REQUEST FOR PROPOSALS

FEASIBILITY STUDY FOR THE

SHANDONG FLUE GAS DENITRIFICATION (deNOx) PROJECT

Submission Deadline: **5:00pm**

LOCAL TIME

September 10, 2008

Submission Place: Shandong Provincial Environmental Protection Bureau
12 Zhi Jin Shi Street, Jinan
Shandong, 250012, China
Phone: (86-531) 8610-6151/52

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.

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Section 1: INTRODUCTION

The U.S. Trade and Development Agency (USTDA) has provided a grant to the Grantee to assess the technical, economic and financial feasibility of implementing Nitrogen Oxide (NOx) emissions control systems at coal-fired power plants throughout the province. 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 Feasibility Study.

1.1 BACKGROUND SUMMARY

Shandong Province is home to over 50,000 megawatts of coal-fired power generation capacity and ranks second among all provinces in terms of coal consumption to power its plants. While these plants have begun to implement desulfurization systems in order to reduce emissions of sulfur dioxide, most have not begun preparations to address NOx removal. The Ministry of Environmental Protection (MEP) of China and the Grantee have recently focused on reducing NOx emissions. A background Definitional Mission is provided for reference in Annex 2.

1.2 OBJECTIVE

The Study would focus on requirements for retrofitting one particular plant, which would be chosen after consultation with the Grantee for its applicability to serve as a model for other facilities. The Terms of Reference (TOR) for this Feasibility Study 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. $600,000.

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 "Shandong Flue Gas Denitrification (deNOx) 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 Feasibility Study.

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 Feasibility Study.

2.5 PROJECT FUNDING SOURCE

The Feasibility Study will be funded under a grant from USTDA. The total amount of the grant is not to exceed U.S. $600,000.

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 20 percent 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 only English.

2.13 PROPOSAL SUBMISSION REQUIREMENTS

The **Cover Letter** in the proposal must be addressed to:

Dr. Huo Taiying
Vice Director of International Cooperation Department
Shandong Provincial Environmental Protection Bureau
12 Zhi Jin Shi Street, Jinan
Shandong, 250012, China

An Original and eight (8) copies of your proposal must be received at the above address no later than 5:00pm, on September 10, 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 and eight (8) copies 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 Feasibility Study 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. $600,000.

Offerors shall submit one (1) original and eight (8) copies 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 Feasibility Study 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 Feasibility Study. 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 Feasibility Study.

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 Feasibility Study.

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 Feasibility Study. 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 Feasibility Study 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:

The Contractor and its personnel shall have previously implemented deNOx projects as the system designer, architect engineer, owners-engineer, or equivalent in order to be considered as qualified.

The Contractor shall demonstrate:

- Project qualifications for planning, design, and implementation to include areas such as technology, operations, personnel, budgeting, facilities, and organizational issues in an international environment (25%);
- Experience with Host Country emissions management legislation, systems, operations and organizational structure of management of this area (10%); and
- Experience and knowledge in financing similar systems (10%).

In addition, personnel qualifications include:

- Experience with a broad variety of technologies for control of emissions of air pollutants from coal-fired boilers and power plants, and specifically NOx, at all stages of development from feasibility study and design to operation and maintenance, and specific experience in sizing, specifying and sourcing of deNOx system (20%);
- Experience in the assessment of environmental impacts of pollution control systems, and possible impacts in other environmental media, including disposal of wastes resulting from operation of air pollution control devices, and possible impacts of malfunction, catastrophic failure or prolonged improper operation of such systems (15%);
- Experience in the assessment of training capacity and efficiency of technology transfer, in the the Host Country, the Asia region or other countries with transition economies (10%); and
- Experience successfully completing similar projects in the Host Country, Asia, or countries with transition economies (10%).

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

Price will not be a factor in contractor selection.

ANNEX 1

Dr. Huo Taiying, Vice Director of International Cooperation Department, Shandong Provincial Environmental Protection Bureau, 12 Zhi Jin Shi Street, Jinan, Shandong, 250012, China

B – China: Shandong Flue Gas Denitrification (deNOx) Project

POC Evangela Kunene, USTDA, 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901, Tel: (703) 875-4357, Fax: (703) 875-4009. Shandong Flue Gas Denitrification (deNOx) project. The Grantee invites submission of qualifications and proposal data (collectively referred to as the "Proposal") from interested U.S. firms which are qualified on the basis of experience and capability to develop a feasibility study to assess the technical, economic and financial feasibility of implementing nitrogen oxide (NOx) emissions control systems at coal-fired power plants throughout the province.

Shandong Province is home to over 50,000 megawatts of coal-fired power generation capacity and ranks second among all provinces in terms of coal consumption to power its plants. While these plants have begun to implement desulfurization systems in order to reduce emissions of sulfur dioxide, most have not begun preparations to address NOx removal. The Ministry of Environmental Protection of China and the Grantee have recently focused on reducing NOx emissions. The Study would focus on requirements for retrofitting one particular plant, which would be chosen after consultation with the Grantee for its applicability to serve as a model for other facilities.

Task 1: Initial Meeting / Selection of Study Plant / Project Work Plan and Schedule
Task 2: Power Plant Technical Review
Task 3: Evaluation of Alternatives
Task 4: Conceptual Design and Cost Estimate
Task 5: Economic Analysis
Task 6: Implementation and Financing Plan
Task 7: Environmental and Regulatory Review
Task 8: Development Impact Assessment
Task 9: Final Report and Seminar

The U.S. firm selected will be paid in U.S. dollars from a $600,000 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 Terms of Reference, and a background definitional mission report are 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/USTDA/FedBizOpps/RFP/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 directly to the Grantee by 5:00pm, September 10, 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.

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A. Executive Summary

The Shandong Environment Protection Bureau (SDEPB) has requested a grant of $600,000 to assist it in assessing the technical and financial feasibility of proposed Nitrous Oxides (NOx) control technologies and alternatives. The expected result of this project is to provide the SDEPB information on U.S. technologies for power plant denitrification (deNOx) system retrofits, with the goal of incorporation of U.S. systems or technologies into their final engineering design. This project will be conducted at a typical plant to be chosen by the Shandong EPB at the beginning of the Feasibility Study (Study) to serve as a model to promote advanced NOx reduction at other power plants in the province which will likely provide opportunities for substantial sales of U.S. goods and services throughout the Province and China.

The total Project cost is estimated to be approximately $750-1,750 million depending on technology selected and number of plants where deNOx technology is deployed. Pending a successful Feasibility Study, the project is scheduled to begin implementation in 2009. The World Bank has previously funded the flue gas desulphurization in the Shandong province.

The Project represents over $750 million in export opportunities for U.S suppliers to provide systems, goods, and services. U.S manufacturers have a good record of export sales of deNOx systems for projects of this type. Currently there are no competitor projects underway. However, given historical competitiveness in the power sector, Japan and Europe can be expected as major competitors. This Project is expected to have a positive impact on U.S. labor if implemented.

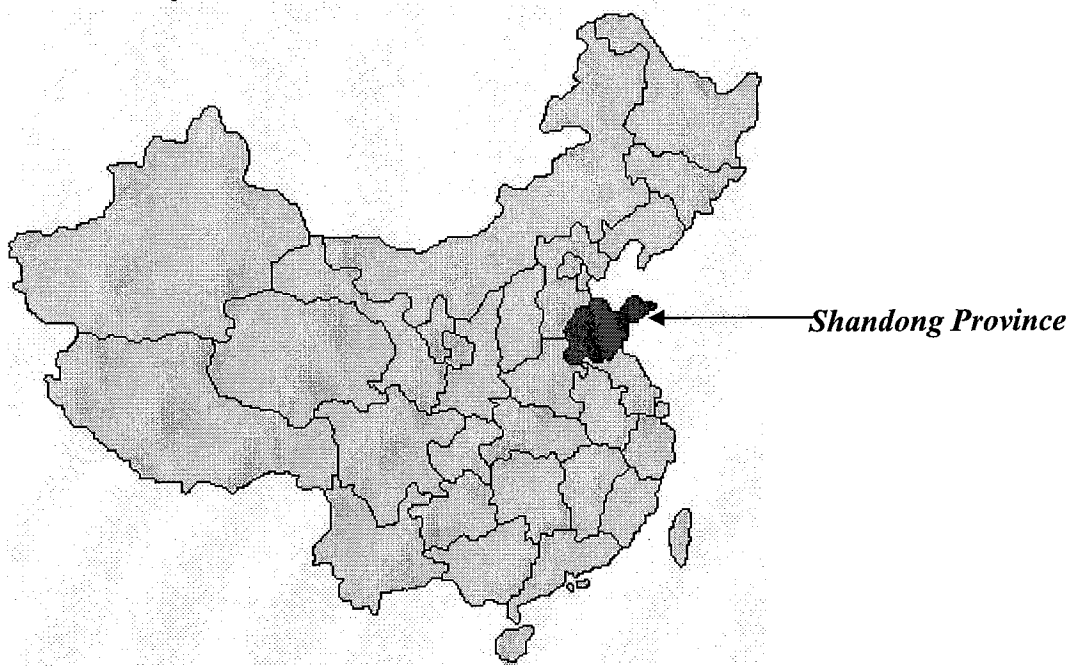
The project will have a positive development impact on the Shandong Province facilitating the continued operation and expansion of existing plants and construction of new power plants utilizing coal while complying with tougher air quality standards. This development will facilitate electrification of Shandong Province with the attendant positive economic carryover effects.

