

INTER-AMERICAN DEVELOPMENT BANK



BRAZIL

***CEMAT Investment Program
Centrais Elétricas Matogrossenses S.A.
(BR-L1040)***

***ENVIRONMENTAL AND SOCIAL MANAGEMENT REPORT
(ESMR)***

November 2005

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BR-LI040 - CEMAT Investment Program (Centrais Elétricas Matogrossenses S.A.)
Environmental and Social Management Report (ESMR)

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LIST OF ACRONYMS

AGER – Mato Grosso State Public Services Regulatory Agency
ANEEL – National Electric Energy Regulatory Agency
CELPA - *Centrais Elétricas do Pará, S.A.*
CELTINS - *Companhia de Energia Elétrica do Estado do Tocantins, S.A*
CEMAT – *Centrais Elétricas Matogrossenses S.A.*
CONAMA – National Environmental Council
CRE – CEMAT’s Regional Engineering Center
CRS - CEMAT’s Regional Service Center
DEC - Equivalent Duration of Interruptions per Consumer
EA - Environmental Analysis
EAR – Environmental Analysis Report
EIS – Environmental Impact Study
ESDD – Environmental and Social Due Diligence
ESMP - Environmental and Social Management Plan
ESMS - Environmental and Social Management System
FEC – Equivalent Frequency of Interruptions per Consumer
FUNAI - National Indian Foundation
HSMP – Health and Safety Management Plan
HSMS - Health and Safety Management System
IDB – Inter-American Development Bank
IBAMA – Brazilian Institute for Environment and Natural Renewable Resources
ISO 14001 – International Standard for Environmental Management Systems
NGO – Non-Governmental Organization
OHSAS 18001 - International Standard for Health and Safety Management Systems
PCB – Polychlorinated Biphenyls
PPE - Personal Protective Equipment
PPRA – Environmental Risk Prevention Program
RAS – Simplified Environmental Impact Statement
ROW – Right-of-Way
SE – Electric Substation
SEMA – State Environment Secretary
TU – Thermoelectric Power Plant

I INTRODUCTION

- 1.1 CEMAT, *Centrais Elétricas Matogrossenses S.A.* (or “Company”), was created, in August 1956 and privatized in December 1997 (Grupo REDE as main shareholder), to distribute electricity in its service area, which comprises the entire State of Mato Grosso in Brazil’s Central-West Region (**see Figures 1 and 2**). This state, the third largest in the country, presents an area of approximately 907 thousand square kilometers (km²) and population of almost 2.8 million inhabitants (79 percent of the population lives in urban areas). The Company’s activities comprise electricity distribution and generation. Presently, with a workforce of about 1754 employees, the Company provides service to the 140 municipalities in the state, servicing approximately 750,000 consumer units, and distributing around 3,885-GWh per year. Of the energy provided by CEMAT, approximately 29 percent is used by residential consumers, 21 percent commercial, 28 percent industrial, and others (government, municipalities, street lighting, etc.) make up 22 percent.
- 1.2 To increase service coverage and quality under its Concession contract, CEMAT has developed an Investment Program, part of which (the 2005-2007 component) is under analysis for support by IDB. CEMAT is seeking from IDB partial financing for its US\$ 350.8 million Investment Program (US\$ 316.8 million plus US\$ 34.0 million for financing related costs), under the IDB A/B loan program, which would amount to US\$ 114.5 million (IDB participation US\$ 75 million; other institutions US\$ 39.5 million).
- 1.3 CEMAT’s Investment Program (or “Project”) is comprised of the following components: (i) high-voltage distribution expansion; (ii) rural electrification expansion (in association with the “Light for All” – *Luz para Todos* - Program); (iii) urban electrification expansion; (iv) renovation of distribution lines; and (v) distribution system quality improvement. The majority of this investment (*i.e.* approx. 89 percent of the total) will be directed toward increasing energy distribution capabilities through the first three components that involve network expansion.

II PROJECT DESCRIPTION

A. Existing Operations and Facilities

- 2.1 CEMAT’s activities are mainly geared towards electric energy distribution as less than 10 percent of the energy distributed comes from its generating units (the remaining is provided through the interconnected system and independent generators).
- A.1 Energy Generation*
- 2.2 CEMAT’s electricity generation park is composed of hydroelectric and thermoelectric plants. Currently, CEMAT’s hydroelectric generation park comprises 12 plants (the Casca III hydropower project with 12-MW, and 11 small hydro developments with capacities ranging from 0.4 to 8 MW) totaling 54.9-MW of installed capacity. The thermoelectric generation park is made up of 32 diesel plants (with capacities ranging from 0.4 to 14 MW) amounting to a total capacity of 92.1 MW. The majority of CEMAT’s 70,000 transformers and generation plants are in rural areas in the State of Mato Grosso.

A.2 *Deverticalization and Deactivation of Thermal Power Plants*

- 2.3 Article 20 of the Deverticalization Law (ANEEL Law 10.848/04) requires distribution companies in Brazil to split up generation and distribution assets. In order to accomplish that, CEMAT has removed the hydroelectric power plants from the Company's assets and distributed them into six different generation-only companies. As the thermal power plants are part of the isolated system, they are not included in the deverticalization process.
- 2.4 However, the expansion of the transmission and distribution systems as foreseen in the Investment Program will result in the expansion of the National Interconnected System, through the connection of CEMAT's network segments to the grid, which will lead to the gradual elimination of the thermoelectric power plants. According to CEMAT's plans, 50% (or 16 units) of the Company's thermal power plants will be deactivated up to 2009.

A.3 *Distribution System*

- 2.5 The existing CEMAT electric energy distribution network comprises approximately: (i) 8,200 km of 69-138 kV distribution lines, 36,000 km of 13,8-34,5 kV, and 8,700 km of 127-380 V; and (ii) 93 substations (SEs), amounting to a total installed capacity of 1569 MVA.

B. **Investment Program Proposed Components**

- 2.6 The CEMAT Investment Program for high, moderate and low-voltage distribution of electric energy in the State of Mato Grosso comprises the following main components:
- (a) **High-voltage distribution expansion** - investment in high-voltage energy distribution with the following objectives: (i) construction of approximately 1,150 km of high-voltage distribution lines at 138.0 kV; (ii) construction of approximately 1,230 km of moderate-voltage distribution lines at 34.5 kV; and (iii) construction of 34 energy substations in the voltage classes of 138.0 kV, 34.5 kV, 13.8 kV, and a total installed power capacity amounting to 312 MVA.
- *Projected results include:* (i) expansion of the high-voltage distribution capacity in the State's main economic hub - in the Central and Capital Regions - directly servicing 300,000 customers; and (ii) connecting the Isolated Electric Energy Systems to the National Interconnected System (national grid) in 27 towns throughout the State; thus, gradually discontinuing electricity generation from 50% of CEMAT's thermal power plants (up to 2009) and consequently reducing 39.9 million liters of diesel usage per year.
- (b) **Rural electrification expansion (integrated in the Light for All Program)** - investment in rural electrification includes: (i) constructing approximately 16,000 km of moderate-voltage distribution networks at 34.5 kV; and (ii) installing approximately 44,450 rural distribution transformers totaling 436 MVA of installed power capacity.
- *Projected results include:* (i) electrification of 62,000 rural residences throughout Mato Grosso State; and (ii) boosting the economy and infrastructure in Mato Grosso State's rural area through the replacement by clean electric energy of diesel thermal plants currently operating in rural industries.

- (c) **Urban electrification expansion** - investment in the expansion and universalization of urban networks including: (i) constructing approximately 1100 km of low-voltage networks at 127/220 volts; and (ii) installing 1370 urban distribution transformers.
 - *Projected results include:* (i) electrification for approximately 160,000 new customers living in urban areas; and (ii) installing an electric energy network geared at servicing new industrial and commercial enterprises set up in towns across Mato Grosso State.
- (d) **Renovation of Distribution Lines** - investment in the renovation and maintenance of 33,093 km of the CEMAT's 13.8 kV and 34.5 kV-voltage distribution networks with a view to re-insulate networks that require a basic insulating level (NBI) increase, replacement of electricity poles and other rundown equipment, and installation of automation systems.
 - *Projected results include:* an improvement and isonomy in the reliability and continuity indices for electricity supply to all of Mato Grosso State's consumers.
- (e) **Distribution System Quality Improvement** - investment in distribution system to improve the quality includes: (i) the installation of approximately 360 voltage regulation and network protection devices (three-phase regulators and reconnectors); and (ii) the adjustment of 750 distribution transformers in low-voltage circuits.
 - *Projected results include:* eliminating power spikes and surges, and voltage quality problems Improvement and isonomy in the quality of electricity supply and voltage levels for all of Mato Grosso State's consumers.

