INTER-AMERICAN DEVELOPMENT BANK

DOMINICAN REPUBLIC

EDE Sur EDE Norte Electric Distribution Project
(DR-0137)

ENVIRONMENTAL AND SOCIAL IMPACT REPORT (ESIR)

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I. INTRODUCTION

1.1 The Commission for the Reform of Public Enterprises (*CREP*) of the Dominican Republic has initiated a process of capitalization of the Dominican Electricity Corporation (*CDE*). This process is being implemented within the legal framework of the Law of Reform of Public Companies No 141/97 passed on July 24, 1997 and Law No 4115 passed on April 21, 1955. The aim of the capitalization process is to encourage the further development of electricity generation and distribution in the Dominican Republic through private sector participation. Thus in the longer term, the government aims to change its role from service provider to service regulator.

1.2 The restructuring process has resulted in CDE maintaining control of the existing hydroelectric plants and the signing of Power Purchase Agreements (PPAs) with private sector Independent Power Producers (IPPs) including Smith-Enron and Dominican Power. The infrastructure for high voltage electricity transmission remains under government control. The infrastructure for electricity distribution is controlled by the three newly privatized distribution companies: EDE Norte (Northern Distribution Company), EDE Este (Eastern Distribution Company), and EDE Sur (Southern Distribution Company). CDE retains 50% of the distribution system properties as its infrastructure contribution to the new distribution companies but has no management role.

1.3 Unión Fenosa was awarded the concession contract for two distribution companies, EDE Norte and EDE Sur, on April 15, 1999 with a total bid of approximately US $211 million which purchased 50% ownership of the two companies. Unión Fenosa is applying for a corporate loan from the Inter-American Development Bank (IDB) for US$53.4 million to assist their efforts to modernize and expand EDE Norte and EDE Sur specifically related to project investments for Year 2000 and 2001, for both EDE Norte and EDE Sur (the "Project"). Co-financers will provide an additional US$86.6 million.

II. PROJECT DESCRIPTION

A. Site Location

2.1 The Project is located in the north of the Dominican Republic in the existing service areas of

2.3 EDE Sur's distribution system serves residential, industrial and commercial customers in the Santo Domingo metropolitan area (*Distrito Nacional*). The estimated number of EDE Sur customers in 1998 was 303,200. Continued growth in demand, particularly among commercial and industrial users, is anticipated to grow. Population density is relatively high.

B. Project Facilities

2.4 The current EDE Norte distribution network includes approximately: 55 electrical substations, measuring and control devices; 3,500 kms of distribution lines (triphasic and monophasic) and associated right-of-ways, pylons, poles, distribution transformers, etc.; approximately 19,000 lamps for public lighting; and various warehouses and commercial offices.

2.5 The EDE Sur distribution network includes approximately: 50 electrical substations, measuring and control devices; 3,000 kms of distribution lines (triphasic and monophasic) and associated right-of-ways, pylons, poles, distribution transformers, etc.; approximately 16,000 lamps for public lighting; and various warehouses and commercial offices.

2.6 There are nine sub-stations among the 105 where infrastructure is shared between EDE Norte and CDE or EDE Sur and CDE. These substations are described in more detail in Shared Infrastructure and Potential Liabilities, Section V.C

C. Project Components

2.7 The Project consists of six main programs. Only one program (the "Reduction of Technical Losses Program") involves significant physical construction works associated with the refurbishing of the network with the potential to cause environmental or social impacts. The remaining programs involve management measures, equipment purchase, enhancement of plant or offices, installation of small appliances, and development of new office facilities. The four programs which requires only management actions, computer hardware/software application, installation of metering appliances, office improvements, or training are:

- *Reduction of non-technical losses* – Non-technical losses refer to accounting losses attributable to poor metering of electricity flows, this program considers a massive program of meter installation to more accurately account for electricity flows.
- *Improvement of customer service*- this will mainly involve physical improvement of commercial offices, improvement of invoicing mechanisms, and training of personnel who have direct contact with customers.

for employees and company vehicles and warehouse space. The area required for these sites is about 6,000 $m^{2.}$ The areas have not yet been identified but will be urban or suburban sites; construction will involve only standard urban construction activities for such facilities.

2.9 The *Technical losses reduction program* requires physical plant works to reduce technical losses (i.e. transmission losses attributable to line inefficiencies due to dilapidated equipment). This program involves the rehabilitation, upgrading, and installation of substations and distribution lines. The two basic components of the program are substations and distribution lines.

2.10 Substations will be upgraded primarily through replacement of transformers and associated infrastructure (secondary containment, grounding, remote control, etc.) and in two installation areas of new substations. This program involves small-scale civil works. The EDE Norte sub-stations scheduled for improvement are: Palamara, Bonao Per, Sosua, Don Pedro, Canabacoa, Puerto Plata, San Francisco de Macoris, Cruce Esperanza, Cotui, Imbert, La Vega Per and Sabaneta Yasica. A new transformer substation is needed at Cabarete; for which presently the exact location has not yet been determined, but the setting will be either urban or suburban. The EDE Sur substations scheduled for improvement are: Azúa, Matadero, Madre Vieja, San Juan de la Maguana, Km 10.5, Bani Per, Bayona, Centro de Operaciones, and Pizarrete. A new transformer substation is needed at Santo Domingo; for which presently the exact location has not yet been determined, but the setting will be either urban or suburban.

2.11 Distribution lines work involves the decommissioning of existing lines and poles, mounting of new concrete poles, lines and associated equipment (pole transformers, capacitors, lightning rods, etc.). These actions involve mainly small excavations for pole installation, transport of large quantities of poles, and pouring of concrete (i.e. pole foundation). The 2000/2001 program includes the rehabilitation of lines in 10 areas, all urban and suburban, along existing rights of way (which are mostly along existing roads) or along existing roads. Approximately 230 kms of new trunk lines will be installed, 250 kms of triphasic and monophasic lines will be rehabilitated, and 6,000 poles will be installed.

