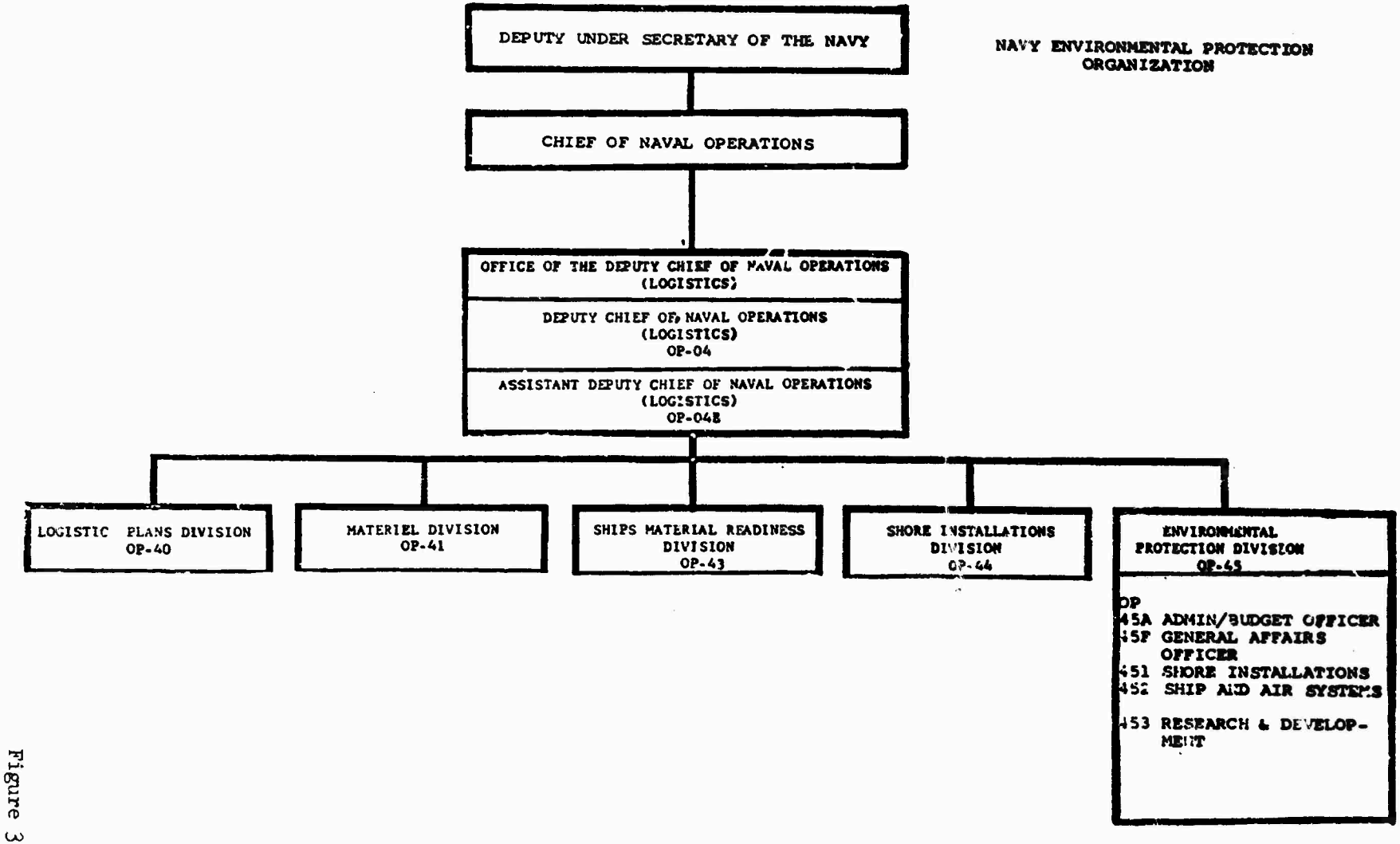

Figure 3

facilities for airborne emission control of heating and power plants, fuel storage facilities, and certain industrial processes.

b. A Source Emission Testing Team evaluates existing air pollution problems at naval installations and recommends appropriate measures for controlling emission of air pollutants. Using the latest instrumentation and technology, the team can determine gaseous flow rates, concentration of particles, hydrocarbon, sulfur dioxide and water vapor contents, dust collector efficiency and size of particles released into the air.

c. A team of Industrial Hygienists, by means of mobile laboratory equipment and survey instrumentation collects air samples from venting systems of industrial processes to determine the extent of air pollutants. Upon evaluation of individual pollution problem areas, they have made specific recommendations for appropriate remedial actions to be taken. All necessary survey instruments are housed in a motorized laboratory which can be moved from activity to activity, thus providing the team with instrumentation to measure potential pollution sources and to analyze collected samples.

d. The training of Navy personnel in the techniques of fighting shipboard fires is an essential requirement and must be repeated periodically throughout a man's career in order to ensure operational and safety readiness. Training is conducted at naval shore installations where fires are set and extinguished inside special structures built to simulate various ship compartments such as boiler and engine rooms. Unfortunately, these training operations produce dense smoke.

An engineering study was made in 1966 to correct a particularly unfavorable and highly publicized situation at the Navy's Fire Fighting School located on Treasure Island in San Francisco Bay. The study determined that burning of the smoke in gas-fired afterburners was the most economical and most reliable corrective method. The afterburners complete the combustion of the smoke and produce acceptable levels of carbon dioxide and water vapor. An engineering firm was employed to design the corrective measures which involved a combination of ducts, fans and five afterburners capable of simultaneously handling smoke loadings from any combination of two of the four simulated ship's compartments. Construction of the smoke abatement improvement facilities was initiated in early 1968 and accepted in May 1969. Since that time it has been in full use for normal fire fighting training. Based on the success of this prototype facility, a similar installation is being constructed with the new fire fighting school at the Naval Training Center, Orlando, Florida. The Orlando installation differs from the Treasure Island plant in that an afterburner is provided for each mock-up rather than one central afterburner.

e. A new smoke abatement concept for fire fighting schools is under development. The concept utilizes a water spray to prevent the production of smoke. After initial successful tests it was determined that this new system would be suitable for smoke abatement at the Recruit Training Fire Fighting Schools in San Diego and Great Lakes.

The new prototype water spray system has recently been installed at the Fleet Training Center, Norfolk for further evaluation to determine if this system is also suitable for the more complicated and extensive fire fighting training at the Fleet Training Centers in Newport, Rhode Island; Norfolk, Virginia; Mayport, Florida; and Charleston, South Carolina.

f. Petroleum Fuels. Local and federal air pollution limitations on sulfur oxides, smoke and other pollutants are included as required in the procurement of fuel oil for shoreside boiler plants to insure that the emission for ambient air quality standards are met.

g. An initial problem area involving smoke pollution from weapons cook-off testing has been identified as contributing to environmental contamination by the resulting copious clouds of black smoke. A program has been implemented and funded in FY 1972 to resolve the smoke pollution from weapons cook-off testing. A survey is being conducted concerning pollution caused by transportation, chemistry, packaging, and testing of aviation ordnance not covered in surveys underway.

3. Aircraft and Related Facilities.

a. Air pollution is caused by visible particulates (smoke) and invisible chemical by-products emitted from engines. No specific pollution standards now exist for aircraft engine emissions. The pollution abatement program consists of reducing air pollution from operating aircraft and ground maintenance facilities/equipments consistent with existing codes, and the Clean Air Act. The abatement program is divided into four inter-related general corrective areas:

(1) Aircraft smoke reduction
(2) Aircraft chemical emission reduction
(3) Ground maintenance smoke reduction
(4) Ground maintenance chemical emission reduction

b. Aircraft smoke reduction is currently being applied on a time-phased basis to all major tactical aircraft. Smoke reduction is being accomplished on new engines (F-14B and S-3A aircraft) as an integral part of the design and development process. On existing engines, new combustion chambers (burners) must be individually

designed to be smoke-free for installation in each model engine. Plans have been made to retrofit over 5000 TF-41, J-79 and TF-30 engines through FY 1975. Fuel additives have been tried on a limited basis to reduce smoke pollution. They are currently being further evaluated with regard to possible toxicity and effect on engine performance.

c. Jet engine chemical emissions consist primarily of carbon monoxide, unburned hydrocarbons, and oxides of nitrogen. New engine designs show some improvement over existing engines in the reduction of carbon monoxide and unburned hydrocarbons and represent the limits of the achievable state-of-the-art in jet engine development today. Oxide of nitrogen emissions, however, become greater as engine performance improves. Various new approaches are being sought by the Department of Transportation (FAA) under contracted study effort. Technology is not at hand to overcome the chemical emission problem, and it may not be for several years. NAVAIR is maintaining liaison with the Department of Transportation and engine manufacturers in this regard and in participating in special studies required to increase technology. An exploratory development effort was initiated in FY 72 relative to the evaluation, control and reduction of smoke and chemical pollutants.

d. Smoke and chemical emissions also prevail in ground maintenance operations such as in aircraft run-up pads, fleet engine test cells, industrial engine test cells and mobile support equipment. A prototype Nucleation Scrubber System is being tested on an existing test cell at the Naval Air Rework Facility, Jacksonville, to reduce smoke and chemical emissions as well as to improve engine test cell operations. Preliminary results indicate this system has promise. Since new test cells with the nucleation scrubbers in all existing cells will be extremely costly, other approaches are also being considered under an exploratory development effort.

e. Liquified natural gas (LNG) has a potential as a coolant and fuel for future propulsion systems. Exploratory development is being conducted in support of potential LNG fueling requirements including types of ground support storage and transfer equipment and facilities that will advance the state-of-the-art. Feasibility studies were initiated in FY 71. These studies will be continued in FY 72 to include tests on certain ground support equipment converted to LNG use.

4. Ships

a. The Navy is in the process of converting its conventionally boilered ships from Navy Special Fuel Oil (NSFO), a black

heavy residual type fuel to Navy Distillate Fuel (ND), which is a clean-burning light fuel oil. This conversion program will result in major reductions in the discharge of particulate matter and sulfur compounds. As new air quality standards are promulgated, the specifications for Navy Distillate may require future adjustments to conform to more stringent standards. The current fuel conversion program is scheduled to be completed in 1973.

5. Vehicle Air and Noise Pollution.

As Federal and State standards are developed they are incorporated in vehicle procurement specifications. With respect to motor fuels, all Navy Commands have been directed to use the new (low lead/no lead) motor fuel in Fiscal Year 1972 in the 50 states, Puerto Rico, Virgin Islands and Guam. Two Naval Supply Centers have been authorized to convert gasoline-powered fork lift trucks to liquified petroleum gas (LPG). The Naval Logistics Engineering Group, Cheatham Annex, Virginia has been tasked to conduct a study of comparative exhaust emissions of LPG powered and gasoline powered fork lift trucks.

C. Water Pollution

1. Funding Plan

($ millions)

	FY 68--71	FY 72	FY 73
MCP	73.8	23.8	56.2
O&M	1.5	3.9	12.1
PROC	1.5	4.4	34.1
Total	76.8	32.1	102.4

2. Shore

a. In response to Executive Order 11258 of November 1965, the Navy, in 1966, began a five year program to improve waste water discharges from the shore establishment in the United States and its possessions to meet evolving standards and to enhance and protect the quality of one of our Nation's most vital resources - its waters.

b. When the Navy started the water clean up program, it was estimated that only 65 of the 170 million gallons of waste waters discharged daily from our shore facilities met the new water quality standards. The first funding for corrective construction projects was received in Fiscal Year 1968. Follow-on funds received in Fiscal Year 1969 and 1970 brought the total to $46.2 million. It is noteworthy that the funds provided by Congress through FY 1970 enabled the Navy to correct 68% of the problem on a volume basis. An additional $25.3 million was provided in the Fiscal Year 1971 budget. It is expected that projects necessary to correct shore facility discharges will be completed or underway (as required by Executive Order 11507 of 4

February 1970) by 1 December 1972.

c. When practical, the Navy seeks to dispose of its sanitary sewage to municipal systems rather than to construct base facilities to meet new standards. By participation in a larger treatment facility operating economies for both the community and the Navy can be realized.

d. NAVRESO (Navy Resale Systems Office) and NAVSEC are evaluating present detergent use. The phosphate content of the detergents for large plant laundries is not high as in home use detergents. Navy is monitoring industry advances and will use those products which minimize water pollution while retaining reasonable cleaning effectiveness.

3. Ships

a. Sanitary Sewage. The Water Quality Improvement Act of 1970 (P.L. 91-224), requires existing and new vessels to be equipped with marine sanitary devices five years and two years, respectively, after promulgation of Federal standards and regulations. The Environmental Protection Agency is currently developing standards which should be released in 1972. Adequate shipboard treatment devices designed for the specific Navy problems of high population density ships and water tight integrity are not commercially available. However, Navy development is underway on 4 separate shipboard sewage devices. Three 500 man improved shipboard units were installed and tested on the USS FULTON (AS-11) and failed to meet performance requirements. Other evaluations made at the time included: (1) ship-to-shore connection for all sewage and waste liquids (less oily wastes) and (2) submarine waste water discharge to FULTON.

b. In view of difficulties experienced by the Navy, the Coast Guard and the Environmental Protection Agency in developing shipboard sewage treatment units, the Navy plans in the FY 1973 program to provide collection, holding and transfer (CHT) systems on certain vessels so that ships sewage and domestic wastes including galley, laundry, and other liquid waste could be transferred to shore based sewage treatment plants through pier sewers or via barge. Subsequently, beginning in FY 74, it is planned to equip most ships entering overhaul with CHT systems. The advantages of discharging waste waters to shore, as opposed to use of on-board sewage treatment are: (1) all waste waters (less oily waste) can be handled; (2) connection to shore automatically insures compliance with any sewage standards to be established by EPA; and (3) several cost effectiveness studies have shown shore disposal to be considerably less expensive.