2.7 Also integrated in the Investment Program are the following activities:

- (a) **Generation system improvements:** relocation and modernization of thermoelectric power plants, considering mainly noise control. As indicated, CEMAT intends to gradually eliminate all thermoelectric power plants; in the meantime, some of the remaining units, especially the older ones, will be restored and/or replaced. Noise control will be achieved by relocation to more isolated sites and/or through engine enclosure.
- (b) **Service improvements:** (i) automation of substation and other network components, and modernization of operation control centers; (ii) control of irregular connections; (iii) reduction of system losses; and (iv) improved metering.
- (c) **Support system improvements:** (i) upgrading Company's data processing capabilities through acquisition of more efficient hardware and software components; and (ii) improvements in telecommunications infrastructure, aimed at implementing in-house capabilities to support the telecommunications demand of CEMAT operation and maintenance activities.
- (d) **Other investments:** (i) acquisition of tools and equipment for the Maintenance Department such as measuring instruments, new vehicles and other fixed assets; (ii) improvement of health and safety conditions in transmission and generation units, as well as in administrative buildings; and (iii) investments in research and development of new technologies.

III ENVIRONMENTAL LICENSING COMPLIANCE

- 3.1 All components of the Investment Program are being planned and developed according to the Concession Contract, legal and technical requirements applicable to the electric energy sector and goals established in the Light for All Program.
- 3.2 As all projects included in the Investment Program involves voltages lower than 230 kV, their environmental licensing does not necessarily requires the presentation of an Environmental Impact Study (EIS). Nevertheless, according to national and State of Mato Grosso legislation the licensing of 138 kV, lower voltage lines, and other relevant infrastructure may require presentation of an EIS if conservation and indigenous areas are expected to be significantly and negatively affected, which is not the case of any of the projects integrated in the Investment Program.
- 3.3 However, IDB has requested CEMAT to perform an Environmental Analysis (EA) of the Investment Program, as well as of existing facilities and operations to assess associated environmental, social, health and safety impacts, risks and liabilities, and evaluate the actions and measures that are foreseen and/or being adopted to prevent or control relevant impacts, risks, and liabilities. The ensuing Environmental Analysis Report (EAR), or *Relatório de Análise Ambiental*, has been publicly disclosed according to Bank's OP-102 Disclosure of Information Policy, in fourteen of CEMAT's Regional Unit sites in the State of Mato Grosso, representative of the Concession Area, at IDB's Public Information Center in Washington, DC, and Country Representative Office, and at the Bank's web site (<http://www.iadb.org/exr/pic/environmental/proposed.cfm>).
- 3.4 Relative to the projects integrated in the Light for All Program, CEMAT, together with the Commission responsible for the coordination of the Program in the State of Mato Grosso, has established formal consultations with several competent authorities, such as the IBAMA (Brazilian Institute for Environment and Natural Renewable Resources), FUNAI (National Indian Foundation), and SEMA (State of Mato Grosso Environment Department) to define the procedures to be adopted for environmental licensing of the projects, as well as to grant vegetation clearing permits for distribution line projects, when applicable.
- 3.5 All other projects in CEMAT's Investment Program will be licensed at the State level, with the exception of the Santana do Araguaia-Vila Rica high-voltage distribution line. State legislation requires that a Simplified Environmental Impact Statement, known as RAS (*Relatório Ambiental Simplificado*), be presented for cases involving 138 kV high-voltage lines totally developing within the State. For moderate-voltage distribution lines (both urban and rural) the environmental licensing procedure consists in registering the project with SEMA. This registration procedure consists simply in informing or listing distribution projects prior to their implementation. Notwithstanding, all projects that involve clearing of natural vegetation need to submit a request for a permit based on detailed characterization and quantification of the vegetation to be affected.
- 3.6 Relative to the Santana do Araguaia-Vila Rica 138 kV high-voltage distribution line also included in the Investment Program, as the alignment is partially within another state (State of Pará) the environmental licensing process will be coordinated by the federal environmental agency, the IBAMA. The Terms of Reference for environmental impact assessment of the project have already been issued by IBAMA, establishing scope and content similar to that of a RAS.

- 3.7 Projects included in the Investment Program and scheduled for start-up in 2005 have already received the appropriate environmental licenses, with the exception of the Sapezal substation, which process is still ongoing. Projects for start-up in other years will have licensing procedures initiated with proper anticipation, and it is expected that the applicable Environmental Installation Licenses will be issued within expected timeframes.
- 3.8 Regarding existing facilities, all hydroelectric plants (to be deverticalized), 138 kV high-voltage distribution lines, and thermal power plants have valid Environmental Operation Licenses (or are in the process of renewal). The same is the case with substations, which have been licensed independently, and with transmission lines with voltages lower than 138 kV and that interfere with legally protected environmental conservation areas.
- 3.9 Finally, it should be pointed out that CEMAT has a proactive attitude toward establishing a good relationship with environmental and other competent authorities. The Company has established specific protocols and agreements and also shares with authorities some of the procedures and guidelines it had developed.

IV ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS

- 4.1 The main environmental, social, health and safety negative impacts and risks associated with the Investment Program will be related to the first two components, i.e. high-voltage distribution expansion and rural electrification expansion. It should be pointed out, however, that the projects and actions involved in CEMAT's proposed Investment Program are not likely to generate negative environmental, social, health and safety impacts of significant magnitude and importance, as: (i) no large-scale engineering work is involved, and no concentration of works in time and space is expected; (ii) CEMAT effectively takes into consideration environmental criteria to guide the selection of alignments and sites, and try to avoid, as much as possible, affecting sensitive areas, such as conservation and indigenous areas, as well as housing, commercial and industrial areas, even though this may implicate in longer line segments to circumvent sensitive areas; and (iii) the Company tries as much as possible to expand their network through established rights-of-way, or existing corridors, roads, and pathways, to avoid establishment of new rights-of-way and construction of new accesses (temporary or permanent).
- 4.2 The implementation of the projects included in CEMAT's Investment Program is not likely to require resettlement of people and will not significantly and negatively affect sensitive areas, such as conservation or indigenous areas. In fact, some indigenous communities that have requested to be linked to the energy distribution network, and after approval by FUNAI, may benefit from some of the projects integrated in the Light for All Program.

A. Construction Phase

A.1 *Environmental Impacts and Risks*

- 4.3 *Suppression of native vegetation and soil erosion:* Activities such as vegetation suppression and soil moving may result in topsoil exposure to the rainfall action. This may potentially carry solids to the closest water bodies. The areas most susceptible to erosion are the steepest slopes, and the river margins. The risk of erosive processes during construction is higher

when associated to the vegetation suppression, required both for the construction itself and for the maintenance of the rights-of-way. However, it should be pointed out that CEMAT makes, as much as possible, use of non-forested areas for the installation of power lines or substations, as well as adopt specific engineering solutions to minimize the need for vegetation suppression. It is important to notice also that the Company uses single-based towers, in opposition to the traditional four-based towers; these single-based towers require a very small amount of soil movement during their installation. Some small magnitude erosion is expected during construction of substations, mainly due to opening of ditches for installation of the grounding grid.

- 4.4 *Habitats fragmentation:* This risk is considerably reduced in CEMAT activities since all distribution lines are planed, prior to its installation, in order not to cross forested fragments. In cases when crossing of forest fragments is inevitable, the Company has special procedures in order to reduce disturbance at minimum, such as the use of higher posts and the selective vegetation suppression that eliminates only the higher trees.
- 4.5 *Fauna disturbance:* The construction aspects that may cause disturbance to fauna are noise generation, vehicles movement, vegetation suppression, and presence of workers. The noise and the movement may temporarily drive fauna off. The workers must be trained not to hunt or collect animals or eggs. Thus, the major negative impacts will be associated with the suppression of native vegetation within the right-of-way (ROW), which may chase away individuals and species, cause habitat fragmentation, and destroy nesting sites. These impacts may be significant only in rural areas or in protected areas of environmental interest where there is a stronger presence of forest fragments and other ecosystems inhabited by wild animals. Nevertheless, CEMAT adopts special procedures to deal with these issues and avoid or mitigate impacts.
- 4.6 *Disturbances on environmentally protected areas:* This type of impact is expected to be of a low magnitude in the case of new distribution lines integrated in the Investment Program, since none of the proposed projects is supposed to cross any environmentally protected area. The CEMAT Environmental Unit analyses all the projects in order to define the best options of alignment each system, considering the presence of protected areas. Occasionally, lines may cross rivers and, in this case, a special CEMAT procedure indicates that only the cables will cross the river, and no tower or pole will be installed in the river bed. The Company also adopts specific procedures to avoid or mitigate impacts on ecologically sensitive areas, such as it was verified at the Serra Azul Protected Area (a savanna reserve and State Park) in Barra do Garças, which was visited during the Environmental and Social Due diligence (ESDD), and where a distribution line crosses the Park. In this area, CEMAT applied specific engineering procedures that consists of a combination of higher poles, installing the line using as much as possible the existing internal road as ROW, changing line from one side to the other of the road, to avoid interfering with relevant individuals or forest patches, selective vegetation suppression, and selective branch trimming that consists of removal of highest branches only.
- 4.7 *Soil and groundwater contamination:* The risk of soil and groundwater contamination during the implementation of the Investment Program will be relatively low as no large-scale engineering work is involved and the works will not be concentrated in space and time. Spills may potentially occur during construction, especially considering septic tanks, chemical toilets, fuel and lubricant oil storage sites, oil leaks from machines and vehicles, and mineral oil from transformers.