The Feasibility Study is justified because China is experiencing severe air pollution due to economic growth and limited air pollution control measures. This project has the potential to improve human health and living standards by drastically reducing Shandong's NOx emissions to improve the air quality. Moreover it has the potential to positively impact global air quality if widely implemented in China including measurable positive air quality impacts in the U.S.

- The Feasibility Study shall provide a comprehensive study of the technical and economic feasibility of the installation of deNOx systems at large coal-fired power plants. The Terms of Reference (TOR) are comprised of a series of tasks that form a systematic analysis of deNOx technologies for coal-fired power plants to be performed over a period of 12 months.

B. Project Description

Project Location: The Project will be located in Shandong Province, China.



Project Objective:
The objective of this project is to assist the Shandong Provincial Government (SDEPB) in assessing the technical and financial feasibility of proposed Nitrous Oxides (NOx) control technologies and alternatives. The expected result of this project will be to provide the SDEPB information on U.S. technologies for power plant denitrification (deNOx) system retrofits, with the goal of incorporation of U.S. systems or technologies into their final engineering design. This project will be conducted at a single plant to be chosen at the beginning of the Feasibility Study (Study) to serve as a model for other power plants in the province, and will likely provide opportunities for substantial sales of U.S. goods and services.

Project Overview:
The electric power industry of China is still coal-fired at present. China has taken an important first step by requiring new coal-fired power plants to install desulphurization equipment. This has been a direct result of concerns over China's world-leading SO_2 emissions. However, a similar requirement for NOx controls does not currently exist, though the government began pilot projects in 2004 to implement a NOx levy of 0.6 RMB/kg. While some plants in China are voluntarily installing low-NOx burners on new facilities, very few have invested in additional NOx controls.

The concentration range of NOx emissions from existing coal-fired boiler is 600~1200 mg/m^3 equaling 39,000~88,000 tons per ten billion kilowatt-hours (kWh) of coal-fired power generation. In 2000, the NOX emission concentration of China averaged 750mg/m^3 for a country wide emission total of 2,580,200 tons. Driven by the development of national economy, the electric power industry continues to grow rapidly adding one new coal fired plant a week! The consumption of coal by the electric power industry is expected to reach

630 million tons per year by 2010. In 2010, coal-fired power generation of China is expected to reach 227 billion kWh per year. Due to improvements in coal-fired power technology and increased number of large-capacity units, the emission concentration of NOX from coal-fired power plants is expected to reduce to 650mg/m^3 in 2010 from 750mg/m^3 in 2000. However, due to the rapid growth of power generation, the total NOx emissions is expected to reach 5.9 million tons per year in 2010 up from 2.6 million tons per year in 2000, driving the need to install flue gas deNOx system in coal-fired power plants.

Regulatory Framework

NOx emission concentration limits were first stipulated in the emission standards of air pollutants for thermal power plants (GB13223-1996) in 1997. This standard calls for the NOx emission concentration of solid slag discharge pulverized coal boilers in new/expansion/modified 300MW and above coal-fired power plants not to exceed 650mg/m^3 while liquid slag discharge pulverized coal boilers not to exceed 1000mg/m^3. In 2007 SDEPB published additional emission standards for air pollutants for thermal power plants (DB37/ 664—2007). As defined in this standard, NOx emission concentration limits of coal-fired power boilers and gas turbines must meet the standards shown in Figure 1. Emission limits are set based upon the volatile matter yield in a dry and ash free condition (Vdaf). Starting in 2007, power boilers were required to reserve space for a flue gas deNOx facility and liquid slag discharge pulverized coal boilers must meet Vdaf<10% NOx emission concentration limits.

Although NOx emission standard have been adopted no NOx monitoring facilities have been installed at power plants in Shandong Province. Therefore no plant can be shown to be in compliance with the emission standards.

Figure 1 NOx Emission Limits

		Maximum NOx emission concentration mg/m^3				
Period		I		II		III
Implementation Date		1st May 2007	1st Jan 2010	1st May 2007	1st Jan 2010	1st May 2007
Coal-fired boiler	V_{daf}<10%	1300	1100	1100	900	900
	10%≤V_{daf}≤20%	1100	800	650	600	600
	V_{daf} >20%	800	400	450	400	400
Oil-fired Boiler		650		400		200
Gas turbines	Petrol-fired					150
	Gas-fired					80

Since the basic law, emission standards, emission penalties, and treatment technology have been established, it is feasible to assess implementation of NOx emission controls. In the current regulations regarding pollution discharge penalties, NOx penalties became the same as sulfur dioxide (SO_2) in July 2005.

The State Environmental Protection Agency has spent six months ending March 31, 2007 creating a NOx database. A deNOx Technology Assessment Study report has been submitted to the State Council regarding NOx control and associated economics based on five factors: (1) new plant versus old plant; (2) fuel type; (3) region; (4) boiler size; and (5) boiler type. NOx issues are moving to the number one priority position with SEPA within the next two to three years and more stringent NOx emission standards are expected no later than the 12th Five-Year Plan. NOx has already moved to be a greater emissions issue than SOx.

By comparison, the U.S regulatory systems tackle emissions on a regional approach and reasonable achieve control technology (RACT). On March 10, 2005, the U.S. Environmental Protection Agency (EPA) issued the Clean Air Interstate Rule (CAIR), which will dramatically reduce air pollution that moves across state boundaries. The emission reductions required by CAIR will be implemented in two phases. The first phase commences in 2009 for NOx and 2010 for SO_2, the second phase commences in 2015 for both pollutants. The emission reductions are based on declining region-wide emissions caps. CAIR includes model rules for interstate emissions cap-and-trade programs for annual NOx and SO_2 emissions and ozone season NOx emissions from large electric generating units (EGUs).

The District of Columbia and 12 Northeast state members of the Ozone Transport Commission (OTC) are developing a model rule – known as CAIR-Plus – to achieve NOx and SO_2 reductions in the Northeast greater than required under EPA's CAIR as a means to better achieve attainment. For NOx, the proposed CAIR-Plus imposes annual caps based on an emission rate of 0.12 pounds per million Btu (lb/MMBtu) in 2009 and 0.08 lb/MMBtu in 2012. As a result, CAIR-Plus is approximately 20% more stringent than CAIR for Phase I (0.15 lb/MMBtu) and 36% more stringent than CAIR for Phase II (0.125 lb/MMBtu).

To date only one third of U.S. coal-fired plants have purchased SCR (selective catalytic reduction) or SNCR (selective non-catalytic reduction) systems but this total is expected to grow to 50 percent by 2010 and 100 percent by 2020 as CAIR is fully implemented.

