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REPORT ON NIGERIAN ENVIRONMENTAL SURVEY
OCTOBER 21 - NOVEMBER 11, 1978

I. INTRODUCTION

In November 1977, representatives of the Federal Military Government of Nigeria requested the assistance of the United States Environmental Protection Agency in assessing the environmental setting in the Federal Republic of Nigeria. The objective of the assessment was to recommend appropriate enabling legislation, program development and implementation, and regulations for the control of pollution problems posing actual or potential danger to the health and welfare of Nigeria's population. Specifically, the representatives of the United States Environmental Protection Agency were asked to evaluate the Nigerian situation with respect to municipal and industrial pollution by either air or water contamination; special problems associated with the development of oil resources; exposure of the population to toxic and hazardous wastes, including pesticides, through manufacturing, transportation and application; solid waste generation, collection, transportation and disposal. The evaluation was also to consist of an assessment of the institutional structures presently available in Nigeria to administer suggested regulatory programs, as well as the necessary logistical resources, organizational arrangements, and training abilities to efficiently carry out such programs.

An initial visit was made to the Federal Republic of Nigeria during February 1978. At that time, the oil resources development problem was assessed and a preliminary inquiry of the solid waste problems, particularly in the city of Lagos, was made. A report of this evaluation has been prepared and transmitted to the Federal Military Government. During the October 21 - November 11, 1978 period, an extensive series of consultations and inspections were made by a United States Environmental Protection Agency team in four States of Nigeria. A listing of these visits is contained as Appendix I. This report covers the remaining assessments referred to in the above objectives.

II. EXECUTIVE SUMMARY

A. Introduction

Numerous and comprehensive discussions and inspections were held during the survey period with both Nigerian Federal Government personnel and representatives of four State governments. These discussions and inspections related to questions of municipal and industrial air and water pollution, refuse disposal, water supply, water resource planning, toxic and hazardous substances (including pesticides), oil pollution, existing legislation, organizational responsibilities and training. The following is a summary of recommendations developed from these discussions and inspections.

B. Enabling Legislation

Comprehensive enabling legislation should be enacted as soon as possible establishing a Federal Environmental Protection Agency of Nigeria which is independent of existing Federal Ministries and is responsible to the Head of State. The environmental agency should be an entirely governmental body and not constituted as a public corporation.

Regulatory programs should be established in the legislation for water, air, noise, toxic and hazardous substances, refuse disposal and oil pollution. The enabling legislation should establish the

authority of the Federal agency to promulgate national standards, establish specifications for grant and enforcement programs to be administered by the States, and to approve environmental impact requirements for all nationally significant development projects.

Immediately upon enactment of the decree, individual States should be required to designate a coordination and liaison representative for environmental programs in the State Administrator or State Governor's Office. The ultimate objective would be for the States to establish a State agency having responsibilities parallel to the Federal agency.

C. Program Administration

The basic elements of programs for implementing the authority in the decree should consist of:

1. Standards development
2. Licensing and/or permit systems
3. Regulations establishing specifications for grant management
4. Enforcement
5. Data acquisition and progress reporting

Program application of these elements to each program is discussed as follows:

1. Municipal and Industrial Pollution

Ambient standards, based upon use, for air and water pollution control should be established by the Federal agency with specific uses for each geographical air or water body established by the States. This would be a major decision factor in the siting of new development projects.

Regulations should be developed by the Federal agency designating best available water and air pollution control technology. All new sources would be required to install this technology prior to operation. Regulations should also be developed by the Federal agency for best practicable water and air pollution control technology. Existing sources would be required to install this technology within a certain time-frame not to exceed five years from the date of the promulgated regulations.

Each new and existing source would be issued a comprehensive water and air permit containing effluent and emission limitations as well as management and operating practices consistent with the technology standards. The permit system would be administered by the States if they met specifications established by the Federal agency. For those States not meeting these specifications, the Federal agency would administer the permit system. Enforcement of standards and permits would be primarily a State responsibility.

Specifications should be developed for the design, construction, and operation of sewage treatment and collection systems. Subsequent to the development of these specifications, a grant program should be established for assistance to municipalities in sewage collection and treatment. Any entity receiving Federal government grants should be legally required to incorporate these specifications.

2. Solid Waste and Refuse

Guidelines and regulations should be developed at the Federal level which will offer technical and financial assistance to States for control of collection, transportation, and disposal of refuse. These regulations should establish a permit system and specifications by which a grant program for equipment and facilities will be administered.

The Federal government of Nigeria should consider establishing a pilot program for refuse collection and disposal in the city of Lagos embodying the above considerations. As experience is developed, refuse programs of this type could be established in other States and municipalities.

3. Water Supply

Standards should be promulgated concerning acceptable levels of quality for potable water supplies.

A permit system should be established incorporating management and operation practices for industrial installations which extract process water directly from ground water supplies. The permitting system should also include limitations for those sources which re-inject process wastes to the ground water.

Specifications should be developed for the design, construction, and operation of water treatment and distribution systems. Any entity receiving Federal grants for such systems should legally be required to comply with these specifications as a pre-condition for receiving the grant.

4. Toxic and Hazardous Wastes Including Pesticides

A registry of approved chemicals and uses should be established by the Federal agency before a product could be introduced into commerce. A use certification would have to be acquired from the Federal agency. This certification would include specifications for formulation, transport, application and disposal of the product. No uses inconsistent with these specifications would be permitted. Testing for certification should be accomplished under the auspices of the Federal agency, possibly through contracting with appropriate universities.

Consideration should be given to controlling distribution of toxic products and pesticides by requiring sales exclusively through facilities administered by the States. Compliance monitoring for the application, use and disposal of toxic and hazardous products, including pesticides, would be a State responsibility in accordance with specifications established by the Federal agency.

5. Oil Pollution

A special licensing program having legislative provisions for environmental protection would be established for oil extraction, transportation, refining and storage. The Federal agency would be required to develop specifications for preventing and controlling oil spills and would establish standard control measures and liability for clean-up when such spills occur. Each installation must develop a plan for meeting these specifications. The plan would be approved by the Federal agency.

6. Miscellaneous Programs

Programs involving control of noise and automobile air pollution are of longer range significance to the Nigerian government. The Federal agency should consider contracting for a feasibility study on control programs in these areas. The feasibility

studies should emphasize product requirements, importation controls and sales restrictions as several elements in a regulatory program.