2.12 The distribution and quantities of the Technical Losses Reduction Program for the three EDE Norte service area are:

- *City of La Vega:* Construction of 7 trunk circuits of 43 kms total length; conversion of voltage in other 43 kms of lines; installation of 3,000 transmission poles, 1,556 lighting poles, 371 in-house distribution transformers, and 184 exclusive distribution transformers.

- *City of Bani:* Construction of four trunk circuits 30kms in total length; conversion of voltage in other 30 kms of lines; and installation of 300 in-house distribution transformers.
- *City of Bonao:* Construction of six trunk circuits 35kms in total length; conversion of voltage in other 60 kms of lines; installation of 1,300 transmission poles; and 475 in-house distribution transformers.
- *Area of Haina (Granitos Bojos) substation:* Construction of three trunk circuits of 25kms total length; installation of 500 transmission poles and lighting poles, and 125 in-house distribution transformers.
- *Area of Feria substation*: Construction of two trunk circuits of 10kms total length; installation of 50 new and substitution of 138 in-house distribution transformers.
- *Area of Matadero substation:* Construction of five trunk circuits of 16 kms total length; conversion of voltage in other 17 kms of lines; installation of 200 transmission poles with transformers.
- *City of Nagua:* Construction of four trunk circuits of 20 kms total length; conversion of voltage in other 25 kms of lines; installation of 600 transmission poles and 200 in-house distribution transformers.
- *City of San Juan:* Construction of five trunk circuits of 14 kms total length; conversion of voltage in other 5 kms of lines; installation of 350 transmission poles, 350 lighting poles and 70 in-house distribution transformers.

D. Project Workforce

2.14 The Companies are to be managed by a five-member management committee, four of which were appointed by the strategic investor (Ufacex). Ufacex is the international investment and operating unit of *Unión Eléctrica Fenosa, S.A.* ("Unión Fenosa"), an international group investing in a wide variety of businesses, from electricity and water to software development and international consulting. The group is a leading developer and qualified operator of electricity distribution networks, including controlling shareholdings in the two largest distribution concessions in Panama and the former distribution assets of INDE in Guatemala. Unión Fenosa owns and operates more than 5,300 MW of capacity and has interests in a total 8,300 MW of capacity and distributes electricity to approximately 4.4 million customers worldwide, 32 percent of which outside Spain

2.15 The total workforce required for the project is difficult to estimate due the works to be performed (numerous small construction activities), their location (distributed throughout the main population centers of the country), and schedule (to be performed over several years).

- General contracting/construction (i.e., masonry and concrete work, carpentry, plumbing, etc) will be carried out by local; and
- Existing EDE Norte and Sur staff will carry out management system improvements.

2.16 The Companies' total initial workforce was 1,800 and it has increased up to 2,500. The Companies policy is to also outsource various, non-core business support services. EDE Norte and Sur will encourage workers to found small businesses to provide non-core services. Both companies would then issue contracts to these companies to supply the services.

E. Project Costs

2.17 The total estimated project costs (i.e., investments for the two-year business plan 2000 and 2001) is US$142 million. Projected costs for the six individual programs are presented in Table 2.1.

F. Alternative Analysis

2.18 The most relevant alternatives to be studied in energy distribution projects are the routing of the distribution network lines and the location of sub-stations and other support infrastructure (e.g., warehouses and other buildings). As previously described, most of the project components involve existing sites/infrastructure (e.g., upgrade of existing sub-stations, revamping of existing lines) in an urban or suburban context. Only in the cases of new substations (two), new buildings (two) and new trunk circuits (11 new lines) are consideration of alternative routes/locations a realistic possibility. Currently, no alternative locations have been studied for the new sub-stations and buildings. However, it is extremely likely that all locations will be either urban or suburban, not rural. The environmental characteristics of these locations are likely to be relatively similar, such that little would be gained through alternative analysis in terms of environmental impact. The social context, however, will likely be more varied and potentially more sensitive (i.e., noise, visual impacts, land use). Therefore, alternative analysis focusing on social impacts will be required as part of the selection process of the new locations.

2.19 With respect to the new trunk circuits, given that they will be located in urban environments, there are no alternatives other than following existing roads and streets. Even in suburban locations, past and planned future practice is to follow existing roads and rights of way. Other types of alternatives, such as transport voltage, new sources of energy, and construction

A. Institutional

Electricity

3.1 Currently, the Secretariat of State for Industry and Trade, under the Ministry of Industry and Trade, is the government agency responsible for designing policies for the electrical energy sub-sector[1]. Next in line is the Superintendence of Electricity, the regulatory body for electricity services with the responsibility for supervising and enforcing regulations, defining tariffs and guaranteeing the continuous supply of electricity. The Dominican Corporation of Electricity (CDE) is the former state owned monopoly responsible for generation, transport and distribution of electricity. CDE currently owns hydropower electrical generation facilities, all high voltage transport infrastructures, and some residual and shared transforming infrastructure at the high-medium voltage boundary sub-stations. CDE must purchase electricity from the Independent Power Producers (IPPs), transport it and sell it to the privatized distribution companies (e.g., EDE Norte and EDE Sur).

3.2 The "Commission for Reform of State Owned Companies", created by the General Law of Reform of State Owned Companies (24 June 1997), is the implementing agency for the capitalization of state-owned companies through private investment. The Commission is also responsible for the establishment of procedures and mechanisms for privatization of state companies.

Environment

3.3 The institutional framework with respect to environment in the Dominican Republic is also in a transitional situation due to the change in government. Historically, environmental responsibilities have been divided among a large number of institutions at the national and local government level. Over the last several years there have been several initiatives to centralize environmental responsibility. The centralization initiatives as well as the main environment agencies are described below.