How deNOx Works

The reduction of NOx emissions (flue gas denitrification) is performed by primary and secondary measures. Primary measures are tasks at the point at which nitrogen oxides occur, e.g. within the firing point of a burner. Employing these measures, reductions of more than 30% can be attained. However, even these reductions are not enough to fulfill all legal requirements on large power plants. For that reason, emission reduction measures in the flue gas are applied, primarily the Selective Non Catalytic Reduction (SNCR) and the Selective Catalytic Reduction (SCR) processes. The heart of the SCR system is a catalyser which causes the chemical conversion of the nitrogen oxides without taking part in the chemical reaction itself. The catalyser system is also called the DeNOx reactor. The flue gases enter the reactor and are enriched by a mixture of ammonia and air. The liquid ammonia is taken from the ammonia storage, vaporized and then injected in the deNOx reactor. In this process, the

ammonia gas acts as reduction material; the nitrogen is removed from the oxygen. The result is molecular nitrogen (N_2) and water (H_2O). The individual catalyser elements are compounded in the reactor to larger elements and are distributed on several levels. The size of a deNOx reactor may reach several cubic meters. There are two typical configurations of a catalyser:

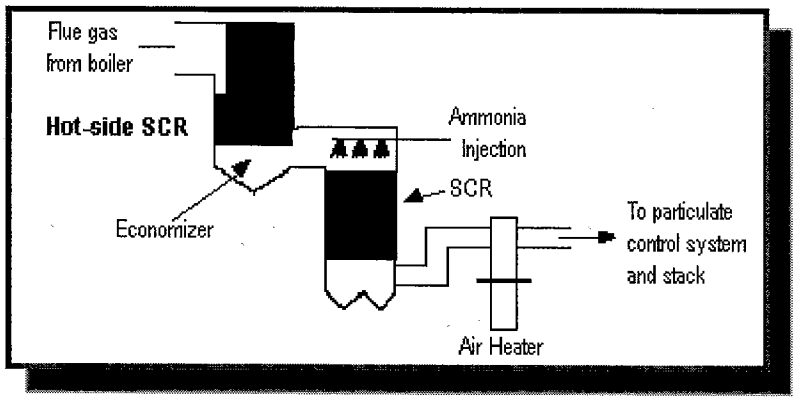
1. Selective Non-Catalytic Reduction (SNCR)
   The Selective Non Catalytic Reduction process involves the injection of a reagent, usually ammonia or urea, into the flue gas stream to react with NOx. The desired chemical reactions take place within a relatively narrow temperature window, in the range between 850-1050oC. For best results, matching the reagent injection location with the desired gas temperature is a critical aspect of the technology. If the reagent is injected into too low a temperature region the NOx reduction rates decrease, resulting in increased amounts of unreacted ammonia ('slip') in the flue gas stream and a reduction in the NOx removal efficiency. If the SNCR reaction zone temperature is too high, the reagents react with oxygen instead of NOx, resulting in increased reagent consumption and poor NOx removal efficiency. Experience has shown that the high levels of gas stratification and uneven temperature distribution in the boiler gas passes associated with large utility boilers significantly reduce the viability of SNCR as a NOx control option. Consequently, SNCR should only be considered applicable to the small boiler sizes (250 Mw and below).

2. Selective Catalytic Reduction (SCR)
   In this case, the mixed flue gas and reagent are passed over a suitable catalyst material. The use of a catalyst promotes the NOx reduction reactions to occur in a lower temperature range, typical of economizer outlet temperatures (300-400"C). Catalyst reactivity will, during normal operation, gradually decline due to blockage, erosion and poisoning of the catalyst surface. When considering SCR systems, allowance must therefore be made for the replacement and disposal of spent catalyst. Unlike SNCR, SCR has been widely applied on units of 500 MW or more.

   In general, there are two basic system configurations for the location of an SCR: SCR after the economizer and SCR after the precipitator or scrubber. For retrofit installations the SCR after the economizer will likely be the location of choice because of the need to operate the reactor within a certain temperature range. The flow to the SCR reactor(s) would be ducted from the bottom of the economizer, passing through the rear boiler house wall to the reactor location. The dust hoppers at the base of the economizer pass would be retained in their current configuration. The return flow would pass back into the top of the air-heater. If the SCR is located anywhere but directly after the economizer it will likely be at a considerably higher cost because of the need to reheat the flue-gas.

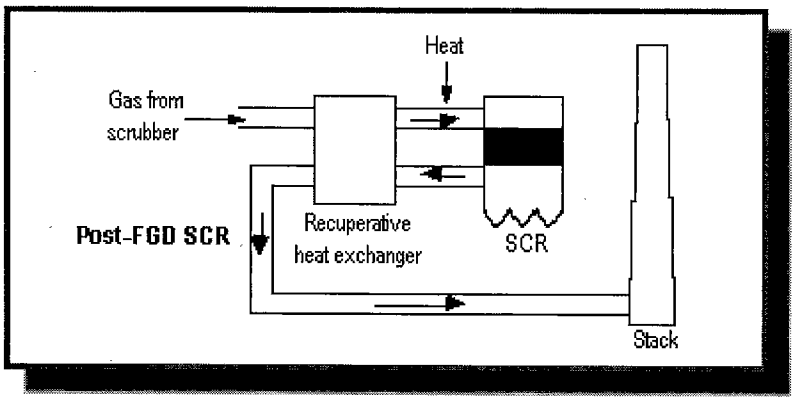
   1. Alignment after the economizer, but in front of the air heater and electro-filter. This is the so-called "high-dust" alignment. The advantage is the high temperature while the disadvantage is the high dust content which damages the catalyser. A typical installation shown in Figure 2.

Figure 2 Post Economizer Installation



2. Alignment behind the air pre-heater and electro-filter and or the scrubber, if installed: This so-called "Low-Dust"- alignment limits some of the disadvantages; however it requires repeated heating of the flue-gases at considerable cost. An example of an SCR located downstream of the scrubber is shown in Figure 3.

Figure 3 Post Scrubber Installation



C. Project Sponsor's Capability and Commitment

With the continued increase of air pollution in all major cities in the People's Republic of China (PRC), renewed efforts by the government are underway to implement technologies for reduction of air pollutant emissions from all sources. Given the fact that China is essentially a coal-based energy economy, with huge reserves of a wide range of qualities of coal, there is interest to identify and install cost-effective air pollution control technologies that will improve ambient air quality. The market is substantial, if such technologies are promoted, required and implemented in China.

Both national and provincial governments encourage the installation of SCR technology to curb NOx emissions. At the same time, the provincial, and local EPBs are enforcing air pollution standards at all plants and collecting higher emission fees/tariffs from those plants

who emit more NOx because they do not have deNOx or equivalent controls installed. SDEPB has targeted 25,000 MW of existing generation to install SCRs or SNCRs with none operating with SCRs or SNCRs now.

D. Implementation Financing

The total project cost is estimated to be approximately $10 million to $40 million per plant based on the size of plant and technology employed. Shandong has over 400 coal-fired power plants of all sizes representing 50,000 MW of installed capacity. If 50% of the installed capacity in the Shandong Province implements deNOx systems at $30/kW then a total of $750 million while at $70/kW, $1.75 billion will be required. Pending a successful Feasibility Study, the deNOx projects are scheduled to begin implementation in 2009. World Bank or US Export Import Bank financing are the most likely sources of funds.

World Bank: The World Bank has lent China $42 billion of which $6.9 billion involved thermal power plants and additional 2.8 billion involved environmental projects of all kinds. The World Bank is China's most important international partner in the effort to reduce energy-related air pollution and emissions. The World Bank has supported several key strategic analyses, including a clean-coal options review and deployment strategy, a renewable energy promotion plan and an analysis of China's potential in the Clean Development Mechanism. The World Bank is currently implementing a multi-billion dollar energy modernization program to support clean-coal power production and utilization technology transfer, a major energy efficiency improvement program and, more recently, a national renewable energy development program. Bank assistance is likely to continue and evolve in all these three areas. SDEPB has previously borrowed from the World Bank to implement flue gas desulphurization projects.

Shandong has received funding for a $95 million environmental program and has requested $147 million for an additional to the program. The principal objective of the Shandong Environment Project is to support China's efforts to put in place a sustainable environmental framework for the long-term economic and social development of the province, while supporting a conducive foundation for industrial growth. The project, part of a phased development program, comprises a blend of policy and investment initiatives, which support municipal strategies for environmental recovery and sustained use of natural water resources. Three core components are focused on air quality: (1) investments in district heating systems in Weihai Municipality, comprising combined heat and power generation plant and facilities, distribution systems, and support services for improved air quality; (2) investments in district heating systems in Yantai Municipality, comprising peak boiler and heat exchange plant and facilities, distribution systems, and support services for improved air quality; and (3) environmental pollution and control.

