REQUEST FOR PROPOSALS

TECHNICAL ASSISTANCE FOR THE

CFE ENVIRONMENTAL MANAGEMENT PROJECT IN MEXICO

Submission Deadline: **4:00 PM**

LOCAL TIME (MEXICO CITY, MEXICO)

OCTOBER 17, 2008

Submission Place: **Comisión Federal del Electricidad**
Gerencia de Protección Ambiental
Periférico Sur 4156
Col. Jardines del Pedregal
Del. Álvaro Obregón
C.P. 01900, México, D.F.
Mexico
Phone: (52-55) 5229-4400 ext. 44000

SEALED PROPOSALS SHALL BE CLEARLY MARKED AND RECEIVED PRIOR TO THE TIME AND DATE SPECIFIED ABOVE. PROPOSALS RECEIVED AFTER SAID TIME AND DATE WILL NOT BE ACCEPTED OR CONSIDERED.

REQUEST FOR PROPOSALS

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Section 1: INTRODUCTION

The U.S. Trade and Development Agency (USTDA) has provided a grant to the Comisión Federal de Electricidad (CFE) ("Grantee") to conduct Technical Assistance on the proposed CFE Environmental Management Project ("Project") in Mexico. The Grant Agreement is attached at Annex 4 for reference. The Grantee is soliciting technical proposals from qualified U.S. firms to provide expert consulting services to carry out the Technical Assistance.

1.1 BACKGROUND SUMMARY

CFE, a Mexican government-held power utility that operates under the Secretariat of Energy (SENER), is the second largest company in Mexico with annual revenues reaching $20 billion. CFE generates electricity at over 160 power plants with total capacity of nearly 50,000 MW and it owns the transmission and distribution networks for supplying electricity to most of the country. With assets in excess of $60 billion, CFE is the largest utility company in North America. By 2016, the power generation capacity available to CFE for electricity transmission and distribution is expected to be nearly 70,000 MW. Over the next 10 years, 66 new power plants are expected to be constructed in Mexico.

This Technical Assistance would support CFE's efforts to improve its environmental management at its facilities in accordance with Mexican environmental laws and regulations. Polychlorinated biphenyls (PCB) remediation is CFE's top environmental priority. Mexican environmental regulations require that all equipment and materials contaminated with PCB more than 50 parts per million or 100 micrograms per square centimeter be phased out by 2009. In addition, under recently passed Mexican environmental regulations, CFE needs to reduce sulfur hexafluoride (SF6) emissions, expand contaminated site remediation and soils recovery, and develop waste management procedures at the facilities they operate.

The Technical Assistance would help CFE meet its long-term needs for environmental management at its operating facilities, particularly in the areas of site remediation and resource management. The Technical Assistance is expected to lead to environmental remediation projects at a large number of CFE facilities, including 140-160 power plants, as well as substations and other power transmission and distribution facilities.

A background Definitional Mission report is provided for reference in Annex 2.

1.2 OBJECTIVE

The objective of the CFE Environmental Management Technical Assistance is to strengthen environmental management at the Comisión Federal de Electricidad with respect to PCB equipment disposal, SF6 emissions reduction, site remediation and soils recovery, and other environmental management issues at the power plants, substations, and power transmission and distribution facilities operated by CFE.

The Terms of Reference (TOR) for this Technical Assistance is attached as Annex 5.

1.3 PROPOSALS TO BE SUBMITTED

Technical proposals are solicited from interested and qualified U.S. firms. The administrative and technical requirements as detailed throughout the Request for Proposals (RFP) will apply. Specific proposal format and content requirements are detailed in Section 3.

Cost will not be a factor in the evaluation and therefore, cost proposals should not be submitted; upon detailed evaluation of technical proposals, one firm will be selected for contract negotiations. The amount for the negotiated contract has been established by a USTDA grant of U.S. $640,500.

1.4 CONTRACT FUNDED BY USTDA

The negotiated contract will be funded by USTDA in accordance with the terms and conditions of its grant to the Grantee. The contract must include certain USTDA mandatory clauses relating to nationality, taxes, payment, reporting, and other matters. The USTDA nationality requirements and the USTDA mandatory clauses are attached at Annexes 3 and 4 for reference.

Section 2: INSTRUCTIONS TO PROPOSERS

2.1 PROJECT TITLE

The Project is called the "CFE Environmental Management Project."

2.2 DEFINITIONS

Please note the following definitions of terms as used in this RFP.

The term "Request for Proposals" means this solicitation of a formal technical proposal including qualifications statement.

The term "Offeror" means the U.S. individual, or U.S. firm, including any and all subcontractors, which responds to the RFP and submits a formal proposal and which may or may not be successful in being awarded this procurement.

2.3 DEFINITIONAL MISSION REPORT

USTDA sponsored a Definitional Mission to address technical, financial, sociopolitical, environmental, and other aspects of the proposed Project. A copy of the Report is attached at Annex 2 for background information only.

2.4 EXAMINATION OF DOCUMENTS

Offerors should carefully examine this RFP. It will be assumed that Offerors have done such inspection and that through examinations, inquiries, and investigation they have become familiarized with local conditions and the nature of problems to be solved during the execution of the Technical Assistance.

Offerors shall address all items as specified in this RFP. Failure to adhere to this format may disqualify an Offeror from further consideration.

Submission of a proposal shall constitute evidence that the Offeror has made all the above mentioned examinations and investigations, and is free of any uncertainty with respect to conditions which would affect the execution and completion of the Technical Assistance.

2.5 PROJECT FUNDING SOURCE

The Technical Assistance will be funded under a grant from USTDA. The total amount of the grant is not to exceed U.S. $640,500.

2.6 RESPONSIBILITY FOR COSTS

Offeror shall be fully responsible for all costs incurred in the development and submission of the proposal or any other cost incurred by Offeror prior to issuance of an agreement or contract. Neither USTDA nor the Grantee assumes any contractual obligation as a result of the issuance of this proposal request, the preparation or submission of a proposal by an Offeror, the evaluation of proposals, or final selection.

2.7 TAXES

Offerors should submit proposals which note that in Annex 4, USTDA Mandatory Contract Provisions, USTDA funds are not to be used to pay taxes or duties under the laws of host country.

2.8 CONFIDENTIALITY

The Grantee will use its best efforts to preserve the confidentiality of any business proprietary or confidential information submitted by the Offeror, which is clearly designated as such by the Offeror.

2.9 ECONOMY OF PROPOSALS

Proposal documents should be prepared simply and economically, providing a comprehensive and concise description of the Offeror's capabilities to satisfy the requirements of the RFP. There is no necessity for expensive bindings, colored displays, or other promotional material unless such material is absolutely pertinent to the proposal. Emphasis should be placed on completeness and clarity of content.

2.10 SUBSTANTIVE PROPOSALS

The Offeror shall certify (a) that its proposal is genuine and is not made in the interest of, or on the behalf of, any undisclosed person, firm, or corporation, and is not submitted in conformity with, and agreement of, any undisclosed group, association, organization, or corporation; (b) that it has not directly or indirectly induced or solicited any other Offeror to put in a false proposal; (c) that it has not solicited or induced any other person, firm, or corporation to refrain from submitting a proposal; and (d) that it has not sought by collusion to obtain for himself any advantage over any other Offeror or over the Grantee or USTDA or any employee thereof.

2.11 CONDITIONS REQUIRED FOR PARTICIPATION

Only U.S. firms are eligible to participate in this tender. However, U.S. firms may utilize subcontractors from host country for up to twenty percent (20%) of the amount of the USTDA grant. USTDA nationality requirements are detailed in Annex 3.

2.12 LANGUAGE OF PROPOSAL

All proposal documents shall be prepared and submitted in English and Spanish.

2.13 PROPOSAL SUBMISSION REQUIREMENTS

The cover letter in the proposal must be addressed to:

Dr. Vicente Aguinaco
Gerente de Protección Ambiental
Comisión Federal de Electricidad
Periférico Sur 4156
Col. Jardines del Pedregal
Del. Álvaro Obregón
C.P. 01900, México, D.F.
Mexico
Phone: (52-55) 5229-4400 ext. 44000

An original in English, an original in Spanish, one (1) copy in English, and three (3) copies in Spanish of your proposal must be received at the above address no later than 4:00 PM (local time in Mexico City, Mexico), on October 17, 2008.

Proposals may be either sent by mail, overnight courier, or hand-delivered. Whether the proposal is sent by mail, courier or hand-delivered, the Offeror shall be responsible for actual delivery of the proposal to the above address before the deadline. Any proposal received after the deadline will be returned unopened.

Upon timely receipt, all proposals become the property of the Grantee.

2.14 PACKAGING

Each proposal must be sealed to ensure confidentiality of the information. The proposals should be individually wrapped and sealed, and labeled for content including "original" or "copy number x"; the original in English, the original in Spanish, one (1) copy in English, and three (3) copies in Spanish should be collectively wrapped and sealed, and clearly marked for content.

Neither USTDA nor the Grantee will be responsible for premature opening of proposals not properly labeled.

2.15 AUTHORIZED SIGNATURE

The proposal must contain the signature of a duly authorized officer or agent of the Offeror empowered with the right to bind the Offeror.

2.16 EFFECTIVE PERIOD OF PROPOSAL

The proposal shall be binding upon the Offeror for sixty (60) days after the proposal due date, and Offeror may withdraw or modify this proposal at any time prior to the due date upon written request, signed in the same manner and by the same person who signed the original proposal.

2.17 EXCEPTIONS

Firms agree by their response to the RFP announcement to abide by the procedures set forth therein. Material modifications in the TOR or responsibilities of the parties will not be accepted.

Any exceptions in the proposal shall be clearly identified, and shall include the scope of such exception, and its impact, on the procurement. The Grantee shall make final determination as to the responsiveness of such exceptions and their acceptability.

2.18 OFFEROR QUALIFICATIONS

As provided in Section 3, Offerors shall submit evidence that they have relevant past experience and have previously delivered advisory and Technical Assistance services similar to those required in the TOR.

2.19 RIGHT TO REJECT PROPOSALS

The Grantee reserves the right to reject any and all proposals and to accept or reject any or all of the items in the proposal, and to award the contract in whole or in part if it is deemed in the best interest of the Grantee.

2.20 PRIME CONTRACTOR RESPONSIBILITY

Offerors have the option of subcontracting parts of the services they propose. The Offeror's proposal must include a description of any anticipated subcontracting arrangements, including the name, address, and qualifications of consultants and subcontractors. USTDA nationality provisions are set forth in detail in Annex 3. The successful Offeror shall cause appropriate provisions of its contract, including all mandatory USTDA clauses, to be inserted in all subcontracts ensuing to ensure fulfillment of all contractual provisions by subcontractors.

2.21 AWARD

An award resulting from this RFP shall be made to the best qualified Offeror, taking into consideration the evaluation factors set forth herein; however, the right is reserved to reject any and all proposals received and, in all cases, the Grantee will be the judge as to whether a proposal has or has not satisfactorily met the requirements of this RFP.

2.22 COMPLETE SERVICES

The successful Offeror shall be required to (a) furnish all supplies, supervision, transportation, and other execution accessories, services, and facilities; (b) provide and perform all necessary labor; and (c) in accordance with good technical practice, with due diligence, and in accordance with the requirements, stipulations, provisions, and conditions of this RFP and the resultant contract, execute and complete all specified work to the satisfaction of the Grantee.

2.23 INVOICING AND PAYMENT

Deliverables under the contract shall be delivered on a schedule to be agreed upon in a contract with the Grantee. The Contractor may submit invoices to the designated Grantee Project Director in accordance with a schedule to be negotiated and included in the contract. Upon approval of each invoice, the Grantee will forward the invoice to USTDA which will process payment to the Contractor. All payments by USTDA under the Grant Agreement will be made in U.S. currency.

Section 3: PROPOSAL FORMAT AND CONTENT

To expedite proposal review and evaluation, and to assure that each proposal receives the same orderly review, all proposals must follow the format described in this section.

Proposal sections and pages shall be appropriately numbered and the proposal shall include a Table of Contents. Offerors are encouraged to submit concise and clear responses to the RFP. Proposals shall contain all elements of information requested without exception. Instructions regarding the required scope and content are given in this section. The Grantee reserves the right to include any part of the selected proposal in the final contract.

The proposal shall consist of a technical proposal only. No cost proposal is required as the value of the USTDA grant is established at U.S. $640,500.

Offerors shall submit one (1) original in English, one (1) original in Spanish, one (1) copy in English, and three (3) copies in Spanish of the proposal. Proposals received by fax cannot be accepted.

The following sections and content are required for each proposal:

Transmittal Letter,
Cover/Title Page,
Table of Contents,
Introduction and Executive Summary,
Company Information,
Organizational Structure, Management Plan, and Key Personnel,
Technical Approach and Work Plan,
Experience and Qualifications, and
Miscellaneous.

Detailed requirements and directions for the preparation of each section are presented below.

3.1 SECTION 1: INTRODUCTION AND EXECUTIVE SUMMARY

An Executive Summary should be prepared describing the major facts or features of the proposal, including any conclusions, assumptions, and generalized recommendations the Offeror desires to make. Offerors are requested to make every effort to limit the length of the Executive Summary to no more than five (5) pages.

3.2 SECTION 2: COMPANY INFORMATION

3.2.1 Company Profile

Provide the information listed below relative to the Offeror's firm. If the Offeror is proposing to subcontract some of the proposed work to another firm(s), similar information must be provided for each subcontractor. Offerors are requested to limit the length of the Company Profile Information to one (1) page per firm.

1. Name of firm and business address, including telephone and fax numbers.

2. Year established (include former firm names and year established, if applicable).

3. Type of ownership and parent company, if any.

4. Project Manager's name, address, telephone and fax number, if different from (1).

3.2.2 Offeror's Authorized Negotiator

Provide name, title, address, telephone, and fax number of the Offeror's authorized negotiator. The person cited shall be empowered to make binding commitments for the Offeror and its subcontractors, if any.

3.2.3 Negotiation Prerequisites

1. Discuss any impact of any current or anticipated commitments which may impact the ability of the Offeror or its subcontractors to complete the Technical Assistance as proposed and within the Project schedule.

2. Identify any specific information which is needed from the Grantee before commencing contract negotiations.

3.3 SECTION 3: ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL

Describe the Offeror's proposed Project organizational structure. Discuss how the Project will be managed including the principal and key staff assignments for this Technical Assistance. Identify the Project Manager who will be the individual responsible for this Project. The Project Manager must have the responsibility and authority to act on behalf of the Offeror in matters related to the proposed Technical Assistance.

Provide a listing of personnel (including subcontractors and consultants) to be engaged in the Project, either U.S. or local with the following information for key staff: position in the Project; pertinent experience; curriculum vitae; other relevant information. If subcontractors are to be used, the organizational relationship between the firms must be described.

A manpower schedule and the level of effort for the Project period, by activities and tasks, as detailed under the Work Plan shall be submitted. A statement confirming the availability of the proposed Project Manager and key staff over the duration of the Project must be included in the proposal.

3.4 SECTION 4: TECHNICAL APPROACH AND WORK PLAN

Describe in detail the proposed technical approach and work plan. Discuss the Project requirements as perceived by the Offeror. Include a brief narrative of tasks within each activity series. Begin with the information gathering phase and continue through delivery and approval of all required reports.

Prepare a detailed schedule of performance that describes all activities and tasks within the Technical Work Plan, including periodic reporting or review points, incremental delivery dates, and other Project milestones.

Based on the Technical Work Plan, and previous project experience, explain when and where Offeror will require support from the Grantee. Detail the amount of staff time required by the Grantee or participating agencies and any work space or facilities needed to complete the Technical Assistance.

3.5 SECTION 5: EXPERIENCE AND QUALIFICATIONS

Provide a discussion of the Offeror's experience and qualifications which are relevant to the objectives and TOR for the Technical Assistance. If a subcontractor(s) is being used, similar information must be provided for the prime and each subcontractor firm proposed for the Project. Relevant experience and qualifications of key staff proposed shall be provided including letters of commitment from the individuals proposed concerning their availability for contract performance.

As many as possible but not more than six (6) relevant and verifiable project references must be provided, including the following information:

Project name,
Name and address of client (indicate if joint venture),
Client contact person (name/ position/ current phone and fax numbers),
Period of contract,
Description of services provided,
Dollar amount of contract, and
Status and comments.

Offerors are strongly encouraged to include in their experience summary primarily those projects that are similar to or larger in scope than the Technical Assistance as described in this RFP.

Section 4: AWARD CRITERIA

Individual proposals will be initially evaluated by a Procurement Selection Committee of representatives from the Grantee. The Committee will then conduct a final evaluation and completion of ranking of qualified Offerors, and the Grantee shall promptly negotiate a contract with the best qualified Offeror. If a satisfactory contract cannot be negotiated with the best qualified Offeror, negotiations will be formally terminated. Negotiations shall then be undertaken with the second most qualified Offeror and so forth.

The selection of the Contractor will be based on the following criteria and their corresponding assigned weights:

1. The Offeror's overall experience in the power sector (20 points);
2. The Offeror's experience in managing polychlorinated biphenyls (PCB) and sulfur hexafluoride (SF6) emissions reduction (PCB) (20 points);
3. The Offeror's experience in site remediation and waste management (20 points);
4. The Offeror's experience in environmental monitoring and control programs (regulatory and non-regulatory) (20 points);
5. The Offeror's experience in Mexico and Latin America, including experience and ability to work in the Spanish language (15 points); and
6. The Offeror's experience in conducting workshops or training seminars (5 points).

Proposals which do not include all requested information may be considered non-responsive.

Price will not be a factor in Contractor selection.

ANNEX 1

FEDBIZOPPS ANNOUNCEMENT

Dr. Vicente Aguinaco, Gerente de Protección Ambiental, Comisión Federal de Electricidad, Periférico Sur 4156, Col. Jardines del Pedregal, Del. Álvaro Obregón, C.P. 01900, México, D.F., Mexico, Phone: (52-55) 5229-4400 ext. 44000, Fax: (52-55) 5229-4400 ext. 44007.

B – Mexico: CFE Environmental Management Technical Assistance (RE-ISSUE)

POC Evangela Kunene, USTDA, 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901, Tel.: (703) 875-4357, Fax: (703) 875-4009. CFE Environmental Management Project, Mexico. The Grantee (Comisión Federal de Electricidad, CFE) invites submission of qualifications and proposal data (collectively referred to as the "Proposal") from interested U.S. firms that are qualified on the basis of experience and capability to conduct Technical Assistance for the CFE Environmental Management Project.

The objective of the CFE Environmental Management Technical Assistance is to strengthen environmental management at the Comisión Federal de Electricidad with respect to polychlorinated biphenyls (PCB) equipment disposal, sulfur hexafluoride (SF6) emissions reduction, site remediation and soils recovery, and other environmental management issues at the power plants, substations, and power transmission and distribution facilities operated by CFE.

The Terms of Reference (TOR) for the Technical Assistance include the following tasks: 1) TA Kick-Off Meeting; 2) Environmental Records Review; 3) Environmental Regulatory Review; 4) PCB Management Assessment; 5) Environmental Site Assessments; 6) Development of SF6 Emissions Reduction Program; 7) Assessment of Additional Resource Management Issues; 8) U.S. Sources of Supply and Technology Review; 9) Developmental Impact Assessment; and 10) Final Report.

The U.S. firm selected will be paid in U.S. dollars from a U.S. $640,500 grant to the Grantee from the U.S. Trade and Development Agency (USTDA).

A detailed Request for Proposals (RFP), which includes requirements for the Proposal, the TOR, and a background Definitional Mission report, is available from USTDA, at 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901. To request the RFP in PDF format, please go to:

https://www.ustda.gov/businessopps/rfpform.asp.