It is expected that these programs will be initiated subsequent to the implementation of regulatory requirements discussed above for other higher priority environmental problems.

7. Progress Reporting and Accountability

To assure that the activities of the Federal environmental agency reflect national priorities, the agency should prepare an annual report to the Head of State and appropriate legislative bodies on the activities of the previous year and the program objectives for the year that will follow. In addition, advisory bodies consisting of representatives of all interested sectors should be established to review progress of specific programs and to recommend policy changes to the Federal environmental agency.

D. Support Services

1. Administration

The most pressing immediate need is the drafting of the basic enabling legislation establishing the authorities and responsibilities of the Federal agency. Since there is little

or no indigenous legal expertise in this type of legislation, consideration should be given to acquiring legal services from extra-national environmental lawyers to assist Federal and State legal personnel in the drafting of appropriate legislation and organizational responsibilities.

Upon the establishment of enabling legislation, the major logistical requirement will be for engineering personnel who can evaluate technological proposals and environmental standards, together with legal personnel who can draft the appropriate regulations. It is estimated that the development of ambient use standards; definitions of best pollution control technology; specifications for a permit system involving emission and effluent limitations; establishment of a certification system for toxic and hazardous substances; and development of specifications and a pilot grant program for refuse collection, transport and disposal, will require a minimum of 100 trained legal and technical personnel to prepare the necessary regulations and to work with the States in the implementation of those regulations. Additional programs, such as construction grants for water supply and sewage disposal, motor vehicle control regulations, etc., will require substantial additional personnel beyond the two-year period. In the United States, the cost of one work-year for environmental regulation, including salary, benefits and overhead, approximates forty-

thousand dollars. Therefore, the initial budget for internal administration only, exclusive of demonstration grants and contracts, should approximate at least four million dollars over the next two years.

2. Training

In order to insure that the above programs are administered effectively on a permanent basis, it will be necessary for the Federal agency to begin an immediate period of short-term training oriented towards program management for its existing employees and new personnel. The Federal government should establish an environmental training program for State and Federal personnel at a level of at least twenty persons a year once the program is in operation.

The universities of Nigeria represent a major resource and could serve as the domestic base of a technical training program in the long-term. It is recommended that the Federal government contract with appropriate universities for supplying technical graduates to Federal, State and local agencies.

3. Data Generation and Technical Assistance

The Federal environmental agency should retain a corps of technical and analytical personnel for responding to immediate questions involving application of technology to individual

sources, characterization of immediate problems requiring enforcement, e.g. oil spills, hazardous dumping, etc., and reviewing environmental impact analyses.

The Federal government should consider contracting with appropriate universities in Nigeria and elsewhere who have demonstrated abilities to conduct adequate data support activities related to standards development. Cooperative, coordinated programs involving environmental data generation should be established through grants to the universities to assure consistency with pre-identified objectives of the Federal environmental agency.

Computerized library and information retrieval systems should be developed. A feasibility contract on this need is a very high priority if defensible regulations are to be promulgated.

4. Appendicies

The report contains several appendices consisting of legislative reviews and examples of documents used in the United States to administer and gather data on activities involved with setting standards and issuing permits.

III. REVIEW OF THE CURRENT NIGERIAN ENVIRONMENTAL SETTING

A. Municipal and Industrial Pollution

With the exception of oil extraction and processing, Nigeria at this time does not have an industrial base consisting of large, stationary pollution sources. The overwhelming number of present industrial sources are small by comparison with United States standards and have less than 500 workers. Lists that are available from Federal and State Ministries having responsibility for industrial regulation and development, indicate that significant industrial sources are concentrated in the textile, brewing, slaughtering and rendering, pulp and paper, sugar refining, and miscellaneous small chemical (including pesticide formulators) manufacturing classifications. Approximately 60% of the industrial sources are located in the vicinity of Lagos. An as example of the size distribution of industry in Nigeria, less than 15% of the Lagos industrial sources employ more than 500 people. In general, existing sources have little or no facilities for either air or water pollution control. Waste water is discharged directly either to rivers, other receiving waters, or to open drains, which in effect serve as sewers. Air emissions are similarly uncontrolled. Industries that produce substantial quantities of solid waste inevitably use open burning as a method of disposal.

Nigeria has ambitious plans for developing, in a short period of time, a sophisticated industrial infrastructure. This includes construction of a huge steel producing facility at Ajaokuta; construction and operation of two pulp and paper mills, and significant expansions to pulping operations of the existing mill and; expansion of oil refining capabilities. All of these facilities will have the Nigerian Government as the major partner. It would appear, from discussions with personnel at several of these developing facilities, that air and water pollution control facilities are a major priority during construction. For instance, although further evaluation is required by the Federal Division of Environmental Planning and Protection, the proposed steel mill has developed designs for air pollution technology which may be among the most advanced in the world when the plant is in operation. Likewise, it would appear that the other large-scale developing industries are planning on constructing state-of-the-art pollution control devices.

The situation with respect to municipal emissions and effluents is much more serious. The pressure of population has caused tremendous overcrowding in the major cities of Nigeria, particularly Lagos and Ibadan. For instance, this team was informed that Lagos' population density may be as high as 60,000 people per square mile. This overcrowding has a concomitant effect on environmental quality. No

city in Nigeria has a comprehensive sewerage system. In fact, domestic liquid wastes are either disposed of in open drains or collected and dumped, untreated, into the nearest receiving water. The open drains are frequently filled with solid wastes which inevitably clog the passages, causing back-flooding; an ideal condition for growth of malaria-bearing mosquitoes. Malaria is endemic in all parts of Nigeria. The primary cause of air pollution in urban areas is the large number of badly maintained trucks, jitneys, buses and cars. The congestion in the city of Lagos is such that cars are permitted in the downtown area only on alternate days, depending upon the license plate number. The continual idling of engines, due to chronic traffic jams, causes extensive hydrocarbon emissions. Another common, major source of air pollution is the ubiquitous open burning of municipal and industrial solid wastes. The municipal power plant in Lagos, an older facility, has no workable air pollution control devices.