U.S. Export Import Bank: ExIm Bank financing has been provided for numerous projects in China totaling $42 billion, including a loan guarantee to the U.S. company, Dasibi Environmental Corporation, for a $5,200,000 sale to SEPA of 55 air quality monitoring systems to be installed in 11 Chinese cities.

The U.S. Export Import Bank (ExIm) financing for exports of U.S. equipment and services to China is available in China for short-, medium- and long-term transactions in the public and private sectors. Credit insurance and loan guarantees are available for up to 85% of U.S. contract value, with political risk coverage equivalent to 100% of contract value and 90-95% coverage for commercial risk, with repayment terms ranging from one to ten years. ExIm offers more favorable financing for environmental exports, including:

- Repayment terms of 15 years for many projects
- Capitalization of interest during construction
- Local cost support equal to 15% of the U.S. contract price

For sovereign transactions in the People's Republic of China ("China"), ExIm will typically require an indication of Chinese government support in the form of a "Notice of MOF Guarantee" as defined in the Framework Agreement, dated January 24, 2005 between the Ministry of Finance of China and ExIm B. For public sector non-sovereign and private sector transactions under medium- and long-term programs, ExIm Bank will consider transactions with financial institutions or other entities that are able to provide detailed financial information sufficient to enable ExIm Bank to reach a credit conclusion.

Under short-term insurance policies for public sector non-sovereign transactions, the use of Discretionary Credit Limits and Country Limits of Liability typically requires the obligation of one of the following: the Bank of China, the China Development Bank, the China Construction Bank, the Industrial and Commercial Bank of China, or the Bank of Communications. For private sector transactions, Discretionary Credit Limits are not available, and cover is not available unless specified in a Special Buyer Credit Limit endorsement or an Issuing Bank Credit Limit endorsement.

Coverage under the Working Capital Guarantee Program (WCGP) requires that the transaction be supported by an irrevocable Letter of Credit issued by a bank referenced in the immediately preceding paragraph, or by a bank pre-approved by ExIm Bank. Exceptions may be made for private sector transactions that are insured for comprehensive political and economic risk.

Asia Development Bank (ADB): ADB approved 10 sovereign loans to the PRC totaling about $1.5 billion and secured $3.2 billion in nondirect value-added cofinancing. In addition, 27 technical assistance projects (including two supplementary approvals) provided grants amounting to $13.6 million. ADB began diversifying its operations away from transport, which still accounted for more than half of total lending (52.6%). Other key sectors were water supply, sanitation and waste management (25.0%), agriculture and natural resources (13.1%), and energy (9.3%).

In June 2006, ADB approved technical assistance to help the PRC establish the CDM Fund to manage the fees applied to the large revenue from CDM projects. The clean development mechanism (CDM) allows developed countries to fulfill their greenhouse gas emission reduction obligations under the United Nations Framework Convention on Climate Change (Kyoto Protocol) through investments in emission reduction projects in developing countries such as the PRC. The CDM Fund will be used to support domestic climate change-related activities. ADB introduced innovative carbon financing to the Shandong Hai River Basin Pollution Control Project through the CDM, which introduced additional financing from international carbon markets. The Government proposed to pilot-test the recently approved carbon market initiative for the ADB-assisted medium-sized hydropower project in Gansu.

E. U.S. Export Potential

The retrofit of an SCR System to an existing boiler is not simply the addition of a few more components. Each installation will need to be based on site specific information. Some of the system design factors and constraints to be considered are:

- Inlet NOx Concentration
- Outlet NOx Concentration
- Operating Temperature Range
- Ductwork System Arrangement
- Fuel Characteristics
- S02 and SO3 Concentrations
- Boiler Firing Method and Overall Operation
- System Pressure Drop and Impact on Fans
- Reagent Source and Ammonia Slip Allowable
- Reactor Support Configuration and Space Constraints

Historically capital costs range from $30-70/kW excluding labor depending on the required NOx emission reduction, unit layout (available space and interferences), catalyst unit price, cost of ammonia and, type of SCR (hot-side vs. post-FGD). Hot-side SCRs typically cost $30-50/kW, whereas post-FGD SCRs cost $40-70/kW. However with the recent escalation of commodity prices, it is expected that the capital cost will be significantly higher due to material costs. O&M costs for SCR are expected to add $0.004 to $0.008/kWh, depending on the catalyst life (typically 3 to 5 years) and the catalyst cost (typically 300 to 600 US$/ft^3).

The installed power generation capacity in Shandong province reached 50 gigawatts in 2006. If half of this capacity implemented deNOx, 25,000,000 kW, at the historic market price of $30-70/kW, the potential export market for Shandong alone is in the range $750-$1,750 million dollars.

Each deNOx system is custom designed and deployed as a turnkey unit therefore facility turnkey contracts are the real opportunity in this project for U.S. companies. Subsystem equipment such as catalyst, fans, pumps, injection nozzles, instrumentation, emission monitors, software, dampers, expansion joints, tanks, diverters, injection grid, catalyst management systems, and controls will need to be sourced from U.S. suppliers on a case by case custom basis.

Based on this information, the potential U.S. exports are approximately $10-40 million per plant as only civil construction is currently available locally. Discussions held with expected U.S. suppliers of systems are shown by an asterisk on Figure 4. Most expressed an interest in the Project pending more specifics.

Figure 4 Exporters

Product Category	U.S. Supplier
Engineering/Services	Shaw*
Engineering/Services	Worley Parsons
Engineering/Services	Burns & McDonnell

Engineering/Services	Sargent & Lundy
SCR/SNCR	The Babcock & Wilcox Company*
SCR/SNCR	Alstom
SCR/SNCR	Babcock Power Environmental
SCR/SNCR	Seimens/Wheelabrator*
SCR/SNCR	GE Energy Services*
SCR/SNCR	Foster Wheeler Energy
SCR/SNCR	Hamon Research-Cottrell, Inc.
SNCR	Fuel Tech*
SNCR	Mobotec*
Emissions Monitoring Systems	Thermofisher*,
Emissions Monitoring Systems	Teledyne API
Emissions Monitoring Systems	AMATEK

F. Foreign Competition and Market Entry Issues

The deNOx market in China is currently undeveloped with no Chinese, Japanese, Korean, or European manufacturers established although there are foreign companies (see Figure 5) with the required technology. This project will allow U.S. companies to demonstrate the design, cost-effectiveness and competitiveness of U.S. technology in deNOx proving a competitive advantage over foreign suppliers. Furthermore, as the U.S. has advanced and superior technology in deNOx equipment, this project will demonstrate the competitiveness and effectiveness of U.S. technology vis-à-vis foreign competitors. With the increasingly competitive dollar, U.S. manufacturers are expected to be extremely competitive in both the initial stages of the deNOx markets in China until Chinese manufacturers adopt SCR technology.

Figure 5 Foreign Competition

Product Category	Foreign Suppler
Engineering/Services	WHALCO (Israel)
Engineering/Services	Mitsubishi Corporation (Japan)
Engineering/Services	Huadian Power International Corp. (China)
SCR/SNCR	Mitsubishi Corporation (Japan)
SCR/SNCR	Hitachi (Japan)
SCR/SNCR	Envigy (France)
Emissions Monitoring Systems	OPSIS (China)
Emissions Monitoring Systems	Shimadzu(Japan)
Emissions Monitoring Systems	Siemens (Germany)
Emissions Monitoring Systems	Environment SA (France)

G. Development Impact

The potential economic development impact if the project is implemented is significant.

Infrastructure: The project to install deNOx systems at coal-fired power and thermal plants will reduce NOx emissions by 15% to 20% or around 200,000 tons per year in the Shandong Province alone. This improvement will allow for the continued operation and expansion of existing, and construction of new, power and thermal plants utilizing coal complying with tougher new air pollution and air quality rules. This will facilitate electrification of Shandong Province and thus have a very significant positive carryover effect on economic development in general.

Human capacity building: Each project will create 20 to 100 construction jobs over a six to 18 month period during the installation phase of each deNOx system depending on the technology deployed. A small number (one or two) of maintenance jobs at each facility are expected to be created to operate the facility on an ongoing basis.