Requests for a mailed hardcopy version of the RFP may also be faxed to the IRC, USTDA at 703-875-4009. In the fax, please include your firm's name, contact person, address, and telephone number. Some firms have found that RFP materials sent by U.S. mail do not reach them in time for preparation of an adequate response. Firms that want USTDA to use an overnight delivery service should include the name of the delivery service and your firm's account number in the request for the RFP. Firms that want to send a courier to USTDA to retrieve the RFP should allow one hour after faxing the

request to USTDA before scheduling a pick-up. Please note that no telephone requests for the RFP will be honored. Please check your internal fax verification receipt. Because of the large number of RFP requests, USTDA cannot respond to requests for fax verification. Requests for RFPs received before 4:00 PM will be mailed the same day. Requests received after 4:00 PM will be mailed the following day. Please check with your courier and/or mail room before calling USTDA.

Only U.S. firms and individuals may bid on this USTDA financed activity. Interested firms, their subcontractors and employees of all participants must qualify under USTDA's nationality requirements as of the due date for submission of qualifications and proposals and, if selected to carry out the USTDA-financed activity, must continue to meet such requirements throughout the duration of the USTDA-financed activity. All goods and services to be provided by the selected firm shall have their nationality, source, and origin in the U.S. or host country. The U.S. firm may use subcontractors from the host country for up to 20 percent of the USTDA grant amount. Details of USTDA's nationality requirements and mandatory contract clauses are also included in the RFP.

Interested U.S. firms should submit their Proposal in English and Spanish directly to the Grantee by 4:00 PM (Mexico City, Mexico), October 17, 2008, at the above address. Evaluation criteria for the Proposal are included in the RFP. Price will not be a factor in contractor selection, and therefore, cost proposals should NOT be submitted. The Grantee reserves the right to reject any and/or all Proposals. The Grantee also reserves the right to contract with the selected firm for subsequent work related to the project. The Grantee is not bound to pay for any costs associated with the preparation and submission of Proposals.

ANNEX 2

BACKGROUND DEFINITIONAL MISSION REPORT

FINAL REPORT

Definitional Mission for Power Sector Environmental Remediation Projects in Mexico

Contract Number: TDA-CO2007510006

Submitted to:

U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209

Submitted by:

RKR Enterprises
64-85 Booth Street, # 2F
Rego Park, New York 11374

May 12, 2008

This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U.S. Government. The opinions, findings, conclusions, or recommendations expressed in this document are those of the author(s) and do not necessarily represent the official position or policies of USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report.

Mailing and Delivery Address: 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901
Phone: 703-875-4357. Fax: 703-875-4009. Web site: www.ustda.gov . Email: info@ustda.gov

The U.S. Trade and Development Agency

The U.S. Trade and Development Agency (USTDA) advances economic development and U.S. commercial interests in developing and middle income countries. The agency funds various forms of technical assistance, early investment analysis, training, orientation visits and business workshops that support the development of a modern infrastructure and a fair and open trading environment.

USTDA's strategic use of foreign assistance funds to support sound investment policy and decision-making in host countries creates an enabling environment for trade, investment and sustainable economic development. Operating at the nexus of foreign policy and commerce, USTDA is uniquely positioned to work with U.S. firms and host countries in achieving the agency's trade and development goals. In carrying out its mission, USTDA gives emphasis to economic sectors that may benefit from U.S. exports of goods and services.

Mailing and Delivery Address: 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901
Phone: 703-875-4357 • **Fax:** 703-875-4009 • **Web site:** www.ustda.gov • **email:** info@ustda.gov

FINAL REPORT

DEFINITIONAL MISSION FOR POWER SECTOR ENVIRONMENTAL REMEDIATION PROJECTS IN MEXICO

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DEFINITIONAL MISSION FOR POWER SECTOR ENVIRONMENTAL REMEDIATION PROJECTS IN MEXICO

A. EXECUTIVE SUMMARY

The United States Trade and Development Agency (USTDA) funded a definitional mission (DM) in September 2007 for power sector environmental remediation projects in Mexico. The main objective of the mission was to meet with representatives of *Comisión Federal de Electricidad* (CFE), the country's monopoly for supplying electricity, and assess their requests for technical assistance in developing environmental remediation projects. These requests were made at a meeting USTDA had with CFE in April 2007. The projects of interest to the mission may be grouped as follows:

1. Ongoing environmental projects or projects yet to be developed at CFE's operating facilities. These projects are: disposal of equipment and materials contaminated with poly-chlorinated biphenyls (PCB), reduction of sulfur hexafluoride (SF6) emissions, contaminated site remediation and soils recovery, and other resource management opportunities involving the wastes being generated by the facilities. All these projects are driven by Mexican regulations for environmental protection. The elimination of PCB has been in progress for several years but the remaining work (~50 percent) has to be rapidly accelerated. The reduction of SF6 emissions, which has been in place as a pilot study in electrically isolated Baja California, has to be implemented by CFE nationwide. New Mexican laws and regulations on site remediation and waste management will be impacting the operations of CFE and other companies.

2. Environmental, health, and safety (EHS) considerations in the decommissioning and dismantling of CFE facilities followed by plant retrofitting, construction of new facilities, or other site uses. Contaminated site remediation might also be required at some of the closed facilities. These projects will be undertaken by CFE as needed to meet Mexico's future demand for electricity. Independent Power Producers (IPPs), who have been permitted since 2000 to build power plants and supply electricity to CFE, are expected to meet most of this demand. CFE has already closed about 25 of its older power plants and is expected to close 20 more power plants by 2014.

The following report outlines and recommends two USTDA-funded capacity building activities in support of the above projects. The beneficiary of both activities would be the CFE corporate office for environmental protection, which operates under the division for capital investment projects in the company. In the first activity, this office will receive technical support in upgrading environmental management at CFE's operating facilities (about 140 power plants and nearly 500 substations and power transmission/distribution sites). In the second activity, EHS guidelines will be developed to assist the same office in specifying procedures for decommissioning and dismantling CFE facilities.

B. PROJECT DESCRIPTION

B.1 Introduction and Background

The United States Trade and Development Agency (USTDA) funded a definitional mission (DM) in September 2007 for power sector environmental remediation projects in Mexico. The main objective of the mission was to meet with representatives of *Comisión Federal de Electricidad* (CFE), the country's monopoly for supplying electricity, and assess their requests for technical assistance in developing environmental remediation projects. These requests were made at a meeting USTDA had with CFE in April 2007.

CFE is the second largest company in Mexico with its annual revenue reaching $20 billion. It generates electricity at over 160 power plants with total capacity of nearly 50,000 MW and owns the transmission and distribution networks for supplying electricity to most of the country. Mexico City is supplied electricity by *Luz y Fuerza del Centro* (LyF); however, LyF has very limited power generation capacity and it relies upon power transmitted by CFE for most of the electricity it distributes to the City. With its assets reported to exceed $60 billion, CFE is the largest utility company in North America.

As a government-held company, CFE operates under the Secretariat of Energy (SENER) and it is required by Mexican laws to sell electricity at subsidized rates. Before 2000, CFE was also required to take the entire burden of meeting the growing demand for electricity in the country by having to build a variety of power plants utilizing different types of fossil fuels. This has resulted in CFE operating in loss most of the time.

In recent years, CFE operations have benefited from the permitting and construction of new power plants by Independent Power Producers (IPPs). Simultaneously, CFE has been shifting from oil to natural gas as its primary fuel for generating electricity and it is implementing a plan for closing or replacing its less efficient power plants. These activities are expected to continue in the short- and medium-terms. Mexico's oil monopoly PEMEX is also implementing a plan to build co-generation facilities at its refineries and gas processing plants. Under the current laws in Mexico, CFE will remain to be the only purchaser of electricity from IPPs and PEMEX.

By 2016, the power generation capacity available to CFE for electricity transmission and distribution is expected to be nearly 70,000 MW (40% over the current capacity). Over the next 10 years, 66 new power plants would be constructed in Mexico with total capacity of around 27,000 MW. The IPPs and PEMEX would be providing about 25 percent of future capacity. CFE is planning to close more of its power plants (or to close some power generating units within the plants) and to replace them with new plants (or units) as needed to meet any capacity shortfall. Most of the new power plants or units to be built by CFE are expected to be of the gas-fired, combined cycle type.

In April 2007, CFE representatives had identified four (4) major areas of environmental remediation that may be considered by USTDA for technical assistance grants:

Dismantling of Power Plants and Substations: CFE had requested technical assistance in undertaking this program focusing on minimization of environmental impacts during the dismantling of the facilities and performing any remediation of sites found contaminated.

Recovery of Contaminated Soils: CFE had shown interest in developing a program for recovering the soils found to be contaminated at its facilities – a component of this program might be soils recovery at the facilities being dismantled.

PCB Remediation: CFE had requested technical assistance in the elimination of the dielectric fluid, polychlorinated biphenyls (PCB) from all of its facilities – in particular, assistance was requested in phasing out PCB from the equipment on line.

Sulfur Hexafluoride (SF6) Emissions Reduction: CFE had shown interest in implementing a program similar to the EPA-industry partnership established in USA for reducing the emission of the insulating gas SF6 from its equipment.

In preparing for the mission, the DM Contractor learned from CFE's corporate office for environmental protection that although their technical assistance needs continued in all the areas of cooperation with USTDA identified earlier, PCB remediation was of highest priority. Mexican regulations require all equipment and materials contaminated with PCB more than 50 parts per million (ppm) or 100 micrograms per square centimeter (μg/sq.cm.) to be destroyed before December 31, 2008. CFE provided total inventories of these equipment and materials in storage and on line (see B.2). As for the remaining areas of potential cooperation with USTDA, CFE estimated that 12 to 15 power plants and 40 to 50 substations would have to be dismantled in the next 3 to 5 years (see B.3). Contamination had been found at numerous sites that ranged in area from 1 to 2,500 square meters each with the total area of contaminated land estimated to be around 6 hectares (see B.4). CFE's interest in the EPA-Industry partnership on SF6 emissions reduction had originated from their participation in a teleconference organized by the World Bank in 2006 (see B.5). U.S. technology information related with the management of wastes generated by the power sector was also gathered in anticipation of a discussion with CFE of the opportunities for pollution prevention/resource management (see B.6).

The DM team visited Mexico for five working days (September 3 to 7, 2007). During this visit, meetings were held with the representatives of CFE's corporate office for environmental protection on three days to discuss their previous requests to USTDA for technical assistance. In addition, resource management opportunities were discussed on the wastes being generated by CFE or expected to be generated in future during site remediation. The DM team also met during this visit with representatives of LyF and PEMEX primarily to learn of their progress in PCB remediation. Two meetings were held in the office of the Mexican environmental regulatory agency, SEMARNAT, to discuss the national status of PCB remediation and site contamination. The status of the market for site remediation was discussed with U.S. firms providing engineering and environmental services in Mexico. The DM Team also made a one-day visit to Monterrey, which was arranged by CFE, to see two closed power plants.

B.2 PCB Remediation

Project Need. Mexican regulations under NOM-133-ECOL-2000/2001 require the "elimination" of PCB-contaminated equipment and material, as defined above, before December 31, 2008. In addition, these regulations apply future limits on the concentrations of PCB in air emissions, wastewater, and solid wastes. Limits have also been defined on PCB contamination of agricultural, residential, and industrial/ commercial land. These regulations provide references to the PCB regulations in USA, Canada, and the European Union. CFE needs to develop and implement a comprehensive program for tracking, identifying, and listing of all PCB contamination in their properties and subsequently following up with a compliance plan to meet the regulations.

Project Status. CFE reports that it started collecting PCB-contaminated materials since 1980, soon after the manufacture of PCB was prohibited in USA under Toxic Substances Control Act (TSCA). Although some disposal of PCB occurred in 1985, most of the disposal – approximately 4,500 metric tons – took place only after 2000. The remaining equipment and materials to be disposed include 1,176 transformers, 85 banks of capacitors, and 6 switchgear units on line and nearly 773 metric tons of PCB-contaminated materials contained by these on-line equipment. In addition, nearly 183 metric tons of PCB-contaminated materials are in storage. Details were not available on the locations, types, or sizes of the PCB-contaminated equipment on line.

LyF commenced its program for PCB elimination in 1995. About 3,000 metric tons of PCB-contaminated equipment and materials have been destroyed to date. These included 351 transformers (300 to 750 KVA) that weighed around 1,100 metric tons and contained around 670 metric tons of PCB-contaminated liquid. About 500 metric tons remain to be disposed, which include 76 transformers that weigh around 230 metric tons and contain about 175 metric tons of PCB-contaminated liquid. These data indicate that on an average each transformer contaminated with PCB weighed about 3 metric tons and contained about 2 metric tons of PCB-contaminated liquid. About 10 percent of the equipment and materials (by weight) collected for elimination was PCB-contaminated soil, clothes, etc.

Assuming the sizes of PCB containing transformers on line at CFE are similar to those found at LyF, the former could be roughly estimated to weigh around 3,500 metric tons (carcasses only). However, with the same assumption, the contents of the transformer on line should have been at least 2,200 metric tons (instead of 773 metric tons, as reported by CFE). It is therefore possible that CFE has left only the smaller PCB-contaminated transformers on line or the quantity of PCB-contaminated materials is underreported. The corporate office of CFE relies upon the reports submitted by its widely spread business centers for power generation, transmission, and distribution. The DM team was informed during the mission that the inventory of PCB has been varying from time to time. More information was not made available on the PCB-contaminated equipment and materials remaining to be disposed by CFE. The visit requested by the DM team to a site where PCB contaminated materials were being stored could not be arranged by CFE as well.

The corporate office for environmental programs at PEMEX, which also relies upon reports from the subsidiaries of the company, informed that only one of its transformers

that are currently on line is known to contain PCBs. This information had been obtained recently in response to an inquiry from SEMARNAT. No information was made available on the past disposal of PCB-contaminated materials at PEMEX.

During the mission, it was estimated jointly with CFE that at least 5,000 metric tons of PCB-contaminated equipment and materials have been detected and might still have to be disposed by the company. This means that CFE may have yet to complete at least 50 percent of the work of PCB elimination required by Mexican laws. Without accelerating its efforts, CFE will probably require 5 to 7 more years to complete the work. It will also be difficult and expensive to remove some of the equipment on line.

The challenge of eliminating PCB has not been less in USA and Canada, where until recently the removal and disposal of PCB-contaminated equipment and materials was not mandated. The options to replacing PCB-contaminated transformers were "retrofilling" the transformers with PCB-free oil or keeping the PCB transformers in operation containing any PCB releases that might occur due to spills or fire. While regulating the generation and management of PCB (>50 ppm) as waste, non-regulatory programs have been in place to continue reducing PCB-contaminated equipment and materials on line. The focuses of these programs have been on reducing "high-level" PCB (>500 ppm) in the equipment, proper management and disposal of all PCBs removed from use, and the protection of environment at locations that would be sensitive to PCB releases. Canada has recently amended its regulations to mandate elimination of high-level PCB by 2009. In support of these programs, USEPA has developed software that would help the owners of PCB transformers – utilities, industries, and government agencies – decide when it would be cost-effective to keep, retrofill, or replace their equipment containing PCBs.

Project Costs. LyF reported spending $9 millions in disposal of 3,000 metric tons of PCB-contaminated equipment and materials. Highly contaminated equipment and materials were sent abroad for incineration. CFE's records of past disposal of PCBs also indicated substantial use of hazardous waste management facilities located in foreign/European countries. Based on an average disposal cost of $ 3,000 per metric ton, as indicated by LyF, it is estimated that CFE's cost for disposing of PCB equipment and materials would be at least $ 15 millions.

The above cost estimate is only for disposing the wastes identified and does not include the costs of detecting, decommissioning and replacing additional PCB-contaminated equipment that may be on line and subsequently storing the wastes prior to disposal. The potential regulatory compliance costs for monitoring and containing the release of PCBs from the equipment on line are also not included. Cost escalation factors would have to be applied as well on the total disposal cost for PCB equipment and materials. All these costs would depend upon the speed/rate of implementation of the project.

The cost of decommissioning and replacing the PCB transformers and other equipment on line is estimated to be around $25 millions (average rate of $20,000 per transformer). CFE suggested that their cost of regulatory compliance has been around 35 percent of the total disposal cost. Considering this overhead factor and cost escalation, the overall

disposal cost might be around $25 millions in addition to equipment replacement costs. By considering additional costs (50 percent) for improving and accelerating the detection and monitoring of PCB-contaminated equipment and materials on line and in storage, it appears that the total project may range from $50 to 75 millions. This cost estimate does not include the costs of remediating land found contaminated by PCBs.

Infrastructure. Mexico seems to have already an infrastructure for treatment and disposal of PCB-contaminated equipment and materials. This infrastructure includes both domestic and foreign hazardous waste management facilities that have been authorized by SEMARNAT to receive and treat equipment and materials contaminated with PCBs.

The use of domestic facilities to treat and dispose of PCBs was not well defined to the DM team. However, the availability of the treatment processes like dechlorination for PCB in liquid and thermal absorption, bioremediation, and landfilling for handling PCB contaminated solids was described by CFE. In addition, a hazardous waste landfill operating in Mexico may have received PCB containing wastes from CFE. These wastes included contaminated filtering media generated at two facilities that are being operated by CFE to recycle transformer oil.

Incinerators reported to be operating in Germany, France, Spain, and Finland are being used for destroying PCB-contaminated equipment and materials. Under NAFTA, wastes containing PCBs cannot be normally exported from Mexico to the United States.

Regulatory Framework. Personnel who were met at SEMARNAT felt that a substantial effort has to be made to accelerate the elimination of PCBs in accordance with the current regulations. Following the regulations of 2000/2001, the Mexican parliament had enacted the law in 2004 for pollution prevention and remediation of contaminated sites. PCB contamination of the land is a major area of environmental concern in Mexico. The regulations in support of this law were put in place only in November 2006 (see B.4).

With full enforcement, the new regulations are expected to influence the pace and level of implementation of ongoing programs for PCB remediation. Under international agreements made at the Stockholm Convention, Mexico is committed to mitigating the release of PCB to the environment and management of PCB containing wastes.

Human Capacity. CFE has both the skills and experience required for operating a large electric utility. However, it lacks the capability of managing environmental programs of the size and complexity as for eliminating PCB in all its operations.

Technology Transfer. The project of CFE will benefit from technologies for detecting PCB contamination, monitoring and containing PCB releases, and segregating contaminated materials. These will include software for information, education, and communication (IEC) technologies for managing the project. With elimination of PCB-contaminated equipment and materials from its properties, CFE will need technologies for tracking and remediating lower concentration PCBs (e.g., soils) on site.

B.3 Dismantling of Power Plants and Substations

Project Need. With a number of its power plants and substations having been closed for economic reasons and with several more facilities being planned for closure through 2014, CFE needs a program for managing these inactive sites for extended periods. This program starts from the decommissioning of the facilities and ends with the dismantling of the facilities for retrofitting or building new facilities or for other future uses of the sites. Environmental, health, and safety (EHS) considerations should be important elements of this program. It is expected that, besides the normal requirements for equipment decontamination, the dismantling of facilities will involve site remediation.

Project Status. Since 2004, about 25 power plants and associated substations have been closed by CFE. The closed power plants ranged in capacity from 2.4 MW (facility located at Villa Constitucion in the Baja California transmission region) to 465 MW (Monterrey in the Noreste region). The total capacity decommissioned over this period is around 2,000 MW, which yields an average capacity of 80 MW each for the power plants that have been closed to date. While the facility closures have taken place over the entire country, except for the Occidente regions, nearly 60 percent of the facilities closed are in the Noreste, Central, and Peninsular regions. These regions are also believed to have been the areas for maximum activity of IPPs in developing their power plants. Most of the facilities closed are based on oil as fuel and/or the use of steam for driving generators.

Both the power plants visited during the mission had been decommissioned along with nearly 15 others in 2005. The visited power plants included the facility in Monterrey mentioned above (capacity 465 MW) and a facility located nearby in San Jeronimo (capacity 75 MW). Both facilities had operated conventional thermal power plants with steam-driven electricity generators and had the capability of using both oil and natural gas as fuels. No facility dismantling had started at the Monterrey plant while there was some evidence of removal of the stacks at the San Jeronimo facility.