3.4 In 1987 the National Environmental Commission (CONAMA) was established with the aim of consolidating an environmental management system for the country; however, in practice this Commission has met only a few times. In 1998 the Commission of the State Secretariat for Natural Resources and Environment (COSERENAMA) was created. That same year, by Presidential Decree 216/98, the National Institute for Environmental Protection (INPRA) was

Decree, which created it, INPRA has jurisdiction over a wide range of environmental issues, but there is overlap with other existing institutions in the many areas of environmental management (drafting of regulations, enforcement, management, etc.). INPRA has environmental policing/control jurisdiction but does not currently have sanctioning or enforcement powers. Enforcement or sanctioning powers still reside with various national government sectoral agencies or departments.

3.5 INPRA does have clear responsibility for the Environmental Impact Assessment procedure, controlling the preliminary phases, evaluation of the assessment and the issuance of declarations, conditions, and permits as well as responsibility for monitoring of compliance with conditions imposed under the process. INPRA has published a procedure of obligatory compliance for any project proponent (PT-INPRA 002). This applies to the private sector as well as other government departments, some of which, such as the Secretariat of Tourism (SECTUR) and the National Institute of Hydraulic Resources (INDRHI), have started an internal process of incorporation of environmental impact assessment procedures.

Health and Safety

3.6 The National Secretariat for Work (Labor Relations and Health & Safety) is the main institution involved in Health & Safety management. The Labor Inspectorate enforces the regulations.

B. Legal

Environment

3.7 In the Dominican Republic environmental regulations has only recently been consolidated in an environmental framework law. An initial draft was prepared in December 1998 by COSERENAMA and was since then modified several times until its approval in August 18, 2000. At the moment there are a few environmental regulations which apply to the EDE Norte and EDE Sur project, both for current operations as well as the planned new construction and operation activities. The relevant laws are listed and described below:

3.8 *Water pollution*: There are several regulations that control this issue. Law 4471 of 28 June 1956, National Code of Public Health (Sanitary Code) prohibits the discharge of wastewater, whatever its nature, to waters which could be used for potable water, irrigation, industrial use

sets permit and analytical requirements for discharges into water bodies and determines the need of separate sewer systems (stormwater, sanitary, process and refrigeration) for industries).

3.9 *Solid Waste:* Law No 120 of 30 December 1999 on Waste, prohibits the dumping of any kind of waste in public areas (roads, rivers, parks, beaches, streets, etc.). INPRA procedure No 001 of 1999, defines hazardous wastes as those that pose a threat to public health or the environment when they are stored, transported or managed inadequately. The Sanitary Code determines that the National Health Service must provide advice to industries regarding waste management.

3.10 *Forest Resources:* Law No 5856 of 2 April 1962 on Forest Protection, regulates several issues related to forest management and conservation, prohibiting destruction of forests in areas such as mountains, river banks, etc. and sets a permit system for timbering activities.

3.11 *Hazardous materials:* INPRA procedure No 001 of 1999, determines that any person or company dealing with hazardous materials must inform INPRA regarding the storage, management and final disposition of these materials.

3.12 *Soil pollution*: Indirectly, INPRA procedure No 001 of 1999 determines that temporary storage of hazardous substances on soil or sub-soil, and final disposition of any kind of wastes on soil and sub-soil can only take place with INPRA authorization.

3.13 *Air emissions:* INPRA procedure No 001 of 1999 prohibits the open air burning of wastes, with some exceptions, and sets out the need of INPRA authorization for waste incineration in contained units. INPRA also recommends that World Bank air emission guidelines be followed.

3.14 *Noise:* No specific regulations exist. INPRA recommends World Bank guidelines for noise emissions (see Table 3.1*)*.

3.15 *Environmental Impact Assessment:* INPRA procedure No. 002 of October 1999 specifies the procedure and mechanism for EIA presentation and approval. The promoter must present project data, INPRA analyzes it, undertakes a focused public consultation exercise (scoping) and directs the promoter as to the required level of detail for the EIA (i.e., no EIA, brief EIA, detailed EIA) and the Terms of Reference. An independent and registered consultant or

provide workers with adequate measures for personal protection, neutralize or minimize risks, and reduce the number of hours that a worker is exposed to high-risk activities.

3.17 In addition, Regulation No 807 on Industrial Hygiene and Safety of the Secretary of State for Work (30 December 1996) prescribes minimum requirements that companies should apply for the prevention and control of accidents and occupational illness. Health and safety legislation in the Dominican Republic is summarized below:

- Sanitary Code (*Ley de Salud Publica*,1956);
- Dominican Labor Code (*Código Laboral Dominicano*), created by Law No 16 of 29 of May 1992 and Regulation No 02/93 for the application of the law in 1993;
- Regulation No 807 on Industrial Health & Safety (*Reglamento No 807 Sobre Higiene y Seguridad Industrial,1996*) - Provides a list of recommendations of for best practice in a range of industry sectors. The electricity sector is discussed in Article 106-108;
- Industrial Safety, Prevention of Risks derived from Working (*Medio Ambiente Seguridad Industrial Prevención de los Riesgos Derivados del Trabajo*), NORDOM 496, Resolution No 3/99 (20 June 1999) - Provides a list of definitions;
- Industrial Safety, Safety Colors and Signals. (*Medio Ambiente Seguridad Industrial Colores y Señales de Seguridad*) NORMDOM 493 Resolution No 3/99 (20 July 1999) – Defines the types of signs and color codes that are recommended to be used in specific cases - not obligatory.