4. Oil Pollution Control

a. Navy ships and bulk fuel terminals are combating pollution of water by oil in three major categories: (1) prevention of oil spills, (2) clean up after oil spills, and (3) improved waste oil handling, reclamation and disposal. An extensive research and development effort is also underway.

(1) Ashore: Redesign is underway at naval bulk fuel terminals of the facilities for oil receipt, storage, transfer, reclamation and disposal. Also, a rapid response capability has been established in Navy ports to report, control and clean up Navy oil spills.

(2) Ships: Although the majority of oil spills are the result of personnel error, there is much which can be done to preclude the occurrence of many spills through equipment improvements. The development of oil-water separators, which will permit the discharge of clean water overboard, and the storage of contaminated oil products in special tanks is being initiated to facilitate the proper shipboard handling of contaminated bilge and ballast water at sea. Also, the reconfiguration of fuel filling, transfer and storage systems and the providing of reliable tank gages, overfill alarms, tank stripping systems and other features can substantially reduce the occurrence of spills.

The President's goal of terminating all intentional discharges of oil and oily wastes into the oceans by 1975, if possible, and no later than the end of the decade will depend on the success of our development of an oil/water separator and of monitoring devices beyond the present state-of-the-art. Facilities aboard ships to hold oily wastes and sludges must be matched by facilities ashore to receive, process and dispose of such oily wastes.

D. Herbicides and Pesticides

1. For the Naval Shore Establishment there exists a program for training and retraining of personnel who formulate and apply pesticides (including herbicides). There is also a program for the continuing review of pesticide applications. These programs exist, in part, to assure prevention of land pollution, a portion of the overall protection of the total environment.

2. Periodic training of operating personnel is conducted by Navy entomologists. Annual or bi-annual visits by Navy entomologists can provide for the required professional planning and programming at shore activities. They are also required for on-the-job training and examination of personnel prior to certification. During these visits, all pesticide usages are reviewed and recommendations are provided to

help assure that land pollution will not result from necessary pesticide applications. Further assurance of environmental protection is provided by professional review of pesticide usage reports submitted monthly by the shore activities.

E. Sedimentation and Erosion

1. Watershed protection and improvement plans implemented on over 75 percent of lands under Navy control and remainder will be under plan within the next four years. In addition to erosion control installed under these management plans, 107 plans and minor projects will be implemented to correct erosion. Navy obtains assistance from and coordinates with Services of the U. S. Department of Agriculture in every possible instance in development and furtherance of erosion control and other programs of mutual interest. For major shore stabilization studies, Navy coordinates with U.S. Army Coastal Engineering Research Center.

2. The current year funding of the soil conservation program is $353,000 including salaries. Funds are used primarily for field trains, studies, and plans for building erosion control into construction; plans for watershed protection and correction of deficiencies under the maintenance program; and conservation plans for lands in agricultural outlease program. Lessees are required to provide erosion control on leased lands. Appropriated funds are utilized for erosion control in construction projects and for correction of existing deficiencies.

F. Propellant Disposal Facility

1. During the past three years, the Navy disposed of approximately 5,000 pounds of propellant scrap each day by open burning. Over half of this has been single-base and simple double-base material. Although ordnance materials are currently exempted from most State air pollution control laws, open burning of overaged ordnance, fleet-return motors, production-generated scrap, etc. is a source of air pollution and is not an acceptable long-range solution of the disposal problem.

2. The Navy has planned in FY 73 a project that will provide facilities at the Naval Ordnance Station, Indian Head, Maryland for pollution-free disposal of single-base and simple double-base propellant wastes. The facility will eliminate open burning of those propellants and provide a concept for pollution-free disposal for further application.

G. Radiological Materials

1. Air

a. The Navy is aware of its responsibility for the safe use of nuclear power systems under the Nuclear Shore Systems Program for both nuclear power reactors and radioisotope power generators. These systems have the potential to pose a threat to the atmosphere if not properly monitored or controlled.

b. Air pollution is controlled:

(1) By methods of filtration consistent with the state-of-the-art to maintain gaseous radioactivity releases to the atmosphere from nuclear shore power reactors within the constraints of Atomic Energy Commission regulations to assure the protection of personnel and the environment.

(2) By proper design of radioisotope power generators and by safety evaluations of the generators and ancillary equipment in order to assure compliance with national and international regulations concerning the safe use of nuclear power systems.

2. Water

a. Water pollution with respect to nuclear power reactors ashore is controlled by methods of filtration, hold-up and dilution with monitoring of the discharge of liquid effluents to the environment within the constraints of Atomic Energy Commission regulations to assure the protection of personnel and the environment.

b. Water pollution with respect to radioisotope power generators ashore is controlled first by design and second by safety evaluations of the generators and ancillary equipment, including implantation and recovery procedures, in order to assure compliance with national and international regulations concerning the safe use of nuclear power systems.

3. Land

a. Land pollution with respect to nuclear power reactors ashore is controlled by off-site shipment of radioactive solid wastes for ultimate disposal in approved land burial sites in accordance with the constraints of Atomic Energy Commission regulations to assure the protection of personnel and the environment.

b. Land pollution with respect to radioisotope power generators ashore is controlled first by design and second by safety evaluations of the generators and ancillary equipment in order to assure compliance with national and international regulations concerning the safe use of nuclear power systems.

H. Navy Environmental Protection Awards

This new award program has been developed to recognize those commands throughout the Navy that are solving pollution problems on a day to day basis at the working level. It will officially recognize those commands that are practicing good housekeeping techniques on a daily basis, and devising innovative approaches to combat the pollution problem.

Awards will be made annually to the best ship, the best research and development laboratory and the best shore facility in the Navy.

The first award will be made in 1972.

VI

DEPARTMENT OF THE AIR FORCE

A. Environmental Protection Organization

In February 1970, the Air Force Chief of Staff designated the Directorate of Civil Engineering as the office of primary responsibility for all pollution matters regardless of source of funds or program authority. A small staff was assigned to carry out these responsibilities. As the scope of the task became better defined, the need for an organization with technical expertise in several disciplines was evident. With this inter-disciplinary approach, in August 1970, the Director of Civil Engineering activated the Environmental Protection Group, reporting directly to the Deputy Director (See Figure 4). The Air Force Environmental protection Group was given the responsibility of developing an environmental protection program based on total resources management. The objective was to integrate research and fundamental sciences with engineering and planning to provide comprehensive coordination of theoretical and practical know-how.

Initial published policy guidance was furnished by the revision of Air Force Regulation 161-22, "Environmental Pollution Control," dated September 23, 1970. Shortly thereafter, a new publication series, 19-xx "Environmental Protection" was established. To date, two regulations have been published; AFR 19.1. "Protection and Enhancement of Environmental Quality," 18 February 1972, superceding 161-22, and AFR 19-2, "Environmental Assessments and Statements," 20 January 1972. These regulations provide policy guidance to all Air Force activities. Air Force policy is to plan, initiate, and carry out programs and actions in a manner to avoid adverse effects on the quality of the human environment, insofar as practicable, and with appropriate consideration of assigned mission and of economic and technical factors. To this end, the environmental consequences of all proposed actions are assessed at the earliest practicable stage in the planning process and, in all instances, prior to decision. As required, formal environmental statements are filed with the President's Council on Environmental Quality, or written assessments, in the detail necessary are prepared and maintained at appropriate Hq USAF, Command or Base environmental officers.

The regulations also provide for establishment of Environmental Protection Committees at Hq USAF and the Commands, chaired by the USAF and Command environmental coordinators to provide for thorough and expedient staffing of all environmental protection matters. The environmental coordinator is the central point of contact in each of the field commands.

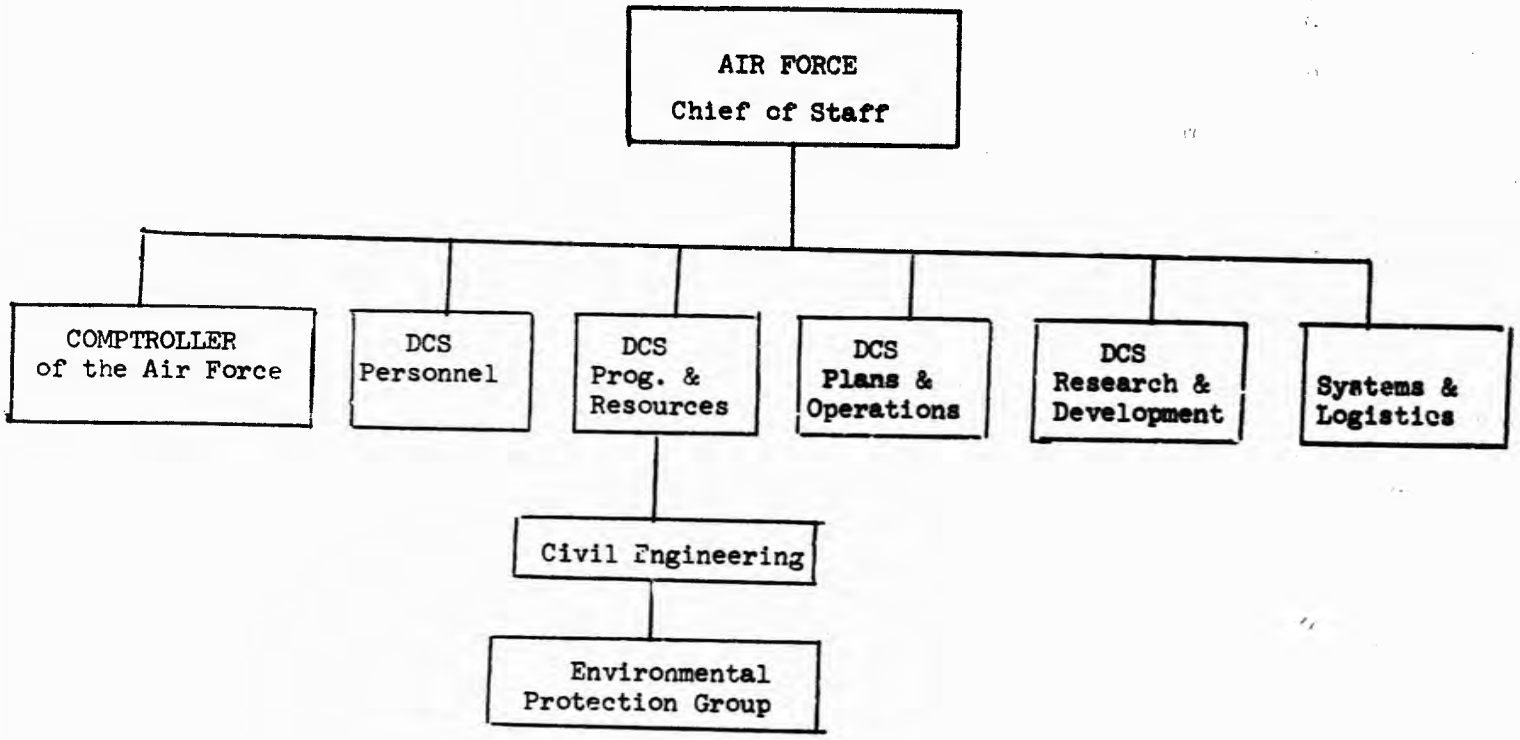
AIR FORCE
Chief of Staff
COMPTROLLER of the Air Force
DCS Personnel
DCS Prog. & Resources
DCS Plans & Operations
DCS Research & Development
Systems & Logistics
Civil Engineering
Environmental Protection Group

Figure 4

B. Air Pollution

1. Fixed Facilities

a. Program Summary. The Air Force has had a program underway for the reduction of air pollutant emission from the fixed facilities since Fiscal Year 1968. The primary emphasis to date has been on converting heating plants from coal to natural gas, or coal to oil with natural gas backup. The resultant reduction in sulfur oxides and particulate emissions meets most present standards, but as standards are tightened and extended to include other pollutants, further plant modifications will undoubtedly be necessary. A summary of the funding levels for this program follows.

($ Millions)

	FY 68-71	FY 72	FY 73
MCP	$ 6.7	$16.0	$ 7.5
O&M	1.2	.3	-----
PROC	2.5	2.8	3.7
TOTAL	$10.4	$19.1	$11.2

b. Jet Engine Test Cells. It has been decided that aircraft engine test cells must meet emission standards as stationary sources. The Air Force has therefore commenced a total systems analysis of the test cell pollution question. This program is complimentary to U.S. Navy efforts to look at individual emissions control devices to use on test cells.

2. Mobile Sources

a. Automotive Vehicles. All new commercial motor vehicles, passenger carrying and cargo trucks, purchased for official Air Force use, comply with applicable Environmental Protection Agency regulations. All official Air Force vehicles are purchased by either the General Services Administration or the Department of the Army, who are responsible for assuring such compliance. For in-use vehicles, the importance of an effective maintenance program has been emphasized for holding emissions to a minimum. It is Air Force policy to use low lead fuel wherever possible, in order to reduce particulate emissions of lead oxides, and this is done at most Air Force Bases.

b. Aircraft. The Air Force is actively participating in the Federal Government's program for the reduction of air pollutant emissions from aircraft. This includes (1) the installation of smokeless combustors in our C-9 aircraft; (2) the development and installation of smokeless combustors for the C-5 aircraft; (3) the requirement of smokeless combustors for all new aircraft, including the B-1 and F-15; and (4) a $600,000 annual program of research and development on aircraft engine emission, managed by the Air Force Aero-Propulsion Laboratory. Efforts underway outside of the Air Force are being monitored closely and available technology will be utilized to the fullest extent consistent with national security.

c. Research. The following research programs are presently (FY 72) underway in this area:

(1) Feasibility Study of Catalytic Combustors for Aircraft Turbine Engines. A catalytic combustion system offers the prospect of practically no exhaust emissions by use of a vapid, low temperature, combustor system.

