

**Environmental and Social Management Framework (ESMF)
For
The National Energy Development Project, Nigeria**

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ACRONYMS

CREST	Commercial Reorientation of Electricity Sector Toolkit
DisCo	Distribution and Marketing Company
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ERSU	Environment, Resettlement and Social Unit
HVDS	High Voltage Distribution System
IDA	International Development Association
kV	Kilovolt
kVA	Kilovolt Ampere
MW	Megawatts
NEDP	National Energy Development Project
NEPA	National Electric Power Authority
NERC	National Electricity Reform Commission
NGO	Non-governmental organization
PCB	Polychlorinated Biphenyls
PHCN	Power Holding Company of Nigeria (NEPA's successor)
PMU	Project Management Unit
TDP	Transmission Development Project (2002 – 2006)
TransysCo	Transmission System Company

Executive Summary

This document provides an Environmental Assessment of the proposed National Energy Development Project (NEDP). An Environmental screening classified NEDP as a Category B project. World Bank policy requires that an Environmental Assessment be prepared and publicly released prior to appraisal of such a project.

The Environmental Assessment indicates that NEDP is not likely to have large-scale adverse impacts on the natural environment, health and safety, of communities and individuals. However, NEDP is a sector investment loan, wherein detailed planning for specific sub-projects will only occur after project implementation begins. The Environmental or Social impacts will be detailed as specific sub-project planning progresses, for which this framework of general policies and procedures for preventing or mitigating adverse impacts has been prepared.

The World Bank safeguard policy on involuntary resettlement has also been triggered, although not more than a few people at most are likely to suffer any loss to their assets, livelihoods, or standards of living. Nonetheless, a NEDP Resettlement Policy Framework (RPF) has been prepared and disclosed separately. This document sets out the principles, organizational arrangements, design criteria, and so forth for providing compensation and other assistance, should this become necessary. If a particular sub-project seems likely to cause any loss or damage to people's assets or welfare, a resettlement action plan will have to be prepared for that sub-project. Appendix 1 to the RPF contains a template to assist Nigerian (NEPA ERSU) authorities in preparing such a plan in line with World Bank policies.

The table on the following page summarizes the possible adverse impacts of the NEDP on the environment, communities, and Staff. The proposed mitigation measures are also stated.

The on-going Transmission Development Project, also assisted by the World Bank, established the Environment, Resettlement, and Social Unit (ERSU) within the Project Management Unit. The ERSU has the responsibility for seeing that the proposed mitigation measures, and Environmental and Resettlement Planning, are implemented under the NEDP. The ERSU will need additional staff in the course of project implementation in order to handle these responsibilities.

Table 1: Possible Adverse Impacts and Proposed Mitigation Measures, NEDP

Adverse Impacts	Proposed Mitigation Measures
Noise during construction	<ul style="list-style-type: none"> • Limit construction to daylight hours
Management of PCBs	<ul style="list-style-type: none"> • Conduct Phase 1 Environmental Audits. • Conduct Phase 2 Environmental Audits, where Phase I Audit finds serious contamination. • Identify a waste disposal facility for PCB-contaminated waste. • Contract consultant to evaluate quality of initial audits.
Poor Environmental Management planning	<ul style="list-style-type: none"> • ERSU should ensure that an Environmental Management Plan (EMP) is prepared for every transformer sub-station where construction will occur. (EMP template provided)
Damage to cultural property	<ul style="list-style-type: none"> • A qualified Nigerian Archeologist should be employed on a Consultancy basis to review the plans for any sub-project located in a traditional urban area. • Construction contract documents should contain standard guidelines for responses to “chance finds” of archeological resources during construction activities.
Loss of assets due to re-establishing safety margin between power lines and structures, or acquiring land for sub-stations, customer care centers, etc.	<ul style="list-style-type: none"> • Make every effort to avoid loss of people’s assets by using taller poles, using insulated wire, re-routing lines, or other means • Follow the objectives, policies, and procedures set forth in the NEDP Resettlement Policy Framework. • Prepare a Resettlement Action Plan for every sub-project where loss of assets is foreseen. • Familiarize TransysCo and DisCo staff with the NEDP Resettlement Policy Framework and the template for a NEDP Resettlement Action Plan through a series of workshops. • Strengthen the public relations capacities of DisCos.
NEPA retrenchment	<ul style="list-style-type: none"> • The World Bank must remain alert to the need to assist with retrenchment packages, as the situation develops.

Source: Sections 6 and 7, NEDP Environmental and Social Impact Management Framework

1. Introduction

This document provides an Environmental Assessment of the proposed National Energy Development Project (NEDP), which the World Bank will appraise for possible IDA financing. For projects such as NEDP, World Bank procedures require that an Environmental Assessment report is prepared and publicly disclosed prior to Project appraisal. This allows the public and other stakeholders to comment on the possible Environmental and Social impacts of the project, and for the Appraisal Team to strengthen as necessary the Environmental Assessment report, particularly measures and plans to prevent or mitigate any adverse Environmental Impacts. Towards this end, this document will be publicly released through the World Bank's InfoShop, and in public locations in Nigeria prior to Project appraisal.

“Environmental Assessment” is used here in a broad sense, encompassing not only impacts on the natural environment, but also on human health and safety, on Social aspects such as people's assets and livelihoods, and on transboundary and global Environmental aspects.

This document builds upon the Environmental Assessment prepared for the World Bank-financed Transmission Development Project (TDP).¹ That Project focuses largely on improving the transmission segment of the national electricity grid. NEDP will continue to support the upgrade of the transmission system, but add *inter alia* a major component to support Bank improvements in the Distribution system as well.

The NEDP Environmental Assessment, therefore begins with a review of the TDP Environmental Assessment, identification of adverse Environmental impacts, and how well the mitigation measures have worked in practice. The approach of the NEDP Environmental Assessment was modified only where the experience of TDP indicated a need for change, or where the inclusion of a distribution component in NEDP calls for additional measures.