Other Requirements

3.18 *Capitalization contract requirements*. No environmental requirements are set out in the capitalization contracts; however, there are clauses addressing the limitation of liability. The contract transfers all environmental liabilities to the new companies, but also states that CDE is putting infrastructure in the hands of the new companies free of environmental liabilities (Clause 5.7). The parties have agreed that if existing liabilities are identified (by means of a study) within 18 months of contract signing, then CDE will compensate Unión Fenosa. Under the contract, CDE also agrees to hand over existing environmental and operational permits to EDE Norte/Sur (Clause E). In addition, no health & safety requirements are set out in this contract, but there are clauses regarding limitation of liability. The mentioned contract states that the responsibility for labor issues that arose before the signing of the contract will remain with CDE. Labor issues arising after that date will be the responsibility of EDE Norte/Sur (Clause 5.8).

work in confined spaces, hazardous material handling and storage, general worker health, general worker safety, training, and record keeping and reporting.

C. Project Compliance Status

3.20 The following permits are likely to be necessary for construction and operation of the project, although none have yet been requested (given that no work have started yet).

- Water abstraction - INDRHI (*Instituto Nacional de Recursos Hidraulicos*): for any water abstraction wells to be drilled, the companies will need permits from INDRHI.
- Sewer connections – INAPA (*Instituto Nacional de Aguas Potables y Alcantarillado*): permits are required for all domestic or sanitary connections and/or discharges.
- Potable water supply – INAPA: permits are required for access to and use of municipal supply.
- Land use – relevant municipal authorities: more of a planning and zoning than environmental function, but requisite process for new construction projects.
- Storage, handling and disposition of hazardous materials – INPRA: requirements are unclear due to lack of definition of hazardous materials in regulations, therefore may or may not be required.
- EIA – INPRA: this requirement has yet to be determined. The companies must submit an initial application describing the planned projects, after which INPRA will determine what is required in terms of additional study and/or documentation. However, given the small scale and urban setting of project location, an EIA is not likely to be required.

3.21 The documentation required to register the company's Health and Safety committees has been submitted. The permits dealing with health and safety issues are required for the following project activities:

- Construction or modification of industrial buildings permit;
- Installation of machines and equipment in commercial and industrial buildings permit;
- Registration of Company Health & Safety Committee.

Environmental Analysis

3.22 Per the IDB's requirements, the company conducted an Environmental Analysis (EA), which comprised an Environmental and Social Audit of the existing facilities and a impact analysis of the proposed works. The EA focussed on evaluating existing environmental, social and health and safety conditions, proposed works and associated operations. The EA gathered general

A. Environmental Conditions

4.1 The project area is located in the northern and southern portions of the Dominican Republic, primarily in urban areas. The area of influence of the EDE Norte and EDE Sur project is the operating area of the two companies, which extends north from Santo Domingo City to Samaná Bay and west to the Haitian Border. The project activities will be carried out in a number of cities and towns within this area, principally of existing infrastructure and generally in urban and suburban areas of low to medium density. Additional areas include high density and mixed land use (mainly residential, some commercial, and some industrial). In addition to upgrading activities, there are a number of other investments planned including the purchase of land for the construction of new sub-stations in Cabarete (small tourist town) and in the center of Santo Domingo, and two buildings and parking areas in Santo Domingo and Santiago cities.

4.2 Hispaniola is the largest island in the Caribbean, located between the latitudes of 18° and 20° North. The Dominican Republic occupies most of the island and Haití the remainder. The Dominican Republic has an approximate size of 48,730 km^2 and has approximately 8 million inhabitants, 2 million of which are concentrated in the metropolitan area of the national capital, Santo Domingo. The landscape is largely mountainous (65% of the territory) with level areas constituting the remainder (27%). There are three main mountain ranges (northern, southern and central) and a good hydrographic network fed by rains that average 1600 mm/year. The coastline is over 1,500 km long.

4.3 The climate features a pronounced rainy season/dry season pattern with the rainy season occurring between May and August and the dry season between November and December. The climate is generally hot and humid in the lower elevations and coastal areas and cooler the higher, central region. Average annual temperature is 29° centigrade.

4.4 In terms of natural environment, the Dominican Republic has the highest biodiversity of the Caribbean islands with the highest number of species per km^2. There are 33 species of mammals, 254 species of birds (22 endemic), and over 60 species of reptiles and amphibians, and more than 5,600 species of plants. Protected areas include 14 national parks and 9 scientific reserves occupying approximately 185 km^2 of the national territory including a submarine national park (*La Caleta*), a reserve for hump whales (*Banco de la Plata*) and a bird sanctuary (*Cayo 7*).

4.5 Many of the environmental problems common to developing countries are present and are

B. Social-Economic

4.6 There are approximately 8 million inhabitants; 56.2% of the population lives in urban areas and 43.8% in rural areas. The annual population growth rate is 2.3%, and the average population density is 150.3 people/km². The economically active population is 2,607,021of which approximately 20% are unemployed manual workers.

4.7 The EDE Norte service area is generally more rural and has a lower population density. Industrial development is less but tourism is the growth industry. The EDE Sur service area is more urban in character with higher population density and more concentrated industrial development.

4.8 The economy of the country has traditionally been based on agriculture. The most important crops are sugar cane, rice, coffee, cocoa, tobacco, fruit and vegetables. Mining, primarily for gold, nickel, and silver is also an important with sector. However, the structure of the economy of the Dominican Republic is changing. Agriculture and mining are declining in relative importance as to the communications and construction sectors have increased in importance. Manufactures, general business, transport, and utilities (e.g., electricity and water) have remained steady through this period.

4.9 Industry is the largest consumer of electricity (34.4%) followed by residential users (32.9%). Federal and local government users consume approximately 22.4% and the commercial customers the remaining 10.3%. Residential consumption may actually be higher due to the large number of consumers who are illegally connected to the network and are therefore not included in the statistics.