The DM team was informed that the plans were to build a new gas-fired, combined cycle power plant of 700 MW capacity at the site of Monterrey plant and to retrofit the power plant with capacity increase at San Jeronimo. These plans were scheduled to take place within the next 3 to 5 years. Before activating these plans for future use of these inactive sites, however, it is necessary first to salvage or dispose of the equipment installed at both facilities. Central American utilities are expected to purchase the equipment.

The Monterrey plant was commissioned in 1965 and had six power generating units. The units had been installed at different times in the life of the plant. Each unit had Mitsubishi generator that had been driven by steam produced by its own boiler and had its own principal and auxiliary transformer for transmitting electricity to a substation and the grid. The boilers were supplied water by a reverse osmosis system and cooling towers. In general, the facility structures and equipment including controls seemed to be in good condition. No evidence of soil contamination could be found during a walk-through the site; however, the plant is located in an industrial area and a full environmental site assessment (ESA) would be needed to determine the condition of the site.

The San Jeronimo plant was commissioned in 1960 and had two power generating units. The plant seemed to have had four units in the past but two generators of 15 MW each were reportedly dismantled and removed even before 2005 when the plant was closed. The remaining two units had GE generators and had other components similar to those found at the Monterrey plant but the salvage value of the components seemed to be lesser at the San Jeronimo plant. The plan for retrofitting this plant may involve moving the larger generators installed at the Monterrey plant. No visible evidence of soil contamination could be found during the visit to this site as well; however, the site is located close to a residential area and future use of the site should look at health impacts.

To date, it seems that only one of the recently closed power plants of CFE has been fully dismantled after salvaging plant equipment. The future use of the closed plants will also depend upon the future availability of natural gas in Mexico. In one scenario, CFE may prefer not to dismantle some of the closed facilities anticipating that there may be a need to restart and operate the plants as before.

Nevertheless, the current ten-year plan of CFE is to close more uneconomically operating power plants and associated substations nationwide. This plan calls for decommissioning 20 more plants or units operating within the plants from 2008 through 2014. The plants to be closed range in capacity from about 10 MW (all units located in Santa Rosallia in the Aislados region) to 700 MW (Villa de Reyes in the Occidental region). The total existing capacity to be decommissioned is over 4,000 MW. The power plants to be closed would be larger in size (average 200 MW) than the facilities closed in the past. The closure of the largest power plant is planned for 2014. It seems that execution of the plan for facility closure will depend upon future trends in price, demand, and supply of electricity.

The future progress made by IPPs and PEMEX in installing alternative capacity for supplying electricity to CFE should be an important factor in determining whether CFE will be closing its facilities as planned. As in the case of the facilities that have already been closed by CFE, there are options to dismantling/retrofitting these facilities.

Project Cost. The cost of decommissioning and dismantling existing plants for retrofitting the existing plants or building new facilities will vary from one site to another. With the additional uncertainties about CFE's future use of the sites make it difficult to define the project or the EHS program for supporting the project.

Mexico's Energy Secretariat (SENER) has forecast that the country has to spend around $50 billions to meet its growing demand for electricity by providing 27,000 MW of additional power generation capacity. Based on this information, one can estimate that a project for replacing the capacities decommissioned recently (2,000 MW) and planned for decommissioning (4,000 MW) would cost around $10 billions.

CFE had estimated that 12 to 15 closed power plants would have to be dismantled within the next 3 to 5 years. If the site of an existing power plant is selected to build new capacity, the cost of dismantling should not normally exceed the cost of acquiring and

preparing new land for construction. Therefore, if the entire decommissioned capacity is going to be rebuilt at the sites of closed plants selected for dismantling, the total cost of dismantling the plants might be around $1 billion (10 percent of total construction cost). This yields the cost of dismantling per plant averaging from $66 to 84 millions.

In the United States, the cost of dismantling thermal power plants seems to have ranged from $30-80 millions per plant after discounting the value of dismantled plant as scrap. Some plant owners have also decided to retain the structures at the existing facility. The capacity of power plant has not been significant in determining the cost of dismantling. Labor cost has typically been a major component of dismantling costs (sometimes over 50 percent of total cost) in the United States. While the labor costs are going to be lesser in Mexico, it is preferable to use the higher range of cost estimates given above because of several unknowns on the condition of the power plants to be dismantled by CFE.

CFE spends up to 5 percent of its annual budget on the environmental components of its projects for building new power plants and upgrading its assets for transmitting or distribution of power. By applying this factor to the total cost estimate of $1 billion for dismantling 12 to 15 closed plants, an EHS program for these plants might cost around $50 millions. By expanding the EHS program to cover the dismantling of 40 to 50 substations, future decommissioning of facilities, and environmental management at the remaining closed facilities, the program cost may rise to $75 millions or more.

Infrastructure. A new infrastructure should not be required as such for decommissioning and/or dismantling the power plants and substations. The industry for building new power plants and substations is well developed in Mexico. However, the project may need new systems to be established for collecting and treating contaminated materials on site, depending upon the type and level of equipment decontamination and site remediation to be performed as part of facility decommissioning or dismantling.

Regulatory Framework. The decision of CFE to close its conventional thermal power plants using oil as fuel seems to have been driven to some extent by the air pollution regulations of Mexico. Safety and health in the operations of CFE are governed by the Ministry of Labor, which has adopted US regulations promulgated under the Occupational Safety and Health Act (OSHA). The construction of new facilities is regulated by *Comisión Reguladora de Energia* (CRE). However, the dismantling of power plants and substations would be based mainly on economics and the strategy of SENER to maintain adequate capacity to meet the country's demand for electricity.

Human Capacity Development and Technology Transfer. The EHS program for supporting the project for decommissioning and/or dismantling facilities will lead to the development of new skills within CFE and regulatory agencies for managing large industrial projects. The technology transfer resulting from the program, although limited by lack of regulations to some extent, would be substantial. The topics covered by the program will include: noise mitigation, soil erosion and sedimentation control, solid and hazardous waste management, wastewater treatment, site remediation, and the protection of health and safety for the workers and the community.

B.4 Site Remediation and Recovery of Contaminated Soils

Project Need. With the recent passing of law and regulations for preventing and remediating contaminated sites, CFE is assessing its liabilities due to site contamination as well as their opportunities for recovering contaminated land. The law of interest is known as *Ley General para la Prevencion y Gestion Inegral de los Residuos* (LGPGIR), which was originally passed by the parliament in 2004. The regulations of interest are NOM-138-SEMARNAT-SSA-2003 limiting the contamination of land by hydrocarbons and NOM-147-SEMARNAT-SSA1-2004 on heavy metal contaminants. The final rules under LGPGIR were published in November 2006. In addition to these regulations, CFE sites would be impacted by previous regulations on PCB remediation.

Project Status. No major site remediation appears to have been started by CFE to date. However, CFE reported that it has surveyed its numerous sites to assess the overall magnitude of the problem. Based on these surveys, the DM team was informed prior to the mission that about 6 hectares of land is contaminated. The contaminated sites ranged widely in size (from 1 meter x 1 meter to 50 meters x 50 meters). The only other information provided during the mission was that the sites were mainly contaminated with hydrocarbons. With the potential regulatory impacts, it is understandable that no other site contamination data could be obtained from CFE.

Site contamination and waste dumps are known to be widely prevalent in Mexico. During its discussions at SEMARNAT, the DM team was informed that nearly 300 contaminated sites have been registered with the regulatory agency. These sites included six sites contaminated with PCB; however, CFE was not identified to be owner of these sites. The sites included a 50-hectare property that was a former pesticide plant, a 20-30 hectare property that had used PCB contaminated oil in a brick kiln, and a 10-12 hectare property owned by a state government. In a pilot study conducted in Mexico City and San Luis Potosi, SEMARNAT had identified about 100 contaminated sites and 100 more waste dumps. Nationwide, it is believed that there were around 5,000 industrial sites needing remediation under the new law and regulations, with PEMEX and the mining industry expected to be owners of most of the contaminated sites.

Because of the wide prevalence of contaminated sites and large number of parties who are responsible for this problem, the Mexican law and regulations on site remediation are expected to have different levels of impact in different areas of Mexico. In Mexico City and other large cities of Mexico, these regulations will probably have adequate enforcement and community involvement. The regulations may lack enforcement and/or community involvement to some extent in the suburban areas. Regulatory impact would be low in most of the remote areas where CFE has substantial operations.

Unless CFE adopts a national policy, therefore, its implementation of the project for site remediation could vary from one business center to another. However, detection of PCB contaminated soil (> 25 ppm) may be handled consistently in all parts of the country.

Project Cost. Without information on the types or location of site contamination found at CFE facilities, only broad estimates can be provided of the cost of this project.

In its Form F-20 submitted to SEC for December 31, 2006, PEMEX has estimated its total environmentally affected area to be nearly 937 hectares with accrued liabilities of Mx. Ps. 2,311.4 millions (around $220 millions). The liabilities included cost for studies to evaluate contamination at the sites and anticipated remediation of the sites. The liability assessment of PEMEX could be used as a starting basis for estimating that the cost of remediating 6 hectares of contaminated sites at CFE might be around $15 million.

Better estimates of the cost of this project are possible if the volumes of contaminated soil are known. Assuming that contamination at CFE sites are within the depths of 5 to 10 meters (without impacting groundwater), the volumes of soil to be treated would range from 300,000 to 600,000 cubic meters. Because these soils are to be found only in relatively small quantities at different sites, it seems reasonable to assign $50 per cubic meter as the average rate for treatment. This yields a cost range of $15-30 millions.

This assessment of the environmental liabilities of CFE might change substantially, however, with the implementation of a comprehensive program of site assessments to characterize and evaluate the nature of contamination at the sites.

Infrastructure. Three facilities in Low Temperature Thermal Desorption -- RIMSA, PASA, CYGSA -- primarily to handle petroleum contaminated wastes generated during oil production in Mexico. The infrastructure is believed to be inadequate in Mexico for handling the additional solid and hazardous wastes that would be generated with full enforcement of the new law and regulations for site remediation. The alternatives to expanding the infrastructure for treating contaminated soils off site would be in-situ treatment followed by recovery and reuse of the soils. Other infrastructure for handling contaminated soils might involve new technologies for containing or stabilizing the pollutants (e.g., metals) in soil and reusing the materials off site (see B.6).

Regulatory Framework. The regulatory framework in Mexico to support site remediation has strengthened in the last five years. In addition to the regulations promulgated under LGPGIR, SEMARNAT has updated its regulations promulgated under the 1988 law for environmental protection – *Ley General del Equibrio Ecologico y la Proteccion al Ambiente* (LGEEPA). These regulations are NOM-052-SEMARNAT-2005 for hazardous waste characterization and NOM-087-SEMARNAT-SSA1-2002 for medical wastes. The following document, which was prepared under funding of the United Nations, provides guidance on the current regulatory requirements on hazardous (*Peligrosos)* wastes:

1. Collección Técnica Estadistíca "*Regulación de los Residuos Peligrosos en México*", by Dra. Cristina Cortinas de Nava, SEMARNAT, August 2007.

Chapter 7 of this document—*Prevencion y remediacion de sitios contaminados* – explains the requirements of the law and regulations on site remediation.

Human Capacity. CFE's project in site remediation and soil recovery will train its personnel in complying with the laws and regulations for preventing and remediating contaminated sites. These skills would include use of software to assist in evaluating site remediation technologies. Similarly, there are tools for selecting field sampling and analysis technologies to characterize site contamination. The work of CFE under this project could become a model to be followed by other industries in Mexico.

Technology Transfer. The project should enable transfer of technologies for on-site remediation of contaminants as an alternative to off-site treatment and disposal. For petroleum contaminated soils, these technologies would include land farming, soil vapor extraction, and bioventing. The demand for remediation technologies and services has grown recently because of the additional need for these technologies in the European Union, both in Western Europe and in the countries of Central and Eastern Europe that have joined the Union. Technologies for preventing cross-media transfer of pollutants during site remediation would also be needed under the project.

B.5 SF6 Emissions Reduction

Project Need. CFE would like to implement a company-wide program for reducing the emissions of SF6, which is used as an electrical insulator in their high voltage equipment for transmitting and distributing electricity. SF6 is a currently unavoidable greenhouse gas with high global warming potential (GWP) used in circuit breakers, gas-insulated substations, and other switchgear. CFE is interested in reducing emissions of this gas in order to comply with international programs for climate change and to save on the costs of losing SF6 during operation and maintenance of equipment containing the material. The specific program of interest to CFE is the partnership with industry established in the United States by EPA for reducing SF6 emissions from electric power systems.

Project Status. In 2005, the operating groups for electricity transmission and distribution at CFE were asked to submit inventories of SF6 in their electric power systems. A pilot study was then started for monitoring SF6 emissions in the Baja California region. This region was selected for the pilot study because it is served by a separate power grid. It was felt that a baseline could be established for SF6 emissions more easily for this region than for the rest of the country, which is served by the same grid.

Preliminary findings of the pilot study indicate that the region loses about 20 percent of SF6 contained by its electric power systems annually. During the period 1999-2005, the USEPA-Industry Partnership has been able to report a gradual reduction of the SF6 Emissions Rate from 17 percent to 8 percent. Over this period, 81 companies representing about 42 percent of the US power industry has joined the partnership. The international goal for reducing SF6 emission rate is 5 percent of contained gas per year.

The inventories submitted in 2005 by CFE's operating groups for transmission indicate that about 313 metric tons of SF6 was being contained in 3,697 pieces of equipment. At the emission rate of 20 percent, the total emission of SF6 from the transmission system of CFE may be estimated to be equivalent to annual release of about 1.5 million metric tons

of carbon dioxide (MMTCE). One pound of SF6 has the same global warming effect as 11 tons of CO_2. In comparison, the USEPA-Industry Partnership alone had reported SF6 emissions reduction of around 1.4 MMTCE (8 percent of total emissions).

Following the guidelines established by USEPA, CFE might consider a "partnership" with its own business centers for electricity generation (5), transmission (9), and distribution (13). With successful results in the first three years, the partnership could be expanded to other Mexican industrial owners of electrical systems that are also known to contain SF6. In 2006, CFE had participated in a teleconference organized by the World Bank to learn of the USEPA-Industry Partnership for SF6 emissions reduction.

Project Cost. The potential savings on the cost of SF6 emissions could be a basis for designing the project. SF6 costs around $20,000 per metric ton. If the project reduces SF6 emission rate by 10 percent in five years, the total emissions reduction from electricity transmission at CFE would be 450,000 tons with savings of $9 million. Accounting for savings from other operations, project cost may be $10 to 15 million.

Infrastructure. SF6 emissions reduction will not require any new infrastructure.

Regulatory Framework. International regulations or agreements such as the Montreal Protocol do not prohibit the use of SF6 as it does not destroy ozone. However, programs for SF6 Emissions Reduction Partnership exist in most OECD countries and are encouraged by international financing institutions like the World Bank.

Human Capacity. Participation in voluntary programs such as the SF6 partnership will help CFE personnel becoming skilled in working with commitment and responsibility even under a non-regulatory framework. Making employees aware of the environmental impact of SF6 and establishing a corporate philosophy within CFE for measuring firs before managing will also be important elements of the program.

Technology Transfer. Besides the use of appropriate information technologies, the program will need the use of technologies for detecting fugitive emissions, repairing SF6 leaks from electric systems, and recycling SF6 collected from the systems.

B.6 Other Resource Management Opportunities

Project Need. In conjunction with CFE's project for site remediation and recovery of soils, the DM team felt that other opportunities should be examined for recycling, reuse, or recovery of hazardous or non-hazardous wastes generated at the power plants. For example, technologies exist for stabilizing the ash generated in large quantities at coal fired power plants and reusing the stabilized materials for buildings or construction. In a similar manner, low or moderately contaminated site remediation wastes can be processed and reused. Besides lessening the need for infrastructure to manage wastes, these opportunities would help in preventing future contamination of sites in Mexico. Because these project opportunities have yet to be developed at CFE, no other assessment of the projects besides recognizing their need is made in this report.

B.7 Summary of Findings and Conclusions

The projects of interest to the mission may be grouped as follows:

1. Ongoing environmental projects or projects to be developed at CFE's operating facilities. These projects are for PCB equipment disposal, SF6 emissions reduction, site remediation and soils recovery, and other resource management opportunities.

2. EHS projects associated with the decommissioning of uneconomically operating facilities and with the dismantling of these facilities followed by retrofitting of the plants, construction of new facilities, or other site uses. Contaminated site remediation might also be required at some of this group of facilities.

The first group of environmental projects is applicable to a larger population of facilities than the second group of projects. The power plants in the first group would be 140-160, while the second group would include 25-45 power plants. The projects in the first group will also involve numerous (~500) other facilities including substations and other power transmission and distribution sites. The projects in the second group are expected to involve 40 to 50 substations besides the power plants.

The PCB remediation project is ongoing since 2000 and is possibly 50 percent complete. A pilot study of SF6 emissions reduction has been started. Only a survey of site contamination seems to have been conducted in preparation for the site remediation project. While these projects will cover all the power plants, the resource management opportunities may consider only selected power plants (e.g., coal-fired power plants).

Only 20 power plants have yet to be decommissioned. The dismantling of power plants is expected to take place in only 12 to 15 power plants in the short term. Future use of the remaining closed power plants is not known – they may stand by with no action taken. Future development of facilities at the dismantled power plants – viz. retrofitting or new plant construction – will depend upon economic trends in the power sector.

In terms of project costs, the short- and medium-term needs seem to be similar. The total cost of projects in the first group is estimated to range from $48 to 80 millions, without considering for resource management. The total cost of projects in the second group is estimated to range from $50 to 75 millions.

The development needs and impacts of these projects seem to be comparable although the projects in the first group are driven by regulations while the projects in the second group would be driven primarily by economics. No major infrastructure development needs seem to exist for the projects. On the other hand, the projects will lead to human capacity building and technology transfer. The development of projects under the first group will help to meet the long-term needs of CFE for environmental management, especially for site remediation and resource management, at its operating facilities.

C. PROJECT SPONSOR'S CAPABILITIES AND COMMITMENT

Project Sponsor. The expression of interest in USTDA technical assistance was made by CFE's corporate office for environmental protection (*Gerencia de Proteccion Ambiental*), which has a staff of 80 and annual budget of $4 millions for salaries and expenses. The Coordinator of environmental projects in this office was the main contact at CFE for this assignment. In addition, the DM team held discussions during the visit to Mexico with the Chief of environmental monitoring and characterization and the staff member responsible for environmental standardization in the office for environmental protection. The DM team also met with staff in the section for studies of environmental risks in the same office to discuss the status of ISO 14001 certification of the operations of CFE. The mission concluded with a meeting with the Manager of the office for environmental protection. This office reports to the division for capital investment projects (*Direccion de Proyectos de Inversion Financiada*), which cost around $4 billion annually.

Organization of CFE. CFE is a decentralized company with an organization in which there are not many levels of senior management. Most of the decisions at operational level are made by the managers of business centers (25+) created for power generation, transmission, and distribution. These business centers report to their respective subdivisions at the headquarters which in turn report to the division for operations (*Direccion de Operacion)*. Strategic business decisions of the company are made by a Committee that includes the Directors for operations, projects, administration, and finance. A Deputy Director for Planning is also a member of the Committee.

Until recently, the office for environmental protection was organized within the corporate subdivision for technical matters reporting to the Director of Operations. The office is now within the subdivision responsible for developing capital investment projects. With the shift from operations to projects, the office for environmental protection is expected to be more effective in supervising and improving the environmental performance of the company. This office seems to have been involved previously only in monitoring and reporting environmental performance to the division for operations. The recent interest in USTDA program shown by the CFE corporate office for environmental protection reflects upon the new roles being played by this office in environmental matters.

Project Responsibilities. At their current stage of development, it appears that operations would still be responsible for implementing the projects for PCB equipment disposal and SF6 emissions reduction at the facilities. For example, we were told that a budget for PCB remediation for the next fiscal year was requested by the subdivision for power generation. The Manager of the office for environmental protection had also mentioned during our meeting with him that his office can only make recommendations (to operations) based on any environmental management studies conducted by the office. However, with the development of new projects under consideration for USTDA assistance, especially site remediation projects, it seems that the office for environmental protection would be a major participant in decision making.