Certain World Bank policies have been revised since the TDP Environmental Assessment was completed. Those revisions were not found to require significant changes in the approach adopted under the TDP Environmental Assessment framework. The NEDP Environmental Assessment does make extensive references to the revised World Bank policies, so readers unfamiliar with them can understand how they have guided the production of this document.

In fact, the Environmental Assessment of NEDP does not indicate any large-scale adverse Environmental impacts from the project. The mitigation measures proposed in this report concern largely ways to improve safety and Environmental protection at transmission substations. The earlier TDP Environmental report made similar recommendations that were more or less implemented, but more work is needed to continue progress until higher safety and Environmental standards are achieved.

¹ Golder Associates, Inc. *Environmental Assessment and Environmental Policy Framework Evaluation of the Nigeria Power Transmission Development Project*. TDP Project Management Unit. NEPA. February. 2001.

Thus, most of this report contains policies and procedures to cover “what if” situations. NEDP constitutes a sector investment loan, meant to assist certain well-defined types of physical, institutional, and policy improvements in the energy sector. However, the specific location and design of the particular investments will be decided as project implementation unfolds. It is conceivable that in the course of this detailed planning, certain adverse Environmental impacts will become apparent. This report identifies the categories of adverse impacts that may arise in the course of sub-project planning, and how to avoid, prevent, or mitigate such impacts when they do appear.

2. World Bank Policies

The World Bank has ten Safeguard Policies to reduce or eliminate the adverse effects of projects. All these policies may be obtained at the World Bank website, www.worldbank.org.

NEDP potentially triggers two of these policies, namely,

- *BP/OP 4.01: Environmental Assessment*
- *BP/OP 4.12: Involuntary Resettlement*

2.1 BP/OP 4.01: Environmental Assessment

NEDP is a Category B project, according to the Bank's criteria for classifying projects based on their potential Environmental impacts. This means that the expected Environmental impacts are largely site-specific, that few if any of the impacts are irreversible, and that mitigation measures can be designed relatively readily. The Environmental Assessment for a Category B project,

- examines the project's potential negative and positive Environmental impacts,
- recommends measures to prevent, minimize, mitigate, or compensate for adverse impacts, and
- recommends measures to improve Environmental performance.

The findings of the Environmental Assessment for a Category B project can simply be described in the Project Appraisal Document and the Project Information Document. However, the findings can also be presented in a separate report, such as the present one.²

It makes particular sense to prepare a separate Environmental Assessment report for NEDP, as the project will be financed through a sector investment loan. Sector loans comprise numerous sub-projects that will only be planned in any detail once project implementation begins. These sub-projects will need to be screened for possible Environmental impacts, and appropriate action taken where necessary. The Environmental Assessment policy directs Bank staff to include in such loans, as necessary, activities to strengthen the capacity within the implementing Agency to:

- screen sub-projects for Environmental impacts
- obtain the necessary expertise to carry out Environmental Assessments,
- review the findings and recommendations of the sub-project Environmental Assessments,
- ensure implementation of mitigation measures, including any Environmental management plans, and
- generally monitor Environmental conditions during project implementation.³

The present document therefore provides a framework of general policies and procedures for carrying out the above five responsibilities, as well as measures to increase the implementing agency's capacity to handle these responsibilities.

² The criteria and reporting requirements for Category B projects are described in *OP 4.01*, paragraph 8(b), footnote 11.

³ The Environmental Assessment requirements for sector investment lending are described in *OP 4.01*, paragraph 9.

2.2 BP/OP 4.12: Involuntary Resettlement

BP/OP 4.12: Involuntary Resettlement covers situations where a project must compensate people for loss of land, other assets, livelihood, or standard of living. This normally happens when a project must acquire a significant amount of land to construct something, say, a dam. NEDP does not require any major land acquisition. However, it is conceivable that a particular NEDP sub-project may adversely affect the assets of one or more persons if, for instance, a sub-station has to be enlarged beyond its present boundaries, or a structure is built dangerously close to power lines. In these situations, the involuntary resettlement safeguard policy could be triggered.

Bank policy states that a Resettlement Policy Framework should be prepared for projects of this nature, that is, where the sub-projects have not been planned in advance, and where they could potentially have a negative effect on people's assets, living standards, or livelihoods.⁴ This framework sets out the principles, organizational arrangements, design criteria, and so forth for providing any compensation or other assistance that becomes necessary in the course of implementing sub-projects. The NEDP Resettlement Policy Framework has been prepared and disclosed as a separate document.

Bank policy does not require a Resettlement Action Plan prior to project appraisal for projects such as NEDP. However, a Resettlement Action Plan will have to be prepared and approved for any sub-project that entails loss of assets or income. A template for such a plan is included in the NEDP Resettlement Policy Framework referred to above. Project implementers can more or less "fill in the blanks" on the template in order to draw up a Resettlement Action Plan for a specific sub-project.⁵

2.3 Other World Bank Safeguard Policies

The World Bank has a number of other safeguard policies as well:

- Natural Habitats (OP 4.04, BP 4.04)
- Pest Management (OP 4.09)
- Cultural Property (OPN 11.03)
- Indigenous Peoples (OD 4.20)
- Forestry (OP 4.36, BP 4.36)
- Safety of Dams (OP 4.37, BP 4.37)
- Projects on International Waters (OP 7.50, BP 7.50)
- Projects in Disputed Areas (OP 7.60, BP 7.60)

Of these, the Habitats and Forestry policies could conceivably be triggered, if NEDP acquired land in a critical ecosystem. However, neither the transmission nor distribution

⁴ The applicable requirements for preparing a Resettlement Policy Framework are given in *OP 4.12*, paragraph 28, and *OP 4.1: Annex A*, paragraph 25.