- 4.8 *Re-suspension of dust and air emissions:* Earthmoving activities and traffic of construction vehicles may cause the re-suspension of dust in construction sites and roadways used on a localized and temporary manner. The traffic of construction vehicles as well the operation of construction machinery and equipment may generate combustion gases and particulate material. However, these impacts will be restricted to the construction phase, will be localized and of low magnitude since the traffic will be relatively low, and the dispersion conditions are usually good, especially in rural areas. Furthermore, if needed, dust emissions can be controlled with simple measures such as aspersion of water in soil exposed areas.

A.2 *Social Impacts and Risks*

- 4.9 *Disturbances on third party property:* Clearing of distribution line rights-of-way or easements as well as the purchase of land for the new substations usually involve amicable negotiations with owners, compensation for loss of arable areas. Legal expropriation proceedings are used only when avoidable. Involuntary resettlements are not a practice of CEMAT and are not expected in the scope of the projects included in the Investment Program, since the study of locational alternatives always prioritizes unused or low-use areas.
- 4.10 *Consideration of indigenous areas and peoples:* CEMAT avoids as much as possible to cause any negative interference with indigenous areas and peoples. In effect, the alignments of the distribution lines are designed in accordance with CEMAT's Environmental Unit guidelines and orientation in order not to interfere with indigenous areas and communities. None of the projects integrated in the Investment Program is expected to generate any significant negative impact on indigenous areas or communities. Nevertheless, the Company is engaged in the Light for All governmental program and must provide electrification to indigenous lands, if requested by indigenous communities, and after approval by FUNAI for these connections. Therefore, the following steps have been taken in the analysis of this operation to properly address indigenous issues:
- (a) The Terms of Reference for the Environmental and Social Due Diligence (ESDD) specifically called for the Environmental and Social Consultant team to integrate staff with adequate knowledge of indigenous issues. It has been confirmed that the selected Consultant included a sociologist and other staff with adequate knowledge of indigenous issues, and presented large and recent experience with social and environmental studies in the State of Mato Grosso.
 - (b) The Company has taken into account available demographic data and geographic information on indigenous communities and areas in the preparation of the Environmental Analysis Report (see, for instance, Section 4.1.5 of that report).
 - (c) The construction work involved in bringing the connection of the distribution network to the indigenous communities, as well as the necessary maintenance activities may bring some slight and temporary disturbance to the communities, because of noise, dust and waste generation. In order to properly deal with these impacts, CEMAT always seeks from FUNAI specific orientation for each case. It is a policy of the Company and of FUNAI that rural electrification at indigenous areas must only be provided under indigenous population request, and after approval by FUNAI.

- (d) The Company is presently negotiating with FUNAI and other competent authorities to establish a specific agreement for the Light for All Program projects, which will indicate specific requirements and obligations both for CEMAT and FUNAI, considering all aspects related to rural electrification in indigenous areas. This agreement will include procedures for construction works, operation activities and charging of the services.
 - (e) It should also be pointed out that, according to Brazilian laws and institutional framework regarding indigenous peoples rights, FUNAI coordinates, develops and promotes and/or supervises all contacts and consultations with indigenous communities, and usually adopts specific procedures to negotiate and consult with indigenous communities, including the involvement of FUNAI staff familiar with the specific indigenous community.
 - (f) During the meeting held with FUNAI in the realm of the ESDD, the representative of that governmental Foundation informed that FUNAI is presently developing a Census specifically geared toward indigenous communities, which will update demographic, social and cultural data on indigenous peoples.
- 4.11 *Induction of new occupation frontiers:* Some areas of the Mato Grosso State, especially, the Northern ones, are still under colonization process and the arrival of electricity may act as an inductor for further occupation and industrialization. This may be considered both a positive and negative impact, since non-planned occupation may increase the effects of deforestation and environmental pollution. Another aspect of this fact is that, in urban areas, the ROW areas are prone to be occupied by residences, domestic cultures or commercial units. However, CEMAT avoids as much as possible to construct new accesses (temporary or permanent). Furthermore, the Company proceeds to the monitoring of the areas in order to avoid this occupation.
- 4.12 *Increase in noise and vibration levels:* There will be an increase in noise and vibration levels at construction sites, and the most likely potential receptors would be residents or users of educational and health institutions located in neighboring areas. These effects will be more significant in urban areas but will be of a limited and temporary character. In rural areas, these impacts will not be too significant due to a higher dispersion of occupied areas and lower number of receptors likely to be affected.
- 4.13 *Impacts associated with the increase in the traffic of construction vehicles:* The implementation of new substations and distribution lines will generate traffic of vehicles at the construction sites. The roads directly affected will be the ones providing access to the construction sites. The traffic in urban roads with a more intense traffic are likely to be more adversely affected, due to the circulation of trucks and other heavy vehicles that may cause traffic slowness and congestion. Despite the relatively low traffic that is expected in any given construction site in association with the construction works related to the Investment Program, pavement in some local roads in residential neighborhoods may wear more rapidly. In rural areas, this impact will be in general less significant. In any of the situations, it will be a temporary impact of low magnitude and with a restricted geographic coverage in view of the characteristics of the works foreseen.
- 4.14 *Risk of disturbance on other infrastructure networks:* Excavations for implementation of new aerial or underground networks may bring risks of damage to water, sewerage, piped gas, and other networks. Underground lines are not proposed in the projects included in the Investment Program. During the design stage of CEMAT networks in most developed municipalities and

in the state capital (Cuiabá), potential interferences with underground public utilities are assessed and mapped, thus greatly reducing the risk of accidents. In smallest municipalities, the governments usually do not have a survey of underground public services. However, it is important to note that even in small municipalities, the interruption in public utilities due to CEMAT works is rare.

- 4.15 *Disturbances on flows of pedestrians and vehicles, and commercial activities:* In urban areas, the renovation of distribution lines (replacement of poles, conductors, transformers, and other electric components) in public places may cause the interruption (usually partial) of the flow of pedestrian on affected sidewalks as well as restrict the access of vehicles to homes and establishment located on streets affected. Indirectly, the works may bring discomfort to existing commercial activities, by hampering the access of customers and vendors. However, this will be a temporary impact, limited to the period of replacement of line materials and components.
- 4.16 *Risks of accidents involving persons:* The construction of new CEMAT facilities will increase the risk of accidents involving the population in general, such as fall of persons into trenches and holes excavated at construction sites; electric shocks due to accidental contact with conductors and energized equipment (especially due to vehicular collision with poles during the works), or pedestrian accidents involving construction work related vehicles. These are temporary risks and easily prevented by the adoption of safety measures at construction sites.
- 4.17 *Risk of disturbance on archaeological and historical heritage elements:* In general, excavation work for construction of new substations and distribution lines may potentially contact archaeological elements. However, since excavations in the projects integrated in the Investment Program are extremely limited in space, this impact may be considered of low magnitude. It is important to note that, in case of intervention close to present or past indigenous areas, CEMAT proceeds to an archaeological investigation prior to the beginning of the works, even when the project do not interfere directly to the indigenous communities.

A.3 *Health and Safety Impacts and Risks*

- 4.18 *Risk of falls involving workers:* Works at high places will be a common activity for the great part of employees involved in the construction of new CEMAT electric installations. Suppression of vegetation in future rights-of-way or easements, the assembly of transmission structures and installation of aerial cables and other electric components in towers and poles are the activities presenting the higher risks of accidents involving workers. The risk of falling is also associated with the digging trenches and holes at construction sites. However, CEMAT has specific procedures to prevent accidents of this nature.
- 4.19 *Risk of electric shock involving workers:* The construction of new substations and lines will comprise new electrical installations, involving works dealing with energized equipment and networks. The risk of electric shocks is a constant consideration for contractor employees. However, workers in this type of work usually follow safety procedures and wear proper protection equipment.
- 4.20 *Risk of exposure to health-hazardous environmental conditions (noise, dust, and combustion gases):* The activities associated with the expansion of CEMAT network will comprise minor risks usually associated with civil works, such as exposure to high levels of noise and concentration of dust and pollutants in the air. Nevertheless, in the case of CEMAT's works,

the risk and duration of exposure to unhealthy environmental conditions are much lower than other types of civil works (roads, buildings, large industrial facilities, etc.).

- 4.21 *Risk of explosions and fire:* The risk of occurring explosions and fires will be relatively very low in the implementation of the projects involved in the Investment Program, as it is not foreseen the use of explosives and there will be no accumulation of inflammable products. It should be pointed out that construction of underground distribution networks carries the risk of explosions and fires caused by accumulation of certain gases.
- 4.22 *Accidents with poisonous animals:* During construction activities in rural areas, workers may be exposed to the contact with poisonous animals (e.g., snakes, spiders, scorpions, etc.). CEMAT's employees and contractors are usually instructed not to disturb wild fauna. They also receive personal protective equipment (PPE) that reduces this risk.
- 4.23 In view of the fact that CEMAT does not foresee any underwater crossing in the scope of the Investment Program, there will be no risk of accidents with divers, which are normally deployed in placement of aquatic cables at the bottom of water bodies.