(2) Low Power Turbopropulsion Exhaust Emissions Suppression. This project will identify and develop combustion system design techniques for increased combustion efficiency and reduced undesirable exhaust emissions (CO, hydrocarbons) at part power operation.

(3) Turbopropulsion Engine Exhaust Emissions Investigation. Under this project the exhaust emissions of several gas turbine engines were measured with and without afterburner and at elevated altitudes. A transportable exhaust emissions measurement system based on standard elements was assembled.

(4) Turbopropulsion Augmenter Exhaust Emissions Investigation. A theoretical study of afterburner emissions.

(5) Laser Raman System for Measuring Turbine Engine Exhaust Emissions. An engineering prototype of a system requiring minimal human involvement will be developed.

(6) Development of a Completely Acceptable Turbine Engine Smoke Abatement Fuel Additive.

(7) Investigation of Fuel Modification for Abatement of Aircraft Turbine Engine NO_x Emissions. This project is looking for a fuel additive to reduce NO_x emissions.

3. Other Air Pollution Abatement Activities

a. Firefighting Training. The Air Force has changed its firefighting training policies in order to reduce the quantity and effects of the smoke produced by training activities: This involves (1) limiting the number of fires to as low a level as possible while maintaining proficiency; (2) Controlling the fuel used in such practices; (3) close cooperation with local fire departments; (4) cooperation with local air pollution control officials; and (5) a research and development project, managed by the Air Force Weapons Laboratory, to investigate a method for suppressing smoke from such fires.

b. Environmental Health Laboratories. The Air Force operates four laboratories to provide technical assistant to Air Force installations on industrial health and pollution problems. The Wiesbaden Environmental Health Laboratory (EHL) provides these services to the United States Air Forces in Europe. The USAF Radiological Health Laboratory deals primarily with radiation hazards and is located at at Wright-Patterson AFB, Ohio. The Kelly EHL, at Kelly AFB, Texas, and the McClellan EHL at McClellan AFB, California provide services in the areas of air, water and noise to AFBs in the United States. For special projects in air pollution, the McClellan Laboratory is the lead laboratory. Its stack sampling team has been certified by the Environmental Protection Agency.

C. Water Pollution

1. General

The Air Force, since its inception as the Army Air Service, has recognized that water pollution control and abatement from its installations was of primary importance; first, to protect the health and safety of its own people, and, in more recent years, to protect and enhance the quality of the Nation's water resources. The first biological treatment system to be installed for any of the military services went into operation at Randolph Field, Texas during World War I. World War II saw a great growth in the armed services, the establishment of large training bases, and again, the installation at most of them of the most advanced methods of waste treatment available at that time.

In 1947, with the establishment of a seperate United States Air Force, this concern with protection of water quality continued. Basic policy was that installed sewage treatment facilities should preferably provide secondary treatment, but as a minimum, would provide treatment equal to that required by local communities. At that

time, the Air Force also established the policy that connection to local or regional sewage disposal facilities, where economically feasible, was the method of choice.

2. Plan

By 1967, when new emphasis was placed on this field by Executive Order and Congressional directive, the Air Force had installed about $160 million in sewage treatment and disposal facilities, roughly ten percent of our total real property inventory. Close to 85% of the total CONUS wastewater flow was being treated to meet or exceed then existing water quality standards. In response to Executive Orders, all installations were surveyed for deficiencies and a six year/$25 million program (FY 67-72) was established to correct identified faults and bring all facilities into compliance with then current standards.

This program has been updated annually and additional projects added as the requirement became known, either through our surveys or because of the increasing stringency of State and local standards. At this time almost $80 million has been identified through FY 73 for all programs --MCP, O&M, and Procurement (Industrial Plant).

	($ Millions)		
	FY 68-71	FY 72	FY 73
MCP	$34.7	$9.9	$14.2
O&M	4.1	2.8	.3
PROC	8.5	2.7	.7
TOTAL	$47.3	$15.4	$15.2

At this time all CONUS installations have either installed secondary wastewater treatment or its equivalent or are members of or engaged in active negotiation with local or regional wastewater treatment and disposal/reclamation plans.

3. Wastewater Reclamation

All installations have been instructed to maintain continuing surveys of their water usage to identify areas where water can be conserved and generation of wastewater eliminated. Standing policy for many years has been the use of wastewater treatment plant effluent for irrigation. This practice has been initiated at many bases and others are now investigating the feasibility of this practice for their own effluents.

D. Land Pollution

1. Erosion and Sedimentation

Problems of erosion and sedimentation on Air Force land are nearly all associated with construction activities which disturb soil and vegatative cover. It is, therefore, Air Force policy to make erosion control, grassing and landscaping an essential, integral part of construction projects so that this work is not subject to separate approval and funding as "additive" items of projects. Under this policy there is no separate accounting of erosion control projects but we believe it is the most effective policy for assuring timely accomplishment of erosion control requirements.

The Air Force, in cooperation with the Army, also has addressed the problem of erosion and sedimentation which occurs during the construction process. The Air Force assisted in drafting the Corps of Engineers Guide Specification for Environment Protection, CE-1300 May 1970, and revisions contained in ETL 1110-3-141, 30 November 1970. This guide specification is concerned with the environmental effects of construction activities and outlines temporary procedures that should be applied. Similar guidelines for erosion and sedimentation control have been included in the Air Force design manual AFM 88-15.

2. Herbicides and Fungicides

The Air Force recognizes the use of herbicides as one of several management practices useful in the control of unwanted vegetation. Weed control by means other than by herbicides is encouraged wherever feasible. Manipulative practices which effect control through plant competition are quite applicable to military land and are entirely consistent with low intensity maintenance practices. Herbicide usage is otherwise in conformance with the approval procedure of the Federal Working Group on Pest Management.

The Air Force indefinitely suspended the use of mercurial pesticides in August 1970 in view of the uncertainties of mercury pollution in the environment.

3. Insecticides

Department of Defense restrictions on DDT and other persistent pesticides have been implemented by inclusion in AFR 91-21, 6 August 1971, and by issuance of an AFLC CMAL (Controlled Multiple Address Letter). A survey by DSA in early 1971 revealed that bases had reported valid items as excess and an AFLC CMAL was issued at that time to clarify usage of various materials which were not restricted.

E. Noise Pollution

For a considerable number of years, the Air Force has had continuing programs which are concerned with the several aspects of noise pollution. The programs are manifested in the areas of (1) Human Response, (2) Aircraft, and (3) noise research.

1. Human Response.

a. Hazardous Noise Exposure

In October 1956, Air Force Regulation 160-3, which describes a program to reduce hazardous noise exposure, was published. This regulation pointed out the need for the overall program, established an educational program, required the Medical Service to monitor audiometry of Air Force personnel, and established limits for exposure to hazardous noise. Research into human response to noise has provided more fundamental knowledge upon which to establish more realistic noise exposure limits. This regulation is currently being rewritten based on the results of this continuing research into human response to noise exposure.

b. Research

Research into human response to noise is performed at the Air Force 6570th Aerospace Medical Research Laboratory. Some specific research tasks are:

(1) Continuous Noise Exposure. Major emphasis is being placed on the study of peripheral circulation as influenced by noise exposure.

(2) Impulsive Noise Exposure. This program is designed to identify physiological and performance efforts that are altered by exposure to impulsive noises.

(3) Infrasound. Studies of physiological responses to intense infrasound began on 4 May 1970 with the first manned exposures in the unique Dynamic Pressure Chamber, a one-man environmental chamber designed to produce noise in the infrasonic range (at and below .30 H_z) at sound pressure levels as high as 174 dB.

(4) Effects on the Vestibular System of Acoustic Energy Experienced During Air Force Operations. This research will yield information for understanding the conditions and manner in which high intensity noise affects equilibrium and produces disorientation in the Air Force crewmembers.

(5) Cell Changes Associated with Temporary Hearing Loss. This effort is to investigate the cause of damage to the inner ear occurring when personnel are exposed for long periods to high noise levels.

(6) Effects of Air Force Noises on Populations Surrounding Air Bases. The objective is to investigate in the laboratory the acceptability of approaching versus receding aircraft noises.

(7) Auditory Response to Acoustic Energy in Air Force Activities. A program is established to examine various characteristics of human hearing such as resistance to noise, temporary hearing loss, recovery from hearing loss and long term, low level effects in order to establish general principles of behavior of the human ear in noise.

2. Aircraft

One of the chief sources of noise generated by Air Force activities is that associated with aircraft operations. Attempts have been made to alleviate this source of noise pollution by several means including suppression of sound at the source and by constraints imposed on aircraft operations.

a. Land Use Planning With Respect to Aircraft Noise (AFM 86-5).

In order to plan operations near air bases to minimize noise pollution, it is necessary to have knowledge of the noise produced by these operations. Beginning in the early fifties procedures have been developed for estimating exposure to engine noise from ground and flight operations of jet and propeller aircraft and for relating the estimated exposure to the expected response of residential communities. The methodology for these noise exposure estimates in use at the present time is contained in Air Force Manual 86-5. Efforts are now in progress to revise these methods along the lines of the Federal Aviation Administration computerized noise exposure forecasting (NEF) technique.

b. Air Installation Compatible Use Zone (AICUZ).

A newly proposed concept that will help alleviate noise pollution of residential communities near air bases is the Air Installation Compatible Use Zone: (AICUZ) Protection of Air Force Bases Against Urban Encroachment: A proposed regulation prescribes procedures to be followed by air base commanders in establishing protective zones to encompass selected installations. Rights will be acquired in adjacent land to assure unrestricted base operations and to protect communities from the noise nuisance and other hazards associated with aircraft operations.

c. Ground Runup Sound Suppressors.

One of the preferred ways to eliminate noise pollution is by controlling sound at its source. There exists an active program for the acquisition of sound suppressors for maintenance runup operations. The program has been initiated to:

(1) Eliminate the hearing damage risk for personnel.

(2) Provide a communication environment inside maintenance structures near the runup activity.

(3) Provide sufficient suppression so that essentially no complaints would be expected from nearby residential communities.

d. Flight Disturbances (AFR 55-34).

Air Force Regulation 55-34 establishes practices to further reduce the impact of noise generated by aircraft operations. Procedures explicitly designed to minimize the effect of sonic booms are described in this regulation as well as procedures for altering flight profiles to minimize noise near military airports.

3. Noise Research

Aircraft noise research and development programs are being conducted by various organizations under the Air Force Systems Command.

The Air Force Office of Scientific Research conducts research into the physical behavior of high intensity sound. The purpose of this research is to study the phenomena that distinguishes nonlinear acoustics from linear acoustics and to apply the knowledge gained to physical problems. Additional research is directed toward developing a comprehensive physical model of jet noise which covers generation, convection refraction, and spectrum properties.

The Air Force Aero-Propulsion Laboratory maintains a comprehensive propulsion accoustics research and development program consisting of contracted and in-house efforts. The overall objective is to develop the technology base necessary to significantly reduce aircraft propulsion system noise with minimum associated performance and weight penalties. The work efforts under this task are directed toward two specific goals: (1) development of quiet propulsion for reconnaissance/surveillance and special operations aircraft, and (2) reduction of propulsion system noise to support current government noise abatement efforts.

The Air Force Flight Dynamics Laboratory is conducting exploratory and advanced development work in aircraft acoustics, including noise control

within vehicle interiors and sonic fatigue. The Laboratory has an extensive capability in theoretical acoustics, data management and analysis techniques, and experimental methods. Aircraft acoustics efforts include evaluation and prediction of sound field characteristics encountered by flight vehicles; design, development, operation, calibration, and maintenance of acoustic instrumentation and data analysis systems; and aural detectability studies related to quiet reconnaissance/surveillance aircraft. The Laboratory also maintains a number of in-house facilities for acoustic research.

The Aeronautical System Division continues to initiate programs to develop demountable and portable noise suppression equipment for use during ground maintenance runup operations of turbine-powered aircraft and engines on test stands.

F. Radiation Pollution

1. Microwave Radiation

Within the past few years, there has been an increased concern regarding microwave radiation effects in general and specifically of late in regard to cataract formation. The Radiation Control for Health and Safety Act was signed 18 October 1968. In July 1970, the Air Force was briefed concerning the U.S. Public Health Services proposed project to examine a group of former Air Force personnel who had flown in the EC-121 aircraft. On 11 March 1971, an ad hoc group, which included seven certified ophthalmologists, convened at Letterman General Hospital, the Presidio, San Francisco. The meeting, which was under the direction and coordination of the U.S. Public Health Service (USPHS), was called for the purpose of conducting ophthalmological examination of eight ex-service personnel, all of whom had some degree of opacification. The consensus of the opthalmologists was essentially identical to the text of a USPHS press release provided the afternoon of the meeting. The release, in part, is as follows:

"No evidence was found in these men that the opacities were due to an insult of radiation.

"The consensus was that these lesions are not infrequently found in patients of this age group. Furthermore, since the type and levels of exposure cannot be determined on these subjects, radiation as a definitive causative agent cannot be identified."