Technology Transfer and Productivity Enhancement: DeNOx is an advanced technology reducing stack emissions of NOx at power and thermal plants. Installation of these systems, and training of plant and government environmental staff in their operation, constitutes a very significant level of technology transfer that will enhance the efficiency and productivity of environmental staff in controlling air pollution emissions and improving overall ambient air quality improvement of NOx by up to 85% depending on the technology deployed.

H. Impact on the Environment

This Project will have a positive impact on the environment. This project will reduce NOx emissions which significantly impact public health and the environment. The primary negative impact will be in the need for disposal of the NOx waste materials.

A preliminary environmental review addressing air, water, noise, ecology, solid waste, social impacts, and potential environmental risks shall be completed by the Contractor as part of the Study. New environmental standards are expected to be enforced by the local EPBs. The Contractor shall review the existing preliminary environmental information and revise it as needed so that it meets the content and format requirements of both the Chinese authorities and those of relevant international project financing institutions. The preliminary environmental assessment will review the project and reasonable alternatives, identify potential negative impacts, discuss the extent to which they can be mitigated, and develop plans for a full Environmental Impact Assessment, as necessary, when the project moves forward to the implementation stage.

I. Impact on U.S. Labor

This Project is expected to have a positive impact on U.S. labor if implemented. The deNOx hardware and systems suppliers along with environmental monitoring equipment industries will see a beneficial effect. In these industries, the United States has a strong position and the jobs in this high tech arena are among the best paid in the United States. There are no legislative prohibitions on the use of the funds proposed.

J. Qualifications

The Contractor and its personnel shall have previously implemented deNOx projects as the system designer, architect engineer, owners-engineer, or equivalent in order to be considered as qualified.

The Contractor shall demonstrate:

- Project qualifications for planning, design, and implementation to include areas such as technology, operations, personnel, budgeting, facilities, and organizational issues in an international environment (20%);
- Experience PRC emissions management legislation, systems, operations and the PRC organizational structure of management of this area shall be demonstrated (10%); and
- Experience and knowledge in financing similar systems (20%).

In addition, personnel qualifications include:

- Experience with a broad variety of technologies for control of emissions of air pollutants from coal-fired boilers and power plants, and specifically NOx, at all stages of development from feasibility study and design to operation and maintenance, and specific experience in sizing, specifying and sourcing of deNOx system (20%);
- Experience in the assessment of environmental impacts of pollution control systems, and possible impacts in other environmental media, including disposal of wastes resulting from operation of air pollution control devices, and possible impacts of malfunction, catastrophic failure or prolonged improper operation of such systems (10%);

- Experience in the assessment of training capacity and efficiency of technology transfer, in the PRC, the Asia region or other countries with transition economies (10%); and
- Experience successfully completing similar projects in the PRC, Asia, or countries with transition economies (10%).

K. Justification

This project is justified because it is expected to

- Improve human health and living standards by drastically reducing Shandong's NOx emissions to improve the air quality;
- Positively impact global air quality if the deNOx technology is widely implemented in China. The positive air quality impacts are expected to be measurable on the U.S.
- Provide substantial export opportunities (over $750 million) for U.S. companies providing deNOx systems;
- Provide a competitive advantage to U.S. companies over foreign competition which is expected to result in increased market access by U.S. suppliers and subsuppliers; and
- Positively impact U.S. jobs, even if U.S. companies enter into joint ventures with Chinese companies for local manufacturing of their equipment.

L. Terms of Reference

Aim of the Terms of Reference:
The aim the Feasibility Study is to provide a comprehensive study of the technical and economic feasibility of the installation of deNOx systems at large coal fired power plants.
Outline of the Terms of Reference: The Terms of Reference (TOR) are presented as a series of tasks that form a systematic analysis to identify the most appropriate deNOx technology supported by economic and financial analyses. The tasks are summarized as:

- Task 1: Kickoff Meeting
  - 1.1: Initial Meeting
  - 1.2: Selection of Study Power Plant
  - 1.3: Detailed Project Work Plan and Schedule

- Task 2: Power Plant Technical Review

- Task 3: Evaluation of Alternatives

- Task 4: System Conceptual Design and Cost Estimate

- Task 5: Economic Analysis

- Task 6: Implementation and Financing Plan

- 6.1 Implementation Plan
- 6.2 Financing Plan

- Task 7: Regulatory and Environmental Review
  - 7.1 Environmental Review
  - 7.2 Regulatory Review

- Task 8: Development Impact Assessment

- Task 9: Final Report and Seminar
  - 9.1: Seminar
  - 9.2: Final Report

Terms of Reference: The Study shall include the following activities: (i) survey and collect existing and available environmental background data, environmental standards and long-term trends; (ii) survey the equipment utilized by the selected plant; (iii) prepare financial and economic surveys; (iv) review environmental impacts of the Project; (v) develop detailed list of U.S. equipment suppliers; and (vi) produce a substantive and detailed final report.

Task 1 – Kickoff Meeting

Task 1.1: Initial Meeting: The Contractor shall meet with SDEPB in Shandong, China to launch the Study. During this meeting the Study's initial work plan shall be reviewed, along with expectations of the Study goals, objectives, desired outcome, and reporting formats (Contractor to SDEPB) of the Study. During this task, the Contractor shall conduct one-on-one meetings with relevant SDEPB operational centers and clarify the Study scope, if required, and identify the SDEPB staff that will be involved with the Study.

Task 1.2: Selection of Study Plant: The Contractor shall finalize with SDEPB which power plant as typical that will be used as the basis of the Study. The Contractor shall collect plant specific and regional information relevant to the project, including air pollution emission, control and monitoring standards; project site information; and installation and operation data for existing flue gas facility and continuous emission monitoring systems (CEMS) units.

Task 1.3 Detailed Project Work Plan and Schedule: The Contractor shall prepare and submit to the SDEPB a detailed work plan. The detailed project work plan and schedule will specify tasks and sub-tasks, define roles and responsibilities, establish work sequences and set milestones for tasks completion. The plan shall as a minimum include the following:

- Management structure for the Study team, task responsibilities and reporting requirements;
- Detailed description of each task and sub-task, and team participants' assignment;
- Work span, milestones and key decision points;
- Allocation of work effort; and
- Final Report content requirements, format and scheduling.

Task 2 – Power Plant Technical Review: Based on the data collected in Task 1, the Contractor shall review and analyze existing and planned environmental regulations that affect power plant emissions and the control and/or monitoring technologies to be employed that apply to the selected plant. The Contractor shall visit the power plant and review existing operations as well as plans for a deNOx facility and complimentary monitoring equipment installation. Specifically, the Contractor shall perform a technical review including the following aspects for the power plant:

- Existing preliminary feasibility study and engineering designs – draft reports, key contacts and schedule prepared by the local design institute;
- Comments on the existing equipment by the plant operators;
- Listing of needed improvements and any planned implementation schedules for new equipment;
- Determine any pre-existing arrangements for equipment purchases; and
- Planned investments for deNOx facility systems.

Task 3 – Evaluation of Alternatives: Based upon the Technical Review completed in Task 2 and an assumed financing structure agreed with SDEPB, the Contractor shall:

- Identify at least two potential technical alternatives for providing the optimum level of deNOx control by the Project;
- Identify and estimate costs of all infrastructure requirements needed to implement the deNOx alternative;
- Define the percentage of installed capacity to be treated, and which systems comprise this percentage for each alternative;
- Document that the power plant is expected to meet Chinese environmental standards upon installation of the deNOx system for each alternative;
- Estimate
- Use cost per ton NOx removed, and life cycle cost/benefit analysis of control costs (capital, recurring and O&M) versus costs of noncompliance or emissions fees for each alternative to determine the most economic alternative among the alternatives evaluated;
- Justify the deNOx technology alternative recommended and the reasons for rejecting other alternatives;
- Prepare a summary of the recommended deNOx alternative.

Upon completion of the alternatives evaluation, the Contractor shall meet with SDEPB and power plant operators to discuss the results of the technical analysis and review as they relate to the optimal deNOx system alternative. The Contractor shall prepare and submit a report to SDEPB as the deliverable for this Task after agreeing with SDEPB the preferred alternative.