V. ENVIRONMENTAL AND SOCIAL IMPACTS

5.1 The Project basically involves the rehabilitation of existing infrastructure where relatively few environmental and social impacts are expected as a result of the minor construction activities and operations (Sections V.A and B). A summary of existing environmental and social liabilities is presented in Section V.C and Section V.D. presents the principal positive project benefits. The potential environmental and social impacts associated with the construction or refurbishing activities and operation and operation are presented in section V.A and V.B respectively.

new sub-stations and of two new warehouses. These infrastructures are planned for urban and suburban areas (precise location of the two new sub-stations and warehouses is not decided yet) and along existing rights of way, roads and streets. No new access routes are required since sufficient roads already exist.

5.3 Environmental impacts arising from the construction phase of these activities will be of low intrinsic significance and of a temporary and reversible nature. Associated impacts comprise those typical of civil works of moderate size and include: dust generation from unpaved surfaces, noise from construction equipment, associated heavy load traffic, and some potential incremental increase in erosion with degree location dependant. Impacts to the natural environment (elimination of vegetation, associated effects on fauna) are expected to be of minimal significance due to the urban/suburban locations of the planned works and the fact that the vast majority of the sites are existing.

Social

5.4 The following potential social impacts have been identified for the construction phase of the rehabilitation and expansion program. These impacts are temporary and can be mitigated with the use of environmental management measures commonly used in similar works: inconvenience to local people caused by electrical power cuts and disruption to traffic; noise; and accidents involving workers and the general public.

B. Operational Phase

Environmental

5.5 Given the nature of the Project (i.e., infrastructure upgrades involving transmission lines, sub-stations and warehouses/buildings), the potential operational impacts should not differ from those of the existing operations. Only in the case of the two new trunk circuits and two new sub-stations will the new infrastructure be associated with new operational impacts. The types of potential impacts are described below. In addition, potential operational impacts due to wastewater discharge and air emissions are presented in Section V.C.

5.6 *Generation of hazardous wastes arising from equipment substitution*. The potential hazardous waste may be PCBs from older transformers, used oils and mercury vapor from lamps. The potential impacts involving hazardous wastes will be no different under the proposed project

long time. Given the planned voltages in the two new trunk lines, the potential electromagnetic effects are considered to be insignificant.

5.8 *Corona effect*. The *corona effect* involves the disruption of or interference with radio and TV reception. As with the electro-magnetic field effect, the validity of this impact has not been fully confirmed. Again, as a new impact of the project, it would be relevant only for the new trunk lines, and the projected voltage implies no significant or recognizable effect. Furthermore, the insulation of the new trunk lines will be accordance with international norms and specifications (Class ANS, clay "wet process") and should not cause radio interference.

5.9 *Bird collisions*. As with the above components, this would be a "new" impact only for the new trunk lines. However, it is not anticipated that this will be a significant or major impact given that the lines are not high tension, high voltage lines with large pylons extending far above the ground; on the contrary, these are low voltage, local distribution lines with low elevation poles. Second, the lines will be in urban areas with low-density bird populations and without rare or significant species.

Social

5.10 *Visual impacts.* It is inevitable that the transmission lines and new sub-stations will produce a negative visual impact altering the visual quality of the immediate surroundings and the overall scenery. However, for the most part the transmission lines already exist and the project involves only replacing poles and lines. The new lines are relatively limited in extent and the added impact should be small. In the case of new sub-stations, the visual impact will depend on precise siting and context. The location of the existing substations is highly varied and hence their visual impact is varied as well.

5.11 *Economic impact on poor settlements*. The Project is designed to bring about a reduction in the overall loss of energy caused by fraud, illegal connections and faulty electricity meters. Most of the consumers with illegal connections are those living in the low income, informal settlements. Cutting illegal connections without a strategy to mitigate the effects could have a negative impact on this group and the economy. The current Investment Plan indicates that the company's approach will in the short term be to concentrate on improving cost recovery from larger users (e.g., government and industry) as the cost/benefit ratio is far more favorable than in the low income segment. Thus, this potential negative impact on the poor is unlikely to be realized in the short term. Illegal residential consumers will eventually be targeted by the

C. Environmental, Social, and H&S Issues Associated with Existing Facilities

5.13 Based on the Project Environmental Analysis, a number of existing issues have been identified which pose various degrees of risk. There is a moderate level of risk associated with the overall soil contamination present at EDE Norte and Sur installations. However, the risk may be higher in certain sub-urban or adjacent rural areas where municipal water supplies are not available and certain households may rely on shallow ground-water sources. In such cases, the risk should be evaluated on a case by case basis.

Environmental

5.14 *Soil and Groundwater Contamination.* There is evidence that the practice of dumping used transformer oils directly on the ground was widespread. Half of the substation facilities have areas of oil stained ground; 30% have oil stained area larger than 5 m^2. Also, even though soil contamination appears to be principally from oil, solvent related discharges can not be ruled out. Current information suggests that groundwater is not commonly used for potable water supply in urban areas of the Dominican Republic. With respect to the nature of the type of oils involved, it is reported that PCB containing oils were used or present at very few sites; a total chlorine analyses of 108 operational transformers carried out by Unión Fenosa showed there is the possibility of presence of PCBs in eight transformers (seven belonging to EDE Norte and one belonging to EDE Sur).

5.15 *Solid Waste.* Current storage, treatment and disposal of waste were found to be generally inadequate with different degrees of significance. In terms of storage and potential impacts to soil and ground water, there are a number of sub-stations, workshops and commercial offices (68% of the total) where different types of wastes are stored in the open (i.e., uncovered) on bare ground. This includes decommissioned equipment (transformers, switches), assorted hazardous wastes (mostly used oils, drums, waste lamps and bulbs), metallic scrap (cables, etc), wooden poles and assorted domestic waste. The currently available information does not permit assessment of how many decommissioned transformers there are (at the 28 sites with decommissioned transformers) or which of these may contain PCBs (only operational transformers have been tested). In terms of waste disposal, it is not clear what types of hazardous wastes were disposed in the past at EDE Norte and EDE Sur installations.