B. Water Supplies

At the present time, a very low percentage of the population of Nigeria has access to a potable water supply. The average pumping rate for treated water in municipalities is between 20 to 30 gallons per capita per day. This is approximately seven times less

than the average for an American city. There is vast unmet demand for increased capacity. In fact, the larger cities, such as Lagos and Ibadan, have chronic water shortages. From observations of several water treatment plants, purification techniques are adequate in all cases and exemplary in some. Problems occur within the distribution system. For instance, it is common in Lagos to see private entrepreneurs who sell water from their trucks, fill these trucks from open hydrants, causing a drastic drop in pressure such that infiltration occurs. This infiltration inevitably contaminates the treated water supply. Most Nigerian cities have ambitious plans to augment their water supplies to satisfactory levels by 1985. As an example, Lagos intends to increase its delivery from the present 39 million gallons per day to 300 million gallons per day. It is not clear if an adequate sewerage system to handle the waste water from this increased capacity will be constructed in the same time schedule. Ibadan is presently constructing a sewerage system. Unfortunately, there is little coordination between the water supply personnel and those responsible for the sewerage construction, such that construction operations on sewer excavations have destroyed existing water lines.

Adequacy of rural water supplies may or may not be emphasized by governmental personnel, depending upon the State. Kano State, for instance, has an excellent program for developing water supplies in

smaller towns and villages. On the other hand, Lagos State, because of the overwhelming problems in the city of Lagos, does not have any rural water supply program. Most of the personnel whom this team spoke with indicated that rural water supply was not a high priority at this time.

Because the quality of municipal water supplies are generally inadequate, many industries located in urban areas have drilled bore holes to assure themselves of a continuous supply. There is no regulation of the quality of water or, for that matter, the quantity pumped from these bore holes. The quality of water may have an impact on certain products, particularly those that are consumed directly, such as breweries. There is little or no knowledge of the effects of these withdrawals on the level of the underground water table.

C. Solid Wastes

Solid waste collection, transportation, and disposal in Nigeria is generally ineffective or nonexistent. It is poorly administered with little clear definition of functional authorities, performance, operational coordination, and financial accountability. In general, refuse disposal is a responsibility of local government financed by Federal subsidies transferred through State governments.

Lagos is an example of all of these problems. With the exception of a district near the downtown area, there is no organized refuse collection. Consequently, solid waste is deposited randomly on highways, in vacant lots, or in front of homes, causing huge, unsightly mounds of debris, which also constitute a health hazard. It is readily apparent that collection equipment is inadequate, and that what equipment exists is in a continuous state of disrepair. The present inefficient system will be further compounded by the anticipated transfer of responsibility for refuse collection and disposal for the metropolitan area from Lagos State to several local bodies now projected to occur in October 1979. In the district where refuse collection is performed by contractor, the equipment used is unsuitable for the street configuration and is greatly hampered by incessant traffic congestion. The landfill which was inspected by the team is located adjacent to a heavily populated area and borders the lagoon, a highly unsuitable location. Three incinerators have been built in Lagos and are scheduled for operation in 1979. It is uncertain, to the team, whether there is an efficient collection and delivery system for refuse to these incinerators; whether there has been adequate provision for training operators for the highly sophisticated technology; and whether the organic content of the waste from Lagos will permit effective incineration of the material.

This same situation, absent the incinerators, seems to be the rule in all major cities in Nigeria. The Chairman of the Ibadan Municipal Government has identified refuse collection and disposal as his highest priority governmental problem.

D. Pesticides

Pesticide production is carried out by the oil and chemical companies that transport, formulate, and distribute these products. Theoretically, the manufactured product is submitted before sale to a quality control evaluation run by a University, to assure efficacy and proper formulation. There is no requirement for certification before sale. Sales can be either directly to the applicator, usually an individual farmer, or through stores operated by the various State Ministries of Agriculture. Formerly, these publicly-owned stores resold the pesticide to farmers at a subsidized rate; consequently, approximately 80 percent of the pesticides used in Nigeria were distributed through these outlets. Since the outlets are run by the Ministry of Agriculture, several States, through their extension program, provided instructions to the individual farmers on proper application and disposal. While this instruction program was not entirely comprehensive nor mandatory, it did serve as a vehicle for the regulation and proper uses of pesticides.

Recently, the Federal Military Government has reduced substantially the amount of funds to the States for support of the subsidized price. Consequently, it is estimated that approximately 80 percent of the pesticides presently used are distributed directly from the chemical company to the applicator. The producers and formulators provide no guidance on proper disposal. Disposal of pesticide residues consists of burying drums in dug out pits on the farm property in unrecorded locations. Bags which contain residues are commonly disposed of by open burning. A record of the amount and type of pesticides distributed in each State is theoretically available through various Ministries of Agriculture.

In accord with the Feed the Nation Program, there is expected to be a substantial increase in the use of both chemical fertilizers and pesticides. Indiscriminate application of fertilizers has resulted in demonstrated cases of receiving waters eutrophication through runoff. There is, at present, no regulation of these sources.

E. Toxic and Hazardous Substances

Facilities which formulate, store and distribute potential toxic and hazardous chemicals, including pesticides, generally maintain inventories of their manufactures and transport. A visit to one such plant, which was characterized as typical of the industry,

showed that highly toxic and carcinogenic chemicals are stored in a haphazard, unstable fashion. Many containers had leaked. Although it was claimed that inspection of the storage facilities were made once a week, it was clear from the difficult access that such was not likely the case. Trucks which transport this material in liquid or bulk form are washed out into open drains. No records are kept with respect to the distribution of the finished product. Damaged products are taken to the countryside and buried or dumped at unrecorded sites. At the plant visited, the Superintendent indicated, based on weekly figures, that the potential for disposal of damaged products amounted to approximately five million pounds per year, all of which disposal is unrecorded. Waste products containing toxic materials are generally disposed of by dumping into open drains or removal to undesignated sites.

F. Availability of Professionally Trained Personnel

At the present time, the Division of Environmental Planning and Protection, located in the Federal Ministry of Industries, has 22 positions allotted to it of which 8 had been filled at the time of this team's visit. The incumbents in these positions have excellent academic training and disciplines associated with environmental evaluation, principally in the biological sciences. The Division's most pressing need at the present time is for experienced personnel

who can evaluate and administer technological and engineering proposals for pollution control, as well as legal personnel who can develop required regulations.

In the States there are varying degrees of technical competency in matters relating to environmental protection. Generally, the State Ministries of Works and/or Agriculture, and certain of the planning programs, have personnel who are highly trained in both technical and environmental considerations. However, the functions of the Ministries and Planning Boards are such that environmental concerns may not be a major priority.