Prior to the Letterman meeting, the Air Force Surgeon General directed on 17 November 1970 that two models of the EC-121 aircraft be surveyed for ionizing (X-Ray) and non ionizing (microwav and ultraviolet) radiation. A team of experts was assembled on 8, 9 and 10 December 1970 under the guidance of the USAF Radiological Health Laboratory to evaluate not only the potential physical hazards associated with the aircraft, but to also clinically evaluate the eyes of active crew members. Results of the survey indicated that no hazardous levels of ionizing, ultraviolet or microwave radiation existed at any crew position during flight.

Despite these apparent completely negative findings, the Air Force continued to survey other models of aircraft. In regard to the clinical examinations, results have been received on a total of 307 subjects (115 EC-121 crew members, 46 maintenance personnel, and 146 controls) and no significant differences have been found when comparing the control and study groups.

The Air Force does not discount the possibility of personnel either knowingly or inadvertently violating established safety procedures. A comprehensive survey is now under way to add further to our evaluation of established Air Force programs. This study includes the evaluation of Electromagnetic Radiation (EMR) hazards in maintenance activities at 5 Air Force Bases (which includes McClellan and Castle AFBs): an EMR hazard survey of 6 additional models of aircraft; in flight EMR hazards survey of two types of aircraft; evaluation of the teaching environment associated with RF radiation; a review of the adequacy of technical data at each base in regard to health and safety precautions; evaluation of ground operations and personnel compliance with established procedures; and opthalmological examinations. The clinical examinations will include in the study group selected maintenance personnel, academic instructors dealing with microwave radiation, survey team personnel, and microwave research personnel. Results of this study, expected in the spring of 1972, will allow the Air Force to evaluate their total program and, if required, to take necessary and appropriate corrective measures based on controlled scientific studies.

G. Solid Waste Management

1. Processing and Disposal

Air Force solid wastes are collected by Air Force and contractor personnel and are disposed by incineration and sanitary landfill on Air Force and/or contractor land. The method that is used depends on the availability of land, the availability of contractor services, and the economic studies of contract operations versus in-service operations.

In April 1971, the Air Force Weapons Laboratory (AFWL) Kirtland AFB, New Mexico, completed a technical report on the "New Techniques for Processing of Municipal Refuse." This report investigated new methods for processing and disposing of refuse. There is a detailed discussion of volume reduction techniques including incineration and several variations, pyrolysis, compaction and grinding. Resource recovery and storage, collection and transportation are also covered. New equipment for sanitary landfill operation and selected cost data conclude the report.

The AFWL report on "Solid Waste Practices in the United States Air Force" was completed in October 1971. This report discusses the results

of a survey of 98 major installations in the United States in the following areas: base and family housing solid wastes; grease disposal; garbage grinders; solid wastes generated in sewage treatment; pathological and classified wastes; liquid industrial wastes; fire fighting training, herbicides and pesticides; on-base landfill operations.

The Air Force is presently entering into the second phase of the solid waste management program and will during the fourth quarter FY72 do a complete study of an Air Force base. The purpose of the study is to determine the most efficient and economical approach to solid waste management in the Air Force base studied. The third phase it programmed for FY 73 when specific equipment will be installed as the result of the phase two study. The third phase will be studied to determine what equipment may be available for use Air Force wide and what adaption has to be made to have a useable product.

2. Waste Reduction and Reuse

The Air Force selected six commissaries to stock their shelves with returnable bottled beverages as part of a four-month test. The tentative conclusions indicates that customers do not seem to greatly change their preference for non-returnable cans over returnable bottles within a short period of time. Requiring a deposit on returnable bottles does not, in itself, seem to affect purchase patterns. Sanitation problems appear to be minimal. As a result of this study, returnable bottled beverages are now being made available at Air Force commissaries.

The Air Force is presently investigating the possibility of recycling solid wastes from its bases. To accomplish this, fourteen bases have implemented a six-month recycling pilot program. The objectives of these pilot programs is to (1) test the availability of market for recycling glass, paper, and metal; (2) determine the impact in the family housing area and other base activities of segregating paper, glass, and metals from other refuse; and (3) determine the economic aspects of separate collection and sale of recycleable materials. This study should be completed during FY 73.

Toxic and Hazardous Material

1. Toxic Industrial Chemicals

The disposal of toxic industrial chemicals is an ever-increasing problem. Most bases do not have the physical plant, laboratory facilities or trained personnel to perform disposal of toxic materials by means of chemical/physical treatment methods. Faced with the obvious problems, the tendency is to store the material which, with time, presents additional problems to deteriorating containers. The Environmental Protection Agency was provided information regarding Air Force Toxic waste disposal problems for use in establishing Federal regional disposal sites

2. Contaminated Fuels and Petroleum Waste.

The current procedures and methods of disposal of used or contaminated petroleum products have been reviewed to determine means to reduce pollution. The past practice of disposal by burning in open pits and burial in sanitary landfills could not be considered acceptable. Thus a pollution control system was implemented. The pollution control system was achieved by taking the following actions:

a. Review of the procedures on each base to reduce the production of wastes to an absolute minimum.

b. Establishment of tighter controls at each base to completely segregate contaminated products by category, rather than mixing and commingling.

c. Seek markets for segregated wastes.

d. Programming for waste oil incinerators only where the waste fuel and oil could not be sold or disposed through contracts.

3. Oil and Hazardous Substance Pollution Prevention and Abatement

Fuel storage and handling sites are equipped with dikes, catchment basins and skimmer ponds. Maintenance cycles for fuel handling equipment have been shortened to provide more frequent inspection of critical parts and improved maintenance procedures implemented. Oil separators are installed in drainage systems from flight lines, motor pools, auto-hobby shops, service stations, washracks and other similar areas. In addition to the spill prevention program, specific contingency plans are being prepared for each facility to provide a quick reaction capability for the orderly handling of accidental spills.

4. Disposal of Air Munitions

T. O. 11A-1-42, "General Instructions for Disposal of Air Munitions," dated 1 July 1970, was supplemented to insure that munitions would not be disposed in the ocean. A general review of all disposal procedures outlined in the technical order was performed to determine if disposal in accordance with the prescribed procedure would be detrimental to the environment. The T.O. is being rewritten to incorporate improved disposal methodology and new R&D initiated to develop environmentally clean disposal procedures where knowledge gaps exists.

5. Photographic Wastes

The Air Force is conducting a survey of photographic operations to determine quantities and types of photo waste and methods of disposal. This survey will identify any possible areas of weakness in disposal procedures that could lead to pollution.

A research project is being conducted in conjunction with the Norton AFB photographic operations to reduce toxic waste by developing methodology for the regeneration of photographic bleach.

6. Fumes, gases, Mists and Vapors

During the industrial processes that are accomplished on an Air Force base, there are fumes, gases, mists, vapors and dusts that are created. These are controlled in the working environment by an active industrial hygiene program. As these are exhausted from the buildings they may pollute the atmosphere to some degree. This will be studied to determine what corrective actions have to be taken.

I. Research and Development Activities and Requirements

1. Air Force Weapons Laboratory

Environmental Engineering Technology encompasses the broad look at the total environment and its interaction with man. In its broadest sense, the objective is the abatement of those substances present in the environment in such quantities and duration as to be injurious to human, plant, or animal life, or which reasonably interfere with life and property. The broad approach to man-environment relationship necessitated the establishment of five research groups.

a. Water Resources

(1) The treatment of liquid photographic wastes to examine methods for photographic waste treatment, disposal of waste effluents, and the regeneration and reclamation of processing solutions.

(2) The disposal of electroplating waste to determine the most economical approach to the disposal of electroplating wastes throughout the Air Force.

(3) Field testing of the fused diatomaceous earth water filter. The efforts were devoted to determining those modifications necessary to make the unit operational under various conditions.

(4) There was in-house work on a rapid filter utilizing synthetic media for the treatment of water. The unique features of these synthetic media include reduced weight and high flux rates without chemical addition or regeneration.

(5) Aircraft washrack wastes are being studied to demonstrate economical and efficient emulsified oil removal by filtering

and centrifugation. The biodegradeability of the oil and grease will be determined as a next step.

(6) Standards for an economical, simplified and compact water and waste water testing laboratory for use by base Corps of Engineering personnel are being developed.

b. Air Resources

(1) The first of a two-phase program was completed to apply an efficient smoke abatement method to fires of JP-4 used in aircraft crash rescue training. There is a second part programmed for FY 73. The system will be constructed and tested during the second phase at the Air Force Fire Protection Training School at Chanute AFB, Illinois. Another prototype is being constructed and tested at Hill AFB, Utah.

At Hill AFB fire fighting training involves helicopters in the area. The effect of the helicopter downwash on the smoke suppression is being tested.

(2) Jet engine test cells are being studied to develop and evaluate concepts for pollution abatement. Present levels of material emissions from some test cells are high.

(3) An effort is being accomplished to develop pollution emission factors for the determination of pollution potential of specific Air Force operations for installation purposes. To obtain these factors, five representative Air Force bases will be surveyed to determine the emission from specific Air Force operations and the amount of raw material consumed or discharges produced by these operations.

c. Solid Resources

(1) There has been an in-house study conducted on the incineration of plastics commonly found in solid waste and photographic film, and determination of gaseous products. It is essential to have this knowledge t minimize the environmental insult due to the gaseous effluents.

(2) An in-depth study of a base solid waste management program will be conducted during FY 72. The study will be aimed at achieving a more balance of solids entering and leaving with the ultimate purpose of developing the most economic and efficient means of solid waste processing and disposal techniques.

(3) Coordination with concerned agencies outside the Air Force, such as the Environmental Protection Agency, has continued as

a means of keeping abreast of advances and current research in the field of solid waste management.

d. Noise Abatement

(1) The Federal Aviation Administration has developed a computer procedure to apply to civilian aircraft operations to accomplish noise exposure forecasting (NEF). During this year there has been a demonstration of the applicability of the technique to military aircraft operations and the collection of sound data on military aircraft.

e. Ecosystems Technology

(1) The ecological hazards on Air Force installations to include insects, rodent, small animals, birds and other vermin. There has been a study on the control of birds at the Rocket Sled Test Site, Holloman AFB. Biosonics testing and employment of population reduction techniques have been used as a means of eliminating the bird strike hazard.

(2) There was a laboratory experiment phase conducted using the phototaxis control concept.

Training Programs

1. Training Personnel in Environmental Pollution Control

a. Bioenvironmental Engineering Training. The Air Force Medical Service conducts an intensive 16-week training course for newly assigned Bioenvironmental Engineers. Approximately 35% of the course, which covers the fields of environmental and industrial hygiene engineering, is concerned directly with abatement and evaluation of air, water and noise pollution.

b. Environmental Protection Course. At this time 160 Air Force civil and bioenvironmental engineers have completed the biyearly two-week course at Air Force Institute of Technology's Civil Engineering School on environmental protection. The purpose of the course is to provide an understanding of Air Force environmental problems and how to control them. The course's reputation has spread to the extent that the Navy now joins the Air Force in sending personnel through this training.

c. Technician and Specialist Training. Courses in water and waste processing, pest control, and week control are held at Sheppard AFB. These courses are part of the Department of Civil Engineering training for the Engineer Environmental Support Technician, Entomological and Grounds Maintenance specialists.

d. General Environmental Training. The Air Force is investigating methods and approaches to develop within its personnel an understanding of the environmental goals and how they relate to each individual. Areas where specific training needs have been identified are:

(1) During basic training instill general goals and individual responsibility for resource conversation and anti-littering.

(2) Technical training schools to stress environmental pollution considerations associated with specific tasks, i.e., proper segregation of waste oil to facilitate disposal through recycling methods.

(3) Air Force Professional School to stress the needs of management to access all actions for environmental consequences and select courses of action that minimize adverse environmental factors.

K. Enhancement of the Environment

1. Conservation

Air Force policy is to be a prudent manager of the natural resources. Individual bases are encouraged to utilize the best management practices for mineral and wildlife resources, by inter-service agreements with the Department of the Interior and Agriculture specialists in conservation fields.

2. Fish and Wildlife Policies.

A cooperative program has been initiated at bases with suitable resources to insure a professionally designed and managed program. Habitat, stocking, control practices, and pond management information is provided by this arrangement as a benefit to the base and to the Nation's conservation practices. Self-help labor, Boy Scouts, Girl Scouts, Rod and Gun Clubs, plus base assistance, provide most of the labor, as well as materials needed, to improve, ponds, habitat, and recreational sites on Air Force bases. Access to bases is generally available to outside groups except in a few cases where security conditions or hazards exist.

Functional responsibility for the Air Force Wildlife Program has been assigned to a USAF headquarters at Atlanta, Georgia, an office managed by the USAF Foresters.

3. Natural Beauty

Eight major commands and several of the larger bases have professional land management specialists (agronomists, foresters, landscape architects) assigned to their staffs. Aesthetic objectives are consistently maintained in the integration of natural areas, forest plantings and landscaped grounds to improve appearance of Air Force bases as well as assure optimum land use principles. Over 200 Air Force bases have formal land management plans, with explicit guidance and master plans for the development of these resources as time and funding permit. Present construction policy requires the inclusion of adequate landscaping as an integral part of the construction effort. The format for the General Thomas D. White Environmental Protection Award has been broadened to include more aesthetic considerations along with the traditional conservation activities.

4. Architecture and Site Development, Preservation of Monuments

The Air Force cooperates with various groups whenever problems of historical significance are encountered. Vandenberg AFB recently completed a contract with the University of California at Santa Barbara to survey the base for archaeological sites of significance so as to prevent their damage from construction.