5.16 *Wastewater/oily discharges.* Existing facilities do not produce significant wastewater effluents, as the only effluent is sanitary waste (sewerage) which poses only a moderate risk to the

5.18 *Shared infrastructure and potential liabilities.* A number of sub-stations (9) have been identified where both EDE Norte/Sur and CDE infrastructure is operated. All combinations occur: EDE property with CDE transformers, CDE property with EDE transformers, and EDE properties with other CDE infrastructure (e.g., vehicle fuel service station and USTs in one case) or shared property of warehouse (one case). In the cases where the substations are property of EDE with CDE transformers or other equipment, the management responsibility is EDE's as is the potential liability for existing issues/future problems notwithstanding the liability distribution clauses in the capitalization contract (see Section 3.3). There are also situations where the property is CDE's but EDE has the management responsibility, but these are new sub-stations and generally non-problematic. The least clear cases are where there is relatively minor infrastructure owned by EDE within a mostly CDE operated substation (four cases). In these last four situations it is unclear who retains the environmental liability and who would be responsible in the case of potential future environmental problems.

Health and Safety

5.19 Existing health and safety conditions at EDE Norte/Sur sites are considered to be inadequate when compared with applicable standards (i.e., Spanish/EU regulations). The most important problems identified are summarized below and are a very high priority for EDE Norte and EDE Sur.

Sub-stations

- Lack of security such that unauthorized persons gain access to sites;
- Lack of danger/warning signs on fences;
- Lack of protection channels/shielding for cables;
- Non compliance with minimum safety distances;
- Poor safety conditions of some infrastructure (e.g., interrupter heights);
- Lack of use of personal protective equipment (PPE) and clothing by workers;
- Lack of fire fighting devices;
- Lack of grounding;
- Lack of H&S training;

Offices

- Unsafe conditions (slippery floors, ergonomics in the work place, etc);
- Poor occupational environment (poor illumination & ventilation, etc);
- Lack of Emergency and Evacuation Plans;

Construction phase

5.20 The principal positive direct social impact during the construction phase will be employment opportunities in the form of temporary contracts for local technicians and service companies. Construction works will be sub-contracted on competitive tenders, mainly for general contracting works. For specialized works (i.e., electrical contracting) the Companies will employ either local and/or international contractors with a track record in the electricity sector. The project will also indirectly foster economic growth at a local and regional scale by contracting services and goods in the local market.

Operation phase

5.21 The implementation of the Project is expected to result in improved environmental management throughout all operational phases of EDE Norte and EDE Sur. This will involve both corrective actions to remediate existing problems as well as improved procedures, standards, and monitoring of performance in the future. Specific expected improvements are discussed in Section VI of this report.

5.22 It is suggested that the introduction of the new administrative and operational structure of the two electricity distribution companies (EDE Norte and EDE Sur) will help to bring about an important improvement in the quality and reliability of the electricity supply in these areas. Increased reliability of supply could potentially have the indirect effect of encouraging new productive activities, which will improve the local economy. In addition, since public lighting will be installed at the same time as the new transmission lines, the project should bring about an improvement in public safety.

5.23 In terms of health and safety the general improvement of sub-stations, distribution lines and offices will have a direct effect on safety conditions. Thus, the project should have a positive impact in terms of reducing the number of accidents to workers and the general public, both at construction and operation phases. In addition, the implementation of the Corrective Action Plan for existing Health & Safety issues should further improve these conditions.

VI. ENVIRONMENTAL, SOCIAL HEALTH AND SAFETY MANAGEMENT

6.1 Given the basic lack of previous environmental, health and safety management activities prior

and safety plans and procedures, two specific Company environmental, health and safety plans have been developed:

- Environmental and Health and Safety Improvement Plan, which includes various corrective and preventative measures to address existing Company environmental, health and safety liabilities and deficiencies; and
- Operational Control Plan, which are the environmental, health and safety procedures for the Project construction and operational activities.

6.2 A summary of the various corrective and preventative measures to address existing Company environmental, health and safety liabilities and deficiencies is presented in Section VI.A. A summary of the proposed Project environmental and social mitigation and monitoring measures is presented in Section VI.B, while Section VI.C presents those for health and safety. Project. Section VI.D summarizes the Company proposed Contingency Plan and Section VI.E summarizes planned activities associated with environmental, health and safety management systems (including responsibilities).

A. Environmental and Health and Safety Improvement Plan

6.3 The Project's Environmental and Health and Safety Improvement Plan includes various corrective and preventative measures to address existing Company environmental, health and safety liabilities and deficiencies that were identified in the Project Environmental Analysis. The Plan includes a description of the proposed corrective or preventative action and presents a cost estimated and timetable for implementation. A summary of the principal environmental related and health and safety related actions is presented below.

Environmental

6.4 The two principal environmental corrective actions, in terms of most significant risk, relate to management of solid and hazardous waste and potential soil and groundwater contamination from waste petroleum products (e.g., oils, etc.).

6.5 Other storm waste oil, begin with studies to elaborate the extent of the problems, options, and solutions, improved disposal solutions are on hold pending the completion of a recommended waste management options study. This is a logical course of action, the only issues being time frame and final conclusions and recommended solutions.

for hazardous waste storage at installations; and installation of secondary containment at transformers and fuel or oil storage facilities.