⁵ The requirement to prepare a Resettlement Action Plan for sub-projects is explained in *OP 4.12*, paragraph 29, and *op 4.12: Annex A*, paragraph 25. The contents of such a plan as applicable to NEDP sub-projects are described in *OP 4.12: Annex A*, paragraphs 2-22, 25.

activities are likely to do so. In any case, in regard to habitats and forests, Nigerian regulations for Environmental impact assessments (discussed in the next section) are compliant with World Bank requirements, except for wetlands and forests located outside formally protected areas. If the initial baseline or reconnaissance survey for a sub-project reveals that a Project will pass through such an areas, the relevant World Bank safeguard policies should be consulted at www.worldbank.org.

Since Nigeria has an urban culture dating back several centuries, it is conceivable that distribution sub-projects could damage cultural property. World Bank policy in regard to cultural property is not to finance projects that would significantly damage non-replicable cultural property. Sub-projects in very old urban settings, such as Kano City, are the most susceptible to this. Nigerian regulations (discussed in the next section) do not adequately address the protection of cultural property.

It is difficult to imagine that any of the other World Bank safeguard policies would be triggered, and so they are not discussed further.

2.4 Sectoral Guidelines for Electrical Power Transmission

World Bank sectoral guidelines for electric power transmission systems are given in *Environmental Assessment Sourcebook*, Volume III, “Guidelines for Environmental Assessment of Energy and Industry Projects, 1991.

The World Bank views electric transmission lines as projects with a wide range of Environmental risk, depending on the location and project size. Impacts are principally associated with the creation and maintenance of corridors, the construction of towers, and the health risks from electromagnetic fields. Specific risks include

- the fragmentation of habitat and vegetation along the right of way,
- new access to protected areas and wild habitats along the right of way,
- loss of land and other assets and physical relocation along the right of way, and
- electrocution if low-slung lines are near human activity.

The Environmental Assessment done for the Transmission Development Project did not identify any additional environmental risks based on these guidelines. The NEDP framework adopts the same view. Furthermore, no new lines on transmission conditions are planned under the project to be financed under the project.

2.5 Pollution Standards

The World Bank’s *Pollution Prevention and Abatement Handbook* (1998) provides detailed requirements for general and sector-specific control of pollution, including numerical ambient, emission, and effluent standards for all major contaminants. Of relevance to both the Transmission Development Project and NEDP is the standard for maximum sound level of 45 and 55 A-weighted dB (night and day maximums respectively) for residential, educational, and institutional areas, and 70 A-weighted dB for industrial areas.

Nigerian standards are comparable to the Bank's, as discussed in the section on the Nigerian regulatory framework.

3. Nigerian Regulatory Framework

3.1 Environmental Impact Assessment Act (Decree 86) of 1992

The Environmental Impact Assessment Act. No. 86 (Decree No. 86) of 1992 requires that development projects be screened for their potential impact. Based on the screening, a full, partial, or no Environmental impact assessment may be required.

Guidelines issued in 1995 by the former Federal Environmental Protection Agency direct the screening process. According to these guidelines,

- Category I projects will require a full Environmental Impact Assessment (EIA).
- Category II projects may require only a partial EIA, which will focus on mitigation and Environmental planning measures, unless the project is located near an environmentally sensitive area--in which case a full EIA is required.
- Category III projects are considered to have “essentially beneficial impacts” on the environment, for which the Federal Ministry of the Environment will prepare an Environmental Impact Statement.

The guidelines address areas of special concern that the World Bank addresses through separate safeguard policies. These areas of concern include: mangrove forests; tropical rainforests; natural conservation areas; wetlands of national or international importance; areas which harbor threatened or endangered species; areas of historic or archeological interest; and areas of importance to threatened ethnic groups.

Screening takes place on the basis of a project proposal document that consists of a description of the activity to be undertaken, a summary outline of potentially affected elements in the surrounding environment, and proposed impact reduction or mitigation measures incorporated in the project design.

The guidelines categorize *a priori* some types of projects. In the electricity sector, only thermal projects of 10 MW or greater, combined cycle thermal generation, nuclear generation, or hydro-electric generation of a certain size are automatically categorized as Category I. Small-scale electric transmission lines are placed in Category II, without any further definition of what constitutes “small-scale.”

Environmental Impact Assessments are submitted to the Federal Ministry of the Environment. Within the ministry, an Environmental Impact Assessment Division takes responsibility for EIA-related issues. Within this division, the Impact Mitigation Monitoring Branch has the responsibility for monitoring the implementation of Environmental Management Plans contained in approved EIAs.

Decree No. 86 makes frequent reference to public disclosure, but specific guidelines concentrate on how public files containing Environmental impact assessments and the agency assessments should be established and public access to them assured. In addition, there is an open door policy as far as attending EIA review meetings is concerned.

Public grievance procedures are not well developed or well-known. Some non-governmental organizations have developed their own advocacy tactics in response to issues of concern to the groups.

The Nigerian Environmental Regulatory framework as well as practice is weak on compliance monitoring.

3.2 Pollution Standards

Nigeria has numeric standards for both ambient Environmental quality as well as for emissions and effluents and noise standards. The key legislation and guidelines are as follows:

- *S.I.8 National Environmental Protection (Effluent Limitation) Regulations, 1991*: sets standards for industrial discharge into public air or waters
- *S.I.9 National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations, 1991*: provides numerical standards for effluent and emission quality (except noise) by sector.
- *Guidelines and Standards for Environmental Pollution Control in Nigeria, 1991*: Issued by the Federal Ministry of the Environment, ambient noise standards are included.

The standards are comparable to those of international lending agencies and offer adequate safeguards for Environmental quality, especially since the NEDP sub-projects will generate little in the way of emissions and effluents.

3.3 Electricity Supply Regulations of 1966

According to the Environmental Assessment for the Transmission Development Project, NEPA guidelines establish a minimum horizontal distance⁶ between a building and overhead wires of

- 7.5 meters for 11 kV wires (reportedly revised to 4.5 meters),
- 15 meters for 33 kV wires (reportedly revised to 7.5 meters),
- 30 meters for 132 kV wires, and
- 60 meters for 330 kV wire.

However, the TDP Framework cites no specific source for these requirements. Further inquiries at NEPA Corporate Headquarters also did not uncover any documentation for such a requirement.