Several Universities, particularly those in Ibadan and Ife, do provide the nucleus for an interdisciplinary approach to environmental studies. There is a wide range of sophisticated instrumentation available at the University of Ibadan, and there is an excellent biological effects evaluation capability at the University of Ife. Many excellent research studies have been performed related to the ecological effects of certain economic development decisions. These Universities form an appropriate nucleus for environmental research capabilities within Nigeria.

IV. LEGISLATION REQUIREMENTS AND FUNCTIONAL RESPONSIBILITIES

A. Overview of Existing Nigerian Legal and Institutional Arrangements

Appendix II to this report highlights Nigeria's principal legislation dealing with environmentally-related responsibilities, as researched during the EPA survey trip. The general legal and institutional background is presented here to give some point of reference for recommendations concerning environmental legislation for Nigeria. This overview will also provide some assistance in recognizing areas which are adequately regulated and those which could benefit from more development. Some subject areas are noted for their potential use. Others are mentioned to give an indication of increased government commitment to environmental protection matters.

Appendix II has four major subject areas: natural resource legislation, health and safety legislation, Government and non-government bodies, and policy. A final section on the new Constitution is included as a very brief review of jurisdictional areas as they will be recognized for the levels of government with the enactment of the Constitution in October 1979.

B. Institutional Arrangements

1. Federal Environmental Program

At the present time, responsibility for administering environmental programs on a national basis resides in the Federal Ministry of Industries. This function was transferred from the previous Ministry of Housing, Urban Development and Environment during late 1977. The Division of Environmental Planning and Protection of the Federal Ministry of Industries has a broad mandate in all areas of environmental regulation, as well as responsibility for natural resource protection and land reclamation. No enabling legislation has been instituted clearly defining the authorities of the Division. No formal programs are yet in operation. Present operations emphasize the establishment of communication and liaison with the State Ministries who have fragmented responsibilities in environmental protection.

The existing Division of Environmental Planning and Protection within the Federal Ministry of Industries should be strengthened and given clear statutory authority for environmental protection matters. The Nigerian Government should consider the possibility of giving such an environmental unit an identity

separate from any development-oriented body. This would allow for autonomy and greater effectiveness with environmental protection matters than if the unit were within an essentially development-oriented body or were supervised by a government sector charged primarily with development responsibilities. In addition, environmental matters cross all sectors of activity and an environmental unit, to be most effective, must have ready access on an equal basis with all involved levels of government to ensure access to information and maximum coordination and interaction on environmentally-related activities.

An environmental agency in Nigeria would preferably remain an entirely government body. It should not get involved in commercial activities and therefore any form of parastatal/ corporate status would not be necessary. Rather, as an arm of the government, it would have regulatory, advisory, and coordination roles and would need to be a direct spokesman for government policy, as well as an initiator of government programs. These functions would be weakened, and the integrity of any national environmental protection effort would suffer under any corporate status or within any nebulous commission, board, or council.

It would be most advisable to establish a clearly defined agency by order from the Head of State. Such a Federal Environmental Protection Agency of Nigeria most appropriately would be responsible directly to the Head of State to ensure the requisite autonomy and accessibility to all levels of government. It would be headed by a Director, who has considerable experience in environmental protection, management, and administration. This Federal Environmental Protection Agency (hereinafter referred to as the "Agency") would assume the functions of the existing Division of Environmental Planning and Protection, as well as any other matters that might be delegated as part of its responsibility for national environmental protection. The Agency would coordinate national environmental matters, advise on national policy and programs, and encourage and promote programs of international cooperation in the environment. Finally, it would require such staff and other support resources as might be necessary to effectively and efficiently carry out the specific executive and statutory responsibilities assigned to it.

Because this Agency could be an executive legal government body, a separate statutory decree passed by the Executive Council might not be needed. Rather, an administrative order or Executive Council Meeting Conclusion establishing the Agency and its responsibilities might suffice.

2. State Environmental Program

No State in Nigeria, with the possible exception of Plateau, has a separate and distinct environmental Agency. Environmental considerations and responsibilities are scattered with a large number of Ministries, often with conflicting functions and authorities. This confusion is compounded even further by the prevalence of local agencies who administer basic sanitary inspection and solid waste collection functions. Grants appropriated by the Federal Military Government and State Governments to assist in the administration and operation of environmental programs generally do not have any standards or specifications on performance and output; therefore, the money is passed automatically with little or no overview of results. In nearly all cases there is a lack of trained manpower to assess the effectiveness of Federal, State and local aid effectiveness. There is no institutional authority for administering these programs. This team observed situations in which environmental considerations were being administered very effectively and others in which little or no attention was paid to such considerations in meeting program objectives. In almost all cases, environmental considerations are not a critical part of decision making with respect to development. No environmental impact analyses are done prior to implementation of a project, although this will be required in the future.

The States will play a key and vital role with respect to implementation and enforcement of environmental programs. The type of arrangement the States should adopt to accomplish this purpose was discussed by the team and Nigerian officials on the Federal, State and local levels.

While it was agreed that ultimately each State must determine what approach will be most compatible and responsive within its particular government structure, the following considerations are strongly advised:

a. As with the Federal level, the State should seriously consider identifying one office or department with responsibility for environmental matters; this will allow the necessary coordination and a more readily identified environmental entity for accountability and representation within State government and to the public. Leaving the responsibilities scattered among technical ministries could weaken the effort and cause confusion over responsibilities in areas where functions may overlap. A central office could communicate with all technical ministries to ensure their technical environmental responsibilities are being fulfilled.

b. It would be advisable to place the State environmental office outside ministries with technical development responsibilities for two reasons: 1) performance by an environmental protection office may at times be weakened if financed and overseen by a ministry with development activities as the prime mandate, and 2) the environmental office will need ready access to all Ministries for information gathering and coordination, an arrangement which may be hard to realize if sponsorship is entirely from within one Ministry.

c. Therefore, the establishment of an autonomous government department for environmental matters directly under the State Governor should be seriously considered. This arrangement would allow maximum access to all ministries, independence of action from development-oriented ministries, and the necessary top-level endorsement for the program if it is to be effective and respected.

