

Chapter 3

Introduction

There are approximately 1,200 engineers in the U.S. Public Health Service. These engineers serve in a wide variety of engineering disciplines and in a great many capacities including top management. Part 1 of this chapter describes the six engineering functional categories including assignments outside PHS. Part 2 provides a description of engineering programs within each agency/ operating division (OPDIV)

Part 1 - Engineering Role

Design and Construction

Engineers employed by the Public Health Service are engaged in planning, designing, constructing, altering, and managing federally owned and funded health and research facilities. PHS design, construction, and alteration programs are multi-disciplined, and vary from the provision of sanitary facilities for American Indians and Alaskan Natives to the construction and alteration of the world's leading biomedical research facilities.

PHS engineers typically participate in every phase of design and construction including program or project development, preliminary field investigations, design, on-site construction supervision, and operations and maintenance.

As one example of PHS engineers' contribution to health, consider the impact of the large contingent of PHS engineers serving the Indian Health Service (IHS), which serves American Indians and Alaskan Native populations. IHS engineers provide support to the IHS's comprehensive health care delivery system by building, upgrading, and maintaining facilities and staff quarters. Additionally, statistics show the sanitation facilities construction program, run by IHS engineers, has been a major and effective preventive health program.

As another example, PHS engineers at the National Institutes of Health design, construct, and alter over 743,000 gross square meters of state-of-the art patient care, biomedical research, and conference facilities.

PHS engineers and architects not only provide facilities to the Agencies/OPDIVs of the Public Health Service, but through interagency agreements, PHS engineers also provide support to the Department of Housing, the Department of Education, the Bureau of Prisons, the Environmental Protection Agency, the Department of Energy and the National Park Service. For example, engineers assigned to the Environmental Protection Agency monitor building and community water/wastewater systems as well as participate in the Superfund clean up program.

Research and Development (R&D)

Public Health Service research and development work is predominantly within two areas: (1) device and equipment development and (2) standards and criteria development. These efforts are concentrated within four of the PHS OPDIVs: CDC, FDA, NIH, and ATSDR. Examples of R&D conducted by PHS engineers include:

- Studies on the health effects from workplace and environmental exposure to hazardous substances or physical agents. PHS engineers develop and evaluate engineering controls to prevent or reduce exposures and hazards;
- Development of intricate test methods for determining the safety and efficacy of medical devices. Such devices include orthopedic implants, heart valves, female condoms, etc. Other research examines radiation emitting electronic products including x-ray machines, sunlamps, and video display terminals;
- Studies in such areas as asbestos, toxic and hazardous chemicals, excessive noise exposure, heat stress, and radon. Other research encompasses motivational, psychological, and behavioral factors involved in environmental safety and health;
- Studies on the health effects from radiation exposure. PHS engineers develop and refine dosimetry instrumentation, evaluate public health hazards which may be caused by the use of medical devices and diagnostic products, and study food processing methods and equipment; and
- Studies on health effects of hazardous wastes. PHS engineers study the impact of hazardous materials at toxic waste sites and develop criteria for acceptable air, soil, and ground water quality.

PHS engineers typically do research and development work as part of a multi-disciplinary team. The teams may include physicians, epidemiologists, physicists, chemists, and other biological scientists. The federal laboratories where the PHS engineers work are often equipped with sophisticated, state-of-the-art equipment. These challenging assignments are carried out in an environment that fosters the free exchange of technical information, and may involve collaboration with researchers from other agencies, the private sector, universities, and international research institutions.

Regulatory Enforcement

The development and enforcement of regulations is an important element in the protection and promotion of our nation's health. PHS engineers play a lead role in regulatory development and enforcement for the following OPDIVs or agencies:

Engineers at the FDA's Center for Devices and Radiological Health evaluate the design, testing, and material features of electronic and mechanical devices used for medical treatment and research, as well as devices that emit radiation. They ensure these devices are safe and

effective before they are used on or by the general public. Engineers in the Office of Regulatory Affairs develop test methods for regulated products and conduct field inspections. Engineers in the Center for Food Safety and Applied Nutrition evaluate food manufacturing practices and develop engineering specifications for food industry practices.