B. Operation Phase

B.1 Environmental Impacts and Risks

- 4.24 *Suppression of native vegetation and tree branch trimming:* As mentioned, CEMAT makes, as much as possible, use of non-forested areas for the installation of power lines or substations. Nevertheless, some specimens must always be trimmed out during maintenance for safety reasons. The periodic maintenance of distribution line ROW areas may include the removal of native vegetation that has regenerated through time. Replacement of conductors may also imply removal of vegetation from ROW in order to facilitate access to the towers. All native tree branch trimming must be authorized by IBAMA. In urban areas, trimming is controlled and authorized by municipal authorities. CEMAT developed and adopts specific guidelines for vegetation suppression and trimming, and shares these guidelines with local and environmental authorities.
- 4.25 *Induced erosion processes:* The periodic removal of vegetation from the ROW, performed for maintenance purposes, may induce localized erosion processes, especially on sloped sites where towers or poles are located. To control this type of impact, CEMAT performs periodic inspections along the distribution lines, and erosive processes within the ROW area are identified and corrected as soon as possible. In these inspections erosion in farms adjacent to the ROW are sometimes identified, and this may, in some cases, pose a risk for CEMAT's towers, since they may expand into the ROW area. In these cases, CEMAT notifies the farmer requesting corrective action. In the absence of response, CEMAT may propose to help in stabilization efforts or, where this is not feasible, may notify the responsible environmental authority.
- 4.26 *Fauna disturbance:* During operation, there is the risk that wild animals may make accidental contacts with aerial conductors or high-voltage equipment at substations. This type of risk is more elevated in rural areas or in areas of environmental interest where there is a stronger presence of forest fragments and other ecosystems inhabited by wild animals. CEMAT has special internal procedures to deal with these issues and developed and implemented an interesting program to prevent this kind of accident with a bird species of special interest in

Mato Grosso, the *tuiuiú*, which has the largest wing span of the birds in the *Pantanal* Region. In some of the areas prone to accidents with that bird, CEMAT replaced the regular naked central cable of a triphasic system with an insulated or shielded cable that precludes short-circuiting when cables are contacted by the *tuiuiú*'s wings. This simple measure eliminated the risk of death for those large birds that use to sit on the lines.

- 4.27 *Soil and groundwater contamination:* Oil spills may occur during the operation of substations, such as mineral oil that may spill from transformers. However, CEMAT uses a secondary containment pit under each transformer to control this impact. It is possible that substation's septic tanks may spill, but this impact has very low magnitude, since CEMAT's substations are unmanned and remotely controlled. Maintenance activities in shops offers the highest soil contamination risks since there may be generation of materials and effluents contaminated with diesel, mineral oil or lubricants. Maintenance shops must be paved, impermeable, and provided with proper drainage and effluent and solid waste collection. Oily effluent and oil spills shall be collected in impermeable water/oil separation tanks prior to its discharge. Oil contaminated solid waste and oily sludge shall be collected in metallic barrels and sent to proper destination in authorized processor.
- 4.28 *Solid waste generation:* The solid wastes generated during operation will be mainly related to operation of maintenance shops, substations, and offices, and may involve wastes characterized as domestic and/or office wastes and others categorized as industrial. The Company has some procedures to deal with the wastes generated at their facilities, but these need to be improved, organized and complemented to properly address this issue during implementation and operation of the Investment Program projects.

B.2 *Social Impacts and Risks*

- 4.29 *Risk of illegal settlements within ROW areas:* Illegal settlements within ROW areas of infrastructures are not uncommon in large Brazilian cities, despite legislation and land use control mechanisms enforced sometimes by municipal governments. CEMAT understands that this is a social problem that must be solved in agreement and with support of public authorities. The Company has experience in this type of situation and adopts specific procedures to address it. In most of the projects included in the Investment Program this risk will be low due to the nature of the predominant land use and sparse population encountered.
- 4.30 *Increase in noise levels:* This impact might be associated with the operation of substations foreseen in the Investment Program. However, CEMAT effectively adopts environmental criteria in the selection of sites for their facilities; thus, the risk will be low that the accrued noise levels might disturb human receptors and sensitive areas. In cases where an adequate is not available or feasible, the Company may adopt acoustic barriers to attenuate the noise coming from transformers.
- 4.31 *Risk of accidents involving persons (electric shock):* This risk is associated to accidents with the energized network involving third parties. They may be accidental contacts with the network in normal conditions (by negligence or misinformation about the risk), in exceptional conditions (fall of energized cables on the floor caused by vehicle-hit poles or by faulty network maintenance), and during fraud attempts (energy theft). CEMAT adopts specific technical specifications and procedures to minimize the consequences of these accidents, and promotes educational activities to inform the public of the hazards involved.

- 4.32 *Risk of damage to equipment and appliances due to interruptions and surges in power supply:* (see Section C – Existing Operations and Facilities).

B.3 Health and Safety Impacts and Risks

- 4.33 *Risk of falls involving workers:* Work performed at high places, such as the maintenance and renovation of transmission and distribution lines and trimming of trees expose employees to the risk of falls. However, CEMAT adopts specific technical specifications and procedures to minimize the occurrence and consequences of this type of accident. Furthermore, workers (CEMAT's and contractors) are requested to use appropriate personal protective equipment (PPE) to reduce this risk.
- 4.34 *Risk of electric shock:* Similarly, the very same above-referenced services, together with the activities related to the maintenance and automation of substations, will bring risks to employees. In addition, sharing of poles by electricity and telephone systems is very common in Brazil. Thus, there are also electrical risks linked to installation of telephone cables at electric poles. However, CEMAT adopts specific technical specifications and procedures to minimize the occurrence and consequences of this type of accident. Furthermore, workers (CEMAT's and contractors) are requested to use appropriate personal protective equipment (PPE) to reduce this risk.
- 4.35 *Generation of Electromagnetic Fields:* (see Section C – Existing Operations and Facilities).

C. Existing Operations and Facilities

- 4.36 Most of the impacts previously described with regards to projects in the Investment Program are also applicable to existing operations and facilities. However, the Investment Program does not include some types of facilities that are currently operated by CEMAT, such as warehouses, maintenance shops, and thermoelectric power plants. Similarly, some impacts such as soil contamination are unlikely to occur in new substations of the Investment Program, but may still constitute a risk in some of the older existing substations. Other impacts, such as solid waste generation and disposal, risk of electric shock, interruptions in electric power supply and generation of electromagnetic fields, are basically related to existing operations and facilities, and are described in the following paragraphs.
- 4.37 *Soil and groundwater contamination:* The following aspects shall be considered concerning potential liabilities associated with soil and groundwater contamination at existing facilities:
- (a) Diesel spills in thermoelectric power plants: All CEMAT's thermal power plants have diesel storage. All diesel tank-parks, and generation parks are provided with paved contention, but during site visits, all units presented diesel spills and stained soils, both on tank-parks and in generation parks. There is also the risk of soil contamination during diesel collection and discharge; since the truck-parking areas are not paved some oil usually spills from the truck valves and hoses. Also, all visited units presented underground, non-contained diesel pipelines that offer some risk of soil contamination associated with possible leaks. Similarly, all units have underground water/oil separator drainage and sumps that recovers oil and infiltrates the effluent water.
 - (b) Occasional oil spills: Occasional oil spills may also occur during operation of substations. Mineral oil may spill from transformers, but the use of secondary containment pits under

each transformer control this impact. It is possible that substation's septic tanks may spill, but this impact has very low magnitude, since substations are unmanned and remotely controlled.

- (c) Maintenance activities: Maintenance activities and maintenance shops offers elevated soil contamination risk since there may have generation of materials and effluents contaminated with diesel, mineral oil or lubricants. This risk can be controlled, on the field, with the use on portable contention units during maintenance activities. Maintenance shops must be paved, impermeable and provided with proper drainage and effluent and solid waste collection. During site visits, some signs of possible soil contamination were observed in some of the maintenance shop areas.

- 4.38 *Solid waste generation and disposal*: Used lubricating oil and oil recovered at water/oil separation systems generated at CEMAT's thermal power plants are usually collected and sent for recovery and reuse by specialized companies. Replacement of damaged or obsolete electric equipment, components, and materials at other CEMAT facilities generates wastes of several types. Materials such as copper, aluminum, iron, glass, porcelain and wood are the most common ones. In addition, some wastes that can be considered as hazardous are generated, such as: spent batteries, discharged lamps, used oil, oily sludge and others. CEMAT does not have an inventory of the wastes generated at their facilities. Currently, all the wastes (exclusive of discharged lamps) are sent to CEMAT warehouses in Cuiabá or in Santo Antônio do Leverger. Used oil is collected and sent for recovery and reuse by an authorized processor. CEMAT has also a small plant for oil recovery by filtration, which generates an oily sludge mixed with the filter composed of bauxite and activated-clay. The filter impregnated with oily sludge is sent for recovery by the filter provider. In general, it is possible to say that CEMAT should improve its solid waste management practices in order avoid potential liabilities associated with inappropriate disposal and potential soil and ground and surface water contamination.
- 4.39 *Polychlorinated Biphenyls (PCBs)*: CEMAT does not have PCB-containing equipment since 2003, when all PCB-containing equipment was replaced by equipment containing mineral dielectric fluid, and the PCB-containing equipment sent for incineration at appropriate and authorized processor in Rio de Janeiro State. Therefore, no potential liabilities are expected in relation to PCBs.
- 4.40 *Air emissions*: Air emissions are a major issue related to thermoelectric power plants. All CEMAT's units have diesel engines, whose operation results in emission of particulate material, carbon monoxide and dioxide, nitrogen and sulfur oxides, and hydrocarbons. None of the power plants have air emission control equipments or monitoring procedures, and almost all visited units presented dark, diesel-smelly emissions. However, CEMAT has not yet received any complaint regarding air emissions generated at their facilities. The Company tries to locate thermal power plants away from urban areas, but there were some cases, specially involving older units, where the urbanized area expanded toward the power plant site and a solution must be encountered and implemented.
- 4.41 *Risk of illegal settlements within ROW areas*: Illegal settlements within ROW areas of infrastructures are not uncommon in large Brazilian cities, despite legislation and land use control mechanisms enforced sometimes by municipal governments. CEMAT understands that this is a social problem that must be solved in agreement and with support of public authorities. The Company has experience in this type of situation and adopts specific procedures to address it. In Cuiabá, illegal housing settlements have been found within

segments of CEMAT distribution line's ROW, especially prior to commencement of the concession. CEMAT's inventory performed in 2001 identified illegal settlements amounting to 393 families. Although CEMAT do not have a specific plan to avoid new settlements, it adopts some procedures to control the existing situations. It is a current practice in the Company to perform periodic inspections in the ROW areas to detect and try to prevent new occupations. Any new occupant is warned of the dangerous involved in occupying areas bellow high voltage lines, and asked in an amicably way to vacate the area.