Health & Safety

6.7 As part of the Environmental, Health and Safety Improvement Plan, the Companies have defined responsibilities (shared between line management and human resources), created the required Health & Safety Committee, and developed standard health and safety definitions. In addition, EDE Norte and EDE Sur are in the process of developing various health and safety procedures adapted from those used by Unión Fenosa in Spain to Dominican Republic conditions and realities. These procedures will be implemented over time, and thus divided into short, medium and long term measures:

Short term

- Provide appropriate PPE to all employees as appropriate.
- Provide appropriate fire-fighting equipment (hydrants and/or extinguishers).
- Implement emergency and evacuation procedures.
- Guarantee safety distances at all installations where there are moving parts.
- Provide appropriate fencing.
- Replace unsafe equipment.
- Inspect and upgrade grounding.
- Install risk signage.
- Elaborate Emergency and Evacuation Plan for offices and conduct practice drills at least twice a year.
- Improve working conditions in commercial offices and warehouses.
- Implement safety control and H&S management procedures.
- Elaborate and implement Health & Safety Training Program.

Mid-term

- Provide information signage for PPE use, safety measures and first aid.
- Construct or upgrade specific rooms or buildings for battery storage.
- Provide centralized channels for cables at all sub-stations.
- Improve fencing.
- Inspect fire fighting equipment on a regular basis.

Long-term

- Assessment and Instructions to Sub-contractors (procurement procedure),
- Waste Management during Construction,
- Liquid Discharge Management during Construction,
- Control of Non-Point Air Emissions (e.g., dust) during construction,
- Waste Management under normal operations,
- Storage of Hazardous Materials and Wastes,
- Social mitigation measures are addressed in the Communication Plan (see Section VII), and include communication with local affected communities (e.g., aware of activities before disruption of power or interruption of traffic, potential construction nuisances, etc.),
- Monitoring plans to ensure that the mitigation and preventative measures are taken including visual inspection of works (see Section V.E) and monitoring of solid and liquid waste.

6.9 In addition, the following environmental and social mitigation measures planned:

- *Visual impacts*. In most cases potential visual impacts can be mitigated through planting of vegetative screens, as necessary.
- *Labor force reduction*. The companies do not anticipate any labor force reductions as a result of the proposed project. The rehabilitation and expansion program should lead to the creation of temporary employment for a number of skilled and semi-skilled workers. The companies have in fact increased labor force from 1,800 to 2,250 ant the long term policy is to also outsource various, non-core business support services.
- *Impacts on poor communities.* Illegal residential consumers (e.g., those with illegal connections) will not be targeted by the program in the medium term (e.g., within 2 years). The companies plan on developing a formal strategy and program (i.e., information program, energy conservation strategies and programs, special tariffs, collective agreements with municipal authorities etc.) to deal with this group of consumers when the problem arises in the future.

C. Health and Safety

6.10 For assuring appropriate health and safety management during construction, the following actions will be implemented:

- Awareness raising and training among workers regarding Health & Safety practices both for employees and the public at large;
- Enforcing health and safety requirements on all sub-contractors, including a clause in sub-contractors contracts forcing sub-contractors to follow EDE policies and procedures,

6.11 The companies have developed the following procedures to address the most relevant risks in the short and medium term:

- Management for taking live equipment off line,
- Returning equipment to service,
- Localization and isolation of faults in distribution lines,
- Use of ladders,
- Use of scaffolding,
- Electric welding,
- Storage and manipulation of pressure vessels,
- Use of mechanical and manual tools, and
- Pole erection.

D. Contingency Plan and Procedures

6.12 The Project Contingency Plan has taken into account the following potential emergency scenarios:

- Leak or spill of product in installation;
- Leak or spill of flammable product during installation;
- Leak or spill of hydrocarbons in warehouses;
- Leak or spill of flammable product in tanker loading area;
- Fire in other buildings and installations; and
- Explosions and other hazardous natural phenomena, such as earthquakes and floods.

6.13 For each of these scenarios, there is a procedure describing the nature of the situation, the sequence of actions to be taken, and the preventative measures to be taken to diminish the possibility of damage. The plan also includes the necessary material and equipment, required training, and ongoing revision of the plan and procedures.

E. Environmental, Health and Safety Management

6.14 The Companies plan is to develop, implement over time two separate EH&S management systems: (1) an environmental management system along the lines of ISO 14001; and (2) a health and safety management system along the lines of Spanish Norm UNE 81.900-EX. As a short-term measure, some portions of a management system are under design and implementation; for example, various environmental, health and safety procedures (e.g., as

supervisors will play a leading role in the supervision and control of project mitigation and monitoring.

6.16 The Companies have drafted a training plan related to environmental, health and safety aspects, and includes a "Train the Trainer" strategy. The plan presents the main and preliminary contents of a training plan, which are basically the recommendation of several courses such as: Environmental Awareness Raising.- 4 hours- Managing level; Environmental Problems of Electrical Distribution- 40 hours- EH&S manager and teams; Good Practices in Electrical Distribution Companies –16 hours- EH&S team, construction, maintenance, operations and warehouses supervisors; Hazardous Waste and PCB containing materials management- 16 hours-EH&S team, maintenance and workshops managers, sub-station managers.

6.17 The estimated total cost of the environmental part of the Environmental, Health and Safety Improvement Plan is approximately US$ 1,200,000. The main items are waste disposal, improvement of waste storage, repair of leaks, soil and groundwater contamination assessment studies, construction of secondary containment, development of an Environmental Department, and implementation of an Environmental Management System. In terms of timetable, most actions are planned to start within the current year or the first quarter of 2001 and are projected out over the next 4 to 6 years.