Task 4 – Plant deNOx Conceptual Design and Cost Estimate: Based on the deNOx alternative agreed with SDEPB determined in Task 3, the Contractor shall, in conjunction with the applicable design institute(s), perform a conceptual design, prepare specifications, develop preliminary cost estimates (+/- 20%), and develop a high level construction schedule for the deNOx Project including:

- Preliminary drawings for:

- Plot plan;
- General arrangement;
- Electrical and process one line drawings;
- Process flow diagrams;
- Master major equipment list;
- Utility requirements;
- Waste management system
- Facility building descriptions; and
- Detailed technical specifications and bid documents in accordance with Chinese practice for the systems, services, and components suitable for procurement of the deNOx system for the Plant.

- Capital cost estimates for:
  - DeNOx equipment and auxiliaries;
  - Commissioning, startup, and spares;
  - Cooling water;
  - Building structure;
  - Waste management system;
  - Control room;
  - Interconnects, transformers and switchgear; and
  - Waste transport, storage, and disposal facilities.

- Indirect cost estimates for:
  - Owner's costs;
  - Permitting fees;
  - Financing costs and interest during construction;
  - Legal fees;
  - Real estate and easement costs, if any;
  - Applicable VAT and duties;
  - Inspection; and
  - Insurance.

- Operating cost estimates for:
  - Operations and maintenance;
  - Energy;
  - Administrative;
  - Depreciation and amortization;
  - Interest; and
  - Taxes and fees.

  - Construction Schedule of at least two levels in the work breakdown structure (i.e. the major top level schedule tasks with at least one level of subtasks under each major top level task.)

- Based on the system design, the Contractor shall prepare detailed technical specifications and bid documents in accordance with Chinese practice for the systems, services, and components suitable for procurement of a turnkey deNOx system.

- Technical specifications for any necessary environmental monitoring system improvements provide costing of structural modifications necessary to install the monitoring equipment, and determine the parameters to be measured.

In addition, the Contractor shall identify prospective U.S. Sources of Supply in accordance with Annex II of the Grant Agreement.

Task 5 - Economic Analysis: The Contractor shall:

- Develop a proforma analysis of the Project based upon the information developed in previous tasks. The proforma will include all equity and debt assumptions, revenue expectation, operating costs, capital costs, interest, interest during construction, depreciation, financing costs and payments, taxes and all other costs (such as permit fees, pollution fees, and fines and penalties), or credits that impact the Project;
- Develop pro forma financial statements for the project, including pro forma balance sheet and income statements and proposed return on investment calculations for equity investors;
- Perform sensitivity analyses on revenue, capital cost overruns, operating cost, and fuel costs;
- Perform a risk analysis and identify mitigation steps that can be taken; and
- Incorporate these analyses into a Preliminary Information Memorandum suitable for distribution to potential lenders.

Task 6: Implementation and Financing Plan:

Task 6.1 Implementation Plan: The Contractor shall prepare an implementation plan that will provide specific recommendations for project implementation, as well as an action plan for the next steps that should be taken to implement the project. The implementation plan shall include, at a minimum, the following components:

- DeNOx specification and procurement process;
- Regulatory program revisions to support compliance and enforcement activities associated with operation of deNOx systems;
- Resources and financing plan; implementation schedule;
- Impact analysis; and
- Monitoring and evaluation program.

The action plan shall specify for each step the priority, roles and responsibilities of each party, schedule, and budget and staff requirements.

Task 6.2 Financing Plan: The Contractor shall develop financing requirements, prepare a financing plan, and identify the most likely financing source(s). When identifying financing sources, the Contractor shall:

- Investigate the Government of China's willingness to extend a sovereign guarantee to lenders who could finance the necessary equipment and services for the Project;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Analyze the financial creditworthiness of China from the viewpoint of international lenders;

- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Obtain indicative term sheets from potential lenders; and
- Develop a financing plan taking into account the comments and requirements of the above mentioned institutions. The financing plan shall include indicative capital structure, covenants and terms and conditions for borrowings. It shall evaluate interest rate hedging, import duties, stamp taxes and foreign exchange availability.

The Contractor shall prepare and submit to SDEPB a report on this task.

Task 7: Regulatory and Environmental Review.

Subtask 7.1 – Environmental Review: The Contractor shall review any existing preliminary environmental impact assessments (EIAs) related to the proposed deNOx facility installations that may have been prepared previously by the power plant operators and their respective design institutes. Based on this review, the Contractor shall prepare a preliminary review of the Project's anticipated impact on the environment, with reference to local requirements as well as those of multilateral lending agencies. This review shall identify potential negative impacts, discuss the extent to which they can be mitigated, and develop plans for a full EIA if and when the Project moves forward to the implementation stage. This shall include the identification of steps that will need to be undertaken by the SDEPB subsequent to the Study's completion and prior to Project implementation. The Contractor shall identify significant mitigation measures and associated costs (within +/- 20%) required, if any, to meet the applicable guidelines and regulations and include those costs into Task 5 above.

Subtask 7.2 – Regulatory Review: The Contractor shall review and analyze the pertinent regulations and standards governing environmental quality, pollutant discharges to the atmosphere, surface waters and land, potential uses of the deNOx facility wastes, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc., at the international, national, regional and local levels.

Task 8: Development Impact Assessment: 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 China if the Project is implemented as outlined in the Final Report. If more than one alternative is recommended to the SDEPB for further consideration, the Contractor shall separately outline the development benefits that would be expected in each scenario. The Contractor shall specifically focus on examples from the categories listed below and shall develop a methodology for assessing these impacts over time. The Contractor shall select examples that USTDA could reasonably expect to be able to obtain information on in the future and shall make suggestions as to where USTDA should look to obtain this information (e.g. the SDEPB, trade statistics, or U.S. Embassy in China).

The categories to be considered are as follows:

1. Infrastructure: Improvements in physical infrastructure (including telecommunications) that would result from the Project. Estimate the scale of construction/installation expected and comment on the capabilities of any recommended infrastructure improvements (such as the provision of real time data).
2. Human capacity building: Estimate the number and type of jobs that would be created during the installation/construction phase if the Contractor's recommendations are implemented. Distinguish between temporary construction jobs and the number of jobs that would be created or sustained to operate the facility on an ongoing basis (or the number of jobs that would be lost due to labor-saving technology). Comment on any prospective training recommended in the Study, including an estimate of the number of persons to be trained, type of training needed, and the desired outcome of the training.
3. Technology transfer and productivity impacts: Discuss any commercial contracts for licensing new technology that are recommended, as well as the expected productivity benefits of any such licenses. 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. This may include data from Task 4, such as the extent to which the recommended system would reduce losses or the economic benefits of timely weather information to the business and agricultural sectors.
4. Market-oriented reform: Discuss any market-oriented reforms that would facilitate implementation of the Project or that result from implementation of the Project, which may include any policy changes that result in the liberalization of prices, privatization of previously state-owned assets, or increased competition in a given sector.
5. Other: Discuss prospective indirect development impacts of the key recommendations, such as enhanced safety and economic benefits (including increases in investment, indirect job creation, any spin-off or demonstration effects, etc) that are not captured in the four categories listed above.

The Contractor shall prepare a statement on the impact on U.S. labor in accordance with USTDA guidelines.

Task 9: Final Report and Seminar:

Subtask 9.1: Seminar: The Contractor shall organize a seminar presenting the main deNOx alternatives to the power plant operators. The seminar shall take place in Shandong Province. U.S. vendors for deNOx system suppliers shall be invited to make presentations at their own cost.

Subtask 9.2: Final Report: The Contractor shall prepare and provide to the Grantee and to USTDA a Final Report in accordance with Clause I of Annex II of the Grant Agreement. Each of the above tasks in this Terms of Reference must be distinctly set forth in the Final Report in a substantive and comprehensive manner, and shall include all corresponding deliverables. The Final Report shall contain an executive summary. In

addition to any other required deliverables in accordance with Clause ___ of Annex II of the Grant Agreement, the Contractor will provide both the Grantee and USTDA with 6 copies (each) of the final report on CD-ROM. The CD-ROM version of the final report will include:

- Adobe Acrobat readable copies of all documents;
- Source files for all drawings in AutoCAD or Visio format; and
- Source files for all documents in MS Office 2000 or later formats.

Deliverables: The deliverables of the Study are:

1. Detailed Work Plan (Task 2)
2. Alternatives Evaluation Report (Task 3)
3. Implementation and Financing Plan (Task 6)
4. Final Report (Task 9)

Period of Performance: The estimated period of performance is 52 weeks (12 months) from contract approval.