- 4.42 *Damage to equipment and appliances due to interruptions and surges in power supply:* Interruptions and subsequent surges in power supply may be caused by natural phenomena (e.g., electric discharges during storms), deficient operation and/or maintenance procedures, and by accidents involving third parties (vehicular collision with poles, fires, animals, etc.). CEMAT has specific procedures to deal with these situations, in view of minimizing occurrences and duration, and attenuating consequences. The regulatory agencies (ANEEL and AGER) permanently verify the quality of the energy distribution services provided by CEMAT. This is based on regulated quality indicators, such as the "Equivalent Duration of Interruptions per Consumer" (DEC) and the "Equivalent Frequency of Interruptions per Consumer" (FEC), among others. Complaints associated with damages to electronic equipment and appliances resulting from outage or voltage variation and/or surge (such as blown-out home appliances and electro-electronic equipment), are usually forwarded to the Company sector responsible for customer services so that the necessary corrective or compensatory measures can be taken.
- 4.43 *Generation of Electromagnetic Fields:* The generation of electromagnetic fields along the lines and substations is another aspect related to the operation of CEMAT's electric system that has been analyzed during the ESDD. However, regarding the potential effects of electromagnetic fields on public health, it should be pointed out that the scientific knowledge gathered to date indicates that the risks associated with distribution lines operating at voltages like the ones operated by CEMAT, are not significant. On the other hand, for transmission lines operating at voltages above 500 kV (which is not the case of any of CEMAT's lines), the assessment of the risks should be an important consideration. In terms of national and state regulations, there are no specific laws establishing threshold limit values, and the regulatory agencies (ANEEL and AGER) do not verify radiation levels, nor is any measurement or other form of monitoring conducted.

D. Positive Impacts / Benefits

- 4.44 Electric energy is fundamental for economic and social development, and human well-being. Distribution companies, such as CEMAT, provide energy to residential areas, community services (e.g., hospitals, schools, sports facilities, community centers), as well as to commercial and industrial establishments. Therefore, the projects included in the Investment Program have the potential to benefit several areas and communities throughout the State of Mato Grosso, by providing electricity to areas that did not have it before, and increasing service quality and reliability throughout the system. These improvements may induce significant beneficial impacts on economic and social conditions of served communities. The major positive impacts associated with the implementation of CEMAT's Investment Program are described in more detail below.
- 4.45 *Expanded coverage of electric energy distribution services:* The expansion of electricity supply services in the State of Mato Grosso has been substantial after CEMAT privatization.

The projects included in the Investment Program will allow further expansion of electric energy coverage, such as: (i) expansion of the high-voltage distribution capacity in the State's main economic hub - in the Central and Capital Regions - directly servicing 300,000 customers; (ii) electrification of 62,000 rural residences throughout Mato Grosso State; (iii) electrification for approximately 160,000 new customers living in urban areas; and (iv) improvement in services for most of CEMAT's 750,000 current consumer units.

- 4.46 *Gradual deactivation of diesel power plants:* The expansion of the transmission and distribution systems will result in the expansion and connection of some segments of CEMAT's network to the National Interconnected System (national grid), which will lead to a gradual elimination of the thermoelectric power plants. CEMAT anticipates that 50% (22 units) of the Company's thermal power plants will be deactivated up to 2009. Therefore, the thermal units decommissioning will result in an economy of 39.9 million liters a year of diesel fuel, with corresponding environmental gains in terms of reduced atmospheric emissions and noise, and reduced risk of accidental spills.

- 4.47 *Direct and indirect creation of jobs:* During the construction stage of new CEMAT facilities it will be necessary to increase the number of temporary employees contracted to perform the works. At the operation stage, new permanent jobs will be created at both CEMAT and contractors given the need of staff to meet the additional demand for miscellaneous services resulting from the increased number of facilities, connections and service coverage. More importantly though are jobs that may be created indirectly through the improvement in economic activities and easier and more reliable access to electric energy.

- 4.48 *Expansion of low-income population access to electric energy:* This is one of the most noteworthy positive impacts associated with the expansion in CEMAT's distribution networks. It is believed that 52% of the Company's customers are in the low-income bracket. Implementation of the projects integrated in the Light for All Program will allow a significant increase in the number of consumers, especially in rural areas.

- 4.49 *Enhancement of economic activities:* the increased number of consumers, especially in rural areas, and modernization of distribution systems will create conditions for improvements in agricultural, industrial, and commercial activities in the State of Mato Grosso. In some regions, such as in the North of the state, currently the economic growth faces obstacles such as restrictions on power supply; therefore, implementation of the projects integrated in the Investment Program will directly benefit the communities and also allow the development of local micro and small companies. In other regions, growing agribusiness and processing industry have posed a growing demand for electric energy, which constitutes a basic input for productive activities.

- 4.50 *Growth of municipal revenue:* The incremented productivity of agricultural, industrial, and commercial establishments, as well as the increase in the number of consumers will indirectly cause an increase in the collection of taxes levied on production and consumption, creating multiplying beneficial effects on local economies.

- 4.51 *Improvement in the quality of life of population:* The provision of clean and reasonably priced lighting will allow the extension of educational activities, and provide conditions for improved medical assistance. Furthermore, the access to electricity allows access to other goods and services that make modern life easier and more comfortable, such as telecommunications, home appliances, electro-electronic equipment, etc.

V ENVIRONMENTAL, SOCIAL, AND HEALTH AND SAFETY MANAGEMENT

A. Environmental and Social Mitigation Measures

5.1 Measures described below include both formal and informal procedures adopted by CEMAT to mitigate environmental and social impacts. These measures are currently adopted by CEMAT during planning, construction and operation of its facilities, and will also apply to projects included in the Investment Program.

A.1 Planning and Construction Phases

5.2 *Analysis of locational alternatives:* The participation of professionals from CEMAT's Environmental Unit together with the engineering and construction teams during project planning phases has ensured effective incorporation of environmental criteria during the feasibility analysis of alternative network alignments and unit sites at preliminary design stages. The avoidance of disturbances on remaining native vegetation, fragile ecosystems, conservation and indigenous areas are taken into consideration in the studies of alternatives. Land surveys incorporate a fair amount of environmental information (patches of vegetation, watercourses, slopes etc.). In the case of implementation of distribution networks along rural roads or urban roadways, CEMAT try as much as possible to place the lines on the non-timbered, or lightly timbered side. In the case of substations, as often as possible, plots of land with little or no native arboreal-sized vegetation are prioritized in order to minimize or avoid impacts on the vegetation.

5.3 *Preparation of environmental impact studies:* In projects that may involve sensitive areas, CEMAT has a proactive attitude and carries preliminary discussions with environmental, indigenous, cultural heritage authorities, as applicable, to define the criteria and specifications to be adopted in developing the necessary studies. Furthermore, whenever necessary the Company hires consultants and specialists to perform specific studies in relation to environmental and social issues (*e.g.*, anthropologist to properly address indigenous communities concerns, archeologists, biologists, etc.). In addition, the Company will continue to contract the preparation of environmental reports whenever the projects imply a significant suppression of native vegetation either within or outside conservation and indigenous areas.

5.4 *Environmental instructions for contractors:* Although CEMAT provides specific instructions to contractors when works are developed in sensitive areas, the Company does not have formal procedures to instruct contractors on environmental issues, except for the permit conditions, in case of permitted power lines.

5.5 *Special technical solutions used in distribution line projects:* In specially protected areas, such as conservation areas, CEMAT applies various techniques to avoid or attenuate disturbance to relevant species, such as: (i) use of selective vegetation clearing to allow maintenance of species of interest and those of lower stature; (ii) use of higher poles, which will require suppression and trimming only of the highest individuals and/or branches; (iii) use of insulated or shielded cables and more compact line systems that allow less frequent and less intense vegetation suppression and trimming, besides contributing to reduce risk of accidents with wild animals; (iv) use of single-based towers that occupies less ground space, in opposition to the traditional four-based towers (the single-based towers require a very small

amount of soil movement during their installation); (v) CEMAT does not use wood poles or towers in their network; and (vi) use as much as possible existing ROW, corridors, roads and rural pathways to install the distribution lines to avoid construction of new accesses (temporary or permanent) and ROWs.