In addition, with full enforcement of hazardous waste regulations that were promulgated recently, the office for environmental protection would be the main contact with

regulatory agencies in ensuring compliance by the company. The dismantling of closed power plants at least for building new facilities at the sites would have to be commenced by the division for construction under the Director of Projects.

Project Commitment. In the ongoing environmental projects at operating facilities, there is sufficient evidence that CFE is trying to meet compliance with the applicable regulations. CFE has disposed around 4,500 metric tons of PCB equipment and their contents and it is preparing to reach the goal for eliminating these materials in the short term. A pilot study of SF6 emissions reduction has been started in Baja California. Although details could not be provided to the DM team, CFE reports having conducted environmental audits at its numerous sites to start assessing site contamination. The meetings held at SEMARNAT during the visit to Mexico did not indicate that CFE has been delinquent in responding to any notices of violation of environmental regulations.

Recognizing its position as the second largest company in Mexico, CFE wants to take the leadership in complying with environmental regulations and in maintaining good relations with the communities nationwide where it is operating. The company has to take environmental initiatives as a major trader of electricity with the United States and neighboring countries in Central America. CFE also has to be the role model on environmental matters as the only purchaser of electricity from IPPs and other power generators in Mexico. The company has sought and obtained ISO certifications of its various operating facilities for environmental performance. Because of its combustion of large amounts of fossil fuels for generating electricity, CFE has also to be committed to enabling Mexico in compliance with international agreements on climate change.

D. IMPLEMENTATION FINANCING

D.1 Overview

Order-of-magnitude cost estimates for the projects of interest to the mission are given in Section B – Project Description. These cost estimates are reviewed below in order to define the financing needs of CFE's environmental remediation projects under the headings in which they were grouped for the purpose of USTDA grant consideration:

Upgrading Environmental Management at Operating Facilities. The ongoing project for replacement and disposal of PCB equipment on line and wastes in storage was estimated to cost around $50-75 millions. The cost of remediating the sites where contamination has been found was estimated to be $15-30 million, noting that environmental liability of contaminated sites could be higher. A program for reducing SF6 emissions by 10% within the next five years was estimated to cost $10-15 millions. It was also estimated that CFE might decide to spend up to $10 millions, if there is adequate return on investment, in pursuing other resource or waste management opportunities.

By adding the cost estimates given above, the total financing need of CFE for upgrading environmental management at its operating facilities might range from $75-125 millions.

Over a period of five years, the average financing needed for developing and implementing these projects may be $15 to 25 millions per year.

EHS Program for Closed Facilities. The cost of implementing this program was estimated to range from $50-75 millions, if CFE decides to dismantle and/or retrofit 12 to 15 plants. Over a period of five years, this cost burden may range from $10 to 15 million per year. Before undertaking this program, however, CFE would have to first make a larger investment decision (up to $1 billion) on rebuilding capacity at the closed plants.

D.2 Financing Mechanisms Available to CFE

At first glance, it would seem that the financing needs for implementing these environmental remediation projects should not be a major burden to a large company like CFE. However, the financial statements of CFE give a different picture. For example:

- Income Statements prepared by Deloitte for 2005 shows net operating loss of $893 millions over revenue of $16.8 billions. The loss before taxes was $976 millions, but a net profit of $482 millions could be reported by the company after favorable transfer of funds as non-cash subsidies took place from the Government of Mexico.
- The income statement prepared by CFE for the first 3 Quarters of 2006 showed a net operating profit of only $90 million over revenue of $14.1 billions. The profit before taxes for the same period was only $12 millions.

Although the financial situation is not good, CFE has adequate working capital to undertake the projects of interest to the mission either as part of its operating expenses or from the funding provided for capital investment projects. The company funds its annual budget normally through revenues expected to be generated by operating revenues.

In addition, the dismantling of power plants to rebuild decommissioned capacity may have access to alternative financing under Mexican laws for projects designated as PIDIREGAS, or "long-term productive infrastructure projects" authorized in a special budget by the Mexican Congress. Because of federal budgetary constraints, the Mexican Government has developed public-private partnership to finance PIDIREGAS projects. This designation means that these projects are treated as off-balance-sheet items for annual budgetary purposes, until delivery of the completed project or until payment obligations start under a contract.

D.3 Other Financing Mechanisms

Bilateral and Multilateral Financing. The Ex-Im Bank has maintained a medium-term Credit Guarantee Facility for CFE since 1995. The current facility was approved in 2004 and has a line of credit of $90 million. It allows CFE to make repetitive purchased of US goods and services to meet its annual capital expenditure requirements under an Ex-Im Bank guaranteed line of credit provided by Caylon of New York. The facility is needed because the Mexican government requires CFE to maximize its utilization of such credits for procuring equipment and services. The utilization of the facility has been high for

several years. This line of credit might be utilized by CFE in some of the projects of interest to the mission, especially for the projects involving PCBs and SF6 that have to be implemented over multiple years at its operating facilities.

The World Bank does not seem to have financed the projects of CFE in the past. However, a group from the Bank has visited Mexico recently to discuss carbon financing with the Mexican government including CFE. The SF6 emissions reduction program would be one of the items to be discussed.

E U.S. EXPORT POTENTIAL

The U.S. is a large supplier of equipment to the normal operations and capital projects of CFE. In addition, U.S. firms play a leading role in providing environmental technologies. These factors should help in ensuring that U.S. firms will secure a major share of any international procurement of goods and services that results from the projects of interest to the mission. USTDA technical assistance in the environmental remediation projects of CFE should improve the chances of the technologies selected by CFE being modern and appropriate. Consequently, the chances of CFE seeking environmental technologies from abroad will be greater than they would have been otherwise.

In the short- and medium-terms, the export potential of the environmental projects at the operating facilities of CFE is estimated to be $20 to 40 millions. The export potential for CFE's projects for dismantling and retrofitting of power plants and substations is expected to be around $10 to 15 millions. This will include:

- Management services for all projects;
- Computer software and hardware;
- Communication equipment;
- Instruments and Controls;
- Soils cleanup technologies and services:
  - hydrocarbons
  - heavy metals
  - PCBs
- Special equipment:
  - Transformers & Switchgear
  - Leak detection / repair equipment
  - Gas collection / recycling equipment

In the long term, export potential in other similar projects in Mexico for site remediation technologies and services and in resource/waste management would be much higher.

F. FOREIGN COMPETITION AND MARKET ENTRY ISSUES

The operational expenses and capital expenditures of CFE are significant and they attract several foreign suppliers of goods and services. The total market for environmental

services in Mexico is also large and has attracted several foreign companies. These services are primarily in the areas of air and water pollution control followed by municipal solid waste management and then by treatment and disposal of industrial and hazardous waste. Although there has been considerable investment and technology transfer from USA, both European and Canadian firm are involved in this market.

The market segment for site remediation is emerging and will face a shortage in capacity for traditional off-site treatment and disposal of remediation wastes. Under recently promulgated environmental regulations, there will also be needs for innovative site remediation and resource management technologies in Mexico. The German agency, GTZ, had assisted SEMARNAT in developing these regulations and it is currently involved in preparing a list of contaminated sites in the country.

Within this background, USTDA participation in the projects of interest to CFE will help in developing new project opportunities for US investors, technology developers, and suppliers of goods and services in this segment of the environmental market.

G. DEVELOPMENTAL IMPACT

A discussion of the developmental impacts that could result from the implementation of the environmental remediation projects of CFE is given below.

G.1 Upgrading Environmental Management at Operating CFE Facilities

The initial developmental impact of USTDA technical assistance in these projects would be human capacity building within CFE for handling large and complex environmental problems, such as PCB remediation and SF6 emissions reduction. In characterizing better the problem of site contamination at CFE, there might be technology transfer for developing new solutions for remediating these sites, especially the sites contaminated with PCB. The proposed technical assistance for CFE also has a provision for examining technologies for waste management and soils recovery in the company.

The projects of CFE selected for technical assistance under this heading would generally enable the company to improve its compliance with Mexico's environmental regulations. Specifically, the projects will enable CFE to implement pollution prevention, site remediation, and resource management in critical areas of their operation.

These impacts would be felt by other Mexican companies such as PEMEX and LyF, which have similar problems because of their involvement in the power sector. If companies in the sector choose appropriate solutions for site remediation and/or resource management, the successful implementation of projects should impact the larger market for site remediation that is emerging in Mexico. This includes opportunities for developing new infrastructure and technology transfer within the country.

G.2 EHS Guidelines for Dismantling and Retrofitting Closed CFE Facilities

USTDA technical assistance in these projects will lead to the development of new skills and awareness within CFE for protecting the environment and maintaining safe and healthful working conditions in their projects. The dismantling and retrofitting of closed facilities will primarily benefit the operations and economic performance of CFE. However, the EHS guidelines will be covering a wide range of topics relevant to industrial operations. Consequently, by applying EHS guidelines in these projects, CFE might be establishing standards that could be followed by other industries in Mexico. The regulatory agency might also adopt some of these standards for use in other similar industrial projects. The technology transfer resulting from these projects would be limited, mainly due to the current lack of regulations for such projects. No new infrastructure development is expected to result from these projects.

H. IMPACT ON THE ENVIRONMENT

The CFE corporate office for environmental protection has important responsibilities in all the projects of interest to the DM. Some of these projects have been undertaken in order to comply with environmental regulations (viz., the projects for PCB remediation, and contaminated site remediation). SF6 emissions reduction is mandated under Mexico's international agreements. The application of EHS guidelines in dismantling and/or retrofitting the closed facilities of CFE are also driven by a general need to comply with the environmental laws and regulations in Mexico. The projects for soils recovery and management of wastes would be driven by the need for finding viable solutions to offsite treatment and disposal of these valuable materials. All projects of interest to the DM should have goals that are consistent with the Mexican law for environmental protection and sustainable development.

In addition, the proposed technical assistance for environmental management and EHS guidelines should not have any negative impact on the development of any facility or infrastructure (new or existing) being supported by the projects. Instead, the projects should have net positive impacts on the environment.

I IMPACT ON U.S. LABOR

Technical assistance in the projects of CFE should not result in the movement of any firm outside the U.S. and capture of the existing U.S. market for the same business with adverse impact on domestic employment. USTDA funding of this technical assistance does not seem to violate any internationally recognized worker rights. Although CFE is a trader of electricity with USA, this commodity will not be in surplus for a long time in the future. The financing of environmental projects would have been allowable under the current laws on foreign assistance even if electricity were in surplus.

J. QUALIFICATIONS

The environmental services required for these technical assistance projects should be provided by qualified and experienced firms or consultants that are very familiar with the relevant areas of the power sector industry of the United States and abroad.

J.1 Environmental Management Capacity Building (EMCB)

The Contractor selected to provide this technical assistance should have assembled corporate experience and skills in environmental monitoring and control under both regulatory and non-regulatory programs of the power sector industry in the United States. This experience should specifically include projects in PCB management and SF6 emissions reduction at utilities. In addition, the Contractor for this work should have specialists in designing industrial site remediation and waste management projects. The skills presented by the Contractor should include conducting workshops or other training seminars for technical personnel. The Contractor should have worked for utilities in Mexico or Latin America. Based on these requirements, the following criteria and scores may be considered by CFE for selecting the Contractor for this work:

Selection Criteria	Score
Total Corporate Experience of Prime Contractor in Power Sector – minimum 20 years	20
Experience of Prime Contractor in Mexico or Latin America – minimum 5 years	10
Environmental Monitoring and Control (regulatory programs) – 5 projects	10
Environmental Monitoring and Control (non-regulatory programs) – 5 projects	10
PCB Management (4 projects)	10
SF6 Emissions Reduction (4 projects)	10
Industrial Site Remediation (4 projects)	10
Industrial Waste Management (4 projects)	10
Workshops or Training Seminars (4 projects)	10
Total Score	**100**

J.2 Environmental, Health and Safety Guidelines (EHSG)

The Contractor selected to provide this technical assistance should have assembled corporate experience and skills in the development or implementation of environmental, health, and safety services for the power sector in the United States. This experience should include EHS programs for the construction or decommissioning of conventional thermal power plants designed to operate with oil as fuel and to generate electricity from steam-driven generators. The Contractor should also have participated in the dismantling of power plants and substations. In addition, the Contractor should have specialists in industrial site remediation and in conducting workshops or other training programs for industrial personnel. The Contractor should have worked for utilities in Mexico or Latin America. Based on these requirements, the following criteria and scores may be considered by CFE for selecting the Contractor for this work:

Selection Criteria	Score
Total Corporate Experience of Prime Contractor in Power Sector – minimum 15 years	20
Experience of Prime Contractor in Mexico or Latin America – minimum 3 years	10
Environmental Services to Utilities – 5 projects	10
Health and Safety Services to Utilities – 3 projects	10
EHS for Construction/Decommissioning of Thermal Power Plants – 3 projects	15
Participation in Dismantling of Power Plants and Substations – 3 projects	15
Industrial Site Remediation – 3 projects	10
Workshops or Training Seminars – 3 projects	10
Total	**100**

K JUSTIFICATION

USTDA's grants for technical assistance in these projects will lead to capacity building in the CFE office for environmental protection, which has recently been moved to the corporate division for capital investment projects. This office currently lacks the resources for undertaking detailed environmental studies. USTDA grants will also ensure that environmental services of high quality are obtained for important projects.

K.1 Environmental Management Capacity Building (EMCB)

The requested technical assistance will involve two high-profile environmental projects of CFE. The first project is driven by Mexican regulations that call for elimination of all equipment containing PCB in the near term. The second project – SF6 emissions reduction project – is mandated by the Mexican government signing international agreements on climate change. While these projects are of high priority by themselves to CFE, successful completion of these projects will enable CFE to embark on two larger environmental projects – site remediation and pollution prevention/resource management. In addition to treating PCB contaminated soils, CFE will have to remediate their properties that are contaminated with other hazardous constituents under recently promulgated regulations. CFE will also have to start a program of waste and resource management to prevent contamination of their properties under the same regulations. Both site remediation and pollution prevention/resource management will be covered by the proposed technical assistance services. By participating in these projects, USTDA will enable U.S. firms to get a head start in emerging markets in Mexico.

K.2 Environmental, Health and Safety Guidelines (EHSG)

This technical assistance is associated with the ten-year plan of CFE for developing new capacity for generating electricity in Mexico. Although not driven by regulations directly, the development and application of EHS guidelines to support dismantling and/or retrofitting closed facilities has the potential for establishing new industry standards for conducting similar activities in Mexico. In addition to extending these guidelines to cover decommissioning of CFE facilities, the proposed technical assistance will address the decontamination of equipment and site remediation at the facilities being dismantled.

L TERMS OF REFERENCE

L.1 Environmental Management Capacity Building (EMCB)

Background

The Grantee (CFE) had requested USTDA funding of technical assistance in their ongoing environmental projects or projects yet to be developed at CFE's operating facilities. These projects are for:

- Removal of equipment in operation that contain poly-chlorinated biphenyls (PCB) and disposal of PCB contaminated materials,
- Reduction of the emissions of sulfur hexafluoride (SF6) from equipment in use,
- Remediation of sites contaminated with hazardous/toxic constituents, including PCB, hydrocarbons, and heavy metals, and
- Other resource management opportunities involving pollution prevention or the recycling/reusing of wastes generated by the facilities.

All the projects of interest are driven by Mexican regulations and/or international agreements signed by Mexico for environmental protection, as summarized below:

- The disposal of PCB containing equipment was started in 1995 but the remaining work (estimated to be 50 percent) has to be completed at the earliest. (Mexican regulations call for elimination of PCB containing equipment by end of 2008.)
- CFE would like to implement within the company a program similar to the USEPA-Industry SF6 Emissions Reduction Partnership. A pilot study of SF6 emissions reduction has been in place in Baja California, which is served by a separate electrical grid, for the last few years.
- The laws and regulations on contaminated site remediation and waste management were passed only recently in Mexico and they are expected to significantly impact the businesses of CFE and other large companies in the future.

CFE generates electricity at numerous power plants with total capacity of nearly 50,000 megawatts (MW) and owns the transmission and distribution networks for supplying electricity to most of the country. In the proposed USTDA-funded activity, the CFE corporate office for environmental protection will receive technical support in upgrading environmental management at CFE's operating facilities (about 140 power plants and nearly 500 substations and power transmission/distribution sites).

CFE is a decentralized company in which the managers of business centers (nearly 25) that are responsible for power generation, transmission, or distribution in different parts of the country make most of the decisions at operational level. The proposed grant would be for environmental management capacity building to assist the CFE corporate office of environmental protection to be more effective in its present advisory and supervising roles in the projects of interest.

Goals & Objectives

- Assessing the risks to the environment, community relations, or business due to PCB management and/or site contamination at CFE's facilities in operation, and recommending suitable plans of action to CFE for full regulatory compliance and for meeting its social responsibilities.
- Assisting with upgrading the existing programs or developing new programs within CFE for reducing SF6 emissions and identifying resource management opportunities involving the wastes generated in large quantities at the facilities.

Technical Assistance (TA) Tasks

TASK 1: TA Kickoff Meeting

The Contractor shall coordinate a TA kick-off meeting with CFE to review and agree on the following:

- Technical approach and management plan: The Contractor shall verify its technical approach and management plan with CFE;
- Information requirements of the Contractor: The Contractor shall discuss its information requirements with CFE. CFE shall make CFE information available to the Contractor and shall identify potential sources for non-CFE information. The Contractor and CFE shall agree on the protocol to be followed by the Contractor in obtaining the information from CFE and non-CFE sources;
- Selection of CFE facilities to be assessed in the TA: The Contractor, in consultation with CFE, shall prepare a short list of power generation, transmission, and distribution facilities that characterize CFE's environmental management needs in the areas covered by the TA. The Contractor shall also consider the auxiliary facilities used by CFE to maintain their facilities. The Contractor, in consultation with CFE, shall then develop a strategy for gathering information from these facilities, which may include site visits by the Contractor;
- CFE confidentiality requirements: The Contractor shall verify how CFE confidentiality requirements will be maintained throughout the development of the TA; and
- Work completion schedule and deliverables: Based on the outcomes of the above discussions, the Contractor, in consultation with CFE, shall finalize the schedule for completing the TA, including deliverables.

Task 2: Environmental Records Review

The Contractor shall review CFE's environmental records in the areas covered by the TA. To assist the Contractor's review of CFE's environmental records, CFE shall provide to the Contractor, at a minimum, the following documents or information in the format and level of detail agreed to in Task 1:

- PCB transformers, capacitors, and other equipment on line;
- Quantities of PCB dielectric fluid and PCB-contaminated materials in storage;
- Existing/identified/known contaminated sites at CFE facilities and the basis for such determination;
- Updates on the SF6 pilot study in progress for CFE facilities in Baja California;
- Available inventories of hazardous and non-hazardous waste generation and management at CFE facilities; and
- Notices of violation from regulatory agencies in Mexico.

The Contractor shall evaluate the above information in conjunction with the information gathered in Task 3 to prepare an initial summary of the current status of CFE's environmental management at the facilities operated by CFE. The Contractor shall travel to Mexico to discuss the data provided by CFE on site contamination and waste management, and to develop the procedures to be followed when performing environmental site assessments ("ESAs") in Task 5.

Task 3: Environmental Regulatory Review

In conjunction with Task 2, the Contractor shall conduct a review of existing and proposed environmental regulations in Mexico that are applicable to the operation of CFE facilities. The environmental regulatory review shall cover, at a minimum, the following laws, regulations, and areas:

- Ley General del Equilibrio Ecológico y la Protección al Ambiente ("LGEEPA");
- Ley General para la Prevención y Gestión Integral de Residuos ("LGPGIR");
- Norma Oficial Mexicana NOM-133-ECOL-2000/2001 (PCB regulations);
- Norma Oficial Mexicana NOM-158-SSA-203 (hydrocarbon contaminants);
- Norma Oficial Mexicana NOM-147-SSA1-2004 (heavy metal contaminants); and
- Guidelines on SF6 emissions.