6.18 The total cost of the health and safety part of the Environmental, Health and Safety Improvement Plan is approximately US$2,3 million, including: infrastructure improvement in sub-stations (US$1,6 million); assorted activities at general offices (emergency related, inspections and revisions) (US$ 128,000); assorted activities at commercial offices (US$ 229,000); improvements at other installations (US$ 155,000); provision of PPE (US$ 93,000); and short, mid and long term H&S Management Systems related actions (procedures, training, emergency, implementations of system)(US$ 128,000). In terms of schedule, all identified as short-term actions will start before the 4th quarter of year 2000.

6.19 In addition, the following are estimated costs and schedules for other environmental related aspects:

- Development of an Environmental Management Department in the companies: estimated cost US$105,000, estimated implementation schedule third quarter 2000;
- Development of a waste management options study in order to effectively implement the corresponding Operational Control Plan procedure; no cost has been defined; implementation schedule third quarter 2000-second quarter 2001;

7.1 The Project Environmental Analysis was made available to the public in September 2000, both locally in the area of the Project and at the IDB offices in the Dominican Republic and in Washington. While no other formal public consultation have taken place so far, press releases and some uncoordinated separate actions have occurred such as radio stories, direct information handouts on programmed energy supply cuts, and informal communications between company representatives and local/municipal politicians.

7.2 The Company has, at the specific request of the IDB, developed a Communication Plan, which will be implemented in three phases:

- Short Term or Preliminary Phase (August 00-December 00);
- Project Phase. Step I. (August 00-December 02); and
- Project Phase. Step II (January 03-July 05).

7.3 The proposed actions for the preliminary phase are:

- Media Press Releases - an open public announcement of request for feedback;
- Presentation of the project's main characteristics to the National Regulatory Agencies (INPRA, COSERENAMA, Labor Secretariat, DIGENOR) seeking feedback; community representatives - municipalities (unions), civil groups, NGOs including letters, general brochures and descriptions of works expected to take place in each respective area, requesting feedback of all types including written; and
- Internal diffusion among staff employing several mechanisms for diffusion and feedback.

7.4 In the second phase, which partially overlaps with the previous, several actions are planned such as perception surveys and focus group surveys, etc. Other planned activities are:

- Before any construction takes place, a second local institution meeting will take place;
- Before any construction or disruptions (traffic, energy cut, works themselves) takes place, the affected population will be directly informed by means of radio broadcasts, letters, press releases, via commercial offices, and through local churches and schools; areas with poor population and illegal connection will be also targeted by an energy conservation program.
- Presentations and talks to civil associations; and
- Contacts with other institutions such as fire brigades and hospitals.

7.5 The content of the third phase will be determined depending on results of the previous two.

VIII. RECOMMENDATIONS

2. All requirements associated with any environmental, health and safety related permits, authorizations, or licenses that apply to the Project or the Company.
3. All environmental, health and safety requirements of the Project contracts, and any subsequent modifications.
4. All aspects and components of all of the project's environmental, health and safety documents, including the Operation Control Plan and the Environmental, Health and Safety Improvement Plan.
5. Applicable aspects of the International Finance Corporation Electric Distribution Guideline (July 1998).
6. Applicable aspects of the International Finance Corporation General Health and Safety Guideline (July 1998).
7. Applicable aspects of the World Bank General Environmental Guideline (World Bank Pollution Prevention Handbook, July 1998).
8. Consult with IDB before approving or implementing any and all substantive changes to the Project or its timetable which could potentially have negative environmental, social, or health and safety effects.
9. Send written notice of any and all noncompliance with any environmental, social or health and safety requirement of the loan agreement and any significant environmental, social, or health and safety accident, impact, event, claim or material complaint.
10. Ensure that all companies contracted for construction and operation activities comply with the applicable environmental, social and health and safety requirements of the loan agreement.
11. Implement ongoing information disclosure and consultation activities related to environmental, social, and health and safety aspects of the project.
12. Implement an environmental, health and safety management system that is consistent with ISO 14001 and BS 8800.

8.3 Prior to First Disbursement of the Loan, the Company shall fulfill the following conditions:

1. Present a finalized Environmental, Health and Safety Improvement Plan, in form and substance acceptable to the IDB, including: (a) adequate information and procedures, as necessary, to demonstrate that the presence/absence of PCB´s have been properly assessed in all transformers (active, decommissioned and stored) and that an adequate management plan is been implemented to dispose PCB and reduce any associated risks; (b) approach for assessing potential soil and ground water contamination; and (c) a time schedule for all proposed activities, including start date, end date and key milestones.

4. Present a finalized list of specific, if any, potential environmental, health and safety permits may be required for both new and existing operations, including confirmation that the relevant Dominican Republic environmental authorities do not require a formal environmental impact assessment for any new Project works.

8.4 Prior to each disbursement, the Company must certify compliance with all environmental social, and health and safety requirements in the loan agreement.

8.5 During the life of the Loan Agreement, the Company must prepare and submit an Environmental and Social Compliance Report, in form, content and frequency acceptable to IDB.

8.6 The Bank will monitor the project's environmental, social, and health and safety aspects via internal Bank supervision actions (e.g., site visits, review of documentation, etc.) and will contract an external independent environmental consultant to perform more detailed supervision/monitoring actions during project construction and initial operation. In addition, the Bank will have the right, as part of the Loan Agreement, to contract for the performance of an independent environmental, health, and safety audit, if needed.

TABLE 2.1
PROJECT COSTS BY PROGRAM FOR 2000/2001

Program	**Cost in millions of US$**	
Company	**EDE Norte**	**EDE Sur**
Reduction of non technical losses	38.3	25.5
Reduction of technical losses	37.7	25.1
Improvement of client service	1.3	0.9
Improvement of service quality	2.7	1.8
Improvement of business management	1.5	1.0
Provision of necessary resources and installations for efficient operations	4.2	2.8
TOTAL	85.7	57.1

Notes: Reduction of technical loss program will be expended over 6 years.