The safety requirement for electrical lines is set out in the Electricity Supply Regulations 1994 of 1966 made under sections 3 and 4 of the Electricity Act.⁷ Sections 60 and 61 of these regulations specify that power lines must be clear from buildings and other structures by the following distances:

⁶ A minimum horizontal distance refers to the distance measured from the centerline on the ground, that is, the point directly below the wire.

⁷ S.I. 6 of 1966 Electricity Supply Regulations, Federal Republic of Nigeria Official Gazette, No. 17, Vol. 83, April 2, 1996. Lagos: Federal Government Press.

Table 2: Required Distances between Structures and Power Lines

Line Voltage	Distance (meters)
330 kV	6.0
132 kV	4.0
33 kV	3.0
11 kV and under	2.4

Source: Sections 60, 61, S.I. 6 of 1966 Electricity Supply Regulations, Federal Republic of Nigeria Official Gazette, No. 17, Vol. 83, April 2, 1996. Lagos: Federal Government Press

3.4 Land Use Decree of 1978 (amended 1990)

Virtually no regulatory or policy reference to the socio-economic impact of electricity projects is integrated into the environmental regulatory framework of Nigeria. All issues related to compensation or involuntary resettlement due to the exercise of eminent domain are addressed in the Land Use Act of 1978 (amended 1990).

This act provides the legal basis for land acquisition and resettlement in Nigeria. According to the act, all land in Nigeria is vested in the Governor of each state, to be held in trust for the use and common benefit of all people. The administration of urban land is directly under the control and management of the Governor, whereas non-urban land is under the control and management of the Local Government Authority. The Governor has the right to grant statutory rights of occupancy to land. Local government has the right to grant customary rights of occupancy.

The Land Use Act gives government the right to revoke statutory and customary rights to land for the overriding public interest. NEPA, as a federal agency, was also empowered by a land use decree and by NEPA Operational Decree No. 24 of 1972 to acquire land.⁸

Since the Land Use Act gives to the state the ownership of all land, compensation by NEPA was restricted to structures, installations, and improvements on the land, not the land itself. However, the act does require the state or local government to provide alternative land for affected people who will lose farmland and alternative residential plots for people who will lose their houses.

NEPA generally did this for hydropower resettlement programs, but not for transmission line and sub-station projects, or for distribution projects. Alternative land was not provided to people who lost land for tower base construction, or who were relocated to clear the right of way. In some areas closer to towns and cities, additional cash compensation was paid, on a

⁸ Currently, the authority and decrees of NEPA are unclear. Section 99 of the Electricity Power Sector Reform Act, 2005 repealed the NEPA Act and the previous Electric Power Act. NEPA no longer has any legal standing. This is further explained in Section 4 on the Energy Sector.

case by case basis, to people who lost building plots, other land, or houses to make way for sub-stations. Alternative land was not provided.

3.5 Other Regulations

The Mineral Resources Act of 1990 requires that transmission line corridors not be established through Mineral and Natural Resource Areas, so as to protect their economic value.

The Wild Animal Preservation Act of 1990 prohibits transmission line construction through areas formally designated as Wild Animal Preservation Areas or national parks.

4. Energy Sector Description

4.1 Need for Energy Sector Reform

From 1972 to 2005, the government-owned National Electric Power Authority (NEPA) was responsible for generating and delivering electricity. Although NEPA had an installed capacity to generate nearly 6,000 MW of electricity, the utility managed to deliver no more than about 2,500 MW throughout the 1990s. Around 3,200 MW is currently available for supply, still far below estimated demand.⁹ The inability to meet the demand for electricity in Nigeria has been a check on the country's economic growth and a source of public discontent. Furthermore, the electricity sector has been a drain on the federal government budget, which has had to cover NEPA's losses.

The fundamental problem has been institutional. The final report for a Bank-assisted Nigerian power project ending in 1997 stated,

*Institutional deficiencies are the source of NEPA's technical and financial problems, and any project that attempts a technical solution without a major institutional change that guarantees autonomy in operations will produce results that are not sustainable and waste scarce resources.*¹⁰

Therefore the Nigerian government has embarked on a far-reaching reform of the energy sector. Recently, a major milestone was reached when the Electric Power Sector Reform Act of 2005 was passed by the National Legislature in April. This act abolishes NEPA and the vertical integration of generation, transmission, and distribution functions within a single organization. Instead, these functions will be dispersed among independent companies as follows:

- six companies responsible for generation,
- eleven companies responsible for distribution, and
- one company responsible for transmission.

In anticipation of this goal, NEPA was gradually reorganized between 2003 and 2005 into eighteen business units, each corresponding to an eventual company.

Initially these companies will be essentially parastatals (i.e., government owned). However, the government intends to invite private investment in the companies, with the possibility of outright privatization where feasible. Over the next three to five

⁹ These figures are culled from various World Bank documents, several of them drafts. A more authoritative overview of the situation as of 2001 is as follows: installed capacity of existing power stations = 5,906 MW; maximum load ever recorded = 2,470 MW; peak generation as of August 2000 = 1,500 MW; estimated demand, 2001 = 4, 834 MW; estimated demand, 2005 = 9,780 MW; estimated demand, 2010 = 20,000 MW. (National Council on Privatization. *National Electric Power Policy*. Federal Republic of Nigeria. March. 2001. pgs. 2-3.)

¹⁰ *World Bank Implementation Completion Report for the Power System Maintenance and Rehabilitation Project*. Loan 3116-UNI. June 30, 1997. paragraph 25. quoted in World Bank. *Project Appraisal Document on a Proposed Credit in the Amount of SDR 78.60 (US\$100,000) to the Federal Republic of Nigeria for a Transmission Development Project*. Report No. 22431-UNI. June 15, 2001. page 12.

years, as many as half of these electricity companies could become truly private, with the remaining companies either still under public management or with forms of private participation that stop short of outright ownership.