August 9, 1971
NUMBER 6050.1

ASD(H&E)

Department of Defense Directive

SUBJECT Environmental Considerations in DoD Actions

References (a) through (q) are listed in Enclosure 3

I. PURPOSE AND SCOPE

This Directive establishes Department of Defense policy, assigns responsibilities, and provides guidance for the implementation of Section 102(2) of reference (a) and references (b) through (k) insofar as those references require the inclusion of environmental considerations in the decision-making process.

II. CANCELLATION

Reference (q) is hereby cancelled.

III. APPLICABILITY

The provisions of this Directive apply to the Office of the Secretary of Defense, the Military Departments, the Organization of the Joint Chiefs of Staff, Unified and Specified Commands, and Defense Agencies (hereafter referred to collectively as "DoD Components").

IV. POLICY

A. At the earliest practicable stage in the planning process and in all instances prior to decision, the environmental consequences of any proposed action shall be assessed.

B. Actions that were initiated prior to the enactment of P.L. 91-190 (reference (a)) and for which the environmental consequences have not been assessed should be reviewed to ensure that any remaining action is consistent with the provisions of this Directive.

Continuation of IV.

C. Insofar as practicable, and with appropriate consideration of assigned missions and of economic and technical factors, programs and actions of all DoD Components shall be planned, initiated, and carried out in a manner to avoid adverse effects on the quality of the human environment. When this is not feasible, all reasonable measures shall be taken to neutralize or mitigate any adverse environmental impact of the actions.

D. Whenever an environmental assessment of a recommendation or report on a proposal for legislation or of a proposed or continuing major action indicates under the criteria in enclosure 1 that the resulting action may significantly affect the quality of the human environment or may be highly controversial with regard to environmental impact, a detailed environmental statement shall be prepared and processed pursuant to the guidance contained in "Statements on Major Federal Actions Affecting the Environment" (reference (f)) and in enclosure 2. The Secretary of the Army may prescribe separate criteria and procedures for determining the need for and the processing of environmental statements with respect to civil functions of the Corps of Engineers.

V. RESPONSIBILITIES

A. The Assistant Secretary of Defense (Health and Environment) shall:

1. Provide assistance and advice relative to environmental statements.

2. Review draft environmental statements submitted by other DoD Components, solicit comments concerning such statements within the Office of the Secretary of Defense and from other appropriate DoD Components, and provide consolidated comments to the DoD Component that submitted the draft statement.

3. Review all directives and instructions of the Office of the Secretary of Defense to determine if environmental statements are required.

4. Maintain liaison with the Council on Environmental Quality (CEQ), the Environmental Protection Agency (EPA) and the Office of Management and Budget (OMB) with respect to the environmental policies affecting the entire Department of Defense.

5. Revise and supplement the enclosures and attachment to this Directive or add additional enclosures or attachments

Continuation of V.A.5.

as may be required to implement more effectively the policies set forth in this Directive.

6. Retain a copy of each draft and final environmental statement prepared within the Office of the Secretary of Defense for review by members of the public when such review is requested.

B. The Director of Defense Research and Engineering, Assistant Secretaries of Defense, and Assistants to the Secretary of Defense shall:

1. Monitor the application of policies contained in this Directive with respect to the environmental aspects of continuing and proposed programs and projects within their functional responsibilities.

2. Insure that environmental statements required for actions within their respective offices are prepared and processed.

3. Coordinate as appropriate with other elements of the Department of Defense to preclude duplication or inconsistencies in the preparation of environmental statements for programs or projects within their respective functional responsibilities.

4. Designate a single point of contact within their offices for matters pertaining to this Directive.

5. Assist ASD(H&E) in the review of environmental statements.

6. Coordinate proposed directives and instructions that have environmental implications with ASD(H&E).

C. The Secretaries of the Military Departments, Chairman of the Joint Chiefs of Staff, and Directors of Defense Agencies for operations under their jurisdiction, shall:

1. Establish procedures for assessing environmental consequences of continuing and proposed programs and actions, in accordance with the policies contained in this Directive, and for the preparation and processing of environmental statements required for actions within their respective DoD Components.

2. Establish procedures to insure that all regulations, directives, instructions, and other major policy publications are reviewed for environmental consequences, and, when such consequences are significant, withhold publication of issuances until compliance with Section 102(2)(C) of P.L. 91-190 (reference (a)) has been accomplished.

3. Review environmental statements in their areas of expertise in accordance with reference (f).

Continuation of V.C.

4. Designate a single point of contact for matters pertaining to this Directive.

5. Designate, in implementing directives, an official responsible for making draft and final environmental statements available to the public.

VI. REPORT CONTROL SYMBOL

Reporting requirements contained herein have been assigned Reports Control Symbol DD-H&E(AR) 1068.

VII. EFFECTIVE DATE AND IMPLEMENTATION

This Directive is effective immediately. Three (3) copies of the implementing documents will be forwarded to the ASD(H&E) within 60 days.

Deputy Secretary of Defense

Enclosures 3
1. Determinations of Requirements for Environmental Statements
2. Preparation and Processing of Environmental Statements
3. List of References

DETERMINATIONS OF REQUIREMENT FOR ENVIRONMENTAL STATEMENTS

I. GENERAL

A. Section 102(2)(C) of the National Environmental Policy Act of 1969 (P.L. 91-190) (reference (a)) requires that a detailed environmental statement be included in "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."

B. Executive Order 11514, March 7, 1970 (reference (d)) directs the Council on Environmental Quality to issue guidelines to Federal agencies for the preparation of the environmental statements required by Section 102(2)(C) of the National Environmental Policy Act of 1969 (reference (a)).

C. On April 23, 1971, the Council on Environmental Quality published guidelines for the preparation of environmental statements (Statements on Major Federal Actions Affecting the Environment, 36 Fed. Reg. 79, 7724 1971) (reference (f)). These guidelines contain general guidance for determining when an environmental statement is required.

D. This enclosure interprets and amplifies the general guidelines of the Council on Environmental Quality for Department of Defense actions.

II. GEOGRAPHICAL LOCATION OF ACTIONS

A. Environmental statements are required for actions described in paragraphs III and IV below conducted anywhere in the world, except when conducted in, or partly in, areas which are in or under the jurisdiction of a nation other than the United States. In these latter cases, the DoD Component responsible for the action shall provide to the ASD(H&E) full particulars, a recommendation as to whether or not a statement should be prepared, reasons for the recommendation, and an assessment of the effect of a statement on U.S. foreign relations. The ASD(H&E) shall coordinate these latter cases as appropriate, and shall furnish procedural instructions to the responsible DoD Component.

B. Environmental statements are not required for multi-national activities (such as NATO) when the DoD Component involved does not have primary decision-making authority, or for combat or combat-related activities in a combat zone. (See paragraph IV.C.5.)

C. The DoD Component shall comply with applicable environmental laws and policies, even though an environmental statement is not required. In countries or areas not under U.S. control or administration, projects or activities are subject to the environmental laws, regulations and stipulations of the foreign government concerned.

III. ACTIONS INCLUDED

A. The legislative history of the National Environmental Policy Act of 1969 (reference (a)) and the guidelines of the Council on Environmental Quality define major actions as including, but not limited to, the following:

1. Recommendations or favorable reports relating to legislation, including that for appropriations.

2. Policies, regulations, and procedures-making.

3. Projects and continuing activities:

a. Directly undertaken by Federal agencies;

b. Supported in whole or in part through Federal contracts, grants, subsidies, loans, or other forms of funding assistance; and

c. Involving a Federal lease, permit, license, certificate, or other entitlement for use.

B. Each of the above categories of actions requires somewhat different considerations in determining whether an environmental statement is required.

IV. EVALUATION OF REQUIREMENT FOR ENVIRONMENTAL STATEMENT

A. Proposals for legislation, annual authorization requests, and favorable reports on legislation:

1. Proposals for legislation (other than requests for inclusion in annual authorization requests). Prior to preparing a legislative proposal, the DoD Component shall assess the environmental consequences of the proposal using the factors in attachment 1. If it is determined that the proposal would significantly affect the environment, an environmental statement is required and shall be submitted with the proposal.

2. Annual authorization requests.

a. Prior to submitting authorizing legislation requests pursuant to Section 412, Public Law 86-149, as amended, (reference (1)) or the annual Military Construction Authorization Bill, the environmental consequences of each item requested for inclusion shall be assessed by the DoD Component making the requests using the factors in attachment 1. Further, the Component is required to prepare an environmental statement for each item that will significantly affect the environment unless the item is part of a continuing project or program for which an environmental statement has previously been processed, and the environmental consequences of the item are not expected to deviate significantly from those identified in the prior statement.

b. Three copies of each required draft statement shall be submitted with the requests (see Section III of enclosure 2).

3. Favorable reports on legislation:

a. If the Department of Defense is not the Federal agency that has primary responsibility for the subject matter involved in the legislative item, no environmental statement is required from the Department of Defense. If it is not clear from the legislative item whether the Department of Defense is the primary Federal agency responsible for the subject matter involved in the legislative item, advice should be sought from the General Counsel, Department of Defense.

b. If the Department of Defense is the Federal agency that has primary responsibility for the subject matter involved in the legislative item, the DoD Component responsible for preparing the DoD report on the item shall assess the environmental consequences of the proposal, using the factors in attachment 1 to this enclosure. If the assessment indicates that the proposal would significantly affect the quality of the human environment, an environmental statement is required and should accompany the report.

B. Policy, Regulations, and Procedure Making.

1. This shall be construed to apply to publications including, but not limited to, directives, instructions, regulations, manuals, or major policy statements of all DoD Components.

2. The DoD Component shall assess the environmental consequences, using the factors in attachment 1 to this enclosure, for each proposed publication. If it is determined that actions generated by the publication will significantly affect the

environment, an environmental statement is required unless the publication is an implementation of a publication from another DoD Component and the environmental consequences will not deviate significantly from those of the basic publication. In these latter cases, the DoD Component responsible for the basic publication has the responsibility for assessing the environmental consequences of its publication and preparing an environmental statement.

3. If a proposed publication of a DoD Component is to be published for the purpose of implementing a Federal law or a publication of an agency outside of the Department of Defense, and actions resulting from the law or publication will significantly affect the quality of the environment, an environmental statement is required unless an environmental statement which covers the environmental impact of the DoD Component's publication was submitted in connection with adoption of the law or the other agency's publication.

C. Projects and Continuing Activities.

1. This category includes the majority of the operations and activities of DoD Components. The Components are encouraged to develop plans, programs, and procedures for routine projects and continuing activities having an impact on the environment. Environmental statements should be prepared for these plans, programs, and procedures rather than for particular or individual actions taken pursuant to these plans, programs, or procedures. Only when a particular proposed action involves a potential impact on the environment not considered in the environmental statement for the applicable plan, program, or procedure, will it be considered necessary to prepare an impact statement on that individual or particular proposed action.

2. Each proposed project or activity shall be assessed for environmental consequences, using the factors in attachment 1, and:

a. If it is determined that the action will not significantly affect the environment, any written assessment of the environmental aspects of an anticipated action shall be retained by the Component making the assessment until the action is completed. (See paragraph D of attachment 1 to this enclosure.)

b. If it is determined that the action will have a significant effect on the environment, a statement is required, unless it is excepted by paragraphs 3, 4, or 5 below.

3. If an environmental statement was submitted for a project or activity in accordance with paragraph IV.A. of this enclosure, no additional environmental statement is required for that project or activity unless it appears that there will be significant adverse environmental consequences from the project or activity that were not covered by the environmental statement.

4. If a project or activity is being carried out pursuant to a publication for which an environmental statement was submitted in accordance with paragraph IV.B. of this enclosure, no environmental statement is required for that project or activity unless it appears that there will be significant adverse environmental consequences from that project or activity that were not covered by the environmental statement.

5. Combat or combat-related activities in a combat zone, riot control activities, and other emergency activities do not require environmental statements. However, the intentional disposal of hazardous substances or of other materials in the oceans shall not be construed to be combat or combat-related activities.

6. On occasion, laws other than the National Environmental Policy Act (reference (a)), such as those in reference (c), require the Department of Defense to gain approval of another Federal agency before commencing certain types of actions that may have environmental consequences. Compliance with the requirements of such laws does not relieve the responsible official from preparing and processing an environmental statement if the proposed action is a major action that would significantly affect the quality of the human environment. However, insofar as practicable, the draft environmental statement format should be used in complying with other laws to minimize duplication of efforts.

Attachment - 1
Major Action Significantly Affecting
the Quality of the Human Environment

MAJOR ACTION SIGNIFICANTLY AFFECTING THE QUALITY OF THE HUMAN ENVIRONMENT

A. It is impossible to list categorically all DoD projects or activities that are "major Federal actions significantly affecting the quality of the human environment". In making a judgment in a particular case, it will be necessary for the proponent of the action to assess the expected environmental effects of the action in conjunction with the intent of the National Environmental Policy Act (NEPA) as implemented by the Council on Environmental Quality (CEQ). It is essential that all the environmental effects of an action be assessed, whether those effects are adverse or beneficial. In determining whether or not the effects of an action are significant, the proponent must evaluate the nature and degree of all effects on the environment. These may be significant even though the net environmental effect of the proposed action will be beneficial.

B. DoD Components shall insure that a decision is not made until the environmental consequences of the decision have been assessed. If the assessment indicates that the decision will either affect the environment on a large geographical scale or have a serious environmental effect in a more restricted geographical area, the proposed action shall be considered a Major Action Significantly Affecting the Quality of the Human Environment (MASAQHE), and the decision shall be deferred until Federal agencies possessing special expertise or persons affected by the environmental effects of the decision have had an opportunity to present their views. It is necessary to consider not only the degree of effect on the environment but also the scope of the action and the potential effect of the action on other persons.