3. Federal/State Relationship

In many of the environmental areas, especially those relating to domestic environmental sanitation, natural resource management, and local pollution, the States and Local Governments have the bulk of the responsibility for legislating and

carrying out an effective program. Therefore, it is essential that Federal guidelines and regulations concerning these matters be developed in consultation with the States to the fullest extent possible. The Federal officials developing the framework for a national environmental program could, for example, arrange a briefing session for all states where key state officials and the Federal Agency could come together. The Federal guidelines and regulatory program being developed could be explained and its application or unique circumstances in differenct States could be discussed. States should be allowed to offer written comments.

With respect to the States, the Federal program should provide regulations in part and guidelines in part. It should serve as coordinator between states and bring a national focus and goal to programs throughout the country. Where federal jurisdiction is exclusive (e.g., interstate waters, trade and commerce, etc.), the federal program should set controlling national standards which the States will enforce in their areas with Federal oversight. Where jurisdiction is concurrent, the State and Federal programs should work together to ensure compatibility between States and compliance with national goals. Technical assistance should be provided to the States through the Federal program where possible. And seminars, conferences, and information exchange should be

supported and initiated by the Federal program to the benefit of all States in environmental areas that from time to time need understanding and interchange.

With respect to Federal regulations and guidelines, the State environmental programs should implement and enforce relevant environmental compliance. This should include coordination of local government efforts to apply environmental programs at the grassroots level and oversight of these efforts to ensure compliance with national standards. The State environmental office should also serve as the representative to relay Federal regulations and guidelines to the appropriate State technical Ministries for implementation and oversee this implementation.

Generally, the Federal and State programs must develop an ongoing relationship of information exchange, sharing of technical expertise, and mutual support, if a national environmental program is to have long-range effectiveness and be responsive to the development needs of the country.

C. Legislation

1. Introduction: Enactment of an Environmental Protection Decree

To give effect to environmental programs, particularly when there are regulatory responsibilities, clear statutory authority is required. The enactment of a Federal Environmental Protection Decree is the first and essential step for Nigeria's program. Hopefully, this will be possible within the next few months.

The authorities and framework set out in such a decree would strive to address the immediate needs of the country in controlling pollution by establishing regulatory programs in water, air, noise, toxics, solid waste disposal, etc., and in requiring coordination of environmental activities, creation of a permitting system for pollutant discharge, provision of technical assistance, and creation of advisory bodies. The Environmental Protection Decree should be administered by the Director of the Federal Environmental Protection Agency. It should set out general environmental protection functions and powers with respect to the Director, along with provision that necessary staff be appointed to the Agency in order to carry out the Decree with authority given to the Director to delegate or assign his responsibilities under the Decree to any of his staff. Unless otherwise stated, the Director would be responsible for all matters under the Decree.

2. Regulatory Programs

The following specific environmental protection programs should be authorized for regulation and development through the Decree:

Water and Air: The Director should be authorized to establish, by regulation, water quality standards, based on use, for interstate and other waters under Federal jurisdiction, and air quality standards to the extent necessary to avoid damage to the nation's human, animal or plant life. The Decree should also authorize the promulgation as soon as possible of regulations establishing effluent limitations and emission standards for point sources. Effluent limitations and emission standards for stationary new point sources would require best control technology currently available and best management practices, each as defined by the Director. For existing stationary point sources, the standards would require best management practices and/or best practicable technology under the circumstances, and schedules for compliance as determined by the Director.

Noise: The Director should be authorized to establish, by regulation, such noise abatement programs and noise emission standards as he may determine necessary to preserve and maintain the health and tranquility of the inhabitants of the nation.

Pesticides: The Decree should call for the establishment of a registry of approved pesticides, and should prohibit the introduction into commerce of any pesticides except those on the registry and in accordance with their approved use or uses. This part of the Decree should allow for exemptions from the registration requirements for experimental, emergency, or solely disposal purposes. It should also give the Director authority to establish regulations for the registration, classification, importation, manufacture, distribution, storage, marketing, packaging, handling, use or disposal of pesticides.

Oil and Hazardous Substances: This part of the Decree should declare a national policy aimed at no discharge of oil or a hazardous substance and should further prohibit any discharge in such harmful quantities as may be determined by regulation. It should provide that the Director prescribe regulations as to harmful quantities of oil and hazardous substances, any specific removal methods, national contingency plans, financial responsibility levels for potential dischargers, notice and reporting requirements, etc. Further, this part of the Decree might require that the discharger of oil or a hazardous substance in violation of the determined standards be liable for the costs of removal and other damage resulting from the spill.

Refuse and Wastewater Disposal: The Decree should provide for the establishment, by regulation, of Federal guidelines to Federal, State, and local governments, and other government bodies (including parastatal institutions, etc.) for the collection, treatment, or disposal of sewage or solid waste materials and recommended procedures in these areas. It should specify that the design, construction and operation of both existing and future disposal facilities meet the health and environmental standards of the areas in which they are located. It might also provide for special regulations regarding the collection, treatment, and disposal of agricultural, mining, and hazardous wastes, since these wastes may require special procedures for disposal, etc.

Public Notice: Provision should be made in the Decree for public notice in the official Gazette of any proposed regulations on environmental standards or guidelines and the opportunity for public comment, and the consideration of such comments prior to final promulgation. Any amendment or revocation of such regulations should require the same public notice procedure. The Decree should provide for mandatory review of any such regulations at least once every five years.

Permit System for Pollutant Discharge: The Decree should require that any discharge of a pollutant upon or into the air, water, or land be done only in accordance with a permit issued by the Agency authorizing such discharge either because all applicable environmental standards have been met or such other specifications as the Director determines necessary under the circumstances have been met.

State Environmental Programs: The Decree should provide that the states may establish their own mechanisms to enforce the Federal environmental standards, permitting system, etc. To do this, the States would be required to submit to the Director a plan for implementation and enforcement of the Federal programs, and the plan would have to be approved by the Director, together with any conditions he may deem necessary to attach, to ensure that any State program will be consistent with the Federal program. Also, the Decree should call for coordination between various river basin authorities, states, and other concerned authorities when establishing the state programs to ensure that all appropriate responsibilities are incorporated. Technical assistance would be provided by the Agency to the states as necessary and available in developing, implementing, and otherwise assisting with environmental protection matters.

3. Issuance of Grants

The Decree should provide for the authorization of grants to Federal, State, or local governments, or other governmental bodies, for the construction of public water supply, sewerage or solid waste treatment works, and such other matters as from time to time might be appropriate. These grants may be conditioned upon compliance with guidelines and national environmental standards, including considerations of design, construction, operation, maintenance, and management.