EPA engineers analyze pollution sources and control techniques, and develop the technical basis supporting regulations for air and water pollution control, solid and hazardous waste management, control of radiation hazards, and regulation of toxic substances entering the marketplace.

ATSDR engineers evaluate and assess hazardous waste sites and hazardous material spills under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (better known as Superfund).

PHS Engineers can be found performing regulatory development and enforcement activities such as:

- Evaluating the efficiency, cost, and availability of pollution control technology for an air and water quality regulation;
- Assessing Superfund sites, determining how contaminants move through environmental media and the chemical, physical, and other environmental processes that affect them;
- Evaluating data submitted by manufacturers supporting the safety and effectiveness of biomedical equipment; and
- Assessing quality assurance and testing programs for a food processing facility.

Computer Technology

The application of computing technology is fundamental to the planning and execution of virtually every PHS activity. All of the OPDIVs and their major components perform computing functions of widely varying magnitude and complexity.

Most headquarters, regional, district, field, and laboratory installations regularly utilize the extensive capabilities of the principal PHS computer facilities located in Rockville and Bethesda, MD. In addition, many field and laboratory installations are connected via networked computer systems to support experimental research and administrative activities. Management has come to rely on electronic mail (e-mail) and the connectivity of information systems as a way of doing business.

PHS employees perform a wide variety of computing tasks from maintaining, programming, and connecting personal computers, mainframes, and supercomputers to telemedicine, digital image processing, and on-line information distribution through the World Wide Web.

Historically, PHS requirements for computing staff have been satisfied by recruiting graduates in mathematics and scientific fields. More recently many engineers graduate with extensive

computer training. Thus, the engineer as a computing specialist assumes increasing importance as this field becomes a major engineering activity in the PHS. Most commonly, computer engineers have electrical, electronics, or systems engineering degrees. Engineers trained in other engineering disciplines who have supplemented their basic education with graduate study and experience in programming, networking, and systems engineering are also employed in this field.

Facility Operation and Maintenance

The facilities operation and maintenance environment in the PHS ranges from the National Institutes of Health (the third largest research campus in the nation) to the remote health stations of the Indian Health Service.

Intramural research, direct medical care, training, and administrative activities are conducted by PHS operating divisions in over 2,700 government-owned buildings, with a replacement value nearing \$4 billion, as well as leased buildings throughout the United States. At many locations, sizable numbers of buildings are grouped into research complexes (e.g., CDC, FDA, NIH) and into direct medical care complexes (Indian Health Service hospitals).

Each building and complex has standard operation and maintenance needs which are usually compounded by peculiar requirements and problems related to the mission of the occupying organization.

Engineering personnel operating PHS facilities develop, manage, and coordinate operation and maintenance activities. These are aimed at solving environmental, structural, electrical, and mechanical problems characteristic of facilities designed or utilized for special research, direct medical care, and other PHS activities. Engineers coordinate with physicians, scientists, and administrators to assure provision of a safe environment conducive to quality work performance.

Typical PHS facility engineering activities deal with:

- Traditional structural, electrical, and mechanical aspects common to all facilities engineering operations;
- Biohazard and contamination control;
- Industrial hygiene;
- Safety;
- Hospital sanitation;
- Environmental engineering;
- Environmental studies; and
- Hazardous and non-hazardous waste disposal.

Technical Consultation

PHS engineers routinely serve as technical consultants to two distinctly different groups of clientele:

- As members of internal study groups, standards and criteria development bodies, and research teams, PHS engineers work with medical and scientific associates to provide advice and assistance on problems related to their areas of expertise,
- As representatives of the PHS to other federal, state, and local government agencies and to private individuals, groups, and industries, PHS engineers regularly provide technical consultation and assistance in the technical areas to which they are assigned.

Representatives of virtually all engineering categories serve as PHS technical consultants to federal government organizations and state health departments in numerous locations across the United States.