The Contractor shall travel to Mexico to meet with relevant Mexican government agencies (such as the Secretariat of the Environment and Natural Resources) to obtain clarification of the regulations and conduct follow-up discussions with CFE.

Task 4: PCB Management Assessment

The Contractor shall conduct site visits to examine CFE's practices for operating and decommissioning PCB-containing equipment, storing PCB-contaminated materials, and arranging for disposal of these materials. By conducting the site visits focused on PCB management at CFE facilities, the Contractor shall develop and recommend the following methodology and tools for CFE's consideration:

- Establishing baselines;
- Completing inventories;
- Monitoring and reporting progress; and
- Updating the program for PCB elimination.

The Contractor shall visit, at a minimum, the following number of facilities:

- Six (6) CFE facilities where PCB-containing equipment is in operation;
- Three (3) CFE facilities where PCB-contaminated materials are in storage;
- One (1) CFE facility in operation that is reported to be PCB-free;
- One (1) CFE facility that is being used for the regeneration of transformer fluid; and
- One (1) Mexican facility that is being used for the disposal of PCB-contaminated soil.

The Contractor, in coordination with CFE, shall select the facilities to be visited under this task, taking into consideration the results from Task 1, Task 2, and Task 3.

CFE shall provide ground transportation for the Contractor to reach the facilities that are far from large cities. CFE shall also provide logistical support to the Contractor for all site visits so that the Contractor can meet with facility personnel, conduct the site visit, and gather information.

Task 5: Environmental Site Assessments

In conjunction with Task 4, the Contractor shall conduct ESAs in accordance with the ESA procedures developed in Task 2. The Contractor shall develop and recommend a methodology for CFE to follow to verify and update CFE's data on site contamination, focusing on the presence of PCB and other hazardous and toxic substances in soil and water at CFE facilities. The Contractor shall perform *in situ* sampling and provide the samples to CFE, who will be responsible for chemical analysis of the samples.

The Contractor, in coordination with CFE, shall select the facilities to be visited and assessed under this task, taking into consideration the results from Task 1, Task 2, Task 3, and Task 4. The Contractor shall perform ESAs at six (6) CFE facilities, at a minimum, in accordance with the following criteria:

- Four (4) facilities classified by CFE as contaminated;
- Two (2) facilities classified by CFE as clean; and
- Shall include the following facilities visited under Task 4:
    - One (1) CFE facility in operation that is reported to be PCB-free; and
    - One (1) of the six (6) CFE facilities where PCB-containing equipment is in operation.

Deliverable: Interim Report #1

The Contractor shall deliver an interim report to CFE covering TA progress and results from Tasks 1-5.

Task 6: Development of SF6 Emissions Reduction Program

To prepare for this task, the Contractor shall:

- Review and obtain updated details on the U.S. Environmental Protection Agency's SF6 Emissions Reduction Partnership; and
- Gather new data on SF6 emissions at the CFE facilities visited in Task 4 and Task 5.

The Contractor shall conduct the following activities:

- Work with CFE to develop a SF6 emissions reduction partnership within CFE [a partnership that includes twenty-five (25) or more CFE business centers, for example], based on the U.S. Environmental Protection Agency's SF6 Emissions Reduction Partnership model;
- Establish a baseline and design a SF6 emissions reduction program for CFE, including standards and guidelines;
- Work with CFE to recommend an expansion of CFE's SF6 emissions reduction pilot study (in the State of Baja California) to three (3) to five (5) other CFE business centers;
- Work with CFE to develop a CFE-wide implementation plan for the SF6 emissions reduction program.

Deliverable: SF6 Train-the-Trainers Workshop

The Contractor shall conduct, with support from the CFE corporate office for environmental protection, a two-day train-the-trainers workshop in Mexico City for CFE professionals who are expected to implement the SF6 emissions reduction program. The Contractor shall develop a trainer instruction manual for the participants. The Contractor shall provide 20 copies with CD in Spanish and English translation of the manual. The session will include a power point presentation of the findings of the task.

Task 7: Assessment of Additional Resource Management Issues

In conjunction with Task 6, the Contractor shall identify opportunities for reducing or reusing (after treatment) the following types of resources and wastes at CFE facilities:

- Contaminated soils
- Hazardous wastes
- Non-hazardous wastes

The Contractor shall focus on wastes generated in large quantities, such as fly ash residues generated by coal-fired power plants.

Deliverable: Interim Report #2
The Contractor shall deliver an interim report to CFE covering TA progress and results from Tasks 6-7.

Task 8: U.S. Sources of Supply and Technology Review

The Contractor shall prepare a list of prospective U.S. sources of supply that outlines potential U.S. suppliers who may be able to provide technologies, goods, and services during Project implementation. Specifically, the Contractor shall collect information on U.S. technology and service providers that could address CFE's environmental management needs in the areas covered by the TA. The Contractor shall prepare and deliver a presentation on the information collected to CFE personnel from CFE's operations division (Dirección de Operación) and financed investment projects division (Direccíon de Proyectos de Inversión Financiada).

Task 9: Developmental Impact Assessment

For the benefit of those interested in the Project, the Contractor shall assess the development benefits associated with the Project and the methodology for measuring those benefits. The assessment shall include examples of the development benefits that would be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall specifically focus on examples from the categories listed below, shall develop a methodology for assessing these impacts over time, and shall identify where to obtain this information in the future (e.g. the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project.

Specifically, the Contractor shall evaluate the categories listed below to determine which are likely to result from the Contractor's recommendations. Where possible, the Contractor shall include quantitative estimates. The categories to be considered are as follows:

- *Infrastructure*: Estimate the expected scale of infrastructure development and improvements.
- *Human capacity building*: Estimate the number and type of jobs that would be created if the Contractor's recommendations are implemented. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- *Technology transfer and productivity improvement*: Discuss potential commercial contracts for licensing new technologies that are recommended, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains related to the recommendations, such as improved

systems or processes that enhance productivity or result in the more efficient use of resources.

- *Market-oriented reform*: Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that result in more transparent regulatory systems and institutions or increased competition.
- *Other*: Discuss prospective indirect development impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Task 10: Final Report

The Contractor shall prepare and deliver to the Grantee and USTDA a substantive and comprehensive Final Report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the above tasks, and shall include all deliverables and documents that have been provided to the Grantee. For the benefit of the Grantee, the Contractor shall deliver to the Grantee the main body of the Final Report in the English and Spanish languages.

Budget Estimate

A budget of $640,500 is estimated for providing technical assistance as per the term of reference. Details of this budget estimate are given in three tables in the following pages.

Proposed Schedule

A tentative schedule for completing work as per the TOR within nine (9) months is given below:

	Start	Complete
Task 1, 2 & 3	Week 1	Week 8
Tasks 4 & 5	Week 9	Week 24
INTERIM REPORT #1		Week 26
Task 6	Week 13	Week 28
SF6 WORKSHOP		Week 30
Task 7	Week 17	Week 32
INTERIM REPORT #2		Week 34
Task 8	Week 33	Week 36
Task 9	Week 33	Week 36
Task 10 (FINAL REPORT)		Week 39

BUDGET SUMMARY
Environmental Management Capacity Building Technical Assistance
CFE, Mexico

Estimated Labor Costs (by Labor Category)	Days	Daily Rates	Totals	Total Costs
Project Manager	90	$1,200	$108,000	
Senior Environmental Professional	175	$1,000	$175,000	
PCB Management Specialist	115	$800	$92,000	
SF6 Reduction Specialist	95	$800	$76,000	
Site Remediation Specialist	95	$800	$76,000	
Total Labor Costs			**$527,000**	**$527,000**

Other Direct Costs (ODCs)	Units	No. of Units	Unit Cost	Totals	
Air Fares	Trips	20	$1,000	$20,000	
Hotel and Meals	Days	168	$250	$42,000	
In-country Travel (Air/Ground)	SEE EXPENSE DETAILS		LS	$7,500	
Computer Use and Communication			LS	$11,500	
Document Translation& Interpretation			LS	$10,000	
Reports & Other Deliverables			LS	$22,500	
Total Other Direct Costs (ODCs)				**$113,500**	**$113,500**

L.S. - Lumpsum cost

TOTAL BUDGET ESTIMATE **$640,500**

LABOR COST DETAILS
Environmental Management Capacity Building Technical Assistance
CFE, Mexico

Estimated Levels of Effort (Days)	Project Manager	Senior Environmental Professional	PCB Management Specialist	SF6 Reduction Specialist	Site Remediation Specialist	Total Levels of Effort (Days)
TASK 1-Project Kickoff Meeting	5	5	5	5	0	20
TASK 2-Environmental Records Review & Follow-up	5	20	5	5	5	40
TASK 3 - Regulatory Review & Follow-up	5	20	5	5	5	40
TASK 4-PCB Management Assessment	10	20	80	0	10	120
TASK 5-Environmental Site Assessment	10	20	10	5	40	85
TASK 6-Develop SF6 Emissions Reduction Program	10	20	0	60	0	90
TASK 7-Investigate Resource Mgmt. Opportunities	20	40	0	5	20	85
TASK 8-U.S. Technology Review and Presentation	10	10	5	5	5	35
TASK 9-Developmental Impact Analysis	5	10	0	0	5	20
TASK 10-Final Report	10	10	5	5	5	35
Total Level of Effort (Days)	**90**	**175**	**115**	**95**	**95**	**570**
Estimated Daily Labor Rates (Direct Cost + Indirect Cost) (SEE NOTE BELOW)	$1,200	$1,000	$800	$800	$800	
TA Contractor -- Est. Labor Costs	**Project Manager**	**Senior Environmental Professional**	**PCB Management Specialist**	**SF6 Reduction Specialist**	**Site Remediation Specialist**	**Total Labor Costs**
TASK 1-Project Kickoff Meeting	$6,000	$5,000	$4,000	$4,000	$0	**$19,000**
TASK 2-Environmental Records Review & Follow-up	$6,000	$20,000	$4,000	$4,000	$4,000	**$38,000**
TASK 3 - Regulatory Review & Follow-up	$6,000	$20,000	$4,000	$4,000	$4,000	**$38,000**
TASK 4-PCB Management Assessment	$12,000	$20,000	$64,000	$0	$8,000	**$104,000**
TASK 5-Environmental Site Assessment	$12,000	$20,000	$8,000	$4,000	$32,000	**$76,000**
TASK 6-Develop SF6 Emissions Reduction Program	$12,000	$20,000	$0	$48,000	$0	**$80,000**
TASK 7-Investigate Resource Mgmt. Opportunities	$24,000	$40,000	$0	$4,000	$16,000	**$84,000**
TASK 8-U.S. Technology Review and Presentation	$12,000	$10,000	$4,000	$4,000	$4,000	**$34,000**
TASK 9-Developmental Impact Analysis	$6,000	$10,000	$0	$0	$4,000	**$20,000**
TASK 10-Final Report	$12,000	$10,000	$4,000	$4,000	$4,000	**$34,000**
Total Labor Costs (Est.)	**$108,000**	**$175,000**	**$92,000**	**$76,000**	**$76,000**	**$527,000**

NOTE:

Daily Labor Rates are rounded up to nearest $100, and are based on estimated annual salary PLUS fringe (25%) PLUS overhead (75%)

Basis for Estimating Daily Labor Rates ($)	Project Manager	Senior Environmental Professional	PCB Management Specialist	SF6 Reduction Specialist	Site Remediation Specialist
Estimated Annual Salary ($)	$150,000	$125,000	$100,000	$100,000	$100,000
A - Daily Salary (Annual Salary / 260)	$577	$481	$385	$385	$385
B - Fringe (Daily Labor Rate x 0.25)	$144	$120	$96	$96	$96
C - Overhead (Daily Salary x 0.75)	$433	$361	$288	$288	$288
Daily Labor Rate (A+B+C)	$1,154	$962	$769	$769	$769
Daily Labor Rate (Rounded up to nearest $100)	$1,200	$1,000	$800	$800	$800

EXPENSE DETAILS
Environmental Management Capacity Building Technical Assistance
CFE, Mexico

Estimated Numbers of Round Trips (USA-Mexico) and Days of Stay in Mexico	Project Manager		Senior Environ. Professional		PCB Management Specialist		SF6 Emissions Reduction Specialist		Site Remediation Specialist		TOTALS	
	Trips	Days	Trips	Days	Trips	Days	Trips	Days	Trips	Days	Trips	Days
TASK 1-Project Kickoff Meeting	1	6	1	6	1	6	1	6			4	24
TASK 2-Environmental Records Review &Follow-up		3		3					1	6	1	12
TASK 3 - Regulatory Review & Follow-up			1	6							1	6
TASK 4-PCB Management Assessment	1	6	1	6	2	24					4	36
TASK 5-Environmental Site Assessment				6					1	18	1	24
TASK 6-Develop SF6 Emissions Reduction Program	1	6					2	24			3	30
TASK 7-Investigate Resource Mgmt. Opportunities	1	6	1	12							2	18
TASK 8-U.S. Technology Review and Presentation	1	3	1	3							2	6
TASK 9-Developmental Impact Analysis											0	0
TASK 10-Final Report	1	6	1	6							2	12
TOTALS	**6**	**36**	**6**	**48**	**3**	**30**	**3**	**30**	**2**	**24**	**20**	**168**

Other Direct Costs (ODCs)	Air Fares [1]	Per Diem [2]	In-Country Travel (Air/Ground) [3]	Computer Use & Communication [4]	Document Translation & Interpretation [5]	Reports & Other Deliverables [6]
TASK 1-Project Kickoff Meeting & Follow-up	$4,000	$6,000	$250	$500	$0	$0
TASK 2-Environmental Records Review &Follow-up	$1,000	$3,000	$250	$750	$2,000	$0
TASK 3 - Regulatory Review & Follow-up	$1,000	$1,500	$250	$750	$2,000	$0
TASK 4-PCB Management Assessment	$4,000	$9,000	$2,000	$2,000	$1,000	$2,500
TASK 5-Environmental Site Assessment	$1,000	$6,000	$1,750	$2,000	$1,000	$2,500
TASK 6-Develop SF6 Emissions Reduction Program	$3,000	$7,500	$2,000	$2,000	$1,000	$10,000
TASK 7-Investigate Resource Mgmt. Opportunities	$2,000	$4,500	$500	$2,000	$1,000	$2,500
TASK 8-U.S. Technology Review and Presentation	$2,000	$1,500	$250	$500	$0	$1,000
TASK 9-Developmental Impact Analysis	$0	$0	$0	$500	$0	$0
TASK 10-Final Report	$2,000	$3,000	$250	$500	$2,000	$4,000
TOTALS	**$20,000**	**$42,000**	**$7,500**	**$11,500**	**$10,000**	**$22,500**

Total Other Direct Costs (Est.)		**$113,500**

NOTES:

1. $1,000 per round trip from USA to Mexico (Estimated average cost)

2. $250 per day for hotel, meals, and incidentals (Estimated average cost)

3. $250 per week to be spent in Mexico by the Contractor (total estimated 18 weeks) PLUS $250 per domestic air trip to be made in Mexico (4 person trips each will be required in Tasks 4, 5, and 6)

4. $125 per week for laptop computer use, phones, mail, overnight delivery. (Cost based on estimated duration of each task)

5. $25/page for selected document translation (Tasks 2 & 3 - 60 pages each task; Tasks 4, 5, 6, 7 - 30 pages each task); $250 per day for meeting interpretation and meeting notes (Tasks 2 &3 - 2 days or equivalent; Tasks 4, 5, 6, 7 - 1 day or equivalent); Task 10 - 80 page translation for Spanish version of Final Report.

6. $50/page for additional review and word processing support, and for printing, copying and binding of reports (including three drafts and public version of interim and final reports); Tasks 4, 5, 6, 7 - 40 pages each task; Task 8 - 20 pages; Task 10 - 80 pages; additional $500 each for Tasks 4, 5, 6, and 7 for special graphics & charts to help in presentation; additional $7,500 for desk-top publishing and printing of 30 copies of manuals for SF6 Workshop in Task 6.

L.2 Environmental, Health and Safety Guidelines (EHSG)

Background

The Grantee (CFE) had requested technical assistance from USTDA in undertaking a program focusing on the minimization of environmental impacts while dismantling some of their closed power plants and substations and while remediating any of these sites that are found contaminated. CFE estimated that 12 to 15 power plants and 40 to 50 substations might have to be dismantled in the next 3 to 5 years.

Since 2004, about 25 power plants and their associated substations have been closed by CFE because it was uneconomical to operate these facilities. CFE plans to close 20 more power plants, or units that are operating within the plants, from 2008 through 2014. The power plants or units to be closed would be larger in size (average 200 MW per site) than the power plants closed in the past (average 80 MW per plant). The total capacity of power plants closed between 2004 to 2014 would be around 6,000 MW, which is equivalent to nearly 12 percent of the current power generation capacity of Mexico.

CFE needs a program for managing these inactive sites for extended periods of time. The program starts from the decommissioning of the facilities and ends with the dismantling of the facilities for retrofitting the existing power plants, building new power plants, or for other future uses of the sites. At the time of the visit to Mexico under the definitional mission (DM), only one of the 25 closed power plants appeared to have been dismantled. A closed power plant visited during the DM was scheduled for dismantling and building a new power plant after a purchaser of major equipment at the closed facility is found. Another closed power plant visited during the DM was scheduled for retrofitting.

In the proposed USTDA-funded activity, the CFE corporate office for environmental protection will be provided with environmental, health and safety guidelines (EHSG) for decommissioning, dismantling, and/or retrofitting power plants and substations. This will supplement the skills and experience that CFE already has in constructing and operating numerous power plants of different types and in transmitting and distributing electricity to most parts of the country. By 2016, the power generation capacity available to CFE for electricity transmission and distribution is expected to be nearly 70,000 MW.

Goals & Objectives

- Develop a reference document that would assist CFE' corporate office for environmental protection in specifying the procedures to be followed in decommissioning, dismantling and/or retrofitting power plants and substations under the current 10-year business plan of CFE. These procedures would then become part of the standards of operation for the managers of business centers within the company (nearly 25) for generating, transmitting and/or distributing electricity.

Technical Assistance (TA) Tasks

TASK 1: TA Kickoff Meeting

The Contractor shall coordinate a TA Kickoff Meeting with CFE personnel that have held responsibilities in decommissioning, dismantling, and/or retrofitting power plants and substations in order to discuss the following:

- Status of facility closures under the current 10-year business plan of CFE
- Progress made in or plans for dismantling and/or retrofitting the closed power plants, including a discussion of relevant infrastructure or real estate development plans
- Samples of the current standards and specifications of CFE for operating facilities
- Current and upcoming major regulatory requirements that affect CFE operations and, if any, the decommissioning, dismantling, and/or retrofitting of CFE facilities.

With reference to the program of CFE for decommissioning, dismantling, and/or retrofitting power sector facilities, the Contractor shall present a general comparison with relevant US and international guidelines and practices. The Contractor shall then present and discuss its specific requirements of information from CFE during the assignment. The meeting will conclude with the finalization of the schedule for site visits in Task 2.

TASK 2: Site Visits & Baseline Establishment

The Contractor shall establish a baseline for developing ESHG in the following tasks (Tasks 3, 4, and 5). Available information on past facility closures and future closures planned under the 10-year plan indicate that the following schedule of site visits might characterize the level of effort to be made under this task:

- Four power plants/substations that are already closed, including:
  - Facilities scheduled for dismantling (2)
  - Facilities scheduled for retrofitting (2)
- Six power plants/substations that are scheduled for closure, including:
  - Conventional thermal power plants (2)
  - Internal combustion power plants (2)
  - Geothermal power plants (1)
  - Gas turbines (1)

The Contractor shall arrange for at least one (1) qualified professional to visit each site for 1 to 2 days, in order to gather background information in a standard format on the potential environment, health, and safety issues at the selected facilities. CFE will provide ground transportation to reach the facilities that are far from large cities. CFE will also provide logistical support to the Contractor for all site visits so that the Contractor can meet with facility personnel, inspect the sites, and gather needed information. The additional focus in some of the sites is expected to be remediation of contaminated soil and water.