1. If a DoD Component or a major military command intends to take an action that will influence subactivities in many subordinate units, and the subactivities will each affect the environment, the action is probably a MASAQHE even though a single subactivity may not be in that category. For example, a limited maneuver or training exercise by small elements of a Military Department might not be a major action nor would it normally affect the environment significantly. However, if a Military Department intended to publish a regulation that includes provisions prescribing the environmental considerations that were to be given to the planning of all training exercises or maneuvers of the DoD Component for an indefinite period of time, then it might be expected that such a regulation would have a significant effect on the quality of the environment because it would govern numerous activities which individually would have some effect on the environment. Thus, the regulation should be construed to be a MASAQHE.

2. An example of an action that should be classified as a MASAQHE because of a localized effect is an extremely noisy activity conducted by a DoD Component near a residential area, where the resulting noise might seriously affect the comfort of residents of the area. In keeping with the intent of NEPA, no decision should be made to take any action until those residents have been given an opportunity to present their views, and their views have been carefully considered.

C. Just as it is impossible to categorize all actions, so is it impossible to list in advance all of the environmental factors to be considered. The proponent of the action should consider all aspects of the action to determine if it will interfere unreasonably with the living conditions of man, wildlife, or marine life, or with any ecosystems on an immediate, short-range or long-range basis. Examples of factors to be considered are:

1. Effect on water.

a. Will the action:

(1) Introduce toxic or hazardous substances or significant amounts of chemicals, organic substances or solid wastes into bodies of water,

(2) Significantly increase sedimentation in a body of water, or

(3) Significantly alter the temperature of a body of water?

b. Will the action improve the quality of a body of water?

2. Effect on atmosphere.

a. Will the action result in emissions into the atmosphere of toxic or hazardous substances or significant amounts of other pollutants?

b. Will the action result in the creation of excessive noise, considering the proximity of and the likely effects of the noise on humans or wildlife?

c. Will the action tend to reduce the amount of pollution in the atmosphere?

3. Effect on natural resources.

a. Will the action result in significant destruction of vegetation, wildlife or marine life?

b. Will the action enhance the quality of vegetation, wildlife or marine life?

c. Will the action significantly affect soil quality?

d. Will the action result in contamination or deterioration of food or food sources?

4. Other values.

a. Will the action significantly affect, beneficially or adversely, the health or welfare of man, including aesthetic considerations?

b. Will the action significantly affect, beneficially or adversely, other forms of life or ecosystems of which they are a part?

D. Certain types of actions require close environmental scrutiny because of the possibility that they may either affect the quality of the environment or create environmental controversy. It may be desirable in such cases to have a complete presentation of the environmental aspects of the proposed action available for any interested party. For these reasons, consideration shall be given to assessing the environmental effects of the following types of actions in writing even though a detailed assessment indicates that the action is not a MASAQHE.

1. Development or purchase of a new type of aircraft, ship or vehicle, or of a substantially modified propulsion system for any aircraft, ship or vehicle.

2. Development or purchase of a new weapon system.

3. Real estate acquisitions or outleases of land.

4. Construction projects.

5. New installations (bases, posts, etc.).

6. Disposal of biological or chemical munitions, pesticides or herbicides other than in the manner in which they are intended to be used.

7. Intentional disposal of any substances in a significant quantity or on a continuing or periodic basis.

8. Mission changes which increase the number of personnel in an area to a degree that will tax the environmental capability of the local civilian community.

9. Any action which, because of real, potential or purported adverse environmental consequences, is a subject of controversy among people who will be affected by the action, or which, although not the subject of controversy, is likely to create controversy when the proposed action becomes known by the public.

E. Even though a written assessment supports the conclusion that an action is not a MASA/HE, an environmental impact statement should be written on a proposed action which becomes highly controversial because of environmental aspects. The environmental statement may be based on the information contained in the assessment.

PREPARATION AND PROCESSING OF ENVIRONMENTAL STATEMENTS

I. GENERAL

Preparation of environmental statements shall be based on considerations discussed in the guidelines of the Council on Environmental Quality (CEQ) and the following guidance. These directions are intended to assure consistency of effort in preparing statements.

A. A careful, objective detailing of environmental impacts, alternatives, and implications of proposed projects and activities should give reviewers both within and outside the Department of Defense insight into the particulars associated with the action. The general public, environmental action groups, special interest associations, governmental agencies, and Congressional Committees will expect the statements to be a valid source of information on proposed actions, as well as a reflection of how the DoD Component views environmental factors and seeks to accommodate them. Since the statements must whenever possible be made available to the public, it must be assumed that they will receive careful scrutiny. The statements should be systematic presentations of environmental impacts.

B. A statement should describe physical and environmental aspects sufficiently to permit evaluation and independent appraisal of the favorable and adverse environmental effects of each proposal. It should be simple and concise, yet should include all pertinent facts. Length will depend upon the particular proposal and the nature of its impacts.

C. A statement should not be limited to ultimate conclusions, but should contain in support of such conclusions a thorough evaluation of all factors affecting the potential environmental impact of the proposal.

D. Rather than serving as a means for assisting or supporting project justification, a statement should include a complete and objective appraisal of the environmental effects, beneficial and adverse, and of available alternatives. In no case should adverse effects, either real or potential, be ignored or slighted in an attempt to justify an action previously recommended. Similarly, care must be taken to avoid overstating favorable effects.

E. In developing and obtaining the necessary information to prepare a statement, consultation with other Federal, State, and local agencies is encouraged.

II. CONTENT OF STATEMENT

The body of an environmental statement shall contain the following separate sections with the length of each being adequate to identify and develop the required information.

A. Project description. Describe the proposal by name and specific location and summarize its objectives and the activities which will ensue if it is adopted. Provide technical data adequate to permit a careful assessment of environmental impact by commenting agencies. Where relevant, maps should be provided.

B. The probable environmental impac of the proposed action.

1. Identify the probable direct and secondary environmental consequences of the proposed action. This shall include commentary on the direct impact on man's health and welfare and his surroundings through such media as air, water, or food. Threats to other forms of life and their ecosystems shall be included. Examples of primary and secondary environmental consequences that should be identified are the primary noise impact on a community from proposed military aircraft operations and the secondary impact on future land use which may result from such operations.

2. Discuss both the beneficial and detrimental aspects of the environmental changes, placing some relative value on the impacts described.

3. Identify remedial and protective measures which could be taken in response to adverse effects of environmental impacts. Such measures taken for the minor or short-lived negative aspects of the project shall be discussed in this section. The adverse effects which cannot be satisfactorily dealt with shall be considered in greater detail along with their abatement and mitigation measures in the following section.

C. Any probable adverse environmental effects which cannot be avoided should the proposal be implemented. Discuss the unavoidable adverse effects and the implications thereof, and identify the abatement measures proposed to rectify these and an estimation of their effectiveness. In addition to an evaluation of damage to the natural environment, this would include an evaluation of the extent to which human health or safety, aesthetically or culturally valuable surroundings, standards of living, and other aspects of life will be sacrificed or endangered.

D. Alternatives to the proposed action. Describe the various alternatives considered, their general environmental impact, and the reason(s) why each was not recommended. Identify alternatives as to their beneficial and detrimental effects on the environmental elements, specifically taking into account the alternative of no action. Include with these alternatives economic, technical, and operational considerations, as well as their environmental impact. Discuss any other pertinent points not previously mentioned such as requirements of statutes or DoD Directives that influence or limit alternatives.

E. The relationship between local short-term use of man's environment and the maintenance and enhancement of long-term productivity. Assess the cumulative and long-term impacts of the proposed action with the view that each generation is a trustee of the environment for succeeding generations. Give special attention to considerations that would narrow the range of beneficial uses of the environment or pose long-term risks to health or safety. The propriety of any action should be weighed against the potential for damage to man's life support system - the biosphere - thereby guarding against the short-sighted foreclosures of future options or needs.

F. Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. Discuss irrevocable uses of resources, changes in land use, destruction of archeological or historical sites, unalterable disruptions in ecosystems, and other effects that would curtail the diversity and range of beneficial uses of the environment should the proposal be implemented.

G. Summary sheet. The environmental statement shall be accompanied by a summary sheet which must provide the following information.

1. Indicate whether the statement is draft or final.

2. Give the name of the action and indicate whether it is an administrative or legislative action.

3. Provide a brief description of the action and indicate what geographical region (States and counties) is particularly affected.

4. Summarize the environmental impact and adverse environmental effects.

5. List alternatives considered.

6. a. (For draft statements) List all Federal, State, and local agencies from which comments have been requested.

b. (For final statements) List all Federal, State, and local agencies and other sources from which written comments have been received.

7. Provide the dates the draft statement and final statement were made available to the CEQ and the public.

III. DRAFT STATEMENT

A. Draft statements are those statements that have been prepared in accordance with the guidance of this enclosure and for which review comments will be requested from other DoD Components, the CEQ, and appropriate Federal, State, and local agencies.

1. Three (3) copies of draft statements relating to Section 412, Public Law 86-149, as amended (reference (l)), or the annual Military Construction Bill must accompany the recommendation through agency review procedures. Distribution to other agencies and to the public for comments shall be withheld until the legislative request has been forwarded to the Congress. At that time, statements relating to specific items included in the proposals shall be distributed, by the DoD Component, as appropriate, for comment.

2. In other cases where premature release would be contrary to existing administrative procedures or otherwise be inappropriate, distribution to other agencies and to the public for comments shall be made at the earliest appropriate time.

3. Normally it should not be necessary for a DoD Component to obtain OASD(H&E) approval prior to distributing the draft environmental statement outside the Department of Defense. This procedure does not alter any requirement that may exist to coordinate the action itself within OSD prior to public release or to follow appropriate security review procedures.

4. The advice of the Assistant Secretary of Defense (Public Affairs) shall be obtained through established command channels before routing outside of the Department of Defense environmental statements that have significant public affairs implications. The official designated by a DoD Component to make determinations regarding release of draft environmental statements outside of the Department of Defense should consult with Public Affairs officers to familiarize himself with the subject matter they consider to be newsworthy and to advise them of all requests from the news media.

B. Subject to the requirements of references (m) and (n) pertaining to the identification, safeguarding, and dissemination of classified information and to reference (o) pertaining to security review for public release approval, distribution of the draft statement shall be as follows:

1. Three (3) copies to OASD(H&E). (These copies are in addition to those required by paragraph III.A.1. above.)

2. Ten (10) copies to the CEQ.

3. Five (5) copies to the EPA.

4. Two (2) copies to appropriate Federal agencies having jurisdiction by law or special expertise with respect to any environmental impact involved. (Appendix II of the CEQ Guidelines.)

5. Two (2) copies to State and local agencies authorized to develop and enforce environmental standards when the proposed action affects matters within their jurisdiction. These copies shall be sent to the appropriate State and regional or metropolitan clearinghouses in accordance with the procedures prescribed in OMB Circular No. A-95 unless the Governor of the State involved has designated some other point of contact for obtaining the State and local agency review. The clearinghouses are listed in the Directory of State, Metropolitan, and Regional Clearinghouses under OMB Circular No. A-95 (Revised) of April 19, 1971 (reference (k)).

6. At such time as the draft statement is forwarded to the CEQ, other Federal, State and local agencies, it shall be made available to the public (to any organization or individual upon request) in accordance with reference (p). In appropriate cases, the DoD Component shall solicit the views of public organizations and hold public hearings on the proposed action. Views of public organizations and public hearings are appropriate in the following situations:

   a. Where the proposed action by the agency will have a direct or peculiar impact on the people residing in a particular geographical area.

   b. Where public organization or members of the public possess expertise concerning the impact of the action that may not otherwise be available.

   c. Where no overriding consideration of national security or time makes it illegal or impracticable to involve such organizations or members of the public in the consideration of a proposed action in which there is evidence of

wide public interest. No public hearings need be held in connection with proposed legislation in view of the opportunity for public hearing in connection with Congressional consideration of the bill. Public hearings shall be conducted informally and need not be prolonged beyond a reasonable time necessary to obtain a representative view of the various segments of public interest.

7. The DoD Component seeking review comments may establish time limits of not less than 30 days for reply except that whenever an action related to air or water quality, noise abatement and control, pesticide regulation, solid waste disposal, radiation criteria and standards, or other provisions of the authority of the Administrator of the Environmental Protection Agency is involved, a period of 45 days shall be allowed for review. If the agency consulted does not reply within the established time limit, it may be presumed that the agency has no comment to make, unless a request for a specified extension of time has been made. DoD Components should endeavor to comply with request for extensions of time up to 15 days.

IV. FINAL STATEMENT

A. Final statements are prepared after receipt of review comments provided by other agencies. In many cases the final statements can be prepared by making minor revisions to the draft statement and attaching the review comments received from other sources. In other cases, it may be necessary to make major revisions to the draft statement. In either case, it may be appropriate to provide a discussion of problems and objections raised by other Federal, State, and local agencies and by private organizations and individuals and the disposition of the issues involved. Along with the comments received, this discussion should be attached to the final text of the environmental statement.

B. Subject to the requirements of references (m) and (n) pertaining to the identification, safeguarding and dissemination of classified information and of reference (o) pertaining to security review for public release approval, distribution of the final statement shall be as follows:

1. One (1) copy to OASD(H&E).

2. Ten (10) copies to the CEQ.

3. Five (5) copies of final statements relating to Section 412, Public Law 86-149, as amended (reference (l)), or

the Annual Military Construction Authorization Bill to the appropriate Congressional Committees of the Senate and of the House of Representatives.