Assignment as a technical consultant outside the PHS typically involves such activities as:

- Helping industrial, mining, or other federal, state, or local programs evaluate and prevent occupational safety and health problems;
- Providing assistance and advice to state and local agencies and to industry in surveys of shellfish growing waters, and participating in investigations of shellfish harvesting and processing techniques;
- Assisting state and local agencies and industry in testing radiation hazards of television receivers, microwave ovens, lasers, and diagnostic x-ray products;
- Advising territorial governments in evaluating public health problems and in developing and implementing corrective actions;
- Working with federal, state, and local environmental and health authorities concerning the public health assessment of hazardous waste sites; and
- Providing guidance and information to federal, state, and local regulatory agencies; scientific review groups; professional organizations; and Congress regarding public health aspects of medical waste management.
- PHS engineers and architects serve on subcommittees that review and write standards such as the National Fire Protection Association's (NFPA) codes and the American Institute of Architects (AIA) Guidelines for Design and Construction of Hospital and Health Care Facilities.

Special Assignments

Public Health Service engineers may be “loaned” (detailed), usually for relatively short periods, to other federal agencies; territorial, state and local governments; Tribal governments; international health organizations; and foreign governments *upon the request* of such an agency, organization, or government.

In many instances, detailed engineers are assigned as public health engineering program consultants or advisors and hence must be senior staff personnel eminently experienced in their field. However, the assignment of entry level commissioned officer engineers to operating programs of the EPA is expected to continue.

PHS engineers assigned to the EPA constitute the largest group in any non-PHS program. They occupy positions in most EPA technical programs and are assigned to field, research, and administrative offices nationwide.

The Public Health Service assigns a small number of experienced engineers to the National Park Service, the Bureau of Prisons, and the Department of Energy. A growing number of entry level and mid-career engineers are also assigned to Tribal governments under contract agreements. Numerous other organizations and agencies (e.g., U. S. Coast Guard, Consumer Product Safety Commission, Council on Environmental Quality, World Health Organization, Agency for International Development, Office of Foreign Disaster Assistance, and Health Care Financing Administration) have requested the assignment of PHS personnel to their activities. Such requests are considered in light of their potential beneficial effect on national health goals and honored contingent on the availability of suitable PHS personnel.

Part 2 – Engineering Roles within Some Specific OPDIVs

Agency for Toxic Substances and Disease Registry (ATSDR)

Created by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, also known as the Superfund legislation, ATSDR seeks to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution present in the environment.

Engineers play a vital role in the overall mission of ATSDR, the lead Agency/OPDIV within the PHS responsible for implementing the health-related provisions of Superfund. ATSDR is responsible for: (1) assessing the presence and nature of health hazards associated with hazardous waste sites and unplanned releases of hazardous substances, and (2) helping prevent or reduce further exposure and the illnesses that result from such exposures. ATSDR engineers are responsible for evaluating environmental fate and transport characteristics of contaminants at hazardous waste sites and determining how well remedial actions protect public health. They take a leadership role in developing innovative means of solving complex environmental health problems and ensuring communities are safe. ATSDR employs mostly environmental engineers who make significant contributions to their OPDIV, profession, and the public. Principal engineer activities at ATSDR include:

- Responding to public health emergencies and providing health-related assistance to states, local agencies, and health care providers;
- Evaluating proposed remedial actions (cleanups) and their compatibility with public health goals;
- Teaming with others to prepare public health assessments - a definitive evaluation of the public health implications of hazardous waste sites;
- Interacting with communities to gather health concerns and to explain public health impacts of sites;
- Participating in contaminant exposure investigations - determining who is exposed, when and how they are exposed, and to what extent;
- Identifying potentially exposed populations through application of Geographic Information Systems and other modeling and analysis techniques;
- Serving as regional representatives who further the OPDIV's programs through activities with other federal, state, and local health and environmental agencies; and
- Serving as technical project officers to state health departments through cooperative agreement programs - helping build the nation's environmental health capacity.