4.2 Sector Institutions

The Electric Power Sector Reform Act mandated a number of new institutions as well as abolishing NEPA. The National Council on Privatization and its secretariat, the Bureau of Public Enterprises, has been working to define how these institutions will be organized. The situation as of today looks as follows:

4.2.1 Federal Ministry of Power and Steel

NEPA was under the Federal Ministry of Power and Steel. In theory the ministry was supposed to exercise regulatory functions, but it did not have the policy or technical staff to do so. Oversight was through a technical committee chaired by the Minister and staffed primarily by NEPA officials. The National Energy Regulatory Commission will soon assume the regulatory functions formerly vested in the ministry, leaving it to discharge the appropriate policy making role.

4.2.2 National Electricity Regulatory Commission (NERC)

The Electric Power Sector Reform Act of 2005 establishes the National Energy Regulatory Commission (NERC) to regulate the operations of the eighteen electricity companies. Perhaps the most notable regulatory function of NERC will be to set tariffs, but environmental regulation is also stated to be part of its mandate. NERC should begin functioning by the end of 2005.

4.2.3 Power Holding Company of Nigeria

The Power Holding Company of Nigeria is the initial holding company created to bridge the gap between abolishing the public utility, NEPA, and getting the various successor companies up and running. The holding company will be created out of NEPA's corporate headquarters. When the privatization process is completed, the holding company will cease to exist.

NEPA organized its transmission field operations into six regions: Lagos, Kaduna, Shiroro, Bauchi, Benin, and Enugu. These regions will now be under the Transysco and the staff will be transferred to the TransysCo. The Transysco will have the responsibility for preparing Environmental Assessments, environmental management plans, and so forth in regard to transmission activities.

The structure for NEPA corporate headquarters included an Environment and Resettlement Division reporting directly to NEPA Managing Director. Given NEPA's expected imminent reformulation, the division will still exist. Its future position in the Power Holding Company of Nigeria has not yet been clarified but it is likely to be decentralized to all the component companies of NEPA in order to continue with respective environmental issues relevant to each sector.

4.2.4 Distribution and Marketing Companies (DisCos)

NEPA organized its distribution field operations into eleven zones: Eko, Ikeja, Abuja, Benin, Ibadan, Enugu, Kaduna, Kano, Jos, Port Harcourt, and Yola. These zones have now been transformed into business units, and eventually will become distribution and marketing companies. Although they will each have their own name, they are collectively referred to as DisCos.

Therefore in the long run, distribution staff will work for different companies, and each company will have the immediate responsibility for preparing its resettlement action plans, Environmental Assessments, and so forth. TransysCo will not have responsibility for the Environmental activities of the Disco. ERSU sub Units therefore have to be established in each Disco HQ to take care of the unit's Environmental and Social problems.

4.2.5 Rural Electrification Agency

The Electricity Power Reform Act will enable the establishment of this body to promote rural access to electricity. For the purpose of the NEDP, the NEPA PMU ERSU will oversee the activities here.

5. Project Descriptions

5.1 Ongoing Bank Assistance to Energy Sector Reform

Two ongoing World Bank credits, the Privatization Support Project and the Transmission Development Project, have provided assistance to the Nigerian government in its efforts to reform the energy sector. The Privatization Support Project has been the primary vehicle for Bank assistance to power sector reform, with the Transmission Development Project designed to complement the reform effort by providing investment financing for the transmission. System.

Through these two projects, the Bank has assisted unbundling of NEPA's operations into business units, and providing commercial orientation to the business units, particularly the ones dealing with distribution and transmission. Most notably, the Bank assisted with the development of the Commercial Reorientation of the Electricity Sector Toolkit (CREST). CREST comprises a set of interventions designed specifically for Nigeria, but derived from the Bank's best practice experience around the world. One set of CREST interventions seeks to improve business practices for the distribution units/companies; other sets of interventions are meant to find speedy solutions to generating sufficient electricity and to increasing electrification, especially in rural areas.

As originally designed, the Transmission Development Project had three components:

- *Rehabilitation and Upgrading Transmission Infrastructure:* The physical investments included such things as rehabilitating transmission sub-stations and metering the grid.
- *Establishing the new transmission unit/TransysCo:* Technical assistance looked into things such as change management, a business plan, capacity-building, etc.
- *Establishing a capacity for Environmental and Social impact assessment:* An Environment, Resettlement, and Social Unit (ERSU) was established within the Project Implementation Unit with the idea that ERSU would eventually become part of TransysCo.

After the Transmission Development Project had already begun, a small number of pilot distribution sub-projects were added as a means to test and develop the first type of CREST interventions. These pilot sub-projects are presently at the procurement stage. Each pilot distribution will use the CREST approach to improve multiple aspects of power distribution (from supply through revenue collection) in a given "cluster," defined as the area served by a single 11 kV distribution line.¹¹

5.2 National Energy Development Project (NEDP)

The National Energy Development Project (NEDP) will continue to support power sector reform and the development of options for privatization, in a continuation of the World Bank

¹¹ For those unfamiliar with electrical distribution systems, an 11 kV distribution line carries electrical power from a sub-station (that steps down power from 33 kV to 11 kV) through the neighborhood or area to be served. Low voltage lines (less than 0.5 kV) then carry power from transformers along this line into customers' premises.

assistance begun under the Privatization Support Project and the Transmission Development Project.

NEDP will have two main investment components:

- **Transmission Development:** The investments will be aimed at improving the quality and quantity of power supply both on the transmission grid generally, and to specific distribution areas where the distribution investments will be concentrated. A large portion of these investments are carried over from the Transmission Development Project.
Specific areas of investment will include transmission grid reinforcements, reactive power compensation, transmission supply strengthening to serve distribution clusters and pilot access areas better, and transmission system metering and control enhancements.
- **Distribution Development:** The investments will expand to a national scale the CREST pilot distribution sub-projects tested under the Transmission Development Project. However, NEDP will provide Technical Assistance support to further develop two models for public-private partnership in managing distribution clusters, and expand the definition of a cluster from the area served by a single 11 kV line to a larger geographic area.
Physical investments will go into 11 kV distribution systems, including small-capacity transformers, metering with remote reading and automatic reading facilities, reactive power compensation by installation of online capacitors, customer care centers, spot billing and payment mechanisms, and rapid response customer vehicles.