- 5.6 *Spill containment devices in thermoelectric units and substations:* All thermoelectric power plant units and substations are designed with spill containment dikes in order to prevent soil contamination by oil spills from oil storage tanks and transformers. Furthermore, special drainage is designed to convey spills to oil/water separation sumps.
- 5.7 *Fauna protection:* CEMAT has invested in the prevention of accidents with animals at their distribution lines and substations. CEMAT has specific internal procedures to deal with these issues and developed and implemented an interesting program to prevent this kind of accident with a bird species of special interest in Mato Grosso, the *tuiuiú*, which has the largest wing span of the birds in the *Pantanal* Region. The program involved an agreement with the Federal University of Mato Grosso Foundation for development of some of the studies and monitoring work, and resulted in new technical standards developed by CEMAT and shared with competent authorities for use by others as well. The standards called for the replacement of the regular naked central cable of a triphasic system with an insulated or shielded cable that precludes short-circuiting when cables are contacted by the *tuiuiú*'s wings. It should also be pointed out that the heavier cables require shorter line segments and more poles, increasing the costs of implementation of the distribution lines. However, this simple measure eliminated the risk of death for those large birds that use to sit on the lines.
- 5.8 *Procedures for expropriation and third-party compensation:* CEMAT has internal guidelines for estimation of real estate property value in case of establishing the ROW, and compensation for loss of arable area, in cases of amicable negotiations with owners of areas affected by concessionaire works. Involuntary resettlements are not a practice of CEMAT and are not expected in the scope of the new works included in the Investment Program.
- 5.9 *Protection from risk of electric shock:* CEMAT adopts all the technical standards related to safety in electric installations applicable at design and construction stages. Furthermore, the Company uses electromechanical and digital protection systems that identify failures and disconnect the defective circuits immediately.

A.2 *Operation Phase*

- 5.10 *Solid waste management:* Although CEMAT does not have a formal solid waste management system, nor an inventory of the wastes generated at their facilities, the Company adopts appropriate measures to deal with the most relevant wastes. The items bellow, present some comments on the waste management measures currently adopted by CEMAT.
- (a) Polychlorinated Biphenyls (PCBs): In 2003 all equipment containing PCB were replaced by equipment that uses mineral dielectric fluid. All the PCB-containing equipment was sent for incineration at an authorized processor in Bahia State.
 - (b) Mineral oil: Transformers mineral oil is recovered and reused at the Barro Duro Maintenance Unit. According to its manager, the oil is filtered in a bauxite-activated clay filter and reused. It is important to note that the exhausted filters are sent back to the producer to be recovered.

- (c) Used diesel: All used diesel from thermoelectric units is stored in drums and sent for re-refining at an authorized company in the State of São Paulo. This procedure is in accordance with CONAMA Resolution 362/05.
 - (d) Lamps and batteries: Used lamps and batteries are stored in Central Warehouse at Barro Duro Maintenance Unit. Some of the lamps are then sent to Cuiabá landfill and batteries are returned to the provider. The storage areas are not paved or covered and some batteries are disposed over naked soil.
 - (e) Organic and domestic waste and other wastes are sent to public landfills.
 - (f) Recyclable materials such as paper, plastic, cardboard and metal are locally reused or sent to landfill. The Company does have an informal policy for segregation of waste, as public landfills along the State are not structured to deal with segregated wastes.
 - (g) Wastes generated at vehicle maintenance: vehicle maintenance is performed by outsourced workshops.
- 5.11 *Soil and groundwater contamination*: All thermoelectric power plant units and substations are provided with spill containment dikes in order to prevent soil contamination by oil spills from oil storage tanks and transformers. Furthermore, special drainage is provided to convey spills to oil/water separation sumps.
- 5.12 *Wastewater discharge*: Sanitary waste effluents are sent to septic tanks in all CEMAT units, with the exception of the ones located in large cities such as Cuiabá, where the effluents are sent to the municipal sewage collection system.
- 5.13 *Air emissions*: Air emissions are a major issue related to the thermoelectric power plants; however, none of the power units have air emission control equipment or adopt monitoring procedures. It is important to note that CEMAT will gradually deactivate their thermal power plants. The first phase calls for a 50% reduction, or 16 units, up to 2009, resulting with an economy of 39.9 million liters a year of diesel fuel, with corresponding environmental gains in terms of reduced atmospheric emissions and noise, and reduced risk of accidental spills.
- 5.14 *Mitigation of Substations and Thermoelectric Units (TU) operational noise*: CEMAT tries to minimize the significance of this impact by judiciously selecting sites for thermoelectric units and substations that are distant from urban concentrations, schools, hospitals and other sensitive receptors. However, with time urban growth in some villages and cities have brought urban areas closer to thermal units, particularly in the case of the older plants, requiring some additional measures. Effectively, CEMAT has relocated or is in process of relocating some of their thermoelectric power plants to more distant and unoccupied areas, to attenuate the noise disturbance caused in the communities. This is the case for the Alto da Boa Vista and Vila Rica thermal power plants. Other thermal unit was retrofitted and provided with acoustic barriers such as the Nova Bandeirante TU. CEMAT has also plans to adopt in the future enclosure of generator engines, to reduce noise emissions.

B. Environmental and Social Monitoring Programs

- 5.15 Formal monitoring procedures are better structured to deal with occupational health and safety issues. There is no Environmental and Social, or Health and Safety Management System, and contractors are structured mostly with regard to occupational health and safety. There is no formal monitoring and assessment system for the environmental and social performance of the numerous Company departments or contractors.

B.1 *Construction Phase*

- 5.16 *Monitoring plans for construction:* At the beginning of each construction works, the Company inspects sites and proceeds to control dust emissions, noise, erosion and sediments carriage, if needed. However, there is no formal procedure to account for these measures. Construction activities by contractors are closely supervised with regards to compliance with CEMAT technical standards and health and safety requirements. Whereas the technical standards may include some environmental control measures, there is no systematic monitoring of environmental impacts during construction.
- 5.17 CEMAT's Environmental Unit proceeds to three inspections to all projects submitted to environmental permitting (high-voltage lines, substations and thermoelectric units). These inspections occur at the beginning of construction, sometime during the construction, and at the end of works; however, there are no formal procedures to deal with the inspections.

B.2 *Operation Phase*

- 5.18 *Noise monitoring:* Thermoelectric units are subject to occupational noise monitoring, but this does not include monitoring of environmental noise levels in the vicinities of the power generation site. CEMAT is constantly dealing with noise complaints and problems through the relocation of some units and enclosure of engines.
- 5.19 *Monitoring of illegal occupation of ROW areas:* CEMAT operation and maintenance personnel continuously inspect the distribution lines at more urbanized areas to detect irregular occupation of ROW areas. This includes verification of new constructions as well as expansion of existing ones.

C. Health and Safety Measures

- 5.20 Planning and design of CEMAT's facilities are performed taking into account all applicable sector requirements foreseen in national and state regulations, particularly those addressing safe distances from electric systems.
- 5.21 Regarding other occupational health and safety aspects CEMAT has also some specific procedures and standards, as well as a Health and Safety Unit to control CEMAT's and subcontractors operations. All contractors and new employees are trained on health and safety aspects prior to the beginning of their activities.
- 5.22 CEMAT adopts also specific technical specifications and procedures applicable to electric energy sector to minimize the occurrence and consequences of accidents, and also systems to detect failures and proceed to immediate shut down of defective or damaged circuit. Furthermore, workers (CEMAT's and contractors) are requested to use appropriate personal protective equipment (PPE) to reduce accident risk as well as their consequences.

D. Contingency Plan

- 5.23 In Brazil, in general, the risk of natural disasters is relatively low. Major emergency situations associated with natural events and involving CEMAT electric facilities are related to the effects of rainstorms on distribution networks, such as the fall of trees and branches, and electric discharges that may also cause short circuits and interruptions in power supply.

Vehicular collisions with poles and property fires that ultimately involve the distribution networks are the most important potential non-natural events.

- 5.24 Any person may report to CEMAT an accident involving the system by calling the Company's toll free Call Center line. The Company responds to emergencies occurring on their electric system through 14 CRSs (Regional Service Centers) or one of the 19 CREs (Regional Engineering Centers). Both type of Centers are dedicated to solve daily and occasional energy problems occurring in their specific areas.
- 5.25 All CEMAT facilities feature well positioned and distributed fire extinguishers and proper signaling to identify equipment that may offer risk of electric shock and fire. Central maintenance offices control the validity of the fire extinguishers as well as the recharge dates.
- 5.26 CEMAT does not have formal contingency plans considering eventual environmental emergencies, such as major diesel spills or fire in the thermoelectric units. In case of accidental fire, local employees are trained, as a fire brigade, to deal with it or call for the nearest fire department support.