M. Study Budget

A budget of $600,000 is recommended for the proposed Project.

BUDGET DETAIL

Figure 6 Budget

DIRECT LABOR COSTS

Task	Task Name	Position	Total Person Days		Daily Rate		Total Cost
1	Kickoff Meeting						
		Project Manager	10		$1,216.00		$12,160
		Senior deNOx Specialist	10		$912.00		$9,120
		Emissions Monitoring Specialist	5		$760.00		$3,800
		Environmental Engineer	5		$760.00		$3,800
		Totals	30				$28,880
2	Power Plant Technical Review						
		Project Manager	10		$1,216.00		$12,160
		Senior deNOx Specialist	15		$912.00		$13,680
		Emissions Monitoring Specialist	5		$760.00		$3,800
		Environmental Engineer	5		$760.00		$3,800
		Staff Engineer	20		$608.00		$12,160
		Totals	55				$45,600
3	Evaluation of Alternatives						
		Project Manager	25		$1,216.00		$30,400
		Senior deNOx Specialist	25		$912.00		$22,800
		Emissions Monitoring Specialist	10		$760.00		$7,600
		Environmental Engineer	10		$760.00		$7,600
		Staff Engineer	25		$608.00		$15,200
		Financial Specialist	10		$1,064.00		$10,640
		Totals	105				$94,240

4	Plant Conceptual Design & Cost Estimate					
	Project Manager	10		$1,216.00		$12,160
	Senior deNOx Specialist	15		$912.00		$13,680
	Emissions Monitoring Specialist	5		$760.00		$3,800
	Environmental Engineer	5		$760.00		$3,800
	Staff Engineer	35		$608.00		$21,280
	Financial Specialist	5		$1,064.00		$5,320
	Totals	75				$60,040
5	Economic Analysis					
	Project Manager	2		$1,216.00		$2,432
	Senior deNOx Specialist	2		$912.00		$1,824
	Financial Specialist	15		$1,064.00		$15,960
	Totals	19				$20,216
6	Implementation & Financing Plan					
	Project Manager	10		$1,216.00		$12,160
	Senior deNOx Specialist	5		$912.00		$4,560
	Emissions Monitoring Specialist	5		$760.00		$3,800
	Environmental Engineer	5		$760.00		$3,800
	Staff Engineer	20		$608.00		$12,160
	Financial Specialist	20		$1,064.00		$21,280
	Totals	65				$57,760
7	Regulatory & Environmental Review					
	Project Manager	5		$1,216.00		$6,080
	Environmental Engineer	10		$760.00		$7,600
	Totals	15				$13,680
8	Development Impacts					
	Project Manager	5		$1,216.00		$6,080
	Totals	5				$6,080
9	Final Report					
	Project Manager	25		$1,216.00		$30,400
	Senior deNOx Specialist	15		$912.00		$13,680
	Emissions Monitoring Specialist	5		$760.00		$3,800
	Environmental Engineer	5		$760.00		$3,800
	Staff Engineer	30		$608.00		$18,240
	Financial Specialist	5		$1,064.00		$5,320
	Totals	85				$75,240
	Sub Total Employee	**454**				**$401,736**

Task	Task Name	Position	Total Person Days		Daily Rate		Total Cost
1	Kickoff Meeting						
		General Consultant	10		$200.00		$2,000
		Local Engineer	10		$100.00		$1,000
		Translator	10		$70.00		$700
		Totals	30				$3,700
2	Power Plant Technical Review						
		General Consultant	30		$200.00		$6,000
		Local Engineer	30		$100.00		$3,000
		Translator	40		$70.00		$2,800
		Totals	100				$11,800
3	Evaluation of Alternatives						
		General Consultant	25		$200.00		$5,000
		Local Engineer	30		$100.00		$3,000
		Translator	30		$70.00		$2,100
		Totals	85				$10,100
4	Plant Conceptual Design & Cost Estimate						
		General Consultant	20		$200.00		$4,000
		Local Engineer	30		$100.00		$3,000
		Translator	20		$70.00		$1,400
		Totals	70				$8,400
5	Economic Analysis						
		General Consultant	10		$200.00		$2,000
		Totals	10				$2,000
6	Implementation & Financing Plan						
		General Consultant	15		$200.00		$3,000
		Local Engineer	5		$100.00		$500
		Translator	5		$70.00		$350
		Totals	25				$3,850
7	Regulatory & Environmental Review						
		General Consultant	5		$200.00		$1,000
		Attorney	5		$200.00		$1,000
		Translator	10		$70.00		$700
		Totals	20				$2,700

8	Development Impacts					
		General Consultant	1		$200.00	$200
		Totals	1			$200
9	Final Report					
		General Consultant	5		$200.00	$1,000
		Local Engineer	5		$100.00	$500
		Translator	10		$70.00	$700
		Totals	20			$2,200
		Sub Total Non Employee	**361**			**$44,950**
		Total Labor Costs	**815**			**$446,686**

OTHER DIRECT COSTS

Travel

	Trips		Trip Cost	Total Cost
International Air Fares	25		$2,300.00	$57,500
Domestic Air Fare	50		$150.00	$7,500
To/ From Airport US	50		$90.00	$4,500
To/ From Airport China	50		$10.00	$500

	Trip Days		Per Diem Rate	Total Cost
Per Diem	175		$309.00	$54,075
Visas	6		$300.00	$1,800
Local Travel	175		$50.00	$8,750

Sub Total Travel	**$134,625**

Other

	Quantity	Units	Unit Cost	Total Cost
Reproduction	21000	Pages	$0.25	$5,250
Drawings	1000	Sheets	$1.00	$1,000
Courier	52	Packages	$90.00	$4,680
Communications	52	Weeks	$150.00	$7,800

Sub Total Other	**$18,730**
Total Other Direct Costs	**$153,355**
Total Cost (Direct Labor + Other Direct)	**$600,041**
Total U.S. Company Share	
Proposed USTDA Grant	

BUDGET NARRATIVE

DIRECT COSTS
Direct Labor

Project Manager– This individual will provide necessary guidance and support to the Project to ensure successful completion of the Feasibility Study and oversee the completion of the Terms of Reference. The individual that fills this position is required to have 20 years experience in managing emission reduction and control systems. It is estimated that 102 days will be required at a daily rate of $1216. The rate was calculated with a base salary of $640 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Senior deNOx Specialist - This individual will provide the leadership in the implementation and assessment of deNOx technology related tasks associated with the completion of the Feasibility Study working under the guidance of the Project Manager. The individual that fills this position is required to have 15 years as an emissions reduction specialist with technical experience in the design, planning, implementation, and operation of emissions reduction and control projects. It is estimated that 87 days will be required at a daily rate of $893. The rate was calculated with a base salary of $470 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Emissions Monitoring Specialist - This individual will perform the emissions measurement and monitoring related tasks associated with the completion of the Feasibility Study working under the guidance of the Project Manager. The individual that fills this position is required to have 15 years as an air quality specialist with technical experience in the design, planning, implementation, and operation of emissions monitoring and control projects. It is estimated that 30 days will be required at a daily rate of $760. The rate was calculated with a base salary of $400 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Staff Engineer - This individual will perform the design, specification, and costing related tasks associated with the completion of the Feasibility Study working under the guidance of the Project Manager and the Senior deNOx Specialist. The individual that fills this position is required to have 10 years as an engineer with technical experience in the design, planning, implementation, and operation of air pollution control projects. It is estimated that 130 days will be required at a daily rate of $608. The rate was calculated with a base salary of $320 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Environmental Engineer - This individual will perform the environmental evaluation related tasks associated with the Feasibility Study working under the guidance of the Project Manager. The individual that fills this position is required to have 10 years as a specialist in environmental impact assessment, mitigation, risk analysis, and evaluating environmental damages and benefits associated with air pollution control systems. It is estimated that 45 days will be required at a daily rate of $760. The rate was calculated with a base salary of

$400 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Commercial/Financial Specialist - This individual will perform the financing, economic evaluations, and economic evaluation tasks associated with the completion of the Feasibility Study working under the guidance of the Project Manager. The individual that fills this position is required to have 15 years as an economist, financial specialist, or commercial specialist with expertise in evaluating and financing projects in Asia. It is estimated that 55 days will be required at a daily rate of $1064. The rate was calculated with a base salary of $560 a day and includes a fringe benefit rate of 25% and an overhead rate of 65%.