Centers for Disease Control and Prevention (CDC)

The CDC improves the health of people by preventing or controlling disease, improving laboratory performance, and assuring safe and healthful working conditions. Engineering opportunities in CDC include those in the following areas:

Engineering Service Office (ESO)

The ESO offers many professional opportunities for the design, construction, operation, and maintenance of CDC facilities throughout the United States and Puerto Rico. Most employees are professionally licensed engineers and architects with extensive experience in design and construction management of laboratory and health care facilities. Due to changing technology, newly emerging diseases, government downsizing, and aging facilities, the designer must seek out innovative solutions to environmental controls, space and equipment planning issues, and safety requirements. Cost effective and creative design and layout solutions are found by the ESO to support CDC's ongoing research. Design engineers may find themselves engaged in consulting with international public health officials and private researchers regarding the design of their facilities.

National Institute for Occupational Safety and Health (NIOSH)

NIOSH is the national focal point for research on occupational safety and health. It recommends occupational safety and health standards to protect workers from hazards that might impair their health or cause loss of functional capacity. NIOSH engineers, many of whom have professional licensure, industrial hygienist certification, and other related certifications, have the opportunity for broad experiences and professional advancement. Their work helps to eradicate some of the most hazardous conditions in national and international work sites.

NIOSH engineers evaluate worker exposure to levels of toxic substances as well as examine and evaluate engineering control technologies used to reduce or eliminate these exposures. NIOSH engineers often design, construct, and evaluate engineering controls in workplaces where none exist. Several of these control designs have been patented. In addition to research in larger industries, emphasis is also placed on small business work places which make up a large proportion of the workers in the United States.

Other NIOSH engineers design, construct, and test medical devices, instruments, and survey techniques to better monitor or diagnose occupational diseases. Personal protective equipment, such as respirators or impermeable clothing, is also tested to evaluate how effective these items are under field-use conditions.

NIOSH engineers perform research with state-of-the-art equipment in laboratories and at diverse work sites (mines, factories, office buildings, quarries, and construction work sites) throughout the United States and its territories. These challenging assignments are carried out in an environment that fosters the free exchange of technical information and may involve collaboration with researchers from other agencies, the private sector, universities, and international research institutions.

Food and Drug Administration (FDA)

FDA works to ensure that:

- Foods are safe, pure, and wholesome;
- Drugs, medical devices, and biological products are safe and effective;
- Cosmetics are harmless;
- All of the above are honestly and informatively packaged; and
- Exposure to potentially injurious electronic product radiation is minimized.

Engineering opportunities in FDA include those in three divisions.

Center for Devices and Radiological Health (CDRH)

CDRH regulates all medical devices and radiation-emitting electronic products. In the medical device arena, CDRH:

- Analyzes the material and engineering design features of medical devices entering the market to ensure compliance with safety and performance requirements;
- Assembles panels of experts to evaluate the development, design, and testing of innovative and experimental devices;
- Conducts research for and coordinates the development of standards that identify criteria for materials and performance characteristics relevant to the safety and effectiveness of devices and diagnostic products;
- Reviews existing test procedures and develops new procedures for evaluating the safety and effectiveness of devices;
- Develops and conducts educational programs for producers and users of devices to reduce accidental misuse; and
- Collects and evaluates data on significant public health hazards that may be caused by the use of these products.

In the radiological health field, CDRH:

- Develops and implements a national program of mandatory and voluntary performance standards to control unnecessary exposure of the population to potentially hazardous electromagnetic radiation, and assures that radiation is used safely and effectively;
- Enforces compliance with federal radiation performance standards among manufacturers of electronic products and radiation-emitting medical devices;
- Conducts and supports research on the health effects of radiation exposure;
- Develops criteria, recommendations, and standards related to radiation use and exposure;
- Develops and promotes improved procedures, techniques, and user qualifications for reducing unnecessary radiation exposure; and
- Provides technical and scientific support, including training, to other organizations that have radiological health responsibilities.