E. Environmental and Social, and Health and Safety Management Systems

- 5.27 In terms of environmental, social, health and safety management tools, the Company has: (i) an Environmental Policy and a Health and Safety Policy; (ii) an Environmental Unit and a Health and Safety Unit in its organizational structure, both staffed with full-time specialists to coordinate all respective activities in relation to the Company as well as to the respective competent authorities; and (iii) several specific procedures, standards and guidelines to address environmental and social issues, or health and safety aspects. However, CEMAT's procedures, standards, and guidelines as well as other resources available to address these issues and aspects are not organized and structured into Environmental and Social, and Health and Safety Management Systems.

E.1 Environmental and Social Management System

- 5.28 CEMAT has an Environmental Unit integrated in the Special Projects Department. This Unit is composed of two specialists (one senior) and two technicians, and is responsible for the coordination of all environmental activities and issues related with the Company's activities, as well as contacts with authorities, contractors, non-governmental organizations (NGOs), and other institutions relating to environmental and social aspects. The Environmental Unit is composed of well-qualified staff that produces good quality work, in a very diligent way. However, the Unit seems to be understaffed for the multiple tasks and responsibilities involved, as well as for systematic monitoring and supervision of environmental and social aspects pertaining to Regional Units and contractors activities.
- 5.29 The Environmental Unit effectively participates in the integration of environmental and social criteria and concerns into project design, particularly at the early stages of analysis of alternative alignments and sites for CEMAT's facilities and network, and has successfully contributed to obtain more environmentally favorable solutions.
- 5.30 CEMAT's Environmental Unit has a proactive attitude and carries preliminary discussions with environmental, indigenous, cultural heritage authorities, as applicable, to define the criteria and specifications to be adopted in developing the necessary studies relating to

licensing processes. Furthermore, the Unit promotes and coordinates specific agreements with state universities and research institutes to carry out specialized studies, perform environmental and social monitoring activities, or help develop and implement environmental education actions internally or externally within the community. CEMAT has a strong and very good relationship with the environmental authorities, at local, state and national levels, and some of the standards and guidelines developed by CEMAT are shared with competent authorities to be used by others, if necessary.

- 5.31 However, there is not an organized and structured Environmental and Social Management System, and procedures are lacking to properly address some of the challenges that the Company faces in the day to day operations, as well as in more strategic terms. Management of the environmental and social aspects related to the activities at the Regional Units and of contractors, including monitoring measures and actions, clearly needs to be improved by specific procedures, standards and guidelines.

E.2 Health and Safety Management System

- 5.32 CEMAT has a Health and Safety Unit integrated in the Human Resources Department and composed of a Safety Engineer, seven health and safety technicians, one Doctor, a Nurse, two Social Assistants and a Psychologist.

- 5.33 CEMAT's has several procedures and standards to specifically address health and safety issues relating to Company's as well as contractors activities. These procedures and standards are condensed in a document called "Consented Labor Safety Rules". This is a corporate document produced by Grupo REDE, to be used in all of the group's companies, and includes the following procedures:

- NC-SS 01.01 – Health and Safety Engineering Policy
- NC-SS 01.02 - Subcontractors Occupational Safety Rules
- NC-SS 01.03 - Subcontractors Audits
- NC-SS 01.04 - Technical Report on Electric Installations
- NC-SS 01.05 - Office services
- NC-SS 01.06 –Accident Prevention
- NC-SS 01.07 – Protection Equipment Use
- NC-SS 01.08 – Fire Combat and Prevention
- NC-SS 01.09 – Rubber Gloves for Electricity Workers

- 5.34 The NC-SS 01.01 – Health and Safety Engineering Policy establishes the basic principles, rights and duties, and the relation with employees, unions, companies contract and the community. The internal standards define the general conditions for prevention of occupational accidents and diseases, including the accomplishment of all Brazilian Health and Safety Regulations (*Normas Reguladoras*).

- 5.35 CEMAT is aware of the occupational risks relating to their activities, which are mainly related to work on high places, fall of structures and materials and electric shocks. These risks are presented at the PPRA (Environmental Risk Prevention Program). CEMAT's Health and Safety Technicians monitor them. There are six Regional Health and Safety Regional Units (Superintendencies), each one provided with a trained safety technician.

- 5.36 It is also important to mention that Grupo REDE is engaged in the production of the Corporate Operational Procedures to control and monitor all health and safety aspects related to all of their companies activities. These procedures are being prepared by CEMAT, CELPA and CELTINS and will apply to the whole group.
- 5.37 However, CEMAT does not have a formal and organized Health and Safety Management System. Although many operational procedures are in place, some of them are not formally written, nor are the correspondent monitoring or follow-up procedures. Furthermore, it is necessary to improve the Company's practice with a more systematic survey of relevant health and safety aspects, impacts and risks, in order to establish formal control procedures that can be used both by CEMAT employees and contractors.

E.3 Environmental and Social Responsibility

- 5.38 CEMAT has a proactive attitude toward the consideration environmental and social aspects in relation to their relationship with the communities, NGOs, authorities, and other institutions. It establishes specific agreements with universities and other research institutions to develop specific studies, and promote special educational and other social programs within the communities.
- 5.39 CEMAT also supports social actions and programs not directly related to the electricity business, which are described in more detail in the **Environmental Analysis Report (Sections 6.3.3 and 6.3.4)**. Some of these programs are: the Flutes Orchestra, the *Morro da Luz* revitalization and a Volunteer Work Program called "*De Mãos Dadas*". It is also a policy of the Company, to support local activities related to culture, education and sports.
- 5.40 CEMAT issues its yearly Social Balance, jointly with the Annual Report. Presently this balance is limited to some indicators of expenditure in worker's benefits and social responsibility programs, but CEMAT intends to produce in the future a separate Social Balance Report, with more specific information.

VI PUBLIC CONSULTATION

- 6.1 Federal and State of Mato Grosso environmental laws and regulations include requirements that public consultations, and in some cases hearings, be performed in the realm of the environmental licensing process. Also, sector regulation (ANEEL Resolution N° 259/03) establishes the need to perform a public meeting in processes involving the establishment of ROW through request for integration in the public domain.
- 6.2 CEMAT has not yet been asked by any competent authority to perform public consultations relative to projects included in the Investment Program. Nevertheless, IDB has requested CEMAT to perform an Environmental Analysis (EA) of the Investment Program, as well as of existing facilities and operations to assess associated environmental, social, health and safety impacts, risks and liabilities, and evaluate the actions and measures that are foreseen and/or being adopted to prevent or control relevant impacts, risks, and liabilities. The ensuing Environmental Analysis Report (EAR), or *Relatório de Análise Ambiental*, has been publicly disclosed according to Bank's OP-102 Disclosure of Information Policy, in fourteen of CEMAT's Regional Unit sites in the State of Mato Grosso, representative of the Concession

Area, at IDB's Public Information Center in Washington, DC, and Country Representative Office, and at the Bank's web site (<http://www.iadb.org/exr/pic/environmental/proposed.cfm>).

- 6.3 CEMAT has already performed in the past public meetings independently of legal requirements, for instance the case of two separate substations, or in response to ANEEL Resolution N° 259/03, as for a high-voltage distribution line. CEMAT has procedures to address disclosure of information and public consultation on projects subject to environmental licensing through submittal of a RAS, as well as on other transmission projects where establishment of an easement or right-of-way is necessary. These procedures include public hearings, and in the case of interference with indigenous areas, they also include informative meetings organized and mediated by FUNAI, in order to ensure that the indigenous community will be aware and well informed of all relevant aspects involving the activities that are planned to occur in their territory.
- 6.4 In cases involving indigenous areas and peoples, FUNAI coordinates, develops and promotes and/or supervises all contacts and consultations with indigenous communities, and usually adopts specific procedures to negotiate and consult with indigenous communities, including the involvement of FUNAI staff familiar with the specific indigenous community.
- 6.5 CEMAT has two main structured channels to receive complaints and comments regarding the Company, their staff, and the services provided. One is the Call Center, or a toll-free consumer service for reception of requests and complaints regarding the services provided. The other is the Ombudsman's Office (*Ouvidoria*), which is prepared to receive and process requests and complaints relating to the Company and their employees, or contractors.
- 6.6 The Company has also a Social Communication Program, coordinated by both the Environment Unit and the Social Communication Unit. This program aims to inform population and CEMAT consumers about relevant aspects involving the electricity service. This includes the use of the electricity bill as an information vehicle, as well as some informative booklets dealing with the most popular issues or doubts, such as prevention on electricity risks, fire in transmission lines, burn outs close to the lines.
- 6.7 It should also be pointed out that in line with the good practice standards in terms of promoting public participation and disclosure of information, IDB and their Environmental and Social Consultant performed during the ESDD contacts and meetings with several local, state and federal authorities, as well as with other interested non-governmental institutions.

VII CONCLUSIONS

- 7.1 The main conclusions reached from the ESDD performed by IDB with the support of their Environmental and Social Consultant (*JGP, Consultoria e Participações, Ltda.*), relating to the environmental, social, health and safety aspects relating to the Investment Program, as well as to CEMAT's existing facilities and operations are described below.
- 7.2 CEMAT must clarify and show evidence of compliance with all relevant environmental licensing legislation applicable to the Investment Program as well as to existing facilities and operations.