DELIVERABLE: INTERIM REPORT (with all information gathered at the sites)

TASK 3: Develop Environmental Guidelines

The objective of this task shall be to develop guidelines for protecting the environment at and near the facilities during the complete process of:

- Decommissioning (including guidelines for preventing release of PCB, SF6, and other identified/existing/known contaminants from the facilities)
- Dismantling (including guidelines for Environmental Site Assessments (ESAs) and preparing the facilities for site remediaton if necessary)
- Retrofitting (including guidelines for ESAs and site preparation)

A qualified specialist in environmental management who has visited some of the CFE facilities in Task 2 shall be the main author of these guidelines.

TASK 4: Develop Health and Safety Guidelines

The Contractor shall perform this task based, as a minimum, on the following major considerations:

- Relevant US (OSHA) and international guidelines (e.g., World Bank/IFC)
- Requirements of community health and safety in Mexico
- Requirements of different types of power plants/substations
- Requirements of decommissioning, dismantling and retrofitting

A qualified specialist in health and safety who has visited some of the CFE facilities in Task 2 shall be the main author of these guidelines.

TASK 5: Develop Site Remediation Guidelines

The Contractor shall perform this task based, as a minimum, on the following major considerations:

- Technical Factors
- Cost Factors
- EHS Factors

A qualified specialist in site remediation who has visited some of the CFE facilities in Task 2 shall be the main author of these guidelines.

DELIVERABLE: DRAFT GUIDELINES
The Contractor shall deliver a draft of the environmental, health, and safety guidelines to CFE with any requests the Contractor may have for additional information or clarification from CFE.

TASK 6: EHSG Workshop / Training Seminar

After receiving the comments of CFE corporate office of environmental protection on the draft EHS guidelines, the Contractor shall conduct a 2-day workshop in Mexico City to enable the training of key personnel representing CFE in the application of guidelines in

the operations and investment projects of the company. The training seminar shall include sessions for:

- Decommissioning
- Dismantling
- Retrofitting

DELIVERABLE: EHSG TRAINING MANUAL

TASK 7: U.S. Technology Review & Presentation to CFE

The Contractor shall collect information on U.S. technology and service providers that could address EHS issues in the decommissioning, dismantling and/or retrofitting of power plants. The Contractor shall prepare and deliver a presentation of this information to CFE personnel in their operations division (Dirección de Operación) and financed investment projects division (Direccíon de Proyectos de Inversión Financiada).

TASK 8: Developmental Impact Analysis

For the benefit of those interested in the Project, the Contractor shall assess the development benefits associated with the Project and the methodology for measuring those benefits. The assessment shall include examples of the development benefits that would be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall specifically focus on examples from the categories listed below, shall develop a methodology for assessing these impacts over time, and shall identify where to obtain this information in the future (e.g. the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project.

Specifically, the Contractor shall evaluate the categories listed below to determine which are likely to result from the Contractor's recommendations. Where possible, the Contractor shall include quantitative estimates. The categories to be considered are as follows:

- *Infrastructure*: Estimate the expected scale of infrastructure development and improvements.
- *Human capacity building*: Estimate the number and type of jobs that would be created if the Contractor's recommendations are implemented. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- *Technology transfer and productivity improvement*: Discuss potential commercial contracts for licensing new technologies that are recommended, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains related to the recommendations, such as improved systems or processes that enhance productivity or result in the more efficient use of resources.

- *Market-oriented reform*: Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that result in more transparent regulatory systems and institutions or increased competition.
- *Other*: Discuss prospective indirect development impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

TASK 9: FINAL REPORT

Under this task, the Contractor shall prepare and deliver to CFE and USTDA a final report of all work performed under these Terms of Reference ("Final Report") and in accordance with the Grant Agreement. The main body of the Final Report shall be prepared both in English and Spanish. The Contractor shall submit 10 copies of the Final Report with electronic copies in CDs. The documents shall be prepared using Microsoft Office programs only, unless permitted otherwise by CFE.

Budget Estimate

A budget of $328,050 is estimated for providing technical assistance as per the term of reference. Details of this budget estimate are given in three tables in the following pages.

Proposed Schedule

A tentative schedule for completing work as per the TOR within six (6) months is given below:

	Start	Complete
Task 1	Week 1	Week 2
Task 2	Week 3	Week 8
INTERIM REPORT		Week 10
Tasks 3 & 4	Week 9	Week 16
Task 5	Week 13	Week 16
DRAFT GUIDELINES		Week 18
Task 6		Week 20
TRAINING MANUAL		Week 20
Task 7	Week 19	Week 20
Task 8	Week 21	Week 22
Task 9 (FINAL REPORT/GUIDELINES)		Week 26

BUDGET SUMMARY
Environmental, Health, and Safety Guidelines for Dismantling and/or Retrofitting Power Sector Facilities
CFE, Mexico

Estimated Labor Costs (by Labor Category)	Days	Daily Rates	Totals		Total Costs
Project Manager	55	$1,200	$66,000		
Construction Management Professional	50	$1,000	$50,000		
Environmental Management Specialist	67.5	$800	$54,000		
Health & Safety Specialist	67.5	$800	$54,000		
Site Remediation Specialist	50	$800	$40,000		
Total Labor Costs			**$264,000**		**$264,000**

Other Direct Costs (ODCs)	Units	No. of Units	Unit Cost	Totals	
Air Fares	Trips	15	$1,000	$15,000	
Hotel and Meals	Days	96	$250	$24,000	
In-country Travel (Air/Ground)	SEE EXPENSE DETAILS		LS	$4,750	
Document Translation& Interpretation			LS	$4,000	
Computer Use and Communication			LS	$5,800	
Reports & Other Deliverables			LS	$10,500	
Total Other Direct Costs (ODCs)				**$64,050**	**$64,050**

L.S. - Lumpsum cost

TOTAL BUDGET ESTIMATE **$328,050**

LABOR COST DETAILS
Environmental, Health, and Safety Guidelines for Dismantling and/or Retrofitting Power Sector Facilities
CFE, Mexico

Estimated Levels of Effort (Days)	Project Manager	Construction Management Specialist	Environmental Management Specialist	Health & Safety Specialist	Site Remediation Specialist	Total Levels of Effort (Days)
TASK 1-Project Kickoff Meeting	5	5	0	0	0	10
TASK 2-Facility Site Visits & Baseline Development	10	10	15	15	10	60
TASK 3 - Develop Environmental Guidelines	5	5	30	2.5	2.5	45
TASK 4-Develop Health and Safety Guidelines	5	5	2.5	30	2.5	45
TASK 5-Develop Site Remediation Guidelines	5	5	2.5	2.5	20	35
TASK 6-EHSG Workshop / Training Seminar	5	5	7.5	7.5	5	30
TASK 7-U.S. Technology Review and Presentation	10	5	5	5	5	30
TASK 8-Developmental Impact Analysis	5	5	0	0	0	10
TASK 9-Final Report	5	5	5	5	5	25
Total Level of Effort (Days)	**55**	**50**	**67.5**	**67.5**	**50**	**290**
Estimated Daily Labor Rates (Direct Cost + Indirect Cost) (SEE NOTE BELOW)	$1,200	$1,000	$800	$800	$800	
TA Contractor -- Estimated Labor Costs	**Project Manager**	**Construction Management Specialist**	**Environmental Management Specialist**	**Health & Safety Specialist**	**Site Remediation Specialist**	**Total Labor Costs**
TASK 1-Project Kickoff Meeting	$6,000	$5,000	$0	$0	$0	**$11,000**
TASK 2-Facility Site Visits & Baseline Development	$12,000	$10,000	$12,000	$12,000	$8,000	**$54,000**
TASK 3 - Develop Environmental Guidelines	$6,000	$5,000	$24,000	$2,000	$2,000	**$39,000**
TASK 4-Develop Health and Safety Guidelines	$6,000	$5,000	$2,000	$24,000	$2,000	**$39,000**
TASK 5-Develop Site Remediation Guidelines	$6,000	$5,000	$2,000	$2,000	$16,000	**$31,000**
TASK 6-EHSG Workshop / Training Seminar	$6,000	$5,000	$6,000	$6,000	$4,000	**$27,000**
TASK 7-U.S. Technology Review and Presentation	$12,000	$5,000	$4,000	$4,000	$4,000	**$29,000**
TASK 8-Developmental Impact Analysis	$6,000	$5,000	$0	$0	$0	**$11,000**
TASK 9-Final Report	$6,000	$5,000	$4,000	$4,000	$4,000	**$23,000**
Total Labor Costs (Est.)	**$66,000**	**$50,000**	**$54,000**	**$54,000**	**$40,000**	**$264,000**

NOTE:

Daily Labor Rates are rounded up to nearest $100, and are based on estimated annual salary PLUS fringe (25%) PLUS overhead (75%)

Basis for Estimating Daily Labor Rates ($)	Project Manager	Construction Management Specialist	Environmental Management Specialist	H&S Specialist	Site Remediation Specialist
Estimated Annual Salary ($)	$150,000	$125,000	$100,000	$100,000	$100,000
A - Daily Salary (Annual Salary / 260)	$577	$481	$385	$385	$385
B - Fringe (Daily Labor Rate x 0.25)	$144	$120	$96	$96	$96
C - Overhead (Daily Salary x 0.75)	$433	$361	$288	$288	$288
Daily Labor Rate (A+B+C)	$1,154	$962	$769	$769	$769
Daily Labor Rate (Rounded up to nearest $100)	$1,200	$1,000	$800	$800	$800

EXPENSE DETAILS
Environmental, Health, and Safety Guidelines for Dismantling and/or Retrofitting Power Sector Facilities
CFE, Mexico

Estimated Numbers of Round Trips (USA-Mexico) and Days of Stay in Mexico	Project Manager		Construction Management Specialist		Environmental Management Specialist		Health & Safety Specialist		Site Remediation Specialist		TOTALS	
	Trips	Days	Trips	Days	Trips	Days	Trips	Days	Trips	Days	Trips	Days
TASK 1-Project Kickoff Meeting	1	6	1	6							2	12
TASK 2-Facility Site Visits & Baseline Development	1	6	1	6	1	12	1	12	1	6	5	42
TASK 3 - Develop Environmental Guidelines					1	6					1	6
TASK 4-Develop Health and Safety Guidelines							1	6			1	6
TASK 5-Develop Site Remediation Guidelines									1	6	1	6
TASK 6-EHSG Workshop / Training Seminar	1	6	1	6							2	12
TASK 7-U.S. Technology Review and Presentation	1	6									1	6
TASK 8-Developmental Impact Analysis											0	0
TASK 9-Final Report	1	3	1	3							2	6
TOTALS	5	27	4	21	2	18	2	18	2	12	15	96

Other Direct Costs (ODCs)	Air Fares [1]	Per Diem [2]	In-Country Travel (Air/Ground) [3]	Document Translation & Interpretation [4]	Computer Use & Communication [5]	Reports & Other Deliverables [6]
TASK 1-Project Kickoff Meeting	$2,000	$3,000	$250	$0	$200	$0
TASK 2-Facility Site Visits & Baseline Development	$5,000	$10,500	$2,250	$1,250	$1,200	$1,000
TASK 3 - Develop Environmental Guidelines	$1,000	$1,500	$500	$750	$900	$0
TASK 4-Develop Health and Safety Guidelines	$1,000	$1,500	$500	$500	$900	$0
TASK 5-Develop Site Remediation Guidelines	$1,000	$1,500	$500	$500	$700	$0
TASK 6-EHSG Workshop / Training Seminar	$2,000	$3,000	$250	$0	$600	$5,000
TASK 7-U.S. Technology Review and Presentation	$1,000	$1,500	$250	$0	$600	$500
TASK 8-Developmental Impact Analysis	$0	$0	$0	$0	$200	$0
TASK 9-Final Report	$2,000	$1,500	$250	$1,000	$500	$4,000
TOTALS	$15,000	$24,000	$4,750	$4,000	$5,800	$10,500

Total Other Direct Costs (Est.)		$64,050

NOTES:

1. $1,000 per round trip from USA to Mexico (Estimated average cost)

2. $250 per day for hotel, meals, and incidentals (Estimated average cost)

3. $250 per week for short road trips during each visit of the Contractor's team to Mexico (total estimated 9 weeks); CFE is expected to provide transportation for long road trips to their facilities; average $250 per domestic air trip in Mexico (7 person trips expected in Task 2; 1 trip each in Tasks 3, 4, and 5.).

4. $25/page for translation of selected documents found during the work in Mexico (Tasks 2 - 30 pages; Tasks 3, 4, 5 - 10 pages each task); Task 6 - 20 page translation for EHSG Workshop; Task 9 - 40 page translation for Spanish version of Final Report; $250 per day for interpretation during some meetings outside CFE (Tasks 2, 3, 4, 5 - 1 day or equivalent each task).

5. $20 per person day for computer use, phones, mail, overnight delivery during travel. (Cost based on estimated level of effort in days for each task.)

6. $50/page for additional review and word processing support, and for printing, copying and binding of reports (including three drafts and public version of interim and final reports); Task 2 - 20 pages; Task 6 - 40 pages; Task 9 - 80 pages; additional $500 for Tasks 6 and 7 for special graphics & charts to help in presentation; additional $2,500 for desk-top publishing, preparation of slides and printing of 30 copies of manuals for ESHG guidelines in Task 6.

M. RECOMMENDATIONS

The DM Contractor recommends that USTDA consider issuing technical assistance (TA) grants in support of the CFE corporate office for environmental protection for performing the following two (2) activities as per the terms of reference given in this report:

- Environmental Management Capacity Building (EMCB)
- Environmental, Health and Safety Guidelines (EHSG)

These activities will enable CFE to establish required and necessary environmental programs within the company. The first activity recommended for USTDA funding, EMCB, is designed to cover the projects of CFE for PCB equipment disposal, site remediation and soils recovery, SF6 emissions reduction, and other pollution prevention/ resource management opportunities at their operating facilities. These facilities include about 140 power plants and nearly 500 substations and other sites that are being operated by CFE for generating, transmitting, and distributing electricity in Mexico. The second activity, EHSG, will be in support of the decommissioning of power plants and substations, and the subsequent dismantling and/or retrofitting of closed facilities including equipment decontamination and site remediation at the facilities. In the last few years, CFE has closed about 25 power plants and their associated substations that were found to be operating uneconomically. Under the current 10-year plan, CFE has scheduled to close 20 more power plants or power generating units operating within the plants. Out of these closed facilities, CFE estimates that 12 to 15 power plants and 40 to 50 substations may have to be dismantled in the next 3 to 5 years.

USTDA participation in these projects, as described and recommended in this report, will help to establish a long-term working relationship with CFE and has the potential to generate new commercial activities in Mexico for US firms. CFE is recognized to be the largest single utility in North America. In addition, the needs of CFE for contaminated site remediation and waste management to be addressed in the proposed TA activities are driven by Mexican laws and regulations that would also impact other large companies.

The budget estimates for conducting the proposed TA activities are as follows:

- EMCB: $640,500
- EHSG: $328,050

The activities recommended above for USTDA consideration of grants are primarily for capacity building in environmental areas of importance to CFE at the corporate level. However, the potential for US exports in the operations and investment projects of CFE related to these activities is estimated to be $20 to 40 million for EMCB and $10 to 15 million for EHSG, in the short- and medium-terms. These activities would also create long-term opportunities for the partcipation of US firms in other future projects of site remediation and waste management to be developed in Mexico.

N. CONTACTS

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ANNEX 3

USTDA NATIONALITY REQUIREMENTS

U.S. TRADE AND DEVELOPMENT AGENCY
Arlington, VA 22209-2131

NATIONALITY, SOURCE, AND ORIGIN REQUIREMENTS

The purpose of USTDA's nationality, source, and origin requirements is to assure the maximum practicable participation of American contractors, technology, equipment and materials in the prefeasibility, feasibility, and implementation stages of a project.

USTDA STANDARD RULE (GRANT AGREEMENT STANDARD LANGUAGE):

Except as USTDA may otherwise agree, each of the following provisions shall apply to the delivery of goods and services funded by USTDA under this Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from host country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for implementation of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in host country are not subject to the above restrictions. USTDA will make available further details concerning these standards of eligibility upon request.

NATIONALITY:

1) Rule

Except as USTDA may otherwise agree, the Contractor for USTDA funded activities must be either a U.S. firm or a U.S. individual. Prime contractors may utilize U.S. subcontractors without limitation, but the use of host country subcontractors is limited to 20% of the USTDA grant amount.

2) Application

Accordingly, only a U.S. firm or U.S. individual may submit proposals on USTDA funded activities. Although those proposals may include subcontracting arrangements with host country firms or individuals for up to 20% of the USTDA grant amount, they may not include subcontracts with third country entities. U.S. firms submitting proposals must ensure that the professional services funded by the USTDA grant, to the extent not subcontracted to host country entities, are supplied by employees of the firm or employees of U.S. subcontractor firms who are U.S. individuals.

Interested U.S. firms and consultants who submit proposals must meet USTDA nationality requirements as of the due date for the submission of proposals and, if selected, must continue to meet such requirements throughout the duration of the USTDA-financed activity. These nationality provisions apply to whatever portion of the Terms of Reference is funded with the USTDA grant.

3) Definitions

A "U.S. individual" is (a) a U.S. citizen, or (b) a non-U.S. citizen lawfully admitted for permanent residence in the U.S. (a green card holder).

A "U.S. firm" is a privately owned firm which is incorporated in the U.S., with its principal place of business in the U.S., and which is either (a) more than 50% owned by U.S. individuals, or (b) has been incorporated in the U.S. for more than three (3) years prior to the issuance date of the request for proposals; has performed similar services in the U.S. for that three (3) year period; employs U.S. citizens in more than half of its permanent full-time positions in the U.S.; and has the existing capability in the U.S. to perform the work in question.

A partnership, organized in the U.S. with its principal place of business in the U.S., may also qualify as a "U.S. firm" as would a joint venture organized or incorporated in the United States consisting entirely of U.S. firms and/or U.S. individuals.

A nonprofit organization, such as an educational institution, foundation, or association may also qualify as a "U.S. firm" if it is incorporated in the United States and managed by a governing body, a majority of whose members are U.S. individuals.

SOURCE AND ORIGIN:

1) Rule

In addition to the nationality requirement stated above, any goods (e.g., equipment and materials) and services related to their shipment (e.g., international transportation and insurance) funded under the USTDA Grant Agreement must have their source and origin in the United States, unless USTDA otherwise agrees. However, necessary purchases of goods and project support services which are unavailable from a U.S. source (e.g., local food, housing and transportation) are eligible without specific USTDA approval.

2) Application

Accordingly, the prime contractor must be able to demonstrate that all goods and services purchased in the host country to carry out the Terms of Reference for a USTDA Grant Agreement that were not of U.S. source and origin were unavailable in the United States.

3) Definitions

"Source" means the country from which shipment is made.

"Origin" means the place of production, through manufacturing, assembly or otherwise.

Questions regarding these nationality, source, and origin requirements may be addressed to the USTDA Office of General Counsel.

ANNEX 4

USTDA GRANT AGREEMENT, INCLUDING MANDATORY CONTRACT CLAUSES

WDA # 07-510 20B

MAR - 3 2008

GRANT AGREEMENT

This Grant Agreement is entered into between the Government of the United States of America, acting through the U.S. Trade and Development Agency ("USTDA"), and the Government of the United Mexican States, through the Comisión Federal de Electricidad ("CFE") ("Grantee"). USTDA agrees to provide the Grantee under the terms of this Agreement US$640,500 ("USTDA Grant") to fund the cost of goods and services required for technical assistance ("TA") on the proposed CFE Environmental Management project ("Project") in Mexico ("Host Country").