4. The final statement also shall be made available to the public in accordance with reference (p).

V. WAITING PERIOD BEFORE AN ACTION CAN BE TAKEN

A. It is important that draft environmental statements be prepared and circulated for comment and furnished to the CEQ early enough in the review process before an action is taken in order to permit meaningful consideration of the environmental issues involved. To the maximum extent practicable no administrative action (i.e., any proposed action to be taken other than proposals for legislation or reports on legislation) shall be taken sooner than 90 days after a draft environmental statement has been circulated for comment and furnished to the CEQ, and, except where advance public disclosure will result in significantly increased costs of procurement, made available to the public. Neither shall such administrative action be taken sooner than 30 days after the final text of the environmental statement (together with comments) has been made available to the CEQ and the public. Consequently, the minimum waiting period after submission of the draft statement is 90 days because the 30-day period and 90-day period may run concurrently to the extent that they overlap.

B. When it is not practical for a DoD Component to comply with the time requirements contained in paragraph V.A., above, the DoD Component shall request the Council on Environmental Quality to waive a portion of the time requirement for that specific action. If negotiations in this regard are not successful, the DoD Component shall advise ASD(H&E).

C. If it is impossible for an agency to comply with the time requirements of paragraph III.B., above, the DoD Component shall forward the draft environmental statement with an explanation of the facts and circumstances that preclude adherence to the time requirements to ASD(H&E), who shall attempt to resolve the issues involved. The proposed action shall not be initiated until the time problem has been satisfactorily resolved unless such action is authorized by the Secretary or Deputy Secretary of Defense.

VI. CLASSIFIED ENVIRONMENTAL STATEMENTS

The fact that a proposed action is of a classified nature does not relieve the proponent of the action from complying with the requirements of this Directive. Environmental statements, both

draft and final, shall be prepared, safeguarded, and disseminated in accordance with the usual requirements applicable to classified information (references (m) and (n)). When feasible, these statements shall be organized in such a manner that classified portions can be included as annexes, so that the unclassified portions can be made available to the public.

VII. PROCESSING ENVIRONMENTAL STATEMENTS ORIGINATED BY OTHER FEDERAL AGENCIES

A. Environmental statements will be referred to the Department of Defense by other Federal agencies for two reasons:

1. Where a proposed action may affect matters over which Department of Defense has jurisdiction by law.

2. Where a proposed action may have environmental effects in an area where a DoD Component has been designated in Appendix II of the CEQ Guidelines as possessing special expertise.

B. Comments of a DoD Component on an environmental statement prepared by another Federal agency should normally be restricted to the aspect of the action for which the statement was referred.

C. When a request for review and comment on an environmental statement prepared by another Federal agency is received by OASD(H&E), it shall determine which DoD Components should review the environmental statement.

1. When it has been determined that a single DoD Component should be responsible for the review, OASD(H&E) shall request that the DoD Component reply directly to the agency involved. The DoD Component shall provide one (1) copy of the reply to OASD(H&E) and ten (10) copies to the CEQ.

2. When it has been determined that more than one DoD Component should review the statement, the OASD(H&E) shall prepare a consolidated review report or designate the DoD Component with primary interest to prepare such a report. The OASD(H&E) shall forward the consolidated report to the requesting agency and provide ten (10) copies to the CEQ.

D. When a request for review and comment on an environmental statement from another Federal agency is received directly by a DoD Component, that DoD Component shall reply directly to the requesting agency. Also, that Component shall forward one (1) copy of the reply to OASD(H&E) and ten (10) copies to the CEQ.

REFERENCES

(a) Public Law 91-190, "National Environmental Policy Act of 1969", January 1, 1970.

(b) Public Law 91-604, "Clean Air Amendments of 1970", December 31, 1970.

(c) Section 409 of Public Law 91-121, "Armed Forces Appropriation Authorization, 1970", November 19, 1969, as amended by Section 506 of Public Law 91-441, "Armed Forces Appropriation Authorization, 1971", October 7, 1970.

(d) Executive Order 11514, "Protection and Enhancement of Environmental Quality", March 7, 1970 (35 Fed Reg 46, 4247 (1970)).

(e) Executive Order 11507, "Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities", February 5, 1970 (35 Fed Reg 25, 2573 (1970)).

(f) Executive Office of the President, Council on Environmental Quality, "Statements on Major Federal Actions Affecting the Environment", April 23, 1971 (36 Fed Reg 79, 7724 (1971)).

(g) Executive Office of the President, Office of Management and Budget, "Proposed Federal Actions Affecting the Environment", Bulletin No. 71-3, August 31, 1970.

(h) DoD Directive 5100.50, "Protection and Enhancement of Environmental Quality", June 23, 1970.

(i) DoD Directive 5500.5 , "Natural Resources - Conservation and Management", May 24, 1965.

(j) Executive Office of the President, Office of Management and Budget, Circular No. A-95 (Revised), February 9, 1971 (Parts I and II).

(k) "Directory of State, Metropolitan and Regional Clearinghouses", under OMB Circular No. A-95 (Revised), April 19, 1971.

(l) Public Law 86-149, "To Authorize Certain Construction at Military Installations and for Other Purposes", August 10, 1959.

(m) DoD Directive 5200.1, "Safeguarding Official Information in the Interests of the Defense of the U.S.", July 10, 1968.

(n) DoD Instruction 5210.47, "Security Classification of Official Information", December 31, 1964.

(o) DoD Directive 5230.9, "Clearance of DoD Public Information", December 24, 1966.

(p) DoD Directive 5400.7, "Availability to the Public of DoD Information", June 23, 1967.

(q) DEPSECDEF Memorandum, "Interim Guidelines on Environmental Statements", August 8, 1970. (hereby cancelled)

1972 Military Construction Program

INSIDE THE UNITED STATES

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Alabama	Army	Anniston Army Depot	141,000	---
		Fort Rucker	1,569,000	---
		Redstone Arsenal	2,414,000	---
	State Total		(4,124,000)	
Alaska	Army	Alaska General	---	124,000
		Ft Greelcy	494,000	102,000
		Ft Richardson	---	295,000
		Ft Wainwright	---	87,000
	Navy	Naval Communication Sta, Adak	---	1,245,000
		Naval Arctic Research Lab, Barrow	1,200,000	910,000
	Air Force	Cape Lisburne AFS	---	167,000
		Cape Newenham AFS	---	139,000
		Cape Romanzoff AFS	---	163,000
		Campion AFS	---	111,000
		Ft Yukon AFS	---	110,000
		Galena Airport	---	254,000
		Indian Mountain AFS	---	430,000
		Kotzebue AFS	---	119,000
		Murphy Dome	---	147,000
		Kodiak	---	304,000
		Shemya AFS	524,000	770,000
		Sparrevohn AFS	---	324,000
		Tatalina AFS	---	171,000
		Tin City AFS	---	171,000
		King Salmon Airport	---	105,000
	State Total		(2,218,000)	(6,248,000)
Arkansas	Army	Pine Bluff Arsenal	1,735,000	1,543,000
	State Total		(1,735,000)	(1,543,000)
California	Army	Riverbank AAP	---	1,367,000
		Sharpe Army Depot	216,000	---
	Navy	Naval Security Gp Actvty, Skaggs Isl	---	1,046,000

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
California (cont'd)	Navy (Con't)	Marine Corps Base, Cp Pendleton	---	489,000
		Naval Fuel Depot, San Pedro	---	225,000
		Naval Air Station, Lemoore	---	2,479,000
		Naval Station, Long Beach	---	773,000
		Naval Training Cntr, San Diego	429,000	---
		Naval Station, San Francisco	---	102,000
		Naval Undersea Research & Devlpt Cntr, San Diego	---	200,000
	Air Force	Cambria AFS, San Luis Obispo	---	67,000
		Edwards AFB, Muroc	1,423,000	125,000
		McClellan AFB, Sacramento	---	280,000
	State Total		(2,068,000)	(7,153,000)
Colorado	Air Force	Lowry AFB, Denver	195,000	---
		US Air Force Academy, Colorado Sprgs	---	379,000
	State Total		(195,000)	(379,000)
Florida	Air Force	Eglin AFB, Valparaiso	135,000	759,000
		Patrick AFB Coco Beach	103,000	---
		Eastern Test Range, Cape Kennedy	319,000	---
	State Total		(557,000)	(759,000)
Georgia	Army	Fort Benning	1,179,000	---
		Fort Gordon	1,663,000	---
		Fort Stewart	729,000	---
	State Total		(3,571,000	---

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Hawaii	Army	Helemano	---	200,000
	Navy	Naval Air Sta, Barbers Pt, Oahu	120,000	---
		Naval Communication St, Honolulu, Oahu	151,000	---
		Marine Corps Air Station, Kaneohe Bay	64,000	---
		Naval Supply Cntr, Pearl Harbor, Oahu	---	121,000
		Naval Shipyard, Pearl Harbor, Oahu	72,000	---
		Pacific Missile Ruge Facility, Barking Sands	---	323,000
		Navy Public Works Cntr, Pearl Harbor, Oahu	101,000	---
	State Total		(508,000)	(644,000)
Idaho	Air Force	Mountain Home AFB, Mountain Home	199,000	---
	State Total		(199,000)	---
Illinois	Army	Joliet AAP	176,000	1,316,000
		Rock Island Ars.	2,474,000	---
	Air Force	Scott AFB, Belleville	296,000	---
	State Total		(3,746,000)	(1,316,000)
Indiana	Army	Ft Ben Harrison	468,000	---
		Indiana AAP	---	89,000
		Jefferson P.G.	319,000	---
	Navy	Naval Ammo Depot, Crane	869,000	133,000
	Air Force	Grissom AFB, Bunker Hill	654,000	000
	State Total		(2,310,000)	(222,000)
Iowa	Army	Iowa AAP	---	297,000
	State Total		---	(297,000)

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Kansas	Army	Kansas AAP	---	101,000
			566,000	---
	Defense Sply Agency	Defense Industrial Plant Equpmt Fac, Atchison	28,000	---
	State Total		(594,000)	(101,000)
Kentucky	Army	Fort Campbell	363,000	---
		Fort Knox	1,978,000	142,000
	State Total		(2,341,000)	(142,000)
Louisiana	Army	Louisiana AAP	---	404,000
	State Total		---	(404,000)
Maine	Air Force	Charleston AFS, Charleston	99,000	---
	State Total		(99,000)	---
Maryland	Army	Edgewood Ars.	---	426,000
		Fort Ritchie	333,000	---
		Topo Command	---	110,000
	Navy	Naval Communication Sta, Cheltenham	---	164,000
		Naval Ord Sta, Indian Head	---	198,000
		Naval Ord Lab, White Oak	---	170,000
	Air Force	Andrews AFB, Camp Springs	175,000	---
	State Total		(508,000)	(1,068,000)
Mass.	Air Force	L.G. Hanscom Fld, Bedford	---	167,000
	State Total		---	(167,000)
Michigan	Army	Detroit Ars.	---	88,000
	Air Force	Empire AFS, Traverse City	120,000	---
		K.I. Sawyer AFB, Marquette	415,000	1,250,000
		Sault Ste. Marie AFS, Sault Ste. Marie	56,000	---
	State Total		(591,000)	(1,338,000)

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Minnesota	Air Force	Duluth INTL A'PT, Duluth	183,000	---
		Finland AFS, Finland	92,000	---
	State Total		(275,000)	---
Missouri	Army	Ft Leonard Wood	360,000	---
	Air Force	Richards-Gebaur AFB, Kansas City	468,000	---
	State Total		(828,000)	---
Nebraska	Air Force	Offutt AFB, Omaha	86,000	---
	State Total		(86,000)	
Nevada	Navy	Naval Ammo Depot, Hawthorne	519,000	---
	State Total		(519,000)	---
New Jersey	Army	Fort Dix	129,000	---
		Picatinny Ars.	---	190,000
	Navy	Naval Ammo Depot, Earle	---	195,000
	State Total		(129,000)	(385,000)
New York	Army	Seneca A.D.	503,000	---
		Watervliet Ars.	544,000	137,000
	Air Force	Griffiss AFB, Rome	523,000	363,000
		Hancock Fld, Syracuse	114,000	---
		Saratoga AFS, Saratoga Springs	60,000	---
	State Total		(1,744,000)	(500,000)
North Carolina	Army	Fort Bragg	1,516,000	---
		Sunny Point Mlty Ocean Terminal	629,000	---
	Navy	Marine Corps Base Camp Lejeune	446,000	---
		Naval Air Rework Facility, Cherry Point	---	650,000

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
	Air Force	Pope AFB, Fayetteville	270,000	---
		Seymour-Johnson AFB, Goldsboro	395,000	---
	State Total		(3,256,000)	(650,000)
North Dakota	Air Force	Finley AFS, Grand Forks	75,000	---
		Minot AFB, Minot	104,000	---
	State Total		(179,000)	---
Ohio	Air Force	Wright-Patterson AFB, Dayton	3,757,000	109,000
	State Total		(3,757,000)	(109,000)
Oklahoma	Navy	Naval Ammo Depot, McAlester	531,000	---
	Air Force	Tinker AFB, Oklahoma City	974,000	237,000
	State Total		(1,505,000)	(237,000)
Pennsylvania				
	Army	Letterkenny A.D.	1,008,000	---
		New Cumberland A.D.	1,582,000	---
	Navy	Naval Shipyard, Philadelphia	---	75,000
	Air Force	Benton AFS, Wilkes Barre	67,000	---
	State Total		(2,657,000)	(75,000)
Rhode Island				
	Navy	Navy Public Works Center, Newport	---	1,203,000
		Naval Air Sta, Quonset Point	3,181,000	1,369,000
	State Total		(3,181,000)	(2,572,000)