Office of Regulatory Affairs (ORA)

ORA is responsible for directing FDA's nation-wide field force of analytical laboratories, compliance officers, and investigators who inspect foods, drugs, medical devices, cosmetics, and other health related products. ORA's Winchester Engineering & Analytical Center (WEAC) is FDA's only engineering test field laboratory. ORA also conducts a wide range of programs in consumer and industry education covering all facets of FDA activities.

Center for Food Safety and Applied Nutrition (CFSAN)

CFSAN evaluates manufacturing practices and develops technological and engineering specifications for cooperative federal-state shellfish and milk certification.

Health Resources and Services Administration (HRSA)

The Health Resources and Services Administration (HRSA) is responsible for general health services and resource issues relating to access, equity, quality, and cost of health care.

HRSA is a focal point for many national health care programs and initiatives, in which engineers play an important role. Engineering opportunities within HRSA include the following:

Facility management and biomedical device design at the Gillis W. Long Hansen's Disease Center located in Carville, Louisiana;

Engineering review of health care facilities for targeted populations. The provision of quality health care facilities serves a critical support function for efficient health care delivery. The design, construction, and maintenance of primary health care facilities are crucial to both accessibility and quality of care.

Engineering design and review of designs and construction projects for the over 1,500 nationwide community and migrant health centers;

- Engineering review of design plans for programs for health care and shelter for the homeless and special populations.
- Disaster and emergency response. HRSA has traditionally maintained a leadership role in PHS programs for national disaster and emergency response. Engineers play an important role in this area and work closely with PHS clinicians.
- During responses to emergencies and natural disasters, such as earthquakes and floods, HRSA plays a role in developing responses on short notice. Response teams assist community health center sites in the affected areas immediately subsequent to the disaster. Engineers typically play a role in the provision of shelter, water supply, sanitary waste control, utilities and emergency power supply, communication, and long term reconstruction efforts;

- Health promotion and disease prevention. HRSA is a leader in national health promotion and disease prevention programs. Engineers both benefit from experience with and enhance the success of these programs in areas such as facility design and sanitation;
- Review of federal health care grants for major national AIDS research, health care, or public health programs which involve the review of design plans for engineering activities such as capital improvement or renovation projects;
- Review of hospital and health care facility engineering and architecture design for programs under contract to, or in support of, HRSA activities;
- Relationships with external agencies and programs:
- Maintaining liaison with engineers and other officers assigned to agencies external to the PHS.
- Engineering opportunities in the fields of facility management, environmental safety, and fire prevention. External programs include: Coast Guard, Peace Corps, Immigration and Naturalization Service, Federal Bureau of Prisons, Health Care Financing Administration, Environmental Protection Agency, Department of Energy, and the Department of Defense;
- Data management within HRSA programs; and
- Border health initiatives along the U.S./ Mexico border; water, sanitary sewer, and sanitation improvement.

HRSA has a tradition of engineering activity. Formerly, several hundred engineers with the Indian Health Service (IHS) were part of HRSA before the IHS became a separate OPDIV. HRSA is directly or indirectly involved with supporting design, construction, and maintenance of primary health care facilities. Currently within HRSA, there are Commissioned Officer engineers and Civil Service employees whose professional certifying degree may be architecture or engineering but who work in administrative positions within the OPDIV and may not be patently identified as engineers. Many officers assigned to external agencies are assigned through HRSA, which has traditionally been the point of contact for these officers. HRSA accomplishes engineering reviews partially through agreements with the regional offices in New York, New York; Dallas, Texas; and Seattle, Washington.

Recently, the OPDIV Administrator stated that an OPDIV goal is to ensure the involvement of all HRSA employees and professional categories in the mission of HRSA and asked for the commitment of all staff toward the attainment of this goal. An OPDIV trend is toward inclusiveness of all professional categories in management to promote a broader management approach to public health problem solving.