1. USTDA Funding

The funding to be provided under this Grant Agreement shall be used to fund the costs of a contract between the Grantee and the U.S. firm selected by the Grantee ("Contractor") under which the Contractor will perform the TA ("Contract"). Payment to the Contractor will be made directly by USTDA on behalf of the Grantee with the USTDA Grant funds provided under this Grant Agreement.

2. Terms of Reference

The Terms of Reference for the TA ("Terms of Reference") are attached as Annex I and are hereby made a part of this Grant Agreement. The TA will examine the technical, financial, environmental, and other critical aspects of the proposed Project. The Terms of Reference for the TA shall also be included in the Contract.

3. Standards of Conduct

USTDA and the Grantee recognize the existence of standards of conduct for public officials, and commercial entities, in their respective countries. The parties to this Grant Agreement and the Contractor shall observe these standards, which include not accepting payment of money or anything of value, directly or indirectly, from any person for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the TA.

4. Grantee Responsibilities

The Grantee shall undertake its best efforts to provide reasonable support for the Contractor, such as local transportation, office space, and secretarial support.

5. USTDA as Financier

(A) USTDA Approval of Competitive Selection Procedures

Selection of the U.S. Contractor shall be carried out by the Grantee according to its established procedures for the competitive selection of contractors with advance notice of the procurement published online through *Federal Business Opportunities (www.fedbizopps.gov)*. Upon request, the Grantee will submit these contracting procedures and related documents to USTDA for information and/or approval.

(B) USTDA Approval of Contractor Selection

The Grantee shall notify USTDA at the address of record set forth in Article 17 below upon selection of the Contractor to perform the TA. Upon approval of this selection by USTDA, the Grantee and the Contractor shall then enter into a contract for performance of the TA. The Grantee shall notify in writing the U.S. firms that submitted unsuccessful proposals to perform the TA that they were not selected.

(C) USTDA Approval of Contract Between Grantee and Contractor

The Grantee and the Contractor shall enter into a contract for performance of the TA. This contract, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing. To expedite this approval, the Grantee (or the Contractor on the Grantee's behalf) shall transmit to USTDA, at the address set forth in Article 17 below, a photocopy of an English language version of the signed contract or a final negotiated draft version of the contract.

(D) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of the contract and any amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of funding the TA and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Grantee or USTDA from asserting any right they might have against the

Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Grantee or USTDA.

(E) Grant Agreement Controlling

Regardless of USTDA approval, the rights and obligations of any party to the contract or subcontract thereunder must be consistent with this Grant Agreement. In the event of any inconsistency between the Grant Agreement and any contract or subcontract funded by the Grant Agreement, the Grant Agreement shall be controlling.

6. Disbursement Procedures

(A) USTDA Approval of Contract Required

USTDA will make disbursements of Grant funds directly to the Contractor only after USTDA approves the Grantee's contract with the Contractor.

(B) Contractor Invoice Requirements

The Grantee should request disbursement of funds by USTDA to the Contractor for performance of the TA by submitting invoices in accordance with the procedures set forth in the USTDA Mandatory Clauses in Annex II.

7. Effective Date

The effective date of this Grant Agreement ("Effective Date") shall be the date of signature by both parties or, if the parties sign on different dates, the date of the last signature.

8. TA Schedule

(A) TA Completion Date

The completion date for the TA, which is December 31, 2009, is the date by which the parties estimate that the TA will have been completed.

(B) Time Limitation on Disbursement of USTDA Grant Funds

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this Grant Agreement for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

9. USTDA Mandatory Clauses

All contracts funded under this Grant Agreement shall include the USTDA mandatory clauses set forth in Annex II to this Grant Agreement. All subcontracts funded or partially funded with USTDA Grant funds shall include the USTDA mandatory clauses, except for clauses B(1), G, H, I, and J.

10. Use of U.S. Carriers

(A) Air

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

(B) Marine

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

11. Nationality, Source, and Origin

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the TA and associated delivery services (e.g., international transportation and insurance) must have their nationality, source, and origin in the United States; and (e) goods and services incidental to TA support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

12. Taxes

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees, or other levies imposed under laws in effect in Host Country. Neither the Grantee nor the Contractor will seek reimbursement from USTDA for such taxes, tariffs, duties, fees, or other levies.

13. Cooperation Between Parties and Follow-Up

The parties will cooperate to assure that the purposes of the Grant Agreement are accomplished. For five (5) years following receipt by USTDA of the Final Report (as defined in Clause I of Annex II), the Grantee agrees to respond to any reasonable inquiries from USTDA about the status of the Project.

14. Implementation Letters

To assist the Grantee in the implementation of the TA, USTDA may, from time to time, issue implementation letters that will provide additional information about matters covered by the Grant Agreement. The parties may also use jointly agreed upon implementation letters to confirm and record their mutual understanding of matters covered by the Grant Agreement.

15. Recordkeeping and Audit

The Grantee agrees to maintain books, records, and other documents relating to the TA and the Grant Agreement adequate to demonstrate implementation of its responsibilities under the Grant Agreement, including the selection of contractors, receipt and approval of contract deliverables, and approval or disapproval of contractor invoices for payment by USTDA. Such books, records, and other documents shall be separately maintained for three (3) years after the date of the final disbursement by USTDA. The Grantee shall afford USTDA or its authorized representatives the opportunity at reasonable times to review books, records, and other documents relating to the TA and the Grant Agreement.

16. Representation of Parties

For all purposes relevant to the Grant Agreement, the Government of the United States of America will be represented by the U.S. Ambassador to Host Country or USTDA and Grantee will be represented by the Director General. The parties hereto may, by written notice, designate additional representatives for all purposes under the Grant Agreement.

17. Addresses of Record for Parties

Any notice, request, document, or other communication submitted by either party to the other under the Grant Agreement shall be in writing or through a wire or electronic medium which produces a tangible record of the transmission, such as a telegram, cable, or facsimile, and will be deemed duly given or sent when delivered to such party at the following:

To: Comisión Federal de Electricidad
Paseo de la Reforma 164
Col. Juárez
C.P. 06600, México, D.F.
MEXICO

Phone: (52-55) 5229-4400
Fax: (52-55) 5533-5321

To: U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209-3901
USA

Phone: (703) 875-4357
Fax: (703) 875-4009

All such communications shall be in English, unless the parties otherwise agree in writing. In addition, the Grantee shall provide the Commercial Section of the U.S. Embassy in Host Country with a copy of each communication sent to USTDA.

Any communication relating to this Grant Agreement shall include the following fiscal data:

Appropriation No.:	118/91001
Activity No.:	2007-51020B
Reservation No.:	2008510015
Grant No.:	GH2008510007

18. Termination Clause

Either party may terminate the Grant Agreement by giving the other party thirty (30) days advance written notice. The termination of the Grant Agreement will end any obligations of the parties to provide financial or other resources for the TA, except for payments which they are committed to make pursuant to noncancellable commitments entered into with third parties prior to the written notice of termination.

19. Non-Waiver of Rights and Remedies

No delay in exercising any right or remedy accruing to either party in connection with the Grant Agreement shall be construed as a waiver of such right or remedy.

20. U.S. Technology and Equipment

By funding this TA, USTDA seeks to promote the project objectives of the Host Country through the use of U.S. technology, goods, and services. In recognition of this purpose, the Grantee agrees that it will allow U.S. suppliers to compete in the procurement of technology, goods, and services needed for Project implementation.

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IN WITNESS WHEREOF, the Government of the United States of America and the Comisión Federal de Electricidad, each acting through its duly authorized representative, have caused this Agreement to be signed in the English language in their names and delivered as of the day and year written below. A Spanish language copy of this document will be issued by CFE at a later date. In the event that this Grant Agreement is signed in more than one language, the English language version shall govern.

For the Government of the United States of America

By: _____

Leocadia I. Zak
Acting Director

Date: February 27, 2008

For the Comisión Federal de Electricidad

By: _____

Vicente Aguinaco Bravo
Environmental Protection Manager

Date: February 27, 2008

Annex I -- Terms of Reference

Annex II -- USTDA Mandatory Clauses

Annex I

Terms of Reference

Objective

The objective of the CFE Environmental Management Technical Assistance ("TA") is to strengthen environmental management at the Comisión Federal de Electricidad ("CFE") with respect to polychlorinated biphenyls ("PCB") equipment disposal, sulfur hexafluoride ("SF6") emissions reduction, site remediation and soils recovery, and other environmental management issues at the power plants, substations, and power transmission and distribution facilities operated by CFE ("Project").

Activities

Task 1 TA Kick-Off Meeting

The Contractor shall coordinate a TA kick-off meeting with CFE to review and agree on the following:

- Technical approach and management plan: The Contractor shall verify its technical approach and management plan with CFE;
- Information requirements of the Contractor: The Contractor shall discuss its information requirements with CFE. CFE shall make CFE information available to the Contractor and shall identify potential sources for non-CFE information. The Contractor and CFE shall agree on the protocol to be followed by the Contractor in obtaining the information from CFE and non-CFE sources;
- Selection of CFE facilities to be assessed in the TA: The Contractor, in consultation with CFE, shall prepare a short list of power generation, transmission, and distribution facilities that characterize CFE's environmental management needs in the areas covered by the TA. The Contractor shall also consider the auxiliary facilities used by CFE to maintain their facilities. The Contractor, in consultation with CFE, shall then develop a strategy for gathering information from these facilities, which may include site visits by the Contractor;
- CFE confidentiality requirements: The Contractor shall verify how CFE confidentiality requirements will be maintained throughout the development of the TA; and
- Work completion schedule and deliverables: Based on the outcomes of the above discussions, the Contractor, in consultation with CFE, shall finalize the schedule for completing the TA, including deliverables.

Task 2: Environmental Records Review

The Contractor shall review CFE's environmental records in the areas covered by the TA. To assist the Contractor's review of CFE's environmental records, CFE shall provide to

the Contractor, at a minimum, the following documents or information in the format and level of detail agreed to in Task 1:

- PCB transformers, capacitors, and other equipment on line;
- Quantities of PCB dielectric fluid and PCB-contaminated materials in storage;
- Existing/identified/known contaminated sites at CFE facilities and the basis for such determination;
- Updates on the SF6 pilot study in progress for CFE facilities in Baja California;
- Available inventories of hazardous and non-hazardous waste generation and management at CFE facilities; and
- Notices of violation from regulatory agencies in Mexico.

The Contractor shall evaluate the above information in conjunction with the information gathered in Task 3 to prepare an initial summary of the current status of CFE's environmental management at the facilities operated by CFE. The Contractor shall travel to Mexico to discuss the data provided by CFE on site contamination and waste management, and to develop the procedures to be followed when performing environmental site assessments ("ESAs") in Task 5.

Task 3: Environmental Regulatory Review

In conjunction with Task 2, the Contractor shall conduct a review of existing and proposed environmental regulations in Mexico that are applicable to the operation of CFE facilities. The environmental regulatory review shall cover, at a minimum, the following laws, regulations, and areas:

- Ley General del Equilibrio Ecológico y la Protección al Ambiente ("LGEEPA");
- Ley General para la Prevención y Gestión Integral de Residuos ("LGPGIR");
- Norma Oficial Mexicana NOM-133-ECOL-2000/2001 (PCB regulations);
- Norma Oficial Mexicana NOM-158-SSA-203 (hydrocarbon contaminants);
- Norma Oficial Mexicana NOM-147-SSA1-2004 (heavy metal contaminants); and
- Guidelines on SF6 emissions.

The Contractor shall travel to Mexico to meet with relevant Mexican government agencies (such as the Secretariat of the Environment and Natural Resources) to obtain clarification of the regulations and conduct follow-up discussions with CFE.

Task 4: PCB Management Assessment

The Contractor shall conduct site visits to examine CFE's practices for operating and decommissioning PCB-containing equipment, storing PCB-contaminated materials, and arranging for disposal of these materials. By conducting the site visits focused on PCB management at CFE facilities, the Contractor shall develop and recommend the following methodology and tools for CFE's consideration:

- Establishing baselines;
- Completing inventories;
- Monitoring and reporting progress; and
- Updating the program for PCB elimination.

The Contractor shall visit, at a minimum, the following number of facilities:

- Six (6) CFE facilities where PCB-containing equipment is in operation;
- Three (3) CFE facilities where PCB-contaminated materials are in storage;
- One (1) CFE facility in operation that is reported to be PCB-free;
- One (1) CFE facility that is being used for the regeneration of transformer fluid; and
- One (1) Mexican facility that is being used for the disposal of PCB-contaminated soil.

The Contractor, in coordination with CFE, shall select the facilities to be visited under this task, taking into consideration the results from Task 1, Task 2, and Task 3.

CFE shall provide ground transportation for the Contractor to reach the facilities that are far from large cities. CFE shall also provide logistical support to the Contractor for all site visits so that the Contractor can meet with facility personnel, conduct the site visit, and gather information.

Task 5: Environmental Site Assessments

In conjunction with Task 4, the Contractor shall conduct ESAs in accordance with the ESA procedures developed in Task 2. The Contractor shall develop and recommend a methodology for CFE to follow to verify and update CFE's data on site contamination, focusing on the presence of PCB and other hazardous and toxic substances in soil and water at CFE facilities. The Contractor shall perform field soil and water sampling and shall provide the samples to CFE for analysis (CFE shall be responsible for the analysis of the samples).

The Contractor, in coordination with CFE, shall select the facilities to be visited and assessed under this task, taking into consideration the results from Task 1, Task 2, Task 3, and Task 4. The Contractor shall perform ESAs at six (6) CFE facilities, at a minimum, in accordance with the following criteria:

- Four (4) facilities classified by CFE as contaminated;
- Two (2) facilities classified by CFE as clean; and
- Shall include the following facilities visited under Task 4:
    - One (1) CFE facility in operation that is reported to be PCB-free; and
    - One (1) of the six (6) CFE facilities where PCB-containing equipment is in operation.

<u>Deliverable</u>: Interim Report #1

The Contractor shall deliver an interim report to CFE covering TA progress and results from Tasks 1-5.

Task 6: Development of SF6 Emissions Reduction Program

To prepare for this task, the Contractor shall:

- Review and obtain updated details on the U.S. Environmental Protection Agency's SF6 Emissions Reduction Partnership; and
- Gather new data on SF6 emissions at the CFE facilities visited in Task 4 and Task 5.

The Contractor shall conduct the following activities:

- Work with CFE to develop a SF6 emissions reduction partnership within CFE, based on the U.S. Environmental Protection Agency's SF6 Emissions Reduction Partnership model;
- Establish a baseline and design a SF6 emissions reduction program for CFE, including standards and guidelines;
- Work with CFE to recommend an expansion of CFE's SF6 emissions reduction pilot study (in the State of Baja California) to three (3) to five (5) other CFE business centers;
- Work with CFE to develop a CFE-wide implementation plan for the SF6 emissions reduction program.

Deliverable: SF6 Train-the-Trainers Workshop

The Contractor shall conduct a two (2)-day train-the-trainers workshop for CFE on developing a SF6 emissions reduction program. The Contractor shall train ten (10) to fifteen (15) CFE professionals at CFE's headquarters in Mexico City. The Contractor shall not be responsible for any transportation, lodging, or meals incidental to the workshop for any CFE professionals. CFE shall provide support in organizing and conducting the workshop and shall select the ten (10) to fifteen (15) CFE professionals to be trained from among those who are expected to implement a SF6 emissions reduction program. The Contractor shall develop a trainer instruction manual and shall provide CFE with twenty (20) electronic copies of the trainer instruction manual in English and Spanish. The Contractor shall deliver a presentation of the findings of Task 6 during the workshop. The Contractor shall submit an agenda of the workshop to CFE for approval.

Task 7: Assessment of Additional Resource Management Issues

In conjunction with Task 6, the Contractor shall identify opportunities for reducing or reusing (after treatment) the following types of resources and wastes at CFE facilities:

- Contaminated soils
- Hazardous wastes
- Non-hazardous wastes

The Contractor shall focus on wastes generated in large quantities, such as fly ash residues generated by coal-fired power plants.

Deliverable: Interim Report #2
The Contractor shall deliver an interim report to CFE covering TA progress and results from Tasks 6-7.

Task 8: U.S. Sources of Supply and Technology Review

The Contractor shall prepare a list of prospective U.S. sources of supply that outlines potential U.S. suppliers that may be able to provide technologies, goods, and services during Project implementation. Specifically, the Contractor shall collect information on U.S. technology and service providers that could address CFE's environmental management needs in the areas covered by the TA. The Contractor shall prepare and deliver a presentation on the information collected to CFE personnel from CFE's operations division (Dirección de Operación) and financed investment projects division (Direccíon de Proyectos de Inversión Financiada).

The Contractor shall prepare the list of prospective U.S. sources of supply in accordance with Clause I of Annex II of the Grant Agreement.

Task 9: Developmental Impact Assessment

For the benefit of those interested in the Project, the Contractor shall assess the development benefits associated with the Project and the methodology for measuring those benefits. The assessment shall include examples of the development benefits that would be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall specifically focus on examples from the categories listed below, shall develop a methodology for assessing these impacts over time, and shall identify where to obtain this information in the future (e.g. the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project.

Specifically, the Contractor shall evaluate the categories listed below to determine which are likely to result from the Contractor's recommendations. Where possible, the Contractor shall include quantitative estimates. The categories to be considered are as follows:

- *Infrastructure*: Estimate the expected scale of infrastructure development and improvements.
- *Human capacity building*: Estimate the number and type of jobs that would be created if the Contractor's recommendations are implemented. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- *Technology transfer and productivity improvement*: Discuss potential commercial contracts for licensing new technologies that are recommended, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains related to the recommendations, such as improved

systems or processes that enhance productivity or result in the more efficient use of resources.

- *Market-oriented reform*: Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that result in more transparent regulatory systems and institutions or increased competition.
- *Other*: Discuss prospective indirect development impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Task 10: Final Report

The Contractor shall prepare and deliver to the Grantee and USTDA a substantive and comprehensive Final Report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the above tasks, and shall include all deliverables and documents that have been provided to the Grantee. The Final Report shall be prepared in accordance with Clause I of Annex II of the Grant Agreement. For the benefit of the Grantee, the Contractor shall deliver to the Grantee the main body of the Final Report in the English and Spanish languages.

Notes:

(1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.

(2) The Contractor and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.

(3) The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.

Annex II

USTDA Mandatory Contract Clauses

A. USTDA Mandatory Clauses Controlling

The parties to this contract acknowledge that this contract is funded in whole or in part by the U.S. Trade and Development Agency ("USTDA") under the Grant Agreement between the Government of the United States of America acting through USTDA and the Government of the United Mexican States acting through the Comisión Federal de Electricidad ("CFE") ("Client"), dated _____ ("Grant Agreement"). The Client has selected _____ ("Contractor") to perform the technical assistance ("TA") for the CFE Environmental Management project ("Project") in Mexico ("Host Country"). Notwithstanding any other provisions of this contract, the following USTDA mandatory contract clauses shall govern. All subcontracts entered into by Contractor funded or partially funded with USTDA Grant funds shall include these USTDA mandatory contract clauses, except for clauses B(1), G, H, I, and J. In addition, in the event of any inconsistency between the Grant Agreement and any contract or subcontract thereunder, the Grant Agreement shall be controlling.

B. USTDA as Financier

(1) USTDA Approval of Contract

All contracts funded under the Grant Agreement, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing in order to be effective with respect to the expenditure of USTDA Grant funds. USTDA will not authorize the disbursement of USTDA Grant funds until the contract has been formally approved by USTDA or until the contract conforms to modifications required by USTDA during the contract review process.

(2) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of this contract and amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of financing the TA and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or

liability to such parties. Any approval or failure to approve by USTDA shall not bar the Client or USTDA from asserting any right they might have against the Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Client or USTDA.