- 7.3 To properly address the specific impacts and risks associated with the construction and operation of the individual projects integrated in the Investment Program, CEMAT must further develop its internal standards, guidelines and procedures related to environmental, social and health and safety issues, in order to constitute a structured Environmental and Social Management System (ESMS), and a Health and Safety Management System (HSMS) applicable to their overall activities and the Company as a whole.
- 7.4 The Company must perform adequate risk analysis activities and studies, and develop and implement the applicable Corrective Action Plans to appropriately address potential environmental liabilities associated with existing facilities, such as thermal power plants, relevant substations, warehouses, and shops, and in relation to potential soil and water contamination, noise and air emissions, oil spills, handling of hazardous material, and other pertinent factors.
- 7.5 CEMAT must develop and implement a solid waste management program covering all wastes generated at their facilities, particularly those that can be considered hazardous. This program should include an inventory of the wastes generated as well as the specific procedures to ensure adequate handling, transportation, treatment and final disposal.
- 7.6 The Company must develop and implement a specific program to properly and systematically address situations of illegal occupation of the right-of-way areas.
- 7.7 CEMAT's Environmental Unit is composed of well-qualified staff that produces good quality work, in a very diligent way. However, the Unit seems to be understaffed for the multiple tasks and responsibilities involved, as well as for systematic monitoring and supervision of environmental and social aspects pertaining to Regional Units and contractors activities.
- 7.8 CEMAT's Investment Program must also integrate adequate resources for development and implementation of: (i) Company's adequate Environmental and Social Management System (ESMS) and Health and Safety Management System (HSMS), including applicable environmental plans and programs; and (ii) environmental programs, environmental risk analysis study and associated Corrective Action Plans relative to properly address environmental, social, health and safety non-compliances and liabilities associated with existing facilities.

VIII RECOMMENDATIONS

- 8.1 The Bank (IDB) will require as part of the Loan Agreement that CEMAT, *Centrais Elétricas Matogrossenses S.A.* (or "Company"), and all portions of the Investment Program shall, at all times during the life of the Loan Agreement, comply with each of the following:
1. All applicable environmental, health and safety Brazilian regulatory requirements.
 2. All requirements associated with any environmental, health and safety related permits, authorizations, or licenses that apply to the Investment Program or the Company.
 3. All environmental, health and safety requirements of the Investment Program contracts, and any subsequent modifications.
 4. All aspects and components of all of the Investment Program's environmental, health and safety documents.

5. Applicable aspects of the World Bank General Environmental Guidelines (Pollution Prevention and Abatement Handbook, 1998).
 6. Applicable aspects of the World Bank Monitoring Guidelines (Pollution Prevention and Abatement Handbook, 1998).
 7. Applicable aspects of the International Finance Corporation Electric Power Transmission and Distribution Guidelines (1998).
 8. Applicable aspects of the International Finance Corporation Health and Safety Guidelines (1998).
 9. Consult with IDB before approving or implementing any and all substantive changes to the Investment Program or its timetable that could potentially have negative environmental, social, or health and safety effects.
 10. Send written notice to IDB of any and all non-compliances 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.
 11. 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.
 12. Implement ongoing information disclosure and consultation activities related to environmental, social, and health and safety aspects of the Investment Program, including, if applicable, information from environmental and social, health and safety monitoring reports prepared by external consultants.
 13. Implement Environmental and Social, and Health and Safety Management Systems that are consistent with the principles of ISO 14001 and OHSAS 18001.
- 8.2 Prior to Financial Closure the Company shall submit an Environmental, Health and Safety Action Plan, in form and substance satisfactory to IDB, properly addressing the recommendations indicated in **Paragraphs 7.2 to 7.7** of this ESMR, as well as any other environmental, social, health and safety non-compliance and liability associated with the existing facilities and operations. This Action Plan must clearly address the following aspects:
1. The proposed actions, programs and plans to be adopted to correct the non-compliances and liabilities, including the development and implementation of an Environmental and Social Management System (ESMS), and a Health and Safety Management System (HSMS).
 2. The proposed procedures, programs and plans to be developed and implemented to prevent, mitigate and/or compensate for environmental, social, health and safety impacts and risks associated with construction and operation of projects integrated in the Investment Program.
 3. A time schedule for implementing such proposed actions, programs and plans, including due dates and key milestones.
 4. Estimated costs associated with such proposed actions, programs and plans, as well as indication of budgetary assignment in the Investment Program.
- 8.3 Prior to First Disbursement of the Loan, the Company shall present, in form and substance satisfactory to IDB, the applicable documents, reports and plans indicated in the Environmental, Health and Safety Action Plan, whose due dates are referenced as prior to First Disbursement, including documents pertaining to: (i) Environmental and Social Management Plan (ESMP); (ii) Health and Safety Management Plan (HSMP); and (iii) Contingency Plan.

- 8.4 Prior to each disbursement, the Company shall certify compliance with all environmental social, and health and safety requirements in the Loan Agreement.
- 8.5 Prior to Final Completion of the Investment Program the Company shall submit, in form and substance satisfactory to IDB, a Final Environmental, Social, Health and Safety Report relative to the implementation of the projects integrated in the Investment Program.
- 8.6 During the life of the Loan Agreement, the Company must prepare and submit Environmental and Social Compliance Reports, in form, substance and frequency satisfactory to IDB.
- 8.7 The Bank will monitor the Investment Program's environmental, social, 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 the life of the Loan Agreement. In addition, the Bank will have the right, as part of the Loan Agreement, to contract for the performance of independent environmental, health, and safety audits, if needed.

FIGURE 1

Brazil and State of Mato Grosso

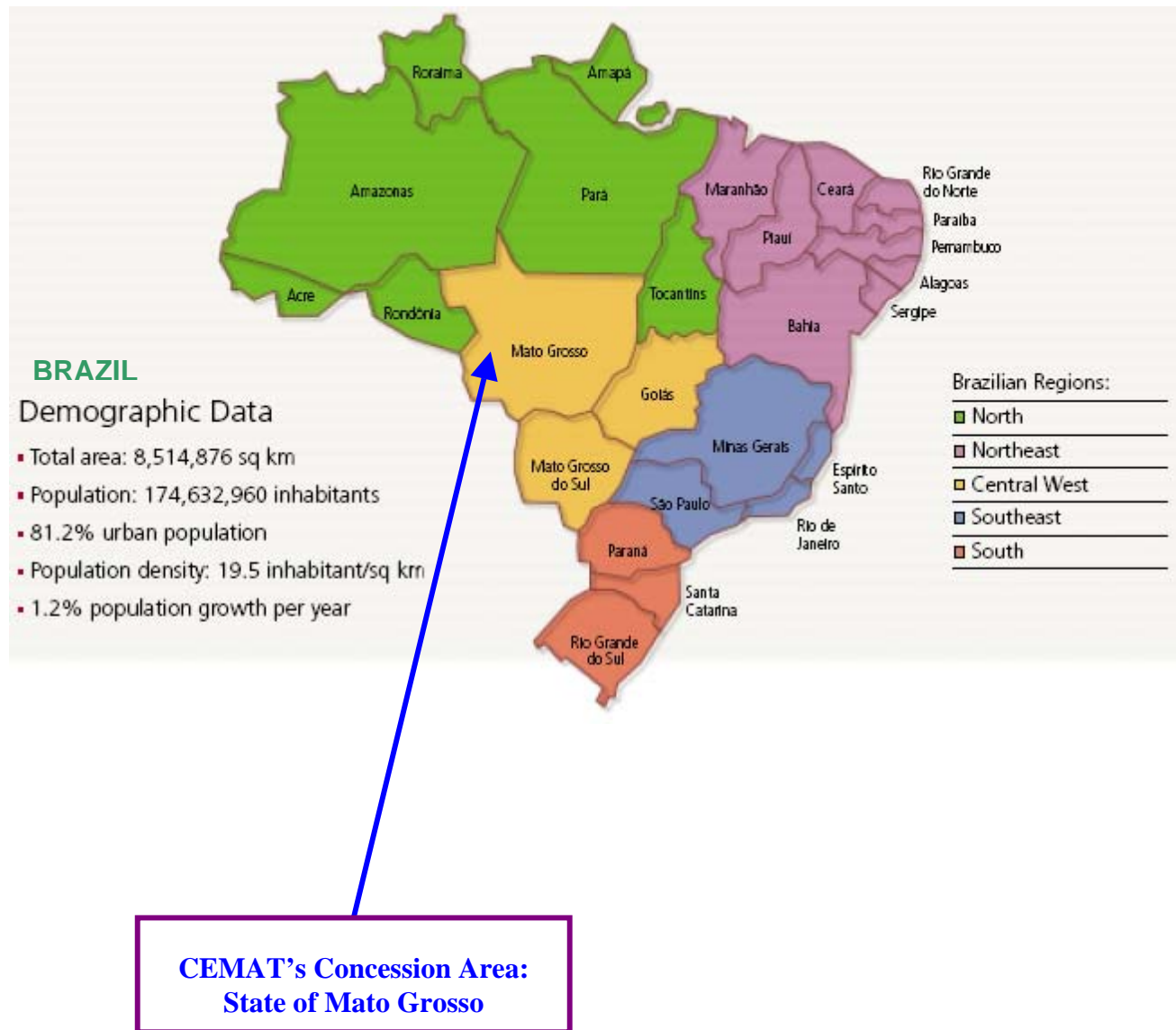


FIGURE 2

CEMAT's Concession Area

State of Mato Grosso