4. Advisory Bodies

A policy level advisory group for the environment, the Interministerial Coordinating Committee for the Environment, already exists and is functioning. Also, the Executive Council has, from time to time, referred to the need for a National Council for the Environment which would include representation from the States, Universities, and other relevant policy and professional bodies. To allow for the continued functioning of such a policy-level group, the Decree should recognize the need for such advisory bodies, chaired by the Director of the Federal Agency.

The Decree should require that the Director submit to the Office of the Head of State an annual (or other periodic) report on the activities of the Agency in environmental protection, including funding, personnel, etc. In the preparation of the report the Director might also draw upon the special technical expertise and recommendations of the technical advisory bodies with respect to assessing the state of the environment, etc.

5. Review of Environmental Impact Statements

Since the Fourth Plan for National Development, 1981-86, will require that all development projects, public and private, assess their likely impact on the environment through an "environmental impact statement" (see Appendix II, pp. 25-26), the Decree should generally outline the process for review of these statements and the role of the Federal Environmental Protection Agency in this review. It should specify that the originator of the project has the responsibility for preparation of the impact statement. A workable arrangement for review might be: 1) with projects located in any state, a state government agency responsible for environmental matters would conduct the first review, with referral and concurrence at the Federal level by the Federal Environmental Protection Agency; 2) with Federal projects on Federal territory review directly by the Federal Environmental Protection Agency.

6. Enforcement Procedures and Penalties

The standard enforcement procedures for the Nigerian legal system would apply, with the special provision that the Director may appoint authorized officers or inspectors for purposes of the Decree who would have powers to search, inspect, and seize, to the extent provided by law. The Nigerian Government may also wish to consider authorizing arrest powers for these inspectors in the Decree.

Special penalties should be provided for violations of the specific regulations, and a general penalty should be provided in all other cases (as is the usual practice). The reasonable limits, as used by the Ministry of Justice and the courts, for fines and imprisonment that might be applicable for environmental violations, should be negotiated fully between the Director of the Division for Environmental Planning and Protection and the Ministry of Justice.

7. General Miscellaneous Provisions

A final section of the Decree should include authority for the Director to have access to information and data from other governmental bodies, universities, etc., as necessary, and

to contract and enter into agreements with public and private bodies and individuals for training and other purposes of carrying out the Decree.

Also, this part would contain the general enabling clause allowing for establishment of such other regulations as might be necessary to carry into effect the purposes and provisions of the Decree.

V. PROGRAM ADMINISTRATION

A. Regulation Development

This phase will consist of the drafting of pertinent regulations to implement the authorities of the enabling legislation. Such regulations will include the definition of ambient air and water quality standards associated with designated uses in geographical areas, e.g. potable water supply, fishery preservation, urban areas, industrial development, etc. This suggested approach involves the development of the specific use standards by the Federal environmental agency with the requirement that the individual States designate the geographic areas within their boundaries where these uses would be applied, based upon a projected development plan. The implementation of ambient standards is necessary since they will tend to emphasize environmental considerations in development decision making, a factor which, although recognized at the present time, is not a critical variable in final development decisions.

In addition to air and water quality standards, regulations should be promulgated on requirements for new and existing sources of air and water pollution to install the best available pollution control technology in the case of new sources and the best practicable technology for existing sources, together with the definition of

that technology for pertinent industrial classifications. Examples of such regulations are attached as Appendix III. These regulations on required technology will serve as the basis for developing permits or licenses for individual pollution sources.

In certain categories where implementation of technology is not the optimal method of controlling discharges or emissions, the best process operation and management practices should be specified. For instance, this is especially applicable to oil storage facilities where there is a possibility of catastrophic spills to water and/or fugitive emissions to the air from the many valves and seals. Under these circumstances, floating roof storage tanks may be specified as one method of controlling the major sources of fugitive emissions, and diking and ponding capacity would be required to collect the greatest spill. The Federal Agency would develop specifications for preventing and controlling oil spills and would establish standard control measures and liability for clean-up when such spills occur.

With respect to hazardous substances such as pesticides and toxic chemicals, regulations should be developed establishing a register of approved products. A use certification should be required by the Federal Agency before a product could be introduced into commerce. Regulations should also be developed on best management

practices for formulation, mixing, transportation, storage, application, and disposal. For instance, open burning of used pesticide containers and disposal of defective products at undesignated, unapproved, and unrecorded sites should be immediately prohibited.

Regulations concerning refuse disposal should emphasize state and local planning efforts and should provide financial and technical assistance to such State and local governments and their designated agencies or authorities. The regulations should establish approved procedures for collection, processing, and disposal of refuse from all sources including residential, commercial, industrial, agricultural, and mining sources. A permit system should be established for private transporters or vehicle owners to eliminate the indiscriminate dumping of refuse in non-approved disposal sites and to prohibit open burning. Suggested guidance for potential regulations in Nigeria are contained in Appendix IV.

Regulations should be implemented for administration, auditing, and performance specifications of a Federal grant program in the areas of solid waste collection and disposal, water supply, sewage treatment, and pesticide products subsidization. Until such specifications are enacted, there will be little progress toward assuring the effectiveness of government public works projects. A possible method of emphasizing the importance of these performance specifications is for the Federal Government to curtail all new capital grants until these regulations are developed.

It is anticipated that the regulation development phase for implementing a Nigerian environmental program will require at least two years. The greatest need during this period will be for legal and engineering personnel who have had extensive experience in the application of process operational and technological solutions to environmental problems. In addition, the Agency, immediately upon enactment of the enabling legislation, should conduct a literature review to evaluate the experience of other countries to determine whether their procedures and regulations have relevance to the Nigerian environmental setting.

B. Licensing and Permits

To assure compliance with the various regulations as described above, a permit system for individual sources should be established. Each new and existing source of pollution will be issued a permit which specifies both emission and effluent limitations consistent with promulgated regulations on best available and best practicable pollution control technology and/or best operations and management practices (See Appendix III). These limitations would be based upon specific data related to the existing and/or projected emissions and effluents from a particular source. This information would be received by the Agency in an application for a permit from the source. The application and subsequent permit would include all environmental considerations related to that source and would be

issued for a specified date and time with periodic reviews prior to reissuance. All new sources would be required to install best available technology prior to operational start-up. Existing sources would be required to install best practicable technology within a certain time frame not to exceed five years from the date of the promulgated regulations. Application forms should be developed which would require the source to submit the technical information necessary to making an environmental assessment for the writing of a permit. A suggested list of necessary technical information is contained in Appendix V. Appendix VI is a typical United States wastewater discharge permit for a pulp and paper facility.