A third component aims to develop models for expanding and intensifying access to electricity and to renewable energy through supporting state initiatives. Finally, a fourth component will provide further technical assistance and capacity-building for sector reform and privatization, generation through a gas pipeline and independent power providers, and project implementation.

5.3 Project Implementation Arrangements

The Transmission Development Project (TDP) established a Project Management Unit (PMU) in NEPA to facilitate and oversee TDP implementation. Under NEDP, that unit will be further strengthened to assume its expanded responsibilities.

In the course of NEDP implementation, the PMU will receive support to help it assume its larger functions as a Corporate Policy and Strategy Unit. In the long run, the unit will possibly be located within the Federal Ministry of Power and Steel to function as a planning, implementation, and monitoring unit for the entire sector. Alternatively, the unit could be set up as a stand alone company that provides a broad range of support to electricity companies on a fee basis.

The rural division of the PMU, together with the Rural Department of the Federal Ministry of Power and Steel, will form the core of the new Rural Electrification Agency, also established under the Electricity Power Reform Act. Until the agency comes into existence,

the PMU Rural Division will channel any assistance provided under this project to states for access expansion.

TDP established the Environment, Resettlement, and Social Unit (ERSU) within PMU to handle responsibility for Environmental Audits, Environmental Impact and Resettlement Assessments, and Environmental Management plans for sub-projects. The intention was therefore to build a capacity within PMU and incidentally the TransysCo for these functions.

6. NEDP Environmental Impacts and Proposed Mitigation Measures

For brevity sake, the following section will not review possible adverse Environmental impacts that were considered and discounted as non-existent or unlikely. For instance, the Environmental Assessment for the Transmission Development Project included an investigation of whether the noise from the operation of the large transformers would violate Nigerian or World Bank standards. The conclusion was that the noise level would likely comply with both standards. Therefore, this and other issues are not further addressed here.

6.1 Noise During Construction

Rehabilitation activities could involve the operation of heavy equipment, such as bulldozers, excavators, and cement mixers, which have acoustic power levels of 90 to 130 dBA.

Nigerian standards for maximum ambient noise allow maximum sound levels from 90 A-weighted dB for an eight hour exposure to 11 A-weighted dB for fifteen minute exposure. The World Bank guidelines call for a maximum sound level of 45 and 55 A-weighted dB (nighttime and daytime respectively) for residential, educational, and institutional areas, and 70 A-weighted dB for industrial areas.

The TDP Environmental Assessment concluded that construction noise would not be a problem because it is typically intermittent and short in duration. Any adverse impact could be sufficiently mitigated by restricting construction to daytime. This assessment for the NEDP adopts the same view.

Proposed Mitigation Measure:

- Construction will be limited to daylight hours.

6.2 Management of PCBs

Field visits in the course of preparing the Environmental Assessment for the Transmission Development Project found evidence of Polychlorinated Biphenyl (PCB) contamination at two of the five transformer sub-stations to be rehabilitated under the project. The assessment report recommended that Environmental audits to be carried out at all five sub-stations. Where contamination seemed to be a problem, a second audit should be conducted to identify means to minimize risks from disturbing contaminated soils during construction.

Although the final construction plan would depend on the findings of the two audits, the following types of measures might be included in such a plan as means to minimize exposure to PCBs:

- Delineation of the extent and concentration of soil contamination, and establishing the new construction footprint to avoid disturbance of those areas;
- Water application for dust suppression during grading and excavation;
- Sediment and erosion control measures to prevent runoff of unconsolidated, contaminated soils;
- Respiratory and skin protection; and
- Removal of contaminated soils, to an offsite waste disposal facility.

The TDP assessment report included various checklists and guidelines that, if followed, would ensure audits of good quality.

ERSU completed environmental audits at all five transformer sub-stations. The sub-stations received a provisional Environmental Audit Certification from the Federal Ministry of the Environment. The provisional status of the certification will be removed when the a number of additional measures are undertaken. These include

- management of waste oil through use of specialized disposal companies;
- periodic radioactive measurements, with results forwarded to the Federal Government on a quarterly basis; and
- worker awareness and education for environmental health and safety issues.

However, based on discussions with the TDP staff and ERSU, it is apparent that the guidelines and checklists in the TDP Environmental Assessment were not adequately followed. This leaves in doubt the quality of the environmental audits for the sub-stations.

This is disappointing, especially in light of the training that TDP provided for ERSU and NEPA staff in environmental management and environmental auditing.

Any rehabilitation and construction work at transformer sub-stations under NEDP also raises the possibility of exposure to PCBs during construction. The TDP assessment report proposed an adequate plan for mitigating exposure, provided the plan is followed.

Proposed Mitigation Measures:

- A Phase 1 Environmental Audit will be carried out for any transformer sub-stations where construction will occur under NEDP. The audit will conform to the terms of Reference and checklists contained in Appendix B, Golder Associates, Inc. *Environmental Assessment and Environmental Policy Framework Evaluation of the Nigeria Power Transmission Development Project*. TDP Project Management Unit. NEPA. February. 2005.
- If the Phase 1 Audit reveals particularly serious contamination, a Phase 2 Environmental Audit will be carried out. The second audit will produce a site-specific plan to minimize the risks from disturbing contaminated soil during construction.

- A waste disposal facility for PCB-contaminated waste (including protective clothing) will be identified. In principle, this is one element in completing a Phase 2 Environmental Audit. However, it deserves highlighting since no apparent progress has been made on this point, despite the attention given to it in the TDP Environmental Assessment.
- All equipment to be used for the Project should not contain PCB
- External consultant will be contracted to evaluate the quality and adequacy of the environmental audits, as soon as one or more such audits have been done.