Indian Health Service (IHS)

The Indian Health Service (IHS) assures a comprehensive health service delivery system for American Indians and Alaska Natives (AI/AN). In support of this mission, the objectives of the IHS health care facilities, sanitation facilities, and environmental health programs are: 1) to provide optimum availability of functional, well-maintained IHS and tribally operated health care facilities and adequate staff housing at IHS health care delivery locations if no suitable housing alternative is available; and 2) to reduce the incidence of environmentally-related illness and injury by: a) determining and addressing factors contributing to injuries; b) advocating the improvement of environmental conditions; and c) constructing Indian sanitation facilities and ensuring the availability of safe water supply and adequate waste disposal facilities in AI/AN homes and communities.

Engineering opportunities in the IHS are predominantly found in Sanitation Facilities Construction, Health Facilities Planning and Construction, Health Facilities Management, and Engineering Services programs of the Office of Environmental Health & Engineering. By law, the IHS must accord preference in employment to AI/ANs.

Sanitation Facilities Construction (SFC) Program

The SFC program constructs water supply and waste disposal facilities for Indian homes and communities, as authorized by the Indian Sanitation Facilities Act, Public Law (P.L.) 86-121. The proportion of AI/AN homes with essential sanitation facilities (safe water supplies and adequate waste disposal systems) has increased from 20 to 85 percent since the program's inception in 1960. In comparison, availability of such facilities among all U.S. populations is approximately 98 percent.

The SFC program is an integral part of the IHS disease prevention initiative and tribal involvement has been the keystone of SFC program success. Since P.L. 86-121 was passed, the IHS has constructed community and individual water supply and waste disposal systems which serve more than 196,000 AI/AN homes.

Most SFC projects are planned, designed, and managed by IHS engineers and constructed by tribal or Indian contractors. Between 60 and 70 percent of the construction work is performed by Indian tribes and firms. After construction is complete, IHS engineers, sanitarians, and environmental health technicians continue to provide technical assistance and training to system operators and individual homeowners to help ensure continued operation and maintenance and long-term health benefits.

Health Facilities Planning and Construction (HFPC) Program

The HFPC program constructs and equips new and replacement inpatient and ambulatory health care facilities (hospitals, health centers, substance abuse treatment centers, etc.), staff quarters, and additional space at existing facilities, as authorized by the Snyder Act, 25 U.S.C. 13; and the Indian Health Care Improvement Act, P.L. 94-437, to provide direct health care services to AI/ANs.

The need for construction of health care facilities and staff quarters projects are assessed through the application of comprehensive priority system methodologies. Projects are planned by the IHS Area Offices often in concert with IHS Headquarters. Management of the design and construction is handled by the Division of Engineering Services offices. In some cases, IHS Area Offices, with assistance from the facility engineers in the Service Units, also oversee construction projects.

Health Facilities Management (HFM) Program

The HFM program provides resources that the IHS uses for materials and contract services needed:

- To keep existing federal and tribal health care facilities in good repair;
- To perform preventive maintenance on facilities and equipment; and
- To accomplish needed improvements to existing space in order that the facilities will be better suited to deliver health care services to AI/ANs.

The IHS, tribes, and tribal groups operate 50 hospitals, 164 health centers, 7 school health centers, 284 smaller health stations and satellite clinics, 7 youth regional substance abuse treatment centers and more than 2,000 units of staff quarters.

The IHS operates and maintains more than 719,000 square meters of federal space in hospitals, clinics, staff quarters, and other facilities and operates health care delivery and administrative program elements in an additional 50,000 square meters of leased and 96,000 square meters of assigned space. The IHS owns a total of 2,079 structures. Tribal contracted health care delivery programs occupy more than 167,000 square meters of space.

Division of Engineering Service – Dallas/Seattle

The Division of Engineering Services offices (DES) provide architectural, engineering, contracting, and leasing services for the IHS. Engineers and architects are involved with planning and construction of new health facilities and staff quarters, and renovation of existing health facilities and staff quarters. They also research and write reports such as site selections, housing verification studies, and feasibility studies. The two DES offices jointly serve as the authority having jurisdiction for code decisions relating to Government-owned IHS facilities.