Certain of the requirements of the permit could be standardized for every source. For instance, the performance reporting requirements during the tenure of the permit could be fairly uniform, as well as the self-monitoring necessary to assure compliance with the regulations. Other common facets of the permit would include enforcement penalties and additional information submittals, as required by the agency, to assess any requested modifications. In certain industrial classifications, special standard requirements may be included in the permit. As an example, in the oil industry the necessity for spill prevention contingency plans can be appended to the permit. A typical spill prevention contingency plan format is shown in Appendix VII. In the pesticide industry, specific formulation, transportation, and disposal practices should be included.

In order to eliminate the indiscriminate dumping of refuse, especially hazardous or industrial wastes, the federal or state governments, in cooperation with other federal or state agencies, should institute a license or permit program for all non-government haulers of all types of refuse to insure that the refuse is deposited in a designated sanitary landfill or other facility. Permits could be issued and renewed on a periodic basis and include the names of industrial refuse generators, types of waste and approximate annual amounts of refuse from these sources. Any non-government hauler or vehicle owner found guilty of indiscriminate dumping of any type of refuse in an unapproved state or local government designated disposal site would be subject to Federal or State prosecution and an automatic fine for each violation, as well as removal of license or permit and vehicle. Fees should be charged for the permit in order to make the program self sustaining.

A permit system should also be established, incorporating management and operation practices for industrial installations which extract process water directly from ground water supplies. Limitations should be included for those sources which re-inject process wastes to the ground water.

There are two approaches to issuance of permits. The first and more common is to specify conditions according to media in separate permits, e.g. water, air, and solid waste. This results in substantial

administrative overlap and potential conflicting technology for control of emissions and effluents. It also is inefficient from a standpoint of reporting requirements on the part of both the source and the regulating agency. Additionally, it makes sources impatient with what they perceive to be bureaucratic ineffectiveness and conflicting regulations. The second and recommended approach is to issue an overall environmental assessment permit to the source which accounts for the relationships between emissions, effluents, process operations, and solid waste disposal. This has the advantage of considering the source as an entity and reducing the paperwork which the polluter must submit. The major disadvantage is that a source permit may become extremely complex and difficult to administer from a compliance standpoint.

The suggested administration of a permit program would be as follows. The Federal Agency would receive the application from the source and would develop a specific permit. The individual States would be responsible for assuring compliance and taking necessary enforcement actions. Self reporting data by sources would be sent to the States for their analysis and evaluation. A permittee should have an opportunity to appeal issues of fact and law for his specific permit, but should not have the opportunity to challenge the promulgated regulation under which the conditions of his permit were developed. The appeal should be administered through examiners who are part of the Federal environmental agency. The decision of

the hearing examiner on a specific permit should be final. Any interested party should be permitted to supply testimony for such a permit and appeal hearing. Once a source has accepted a permit, he shall have waived his rights for any subsequent hearing if that permit is not modified during the period for which it is issued.

The implementation of the permit program would be subsequent to the necessary regulation development. It is anticipated that a public awareness campaign and distribution and receipt of applications from all affected sources will require at least one year. Permit development and issuance for all sources will require at least two years subsequent to receipt of all applications. Staffing and training of State personnel to administer the environmental and self reporting requirements of the permit system can be ongoing during the two year period of permit development and issuance.

C. Grants

Nigeria has very large, unmet needs with respect to environmental considerations. These needs are primarily in the areas of water supply, sewage treatment, solid waste collection and disposal, and toxic substances control. Satisfying these needs will require large expenditures for capital intensive, highly sophisticated technology over a period of several years, through the mechanism of grants from the Federal Government to the administering State

and/or local authorities. However, as has been noted previously, criteria and organizational capabilities for administering such grants and for assessing their effectiveness in meeting stated objectives is presently lacking. It is anticipated that performance specifications and application procedures will be an integral part of regulations developed subsequent to the passage of the enabling legislation. Therefore, a major program of grants for capital intensive projects should be delayed until these regulations are in place.

There are immediate priorities in two areas which could serve as the beginning of an effectively administered Federal grant system for environmental controls. These areas are solid waste collection and disposal and pesticide distribution and application.

To date, solid waste collection throughout Nigeria has been poorly planned and haphazardly organized, resulting in erratic and often indefinable effectiveness. The city of Lagos is a pertinent example where emphasis has been placed on high technology disposal considerations rather than on basic collection, transport, and landfilling. The Federal Government should consider solid waste collection and disposal in Lagos as an experimental area for a model grant program. Specifications should include the organizing of a refuse collection authority for Lagos State, designation of suitable landfill disposal areas and emphasis on the collection,

transport, and landfilling. The refuse authority would be required to submit a plan to the Federal Government designating specific milestones for accomplishment of various tasks with accompanying cost benefit analyses. Suggested specifications for such a solid waste grant program are shown in Appendix VIII. As experience in administering such a program is gained and a grant mechanism is established, the system could be expanded to other States and municipalities. The Lagos refuse collection project would serve as a model for the implementation of a large-scale efficiently administered national program in this area.

With respect to pesticide distribution and application, the former sales subsidy administered through the State Ministries of Agriculture should be re-instituted such that the major consumer source of pesticides is again through the State facilities. This subsidy or grant in each State should be contingent on the development and implementation of a certified applicator program which would require each individual farmer to become knowledgeable in exposure problems, application practices, and proper disposal techniques. The program should also include monitoring by the States of actual practices approved by the Federal Agency in these areas. This type of grant does not require commitment to capital intensive projects and therefore can be flexible enough such that States with exemplary programs could be awarded additional incentives. As experience with effective administration of such a program is gained, it could

be expanded to encompass all aspects of the generation, transport, and disposal of hazardous materials.

When satisfactory experience has been gained by the Federal Government with the two suggested model grant programs, grant programs dealing with capital intensive projects involving water supply and sewage disposal can be instituted. The extended timing of such a grant program would be consistent with the Federal Government's development objectives. Such a grant program could be phased in a highly planned manner.