6.3 Poor Environmental Management Planning

The Environmental Assessment for the Transmission Development Project also identified a general lack of environmental management planning, with waste management practices being particularly poor. As a consequence, environmental pollution and risks to worker health and safety are possible, even likely.

The TDP assessment report recommended that systematic environmental management planning be routinely carried out at every transformer sub-station that would receive project assistance. Toward this end, the report described the elements in an environmental management plan, and provided a generic table of contents for such a plan. The report also recommended training for NEPA and ERSU staff in environmental management planning, which was subsequently carried out.

ERSU drafted an Interim Environmental Management Plan for use at the five sub-stations. A site visit to the Kano sub-station indicated that the Interim Plan appeared to be followed by the sub-station staff and also the contractors. The sub-station was environmentally clean. Maintenance staff appeared conversant with operating procedures and practices, and abided by safety regulations and operational standards. Construction-related health and safety rules were also being followed. All workers wore hard hats, and construction belts and gloves as needed. The construction area had adequate warning signs and properly stored debris.

However, a number of poor waste disposal practices documented during the TDP Environmental Assessment were also observed during the Kano sub-station field visit. Oil-stained ground remains at the sub-station, and represents unknown risks for the workers and environment. Older equipment has not been checked to see whether PCBs are present in their coolants. The possible risks were exacerbated by a lack of personal protective gear among substation staff. The open burning of office waste was observed, which creates the risk of inadvertently burning toxic materials. Used oil was still poured out in the compound as a means of weed control. There was a lack of proper record-keeping.

Proposed Mitigation Measure:

- ERSU should ensure that an Environmental Management Plan is prepared for every transformer sub-station where construction will occur. A template of a plan outline, and a brief description of each section's contents, is given in the following section.

6.4 Template for an Environmental Management Plan

The following template lists the key sections of an Environmental Management Plan (EMP), and describes the contents of each section

1. Summary of impacts: Predicted adverse environmental impacts and their relationship to social impacts (and any uncertainties about their effects) for which mitigation is necessary should be identified and summarized.
2. Description of mitigation measures: Each measure should be briefly described in relation to the impact(s) and conditions under which it is required. These should be accompanied by, or referenced to, designs, development activities (including equipment descriptions) and operating procedures and implementation responsibilities. Public consultation should be clearly described and justified.
3. Description of monitoring program: The EMP identifies monitoring objectives and specifies the type of monitoring required; it also describes environmental performance indicators which provide linkages between impacts and mitigation measures identified in the Environmental Assessment report - parameters to be measured, methods to be used, sampling location and frequency of measurements, detection limits (as appropriate) and definition of thresholds to signal the need for corrective actions. Monitoring and supervision arrangements should be agreed by the Bank and the borrower to: ensure timely detection of conditions requiring remedial measures in keeping with good practice; furnish information and the progress and results of mitigation and institutional strengthening measures; and, assess compliance with national and Bank safeguard policies. Such arrangements should be clearly specified in the project implementation/operations manual to reinforce project supervision.
4. Legal requirements and bidding and contract documents: The incorporation of detailed mitigation, monitoring and supervision arrangements into legal conditions and covenants are essential. It is good practice to ensure that implementation of major environmental requirements is linked to disbursement conditions. It is important to translate EMP requirements into bidding and contract documents to ensure that obligations are clearly communicated to contractors.
5. Institutional arrangements: Responsibilities for mitigation and monitoring should be defined along with arrangements for information flow, especially for coordination between agencies responsible for mitigation. This is especially important for projects requiring cross-sectoral integration. In particular, the EMP specifies who is responsible for undertaking the mitigating and monitoring measures, e.g., for enforcement of remedial actions, monitoring of implementation, training, financing, and reporting. Institutional arrangements should also be crafted to maintain support for agreed enforcement measures for environmental protection. Where necessary, the EMP should propose strengthening the relevant agencies through such actions as: establishment of appropriate organizational arrangements; appointment of key staff and consultants; and, arrangements for counterpart funding and on-lending

6. Implementation schedule: The timing, frequency and duration of mitigation measures and monitoring should be included in an implementation schedule, showing phasing and coordination with procedures in the overall project implementation /operations manual. Linkages should be specified where implementation of mitigation measures is tied to institutional strengthening and to the project legal agreements, e.g. as conditions for loan effectiveness or disbursement.
7. Reporting: Procedures for providing information on the progress and results of mitigation and monitoring measures should also be clearly stated. Recipients of such information should include those with responsibility for ensuring timely implementation of mitigation measures and for undertaking remedial actions. In addition, the structure, content and timing of reporting to the Bank should be designed to facilitate supervision and the Task Manager should establish arrangements for the timely receipt of monitoring reports and their forwarding to the Bank's environment specialists for review and comment.
8. Cost estimates: These should be specified for both the initial investment and recurring expenses for implementing all measures defined in the EMP, integrated into the total project costs and factored into financing negotiations. As mitigating costs may occur at points during project implementation or operations, indications of cash flow should be provided. It is important to capture all costs – including administrative, design and consultancy, and operational and maintenance costs – resulting from meeting required standards or modifying project design.

7. Social Impacts and Proposed Mitigation Measures

7.1 Damage to Cultural Property

Since Nigeria has an urban culture dating back several centuries, it is conceivable that distribution sub-projects could damage cultural property. World Bank policy in regard to cultural property is not to finance projects that would significantly damage non-replicable cultural property. Sub-projects in very old urban settings, such as Kano City, are the most susceptible to this. Nigerian regulations do not adequately address the protection of cultural property.

Proposed Mitigation Measure:

- A qualified Nigerian archeologist should be employed on a consultant basis to review the plans for any sub-project located in a traditional urban area.
- Construction contract documents should contain standard guidelines for responses to “chance finds” of archeological resources during construction activities. These guidelines can be found in the World Bank safeguard policy on Cultural Property, at www.worldbank.org.¹² Appropriate responses will include a cessation of construction activity at the site of a find until professional evaluation can be made of its significance, and the appropriate agency notified.