C. Nationality, Source, and Origin

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the TA and associated delivery services (e.g., international transportation and insurance) must have their nationality, source, and origin in the United States; and (e) goods and services incidental to TA support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

D. Recordkeeping and Audit

The Contractor and subcontractors funded under the Grant Agreement shall maintain, in accordance with generally accepted accounting procedures, books, records, and other documents, sufficient to reflect properly all transactions under or in connection with the contract. These books, records, and other documents shall clearly identify and track the use and expenditure of USTDA funds, separately from other funding sources. Such books, records, and documents shall be maintained during the contract term and for a period of three (3) years after final disbursement by USTDA. The Contractor and subcontractors shall afford USTDA, or its authorized representatives, the opportunity at reasonable times for inspection and audit of such books, records, and other documentation.

E. U.S. Carriers

(1) Air

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

(2) Marine

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

F. Workman's Compensation Insurance

The Contractor shall provide adequate Workman's Compensation Insurance coverage for work performed under this Contract.

G. Reporting Requirements

The Contractor shall advise USTDA by letter as to the status of the Project on March 1st annually for a period of two (2) years after completion of the TA. In addition, if at any time the Contractor receives follow-on work from the Client, the Contractor shall so notify USTDA and designate the Contractor's contact point including name, telephone, and fax number. Since this information may be made publicly available by USTDA, any information which is confidential shall be designated as such by the Contractor and provided separately to USTDA. USTDA will maintain the confidentiality of such information in accordance with applicable law.

H. Disbursement Procedures

(1) USTDA Approval of Contract

Disbursement of Grant funds will be made only after USTDA approval of this contract. To make this review in a timely fashion, USTDA must receive from either the Client or the Contractor a photocopy of an English language version of a signed contract or a final negotiated draft version to the attention of the General Counsel's office at USTDA's address listed in Clause M below.

(2) Payment Schedule Requirements

A payment schedule for disbursement of Grant funds to the Contractor shall be included in this Contract. Such payment schedule must conform to the following USTDA requirements: (1) up to twenty percent (20%) of the total USTDA Grant amount may be used as an advance payment; (2) all other payments, with the exception of the final payment, shall be based upon contract performance milestones; and (3) the final payment may be no less than fifteen percent (15%) of the total USTDA Grant amount, payable upon receipt by USTDA of an approved Final Report in accordance with the specifications and quantities set forth in Clause I below. Invoicing procedures for all payments are described below.

(3) Contractor Invoice Requirements

USTDA will make all disbursements of USTDA Grant funds directly to the Contractor. The Contractor must provide USTDA with an ACH Vendor Enrollment Form (available from USTDA) with the first invoice. The Client shall request disbursement of funds by USTDA to the Contractor for performance of the contract by submitting the following to USTDA:

(a) Contractor's Invoice

The Contractor's invoice shall include reference to an item listed in the Contract payment schedule, the requested payment amount, and an appropriate certification by the Contractor, as follows:

(i) For an advance payment (if any):

"As a condition for this advance payment, which is an advance against future TA costs, the Contractor certifies that it will perform all work in accordance with the terms of its Contract with the Client. To the extent that the Contractor does not comply with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(ii) For contract performance milestone payments:

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(iii) For final payment:

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. Specifically, the Contractor has submitted the Final Report to the Client, as required by the Contract, and received the Client's approval of the Final Report. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(b) Client's Approval of the Contractor's Invoice

(i) The invoice for an advance payment must be approved in writing by the Client.

(ii) For contract performance milestone payments, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and the terms and conditions of the USTDA Grant Agreement."

(iii) For final payment, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and terms and conditions of the USTDA Grant Agreement. The Final Report submitted by the Contractor has been reviewed and approved by the Client."

(c) USTDA Address for Disbursement Requests

Requests for disbursement shall be submitted by courier or mail to the attention of the Finance Department at USTDA's address listed in Clause M below.

(4) Termination

In the event that the Contract is terminated prior to completion, the Contractor will be eligible, subject to USTDA approval, for reasonable and documented costs which have been incurred in performing the Terms of Reference prior to termination, as well as reasonable wind down expenses. Reimbursement for such costs shall not exceed the total amount of undisbursed Grant funds. Likewise, in the event of such termination, USTDA is entitled to receive from the Contractor all USTDA Grant funds previously disbursed to the Contractor (including but not limited to advance payments) which exceed the reasonable and documented costs incurred in performing the Terms of Reference prior to termination.

I. USTDA Final Report

(1) Definition

"Final Report" shall mean the Final Report described in the attached Annex I Terms of Reference or, if no such "Final Report" is described therein, "Final Report" shall mean a substantive and comprehensive report of work performed in accordance with the attached Annex I Terms of Reference, including any documents delivered to the Client.

(2) Final Report Submission Requirements

The Contractor shall provide the following to USTDA:

(a) One (1) complete version of the Final Report for USTDA's records. This version shall have been approved by the Client in writing and must be in the English language. It is the responsibility of the Contractor to ensure that confidential information, if any, contained in this version be clearly marked. USTDA will maintain the confidentiality of such information in accordance with applicable law.

and

(b) One (1) copy of the Final Report suitable for public distribution ("Public Version"). The Public Version shall have been approved by the Client in writing and must be in the English language. As this version will be available for public distribution, it must not contain any confidential information. If the report in (a) above contains no confidential information, it may be used as the Public Version. In any event, the Public Version must be informative and contain sufficient Project detail to be useful to prospective equipment and service providers.

and

(c) Two (2) CD-ROMs, each containing a complete copy of the Public Version of the Final Report. The electronic files on the CD-ROMs shall be submitted in a commonly accessible read-only format. As these CD-ROMs will be available for public distribution, they must not contain any confidential information. It is the responsibility of the Contractor to ensure that no confidential information is contained on the CD-ROMs.

The Contractor shall also provide one (1) copy of the Public Version of the Final Report to the Foreign Commercial Service Officer or the Economic Section of the U.S. Embassy in Host Country for informational purposes.

(3) Final Report Presentation

All Final Reports submitted to USTDA must be paginated and include the following:

(a) The front cover of every Final Report shall contain the name of the Client, the name of the Contractor who prepared the report, a report title, USTDA's logo, USTDA's mailing and delivery addresses. If the complete version of the Final Report contains confidential information, the Contractor shall be responsible for labeling the front cover of that version of the Final Report with the term "Confidential Version." The Contractor shall be responsible for labeling the front cover of the Public Version of the Final Report with the term "Public Version." The front cover of every Final Report shall also contain the following disclaimer:

> "This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U.S. Government. The opinions, findings, conclusions or recommendations expressed in this document are those of the

author(s) and do not necessarily represent the official position or policies of USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report."

(b) The inside front cover of every Final Report shall contain USTDA's logo, USTDA's mailing and delivery addresses, and USTDA's mission statement. Camera-ready copy of USTDA Final Report specifications will be available from USTDA upon request.

(c) The Contractor shall affix to the front of the CD-ROM a label identifying the Host Country, USTDA Activity Number, the name of the Client, the name of the Contractor who prepared the report, a report title, and the following language:

"The Contractor certifies that this CD-ROM contains the Public Version of the Final Report and that all contents are suitable for public distribution."

(d) The Contractor and any subcontractors that perform work pursuant to the Grant Agreement must be clearly identified in the Final Report. Business name, point of contact, address, telephone, and fax numbers shall be included for Contractor and each subcontractor.

(e) The Final Report, while aiming at optimum specifications and characteristics for the Project, shall identify the availability of prospective U.S. sources of supply. Business name, point of contact, address, telephone, and fax numbers shall be included for each commercial source.

(f) The Final Report shall be accompanied by a letter or other notation by the Client which states that the Client approves the Final Report. A certification by the Client to this effect provided on or with the invoice for final payment will meet this requirement.

J. Modifications

All changes, modifications, assignments or amendments to this contract, including the appendices, shall be made only by written agreement by the parties hereto, subject to written USTDA approval.

K. TA Schedule

(1) TA Completion Date

The completion date for the TA, which is December 31, 2009, is the date by which the parties estimate that the TA will have been completed.

(2) Time Limitation on Disbursement of USTDA Grant Funds

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this contract for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

L. Business Practices

The Contractor agrees not to pay, promise to pay, or authorize the payment of any money or anything of value, directly or indirectly, to any person (whether a governmental official or private individual) for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the TA. The Client agrees not to receive any such payment. The Contractor and the Client agree that each will require that any agent or representative hired to represent them in connection with the TA will comply with this paragraph and all laws which apply to activities and obligations of each party under this Contract, including but not limited to those laws and obligations dealing with improper payments as described above.

M. USTDA Address and Fiscal Data

Any communication with USTDA regarding this Contract shall be sent to the following address and include the fiscal data listed below:

U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209-3901
USA

Phone: (703) 875-4357
Fax: (703) 875-4009

Fiscal Data:

Appropriation No.:	118/91001
Activity No.:	2007-51020B
Reservation No.:	2008510015
Grant No.:	GH2008510007

N. Definitions

All capitalized terms not otherwise defined herein shall have the meaning set forth in the Grant Agreement.

O. Taxes

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees, or other levies imposed under laws in effect in Host Country. Neither the Client nor the Contractor will seek reimbursement from USTDA for such taxes, tariffs, duties, fees, or other levies.

ANNEX 5

TERMS OF REFERENCE
(FROM USTDA GRANT AGREEMENT)

Annex I

Terms of Reference

Objective

The objective of the CFE Environmental Management Technical Assistance ("TA") is to strengthen environmental management at the Comisión Federal de Electricidad ("CFE") with respect to polychlorinated biphenyls ("PCB") equipment disposal, sulfur hexafluoride ("SF6") emissions reduction, site remediation and soils recovery, and other environmental management issues at the power plants, substations, and power transmission and distribution facilities operated by CFE ("Project").

Activities

Task 1 TA Kick-Off Meeting

The Contractor shall coordinate a TA kick-off meeting with CFE to review and agree on the following:

- Technical approach and management plan: The Contractor shall verify its technical approach and management plan with CFE;
- Information requirements of the Contractor: The Contractor shall discuss its information requirements with CFE. CFE shall make CFE information available to the Contractor and shall identify potential sources for non-CFE information. The Contractor and CFE shall agree on the protocol to be followed by the Contractor in obtaining the information from CFE and non-CFE sources;
- Selection of CFE facilities to be assessed in the TA: The Contractor, in consultation with CFE, shall prepare a short list of power generation, transmission, and distribution facilities that characterize CFE's environmental management needs in the areas covered by the TA. The Contractor shall also consider the auxiliary facilities used by CFE to maintain their facilities. The Contractor, in consultation with CFE, shall then develop a strategy for gathering information from these facilities, which may include site visits by the Contractor;
- CFE confidentiality requirements: The Contractor shall verify how CFE confidentiality requirements will be maintained throughout the development of the TA; and
- Work completion schedule and deliverables: Based on the outcomes of the above discussions, the Contractor, in consultation with CFE, shall finalize the schedule for completing the TA, including deliverables.

Task 2: Environmental Records Review

The Contractor shall review CFE's environmental records in the areas covered by the TA. To assist the Contractor's review of CFE's environmental records, CFE shall provide to

the Contractor, at a minimum, the following documents or information in the format and level of detail agreed to in Task 1:

- PCB transformers, capacitors, and other equipment on line;
- Quantities of PCB dielectric fluid and PCB-contaminated materials in storage;
- Existing/identified/known contaminated sites at CFE facilities and the basis for such determination;
- Updates on the SF6 pilot study in progress for CFE facilities in Baja California;
- Available inventories of hazardous and non-hazardous waste generation and management at CFE facilities; and
- Notices of violation from regulatory agencies in Mexico.

The Contractor shall evaluate the above information in conjunction with the information gathered in Task 3 to prepare an initial summary of the current status of CFE's environmental management at the facilities operated by CFE. The Contractor shall travel to Mexico to discuss the data provided by CFE on site contamination and waste management, and to develop the procedures to be followed when performing environmental site assessments ("ESAs") in Task 5.

Task 3: Environmental Regulatory Review

In conjunction with Task 2, the Contractor shall conduct a review of existing and proposed environmental regulations in Mexico that are applicable to the operation of CFE facilities. The environmental regulatory review shall cover, at a minimum, the following laws, regulations, and areas:

- Ley General del Equilibrio Ecológico y la Protección al Ambiente ("LGEEPA");
- Ley General para la Prevención y Gestión Integral de Residuos ("LGPGIR");
- Norma Oficial Mexicana NOM-133-ECOL-2000/2001 (PCB regulations);
- Norma Oficial Mexicana NOM-158-SSA-203 (hydrocarbon contaminants);
- Norma Oficial Mexicana NOM-147-SSA1-2004 (heavy metal contaminants); and
- Guidelines on SF6 emissions.

The Contractor shall travel to Mexico to meet with relevant Mexican government agencies (such as the Secretariat of the Environment and Natural Resources) to obtain clarification of the regulations and conduct follow-up discussions with CFE.

Task 4: PCB Management Assessment

The Contractor shall conduct site visits to examine CFE's practices for operating and decommissioning PCB-containing equipment, storing PCB-contaminated materials, and arranging for disposal of these materials. By conducting the site visits focused on PCB management at CFE facilities, the Contractor shall develop and recommend the following methodology and tools for CFE's consideration:

- Establishing baselines;
- Completing inventories;
- Monitoring and reporting progress; and
- Updating the program for PCB elimination.

The Contractor shall visit, at a minimum, the following number of facilities:

- Six (6) CFE facilities where PCB-containing equipment is in operation;
- Three (3) CFE facilities where PCB-contaminated materials are in storage;
- One (1) CFE facility in operation that is reported to be PCB-free;
- One (1) CFE facility that is being used for the regeneration of transformer fluid; and
- One (1) Mexican facility that is being used for the disposal of PCB-contaminated soil.

The Contractor, in coordination with CFE, shall select the facilities to be visited under this task, taking into consideration the results from Task 1, Task 2, and Task 3.

CFE shall provide ground transportation for the Contractor to reach the facilities that are far from large cities. CFE shall also provide logistical support to the Contractor for all site visits so that the Contractor can meet with facility personnel, conduct the site visit, and gather information.

Task 5: Environmental Site Assessments

In conjunction with Task 4, the Contractor shall conduct ESAs in accordance with the ESA procedures developed in Task 2. The Contractor shall develop and recommend a methodology for CFE to follow to verify and update CFE's data on site contamination, focusing on the presence of PCB and other hazardous and toxic substances in soil and water at CFE facilities. The Contractor shall perform field soil and water sampling and shall provide the samples to CFE for analysis (CFE shall be responsible for the analysis of the samples).

The Contractor, in coordination with CFE, shall select the facilities to be visited and assessed under this task, taking into consideration the results from Task 1, Task 2, Task 3, and Task 4. The Contractor shall perform ESAs at six (6) CFE facilities, at a minimum, in accordance with the following criteria:

- Four (4) facilities classified by CFE as contaminated;
- Two (2) facilities classified by CFE as clean; and
- Shall include the following facilities visited under Task 4:
    - One (1) CFE facility in operation that is reported to be PCB-free; and
    - One (1) of the six (6) CFE facilities where PCB-containing equipment is in operation.

<u>Deliverable</u>: Interim Report #1

The Contractor shall deliver an interim report to CFE covering TA progress and results from Tasks 1-5.

Task 6: Development of SF6 Emissions Reduction Program

To prepare for this task, the Contractor shall:

- Review and obtain updated details on the U.S. Environmental Protection Agency's SF6 Emissions Reduction Partnership; and
- Gather new data on SF6 emissions at the CFE facilities visited in Task 4 and Task 5.

The Contractor shall conduct the following activities:

- Work with CFE to develop a SF6 emissions reduction partnership within CFE, based on the U.S. Environmental Protection Agency's SF6 Emissions Reduction Partnership model;
- Establish a baseline and design a SF6 emissions reduction program for CFE, including standards and guidelines;
- Work with CFE to recommend an expansion of CFE's SF6 emissions reduction pilot study (in the State of Baja California) to three (3) to five (5) other CFE business centers;
- Work with CFE to develop a CFE-wide implementation plan for the SF6 emissions reduction program.

Deliverable: SF6 Train-the-Trainers Workshop

The Contractor shall conduct a two (2)-day train-the-trainers workshop for CFE on developing a SF6 emissions reduction program. The Contractor shall train ten (10) to fifteen (15) CFE professionals at CFE's headquarters in Mexico City. The Contractor shall not be responsible for any transportation, lodging, or meals incidental to the workshop for any CFE professionals. CFE shall provide support in organizing and conducting the workshop and shall select the ten (10) to fifteen (15) CFE professionals to be trained from among those who are expected to implement a SF6 emissions reduction program. The Contractor shall develop a trainer instruction manual and shall provide CFE with twenty (20) electronic copies of the trainer instruction manual in English and Spanish. The Contractor shall deliver a presentation of the findings of Task 6 during the workshop. The Contractor shall submit an agenda of the workshop to CFE for approval.

Task 7: Assessment of Additional Resource Management Issues

In conjunction with Task 6, the Contractor shall identify opportunities for reducing or reusing (after treatment) the following types of resources and wastes at CFE facilities:

- Contaminated soils
- Hazardous wastes
- Non-hazardous wastes

The Contractor shall focus on wastes generated in large quantities, such as fly ash residues generated by coal-fired power plants.

Deliverable: Interim Report #2
The Contractor shall deliver an interim report to CFE covering TA progress and results from Tasks 6-7.

Task 8: U.S. Sources of Supply and Technology Review

The Contractor shall prepare a list of prospective U.S. sources of supply that outlines potential U.S. suppliers that may be able to provide technologies, goods, and services during Project implementation. Specifically, the Contractor shall collect information on U.S. technology and service providers that could address CFE's environmental management needs in the areas covered by the TA. The Contractor shall prepare and deliver a presentation on the information collected to CFE personnel from CFE's operations division (Dirección de Operación) and financed investment projects division (Direccíon de Proyectos de Inversión Financiada).

The Contractor shall prepare the list of prospective U.S. sources of supply in accordance with Clause I of Annex II of the Grant Agreement.

Task 9: Developmental Impact Assessment

For the benefit of those interested in the Project, the Contractor shall assess the development benefits associated with the Project and the methodology for measuring those benefits. The assessment shall include examples of the development benefits that would be expected in the Host Country if the Project is implemented as outlined in the Final Report. The Contractor shall specifically focus on examples from the categories listed below, shall develop a methodology for assessing these impacts over time, and shall identify where to obtain this information in the future (e.g. the Grantee, trade statistics, or U.S. Embassy in the Host Country). The Contractor shall only list benefits in the categories that are applicable to the Project.

Specifically, the Contractor shall evaluate the categories listed below to determine which are likely to result from the Contractor's recommendations. Where possible, the Contractor shall include quantitative estimates. The categories to be considered are as follows:

- *Infrastructure*: Estimate the expected scale of infrastructure development and improvements.
- *Human capacity building*: Estimate the number and type of jobs that would be created if the Contractor's recommendations are implemented. Comment on any prospective training recommended in the Final Report, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
- *Technology transfer and productivity improvement*: Discuss potential commercial contracts for licensing new technologies that are recommended, as well as the expected productivity benefits of any such technologies. More generally, discuss the expected efficiency gains related to the recommendations, such as improved

systems or processes that enhance productivity or result in the more efficient use of resources.

- *Market-oriented reform*: Discuss any market-oriented reforms that would facilitate implementation of the Project or that would result from Project implementation, such as any policy changes that result in more transparent regulatory systems and institutions or increased competition.
- *Other*: Discuss prospective indirect development impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in tourism, investment, and indirect job creation) that are not captured in the four categories listed above.

Task 10: Final Report

The Contractor shall prepare and deliver to the Grantee and USTDA a substantive and comprehensive Final Report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the above tasks, and shall include all deliverables and documents that have been provided to the Grantee. The Final Report shall be prepared in accordance with Clause I of Annex II of the Grant Agreement. For the benefit of the Grantee, the Contractor shall deliver to the Grantee the main body of the Final Report in the English and Spanish languages.

Notes:

(1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.

(2) The Contractor and the Grantee shall be careful to ensure that the public version of the Final Report contains no security or confidential information.

(3) The Grantee and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.