D. Longer Term Programs

Programs involving control of noise and automobile air pollution are of longer range significance to the Nigerian government. The Federal agency should consider contracting for a feasibility study on control programs in these areas. The feasibility studies should emphasize product requirements, importation controls, and sales restrictions as several elements in a regulatory program.

It is expected that these programs will be initiated subsequent to the implementation of regulatory requirements discussed above for other higher priority environmental problems.

VI. SUPPORT SERVICES

A. Administration

The most pressing immediate need is the drafting of the basic enabling legislation establishing the authorities and responsibilities of the Federal agency. Since there is little or no indigenous legal expertise in this type of legislation, consideration should be given to acquiring legal services from extra-national environmental lawyers to assist Federal and State legal personnel in the drafting of appropriate legislation and organizational responsibilities.

Upon the establishment of enabling legislation, the major logistical requirement will be for engineering personnel who can evaluate technological proposals and environmental standards, together with legal personnel who can draft the appropriate regulations. It is estimated that the development of ambient use standards; definitions of best pollution control technology; specifications for a permit system involving emission and effluent limitations; establishment of a certification system for toxic and hazardous substances; and development of specifications and a pilot grant program for refuse collection, transport and disposal, will require a minimum of 100 trained legal and technical personnel to prepare the necessary

regulations and to work with the States in the implementation of those regulations. Additional programs, such as construction grants for water supply and sewage disposal, motor vehicle control regulations, etc., will require substantial additional personnel beyond the two-year period. In the United States, the cost of one work-year for environmental regulation, including salary, benefits, and overhead, approximates forty-thousand dollars. Therefore, the initial budget for internal administration only, exclusive of demonstration grants and contracts, should approximate at least four million dollars over the next two years.

Because refuse collection and disposal has been identified by Nigeria as among the highest priorities for environmental control, consideration should be given to establishing an Office of Refuse within the Federal environmental agency with the following duties and responsibilities:

1. Prescribe, in consultation with Federal, State, and local authorities, such regulations as are necessary to carry out his functions under this Act.

2. Consult with or exchange information with other Federal agencies undertaking research, development, demonstration projects, studies, or investigations relating to refuse.

3. Provide technical and financial assistance to States, local or regional agencies in the development and implementation of refuse plans and hazardous waste management programs.

4. Consult with representatives of science, industry, agriculture, labor, environmental protection and consumer organizations, and other groups, as he deems advisable.

5. Utilize the information, facilities, and personnel of other Federal, State and local governments when necessary.

The Office of Refuse should transmit annually to the Agency Director, a comprehensive report on all activities during the preceding year. Each such report should include:

1. A statement of specific objectives for the activities and programs conducted under this Act.

2. Statements and conclusions as to the effectiveness of such activities and programs in meeting the stated objectives and the purposes of this Act, measured through the end of such fiscal year.

3. A summary of outstanding solid waste problems confronting the nation in order of priority.

4. Recommendations with respect to such legislation which the office deems necessary or desirable to assist in solving problems respecting solid waste.

5. The plans for activities and programs in refuse during the next fiscal year.

When fully operational, the budget appropriation for the Office of Refuse should approximate N3,000,000 to be used for staffing and administering a refuse program to states and local governments, developing guidelines and regulations, reviewing and funding research proposals, developing and implementing a national refuse policy providing financial and technical assistance to State and local governments and initiating a licensing or permit program for refuse haulers. Other activities could include the collection and dissemination of information, maintenance of a library and holding of meetings, seminars, training sessions and workshops.

B. Training

In order to insure that the above programs are administered effectively on a permanent basis, it will be necessary for the Federal agency to begin an immediate period of short-term training oriented towards program management for its existing employees and new personnel.

The Federal government should establish an environmental training program for State and Federal personnel at a level of at least twenty persons a year once the program is in operation.

While in Nigeria, the team learned that the Federal Military Government is in the process of establishing an environmental training program. Approximately 50 positions will be designated for such training. Each State will select two people, and the remaining positions will be filled by Federal Government employees. This training program will be part of the US AID Manpower Training Program already established between the US and the Federal Military Government of Nigeria. EPA should work with US AID in suggesting universities which offer exceptional environmental programs. The duration of the programs will vary, depending on the area, level of training required, and each candidate's educational background. It may be possible to locate qualified Nigerian candidates within Federal, State or local programs within the United States. Such assignments would provide on-the-job training situations and would offer practical work experience in solving environmental problems. Details of such a program can be developed with the Federal Military Government on a case-by-case basis.

Nigerian universities could serve as the domestic base of a large technical training program. This program could then supply Federal, State, and local agencies with properly trained personnel. It may

be advisable if participating universities identified training positions within their departments whose graduates would be placed in Federal, State or local agencies.

C. Data Generation and Technical Assistance

All of the recommended programs involving regulation development, permits and grants, will require a technical data base to assure program defensibility and justification. These needs for basic data will be both short and long-term. The short-term needs can most effectively be accomplished through in-house personnel and/or contractors. It is suggested that the Federal environmental agency retain a corps of technical and analytical personnel for responding to immediate questions involving definitions of practicable technology, applications of such technology to individual sources, characterization of immediate problems requiring enforcement, e.g. oil spills and hazardous dumping, etc., and reviewing data submittals from States, local authorities and individual pollution sources.

With respect to the longer term questions involving standards development, environmental impacts of development decisions and ecological effects, the Federal environmental agency should contract with various other government agencies who have responsibility and capabilities in this area, as well as certain universities such as Ife and Ibadan who have demonstrated abilities to conduct such

research. For example, water resource authorities in both Lagos and Kano State currently operate hydrological data collection networks. Federal environmental agency support for the expansion of these networks or sampling stations for analysis of water quality as well as quantity is indicated. Institution of air quality networks are also a very high priority for trend analysis. The government corporatior administering the construction of the steel mill at Ajaokuta has indicated a willingness to establish such a network in their geographical area.

Research grants should be made to universities in order that they may complement each others strengths. For instance, Ife is particularly strong in evaluating ecological effedts while Ibadan is instrumental in analytical capabilities which exceed any other university observed. These grants should be on the basis of these universities developing cooperative, coordinated programs consistent with pre-defined objectives of the Federal environmental agency.

Computerized library and information retrieval systems should be developed. A feasibility contract on such needs is a very high priority if satisfactory regulations are to be accomplished.