7.2 Loss of Assets

The World Bank has not established a safety standard for distance from power lines to structures and vegetation. The Nigerian safety requirement for electrical lines is set out in the 1994 Electricity Supply Regulations under the Electricity Act of 1966.¹³ Sections 60 and 61 of these regulations specify that 11 kV and lower voltage lines must clear buildings and other structures by 2.4 meters, or 1.2 meters if the lines are fully insulated.

This standard would have been met at the time of construction; otherwise the electrical inspector would not have authorized the commission of the power line. However, in the intervening years, people may have encroached on the safety margin.

NEDP planners must be alert for the cases in which the 2.4 meters safety margin has not been maintained. In such cases, it will likely be possible to re-establish such margins through technical means such as (1) using taller poles, (2) using insulated wire, or (3) re-routing lines. As a last resort, though, it may be necessary to remove structures or vegetation in order to restore the safety margin.

It is also conceivable that NEDP would have to acquire land, for instance to expand a transformer station, construct a customer care center, etc.

¹² *Operational Policy 4.11: Cultural Property* is still under preparation. However, one can consult *OPN11.03: Management of Cultural Property in Bank-Financed Projects*.

¹³ S.I. 6 of 1966 Electricity Supply Regulations, Federal Republic of Nigeria Official Gazette, No. 17, Vol. 83, April 2, 1996. Lagos: Federal Government Press.

Thus, NEDP transmission or distribution sub-projects may adversely affect people's assets. In such instances, NEDP will have to follow procedures and policies in line with the World Bank safeguard policies on involuntary resettlement, namely, *BP 4.12: Involuntary Resettlement*, and *OP 4.12: Involuntary Resettlement*.

Therefore, a NEDP Resettlement Policy Framework has been prepared that outlines in general terms how the project will determine and provide compensation and other assistance in case people's assets, livelihoods, or standards of living will be adversely affected. The NEDP Resettlement Policy Framework is prepared as a stand-alone document.

If any particular NEDP sub-project will have such an effect, a Resettlement Action Plan will have to be prepared for that sub-project. Guidelines for preparing such plans are given in the NEDP Resettlement Action Plan template, in the Resettlement Policy Framework.

In order for the NEDP Resettlement Policy Framework to be effective, TransysCo and DisCo staff must be familiar with it. The Framework includes a plan for a series of workshops to familiarize staff with both the Framework and the NEDP Resettlement Action Plan template.

In addition, NEDP and the Zonal Offices/Distribution and Marketing Companies will need good public relations strategies and units to communicate safety concerns and compensation policies to the public.

Proposed Mitigation Measures:

- Make every effort to avoid loss of people's assets by (1) using taller poles, (2) using insulated wire, (3) re-routing lines, and other means.
- Follow the objectives, policies, and procedures set forth in the NEDP Resettlement Policy Framework.
- Prepare a Resettlement Action Plan for every sub-project where a loss of assets is foreseen.
- Familiarize TransysCo and DisCo staff with the NEDP Resettlement Policy Framework and the template for a NEDP Resettlement Action Plan through a series of workshops.
- Strengthen the public relations capacities of DisCos.

7.3 NEPA Staff Retrenchment

NEPA staff expressed surprisingly little discontent and anxiety about possible retrenchment following privatization. Several factors possibly explain this. Firstly the Power Policy Reform Team within the Bureau of Public Enterprises has kept NEPA managers and the unions informed about the process. Second, the electricity reform act states that no one will lose his or her job during the initial transition from NEPA to holding company to private companies. Third, there have been no massive retrenchments yet in Nigeria, and those that have been retrenched have received benefits packages. Finally, the privatization of the telecommunication sector led actually to an increase in jobs, as mobile phone companies came in and dramatically expanded the number of customers.

Still, the situation could change. Something on the order of forty per cent of NEPA's costs is for salaries and wages. NEPA management has wanted to carry out retrenchment in the past and, according to one retired NEPA executive, has failed only due to political concerns. Private electricity companies are therefore likely to pursue retrenchment--they will not be able to expand connections rapidly in the way that wireless technology permitted telecommunications companies to do.

Proposed Mitigation Measures:

- It is premature to suggest specific measures. The World Bank must remain alert to the need to assist with retrenchment packages, as the situation develops.

8. ERSU Capacity

TDP established the Environment, Resettlement, and Social Unit (ERSU) within the Project Management Unit (PMU) be responsible for Environmental Audits, Environmental Impact and Resettlement Assessments, and Environmental Management Plans for sub-projects. The intention was therefore to build the Capacity within TransysCo for these functions.

It is not clear whether ERSU will “follow” PMU to its eventual home, either in the Federal Ministry of Power and Steel or in the private sector. Alternatively, ERSU may be located within TransysCo, in which case its relation to the Environment and Resettlement Division needs to be clarified. A TDP-funded change management study has been undertaken and the report is presently under review. That may clarify ERSU’s role within TransysCo.

When ERSU is eventually placed within TransysCo, the unit will have responsibility for seeing that transmission staff in the six regions carry out environmental planning and management as required. In the long run, TransysCo will not have any responsibility for Environmental and resettlement planning for the DisCos. The individual Distribution and Marketing Companies will have responsibilities for its own affairs in that respect. However, the organizational structure for the DisCos has not yet been worked, so it is premature to say how environmental and social impact planning will fit into the eventual company set-up.

Under these circumstances it is not practical to make any further recommendations as to how to build ERSU capacity for its long term role in the energy sector. This is especially true, given that an extensive study of the issue was carried out last year.¹⁴ The position needs to be reviewed and measures taken to ensure that.

In the short term for the NEDP, the ERSU will need some additional staff in order to meet the demands of Environmental and Resettlement Planning. The Appraisal Team should consider making provision for adding one to three additional staff members over the course of the project, provide adequate training and capacity building interventions.

¹⁴ Greystone Environmental Consultants Inc. 2004. *Establishment, Capacity Building and Training for the Environment, Resettlement and Social Unit of the TranSysCo*. Greystone Environmental Consultants, Greenwood Village, Colorado 80111, USA.