National Institutes of Health (NIH)

NIH seeks to improve the health of the people of the United States by conducting and supporting research in:

- The causes, diagnosis, prevention, and cure of the diseases of man;
- The processes of human growth and development;

- The biological effects of environmental contaminants; and
- Related sciences.

NIH supports the training of research personnel, construction of research facilities, development and research resources, and collection and dissemination of medical and health information.

Engineering opportunities with the National Institutes of Health primarily include those in five organizations:

Division of Engineering Services (DES)

DES plans and implements a comprehensive facilities management program that includes design, construction, operation, and maintenance of the NIH physical plant. DES provides engineering, craft, and labor services for over 743,000 gross square meters of facilities, a 130 hectare campus, utilities plants and related equipment. DES also maintains liaison with various review authorities.

Division of Safety (DS)

DS engineers of various disciplines perform environmental monitoring and permitting requirements, hazardous material and waste management, specialized pollution control and safety system design, industrial hygiene activities, and facility design review. They also coordinate environmental review requirements of the National Environmental Policy Act.

Biomedical Engineering and Instrumentation Branch (BEIB)

BEIB supports NIH scientists applying engineering, mathematics, physics, and the physical sciences to problem solutions in biology and medicine through: (1) collaborations involving measurement, imaging, mathematical modeling, or design of specialized equipment and (2) construction, modification, maintenance, repair, or lease of scientific equipment.

Division of Computer Research and Technology (DCRT)

DCRT incorporates the power of modern computers into biomedical programs and administrative procedures at NIH. It serves as a scientific and technological resource for other PHS OPDIVs and for federal organizations with biomedical and statistical computing needs.

The Facilities Engineering Branch (FEB), National Institute of Environmental Health Science (NIEHS)

The NIEHS, the only one of the Institutes of the NIH not housed on the Bethesda Campus, is located in Research Triangle Park (RTP), North Carolina. The FEB provides the full range of Facilities Management services to the NIEHS staff of 1,000 housed in 84,000 square meters of research and support facilities which are located on a 151 hectare campus in the heart of the RTP. The Facilities Engineering Branch plans, directs, supervises, and coordinates all facilities engineering activities including engineering design, inspection, construction, and master

planning; operation of utility plants and systems; maintenance and repair of all real property (buildings, grounds, surface areas, utility plant and systems), facilities engineering equipment and vehicles, fire prevention and protection; contract services such as custodial, refuse collection and disposal, security, etc; design, fabrication, alteration and repair of intramural scientific instrumentation and leasing.

Environmental Protection Agency (EPA)

EPA executes federal laws issued to protect the environment. Engineers in EPA monitor the discharge and distribution of pollutants; conduct research on pollution and pollution control; develop the technical basis for emission standards; enforce environmental regulations; and develop guidance and information systems for government, industry, and the public. EPA headquarters is divided into the following offices:

Office of Air and Radiation (OAR)

OAR develops policies and regulations for ambient air quality, hazardous air emissions from industrial and mobile sources, radiation, and indoor air quality.

Office of Water (OW)

OW works to preserve the quality of our nation's streams, lakes, and wetlands, and to maintain safe drinking water sources.

Office of Pesticides and Toxic Substances (OPTS)

OPTS assesses the effects of pesticides and other hazardous substances and develops national strategies for toxic substance control including testing protocols, reporting, and regulations.

Office of Solid Waste and Emergency Response (OSWER)

OSWER oversees the management and disposal of solid and hazardous wastes, and the cleanup of hazardous waste sites under the Superfund program.

Office of Enforcement and Compliance Assurance (OECA)

OECA develops compliance assurance procedures, enforces environmental regulations, and provides support to state and local agencies.

Office of Research and Development (ORD)

ORD's national laboratories study the cause and effect of pollutants on ecosystems and human health, and evaluate pollution control technologies.

In addition, engineers in 10 Regional Offices perform the above functions at a regional level.