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
South Carolina	Army	Ft Jackson	968,000	410,000
	Air Force	Charleston AFB, Charleston	2,340,000	---
		N. Charleston AFS, Charleston	---	136,000
		Shaw AFB, Sumter	199,000	---
	State Total		(3,507,000)	(546,000)
Tenessee	Army	Holston AAP	4,074,000	10,411,000
		Milan AAP	270,000	---
	State Total		(4,344,000)	(10,411,000)
Texas	Army	Ft Blics	---	208,000
		Red River AD	---	598,000
		Ft Sam Houston	---	156,000
	Navy	Naval Air Station, Corpus Christi	89,000	---
	Air Force	Brooks AFB, San Antonio	---	108,000
		Kelly AFB, San Antonio	---	355,000
	State Total		(89,000)	(1,425,000)
Utah	Army	Tooele A.D.	1,182,000	---
	Air Force	Hill AFB, Ogden	102,000	---
	Defense Supply Agency	Defense Depot, Ogden	507,000	---
	State Total		(1,791,000)	---
Virginia	Army	Fort Eustis	602,000	205,000
		Radford AAP	4,384,000	13,785,000
	Navy	Naval Weapons Lab, Dahlgren	399,000	---
		Naval Shipyard, Norfolk	3,460,000	---

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Virginia (cont'd)	Navy (cont'd)	Naval Communication Station, Norfolk	---	134,000
		Navy Public Works Center, Norfolk	1,481,000	---
		Naval Weapons St, Yorktown	969,000	---
	Air Force	Cape Charles AFS, Kiptopeke	53,000	---
	Defense Supply Agency	Defense Ceneral Supply Center, Richmond	782,000	---
	State Total		(12,130,000	(14,124,000)
Washington	Army	Fort Lewis	144,000	---
	Navy	Naval Shipyard, Bremerton	1,393,000	---
		Naval Supply Cen, Puget Sound, Bremerton	---	244,000
		Naval Air S Whidbey	---	435,000
	Air Force	Blaine AFS, Blaine	103,000	---
		McChord AFB, Tacoma	312,000	---
		Othello AFS, Pasco	87,000	---
	State Total		(2,039,000)	(679,000)
Wisconsin	Air Force	Antigo AFS, Antigo	71,000	---
		Osceola AFS, Osceola	72,000	---
	State Total		(143,000)	---
INSIDE THE UNITED STATES TOTAL ARMY			35,512,000	32,791,000
INSIDE THE UNITED STATES TOTAL NAVY			15,474,000	12,883,000
INSIDE THE UNITED STATES TOTAL AIR FORCE			15,220,000	7,820,000
INSIDE THE UNITED STATES TOTAL DEFENSE AGENCIES			1,317,000	---
INSIDE THE UNITED STATES GRAND TOTAL			67,523,000	53,494,000

OUTSIDE THE UNITED STATES

LOCATION	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Canal Zone	Air Force	Howard AFB	---	985,000
		State Total	---	(985,000)
Guam	Navy	Naval Communication Sta.	240,000	---
		Naval Supply Dep.	248,000	248,000
		Navy Public Works Center	---	6,181,000
		State Total	(488,000)	(6,429,000)
Puerto Rico	Navy	Naval Station Roosevelt Roads	---	508,000
		Naval Communication St, San Juan	---	475,000
OUTSIDE THE UNITED STATES TOTAL NAVY			488,000	7,412,000
OUTSIDE THE UNITED STATES TOTAL A.F.			--	985,000
OUTSIDE THE UNITED STATES GRAND TOTAL			488,000	8,397,000
WORLD WIDE GRAND TOTAL ARMY			35,512,000	32,791,000
WORLD WIDE GRAND TOTAL NAVY			15,962,000	20,295,000
WORLD WIDE GRADN TOTAL AIR FORCE			15,220,000	8,805,000
WORLD WIDE GRAND TOTAL DEFENSE AGENCIES			1,317,000	---
WORLD WIDE TOTALS			68,011,000	61,891,000

1973 PROPOSED MILITARY CONSTRUCTION PROGRAM
INSIDE THE UNITED STATES

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Alabama	Army	Anniston Army Depot	750,000	---
		Alabama AAP	5,120,000	---
		State Total	(5,870,000)	---
Alaska	Army	Ft Wainwright	3,509,000	---
	Navy	Naval Station, Adak	308,000	4,552,000
	Air Force	Barter Isl, DEW Station	---	690,000
		Campion AFS	212,000	---
		Cape Lisburne AFS	233,000	---
		Cape Newenham AFS	136,000	---
		Cape Romanzoff AFS	155,000	---
		Eielson AFB	908,000	---
		Ft Yukon AFS	177,000	---
		Galena Airport	334,000	---
		Indian Mt AFS	332,000	---
		King Salmon Airport	324,000	---
		Kotzebue AFS	186,000	---
		Lonely DEW Sta	---	260,000
		Oliktok DEW Sta	---	281,000
		Pt Barrow DEW Sta	---	165,000
		Pt Lay DEW Sta	---	238,000
		Sparrevohn AFS	323,000	---
		Tatalina AFS	176,000	---
		Tin City AFS	189,000	---
		Wainwright DEW Sta	---	236,000
		State Total	(7,702,000)	(6,422,000)
California	Navy	Naval Air Sta. North Island	594,000	2,490,000
		Naval Weapons Sta. Seal Beach	237,000	---
		Naval Air Sta. Alameda	---	1,433,000
		Marine Corps Supply Cen, Barstow	---	3,854,000
		Marine Corps Base Cp Pendleton	---	384,000

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
California (cont'd)	Navy (Cont'd)	Naval Weapons Sta, China Lake	---	588,000
		Naval Sta, Long Beach	---	1,459,000
		Pacific Missile Rg. Point Mugu	---	406,000
		Navy Submarine Spt. Fac, San Diego	---	612,000
		Naval Station, San Diego	---	1,358,000
		Navy Public Works Cntr, San Diego	---	208,000
		Naval Shipyard, Hunters Point	---	9,132,000
		Naval Communication Sta, San Francisco	---	721,000
		Naval Shipyard, Mare Island	---	3,225,000
	Air Force	McClellan AFB, Sacramento	---	1,028,000
	State Total		(831,000)	(26,898,000)
District of Columbia	Navy	Naval Photographic Center	---	616,000
		Naval Station	---	416,000
	State Total			(1,032,000)
Florida	Navy	Naval St, Key West	1,648,000	---
		Fleet Trng Cntr, Mayport	909,000	---
		Naval Air Sta, Jacksonville	---	51,000
		Naval Fuel Depot, Jacksonville	---	152,000
		Naval Sta, Mayport	---	2,890,000
		Naval Public Works Center, Pensacola	---	1,115,000
	Air Force	Eglin AFB, Valparaiso	---	1,495,000
		MacDill AFB, Tampa	---	85,000
		Tyndall AFB, Panama City	---	1,020,000

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Florida (cont'd)		State Total	(2,557,000)	(6,808,000)
Hawaii	Army	Ft Shafter	---	1,500,000
	Navy	Naval Station, Pearl Harbor	1,706,000	3,205,000
		Naval Supply Center, Pearl Harbor	351,000	353,000
		Marine Corps Air Sta, Kaneohe Bay	---	936,000
		Navy Public Works Cntr, Pearl Harbor	---	970,000
		State Total	(2,057,000)	(6,964,000)
Illinois	Army	Joliet AAP	---	1,428,000
		Ft Sheridan	---	2,784,000
		Granite City	325,000	---
	Air Force	Scott AFB, Belleville	173,000	---
		State Total	(498,000)	(4,212,000)
Indiana	Navy	Naval Ammo Depot, Crane	---	541,000
	Air Force	Grissom AFB, Bunker Hill	---	85,000
		State Total	---	(626,000)
Iowa	Army	Iowa AAP	450,000	223,000
		State Total	(450,000)	(223,000)
Kansas	Army	Kansas AAP	---	291,000
		State Total		(291,000)
Kentucky	Army	Lexington-Blue Grass AD	230,000	---
	Navy	Naval Ord Sta, Louisville	460,000	---
			(690,000)	

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Louisiana	Army	Louisiana AAP	---	558,000
	State Total		---	(558,000)
Maine	Navy	Naval Shipyard, Kittery	2,217,000	1,500,000
		Naval Security Gp Activity, Winter Harbor	---	100,000
	Air Force	Loring AFB, Limestone	575,000	---
	State Total		(2,792,000)	(1,600,000)
Maryland	Army	Aberdeen P.G.	---	478,000
		Ft Detrick	1,210,000	564,000
		Edgewood A.	845,000	---
		Ft Meade	---	7,909,000
	Navy	Naval Ord Sta, Indian Head	1,692,000	---
	Air Force	Andrews AFB, Camp Springs	---	285,000
	State Total		(3,747,000)	(9,236,000)
Massachusetts	Air Force	Otis AFB, Falmouth	596,000	---
			(596,000)	
Michigan	Air Force	Kincheloe AFB, Kinross	593,000	680,000
	State Total		(593,000)	(680,000)
Missouri	Army	Lake City AAP	747,000	784,000
	Air Force	Richards-Gebaur AFB, Kansas City	---	890,000
	State Total		(747,000)	(1,674,000)
Nebraska	Army	Cornhusker AAP	---	533,000
				(533,000)

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Nevada	Navy	Naval Ammo Depot, Hawthorne	390,000	---
	Air Force	Nellis AFB, Los Vegas	---	143,000
	State Total		(390,000)	(143,000)
New Jersey	Army	Fort Dix	---	117,000
		Fort Monmouth	---	1,700,000
	Navy	Naval Ammo Depot, Earle	418,000	---
	State Total		(418,000)	(1,817,000)
New Mexico	Air Force	Holloman AFB, Alamogordo	---	675,000
	State Total		---	(675,000)
New York	Army	Watervliet A.	---	579,000
	State Total		---	(579,000)
North Carolina	Navy	Marine Corps Air Sta, Cherry Pt.	---	310,000
	State Total		---	(310,000)
Ohio	Army	Ravenna AAP	358,000	--
	Air Force	Lockbourne AFB, Lockbourne	965,000	---
	State Total		(1,323,000)	---
Oregon	Air Force	Kingsley AFB, Klamath Falls	263,000	---
	State Total		(263,000)	
Pennsylvania	Army	New Cumberland A.D.	---	182,000
	Navy	Naval Shipyard, Philadelphia	940,000	247,000
		Navy Ship Parts Control Cen, Mechanicsburg	5,712,000	184,000

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Pennsylvania (cont'd)	Navy (cont'd)	Naval Ships Engineering Cen, Philadelphia	2,200,00	---
		Naval School, Philadelphia	254,000	---
		State Total	(9,106,000)	(613,000)
Rhode Island	Navy	Fleet Trng Cen, Newport	1,624,000	---
		Navy Public Works Cen, Newport	---	1,430,000
		State Total	(1,624,000)	(1,430,000)
South Carolina	Navy	Fleet Trng Cen, Charleston	1,626,000	---
		Naval Wpns Sta, Charleston	---	427,000
	Air Force	Shaw AFB, Sumter	---	1,053,000
		State Total	(1,626,000)	(1,480,000)
Tennessee	Army	Holston AAP	7,000,000	2,247,000
		Volunteer AAP	---	561,000
		State Total	(7,000,000)	(2,808,000)
Texas	Army	Red River A.D.	1,199,000	616,000
		Fort Wolters	---	248,000
	Air Force	Bergstrom AFB, Austin	---	254,000
		State Total	(1,999,000)	(1,118,000)
Utah	Air Force	Hill AFB, Ogden	450,000	128,000
		State Total	(450,000)	(128,000)
Virginia	Army	Radford AAP	6,192,000	11,484,000
	Navy	Fleet Trng Cen, Norfolk	1,345,000	---

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Virginia (cont'd)	Navy (cont'd)	Naval Shipyard, Norfolk	---	3,367,000
		Naval Station, Norfolk	---	2,850,000
	State Total		(7,537,000)	(17,701,000)
Washington	Army	Seattle Defense Area	---	56,000
	Navy	Naval Shipyard, Puget Sound, Bremerton	---	2,844,000
		Naval Air Sta, Whidbey Isl.	---	90,000
	State Total		---	(2,990,000)
Various Locations (Zone of Interior)				
	Army	Various	3,470,000	1,660,000
	Total		(3,470,000)	(1,660,000)
INSIDE THE UNITED STATES TOTAL ARMY			31,405,000	36,502,000
INSIDE THE UNITED STATES TOTAL NAVY			24,831,000	55,016,000
INSIDE THE UNITED STATES TOTAL A.F.			7,300,000	9,691,000
INSIDE THE UNITED STATES GRAND TOTAL			63,536,000	101,209,000

OUTSIDE THE UNITED STATES

STATE	DEPARTMENT OR COMPONENT	NAME OF INSTALLATION	COST AIR	COST WATER
Guam	Navy	Navy Public Works Center	---	1,200,000
	Air Force	Andersen AFB	171,000	4,537,000
		Total	(171,000)	(5,737,000)
OUTSIDE THE UNITED STATES TOTAL NAVY			---	1,200,000
OUTSIDE THE UNITED STATES TOTAL A.F.			171,000	4,537,000
OUTSIDE THE UNITED STATES GRAND TOTAL			171,000	5,737,000
WORLD WIDE GRAND TOTAL ARMY			31,405,000	36,502,000
WORLD WIDE GRAND TOTAL NAVY			24,831,000	56,216,000
WORLD WIDE GRAND TOTAL AIR FORCE			7,471,000	14,228,000
		WORLD WIDE TOTALS	63,707,000	106,946,000