Other Direct Labor

General Consultant -This individual will develop and provide an understanding of the PRC coal-fired power plant design and emissions control, PRC laws and practices, and an understanding of regional issues. He will also direct the in-country data gathering from local participants and officials for the design and implementation plan under the direction of the Project Manager. The individual will have at least 20 years experience developing coal-fired power plants and associated air pollution control systems. It is estimated that 121 days will be required at a daily rate of $200 a day. The rate was calculated with a base salary of $100 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

Local Engineer - This individual will assist the gathering of detailed data and development of the design and implementation plan under the direction of the General Consultant and the Project Manager. The individual will have at least 10 years experience developing air pollution control systems in PRC. It is estimated that 110 days will be required at a daily rate of $100 a day. The rate was calculated with a base salary of $50 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

Translator - This individual will translate documents and provide interpretation as required. The individual be fluent in English and local languages and have experience as a translator in PRC. It is estimated that 125 days will be required at a daily rate of $70 a day. The rate was calculated with a base salary of $35 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

Attorney - This individual will assist evaluation of regulatory and environmental requirements under the direction of the Project Manager and General Consultant. The individual will have relevant experience as an attorney in the PRC. It is estimated that 5 days will be required at a daily rate of $200 a day. The rate was calculated with a base salary of $100 a day and includes a fringe benefit rate of 50% and an overhead rate of 50%.

OTHER DIRECT COSTS

Domestic and Foreign Travel

Travel is planned as follows:

1. One Kick-Off Meeting by the Project Manager, Senior deNOx Specialist, Emissions Monitoring Specialist, and the Environmental Engineer;
2. Plant Technical Review Trip by the Project Manager, Senior deNOx Specialist, Environmental Engineer, and Staff Engineer;
3. Alternatives Evaluation Trip by the Project Manager and the Senior deNOx Specialist;
4. Plant Design Trip by the Project Manager, Staff Engineer, and the Senior deNOx Specialist;
5. Plant Design Trip by the Staff Engineer;
6. Economic Analysis Trip by the Project Manager, Financial Specialist, and the Senior deNOx Specialist;
7. Implementation Plan Trip by the Financial Specialist, Environmental Engineer, Emissions Monitoring Specialist, and the Senior deNOx Specialist Staff Engineer; and
8. Final Review Meeting & Seminar by the Project Manager, Senior deNOx Specialist, Environmental Engineer, and Financial Specialist

One Kick-Off Meeting to be attended by the Project Manager (10 days), Senior deNOx Specialist (10 days), Emissions Monitoring Specialist (5 days), and the Environmental Engineer (5 days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 4 People = $8,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 4 people = $1,200
Per Diem: $309 x 30 days = $9,270
Local Transportation: $50/day x 30 days = $1,500
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 4 persons = $720
Transportation to/from Airport - China $10/Trip x 2 Trips x 4 persons = $80

Plant Technical Review to be attended by the Project Manager (10 days), Senior deNOx Specialist (10 days), Environmental Engineer (5 days), and Staff Engineer (5days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 4 People = $8,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 4 people = $1,200
Per Diem: $309 x 30 days = $9,270
Local Transportation: $50/day x 30 days = $1,500
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 4 persons = $720
Transportation to/from Airport - China $10/Trip x 2 Trips x 4 persons = $80

Alternatives Evaluation Meeting attended by the Project Manager (5 days) and the Senior deNOx Specialist (5 days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 2 People = $4,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 2 people = $600
Per Diem: $309 x 10 days = $3,090
Local Transportation: $50/day x 10 days = $500
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 2 persons = $360
Transportation to/from Airport - China $10/Trip x 2 Trips x 2 persons = $40
Plant Design Meetings attended by the Project Manager (10 days), Staff Engineer (10 days), and the Senior deNOx Specialist (10 days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 3 People = $6,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 3 people = $900

Per Diem: $309 x 30 days = $9,270
Local Transportation: $50/day x 30 days = $1,500
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 3 persons = $540
Transportation to/from Airport - China $10/Trip x 2 Trips x 3 persons = $60

Plant Design Follow-up Meeting attended by the Staff Engineer (10 days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 1 Person = $2,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 1 people = $300
Per Diem: $309 x 10 days = $3,090
Local Transportation: $50/day x 10 days = $500
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 1 persons = $180
Transportation to/from Airport - China $10/Trip x 2 Trips x 1 persons = $20

Economic Analysis Meetings attended by the Project Manager (5 days), Financial Specialist (10 days), and the Senior deNOx Specialist (5days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 3 Person = $6,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 3 people = $900
Per Diem: $309 x 20 days = $6,180
Local Transportation: $50/day x 20 days = $1,000
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 3 persons = $540
Transportation to/from Airport - China $10/Trip x 2 Trips x 3 persons = $60

Implementation Plan Meetings attended by the Financial Specialist (10 days), Environmental Engineer (5 days), Emissions Monitoring Specialist (5 days), and the Senior deNOx Specialist (5 days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 4 Person = $8,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 4 people = $1,200
Per Diem: $309 x 25 days = $7,725
Local Transportation: $50/day x 25 days = $1,250
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 4 persons = $720
Transportation to/from Airport - China $10/Trip x 2 Trips x 4 persons = $80

Final Review Meeting & Seminar attended by the Project Manager (5 days), Senior deNOx Specialist (5 days), Environmental Engineer (5 days), and Financial Specialist (5 days)
Roundtrip Airfare (Economy Class): $2,000/per Trip x 4 Person = $8,000
Travel to/from Beijing and Shandong Province: $150/trip x 2 trips x 4 people = $1,200
Per Diem: $309 x 25 days = $7,725
Local Transportation: $50/day x 25 days = $1,250
Transportation to/from Airport - U.S.: $90/Trip x 2 Trips x 4 persons = $720
Transportation to/from Airport - China $10/Trip x 2 Trips x 4 persons = $80

Other Expenses
Communications – 52 weeks x $150/week = $7,800 to provide communications among the sponsor, the contractor and all team members.

Reproduction of working documents and final report – 21,000 pages x $0.25/page = $5,250

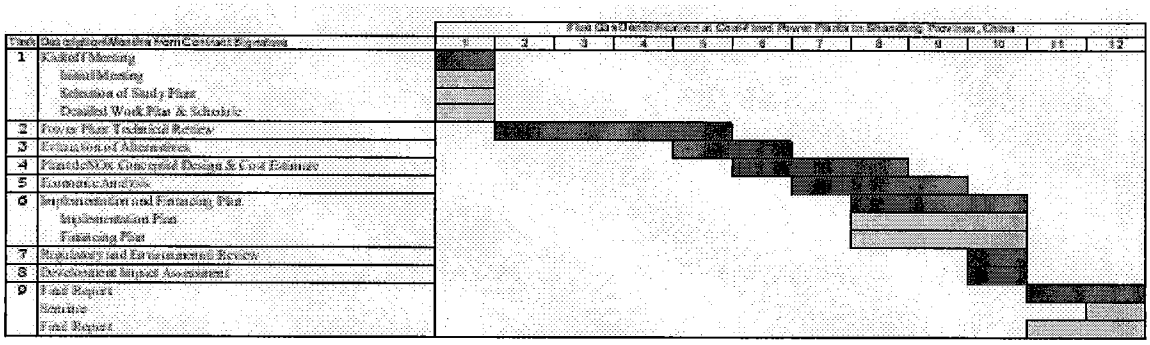
Reproduction of drawings – 1000 pages at $1.00 per page = $1,000

Courier Services – Sending documents to/from China that are not suitable for internet transmittal. 52 shipments x $90/shipment = $4,680

Visas - Visas for personnel traveling to China = 6 people x $300 each = $1,800

TASK COMPLETION SCHEDULE

Figure 7 Schedule



N. Recommendations

Enviromation recommends that the USTDA provides a grant of $600,000 to the Shandong Provincial Government of China to fund the Feasibility Study of the flue gas denitrification at coal-fired power plants in the Shandong Province due to the high potential for U.S. Exports and the significant development impacts.

ANNEX 3

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# 08-32010B

JUL - 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 People's Republic of China, acting through the Shandong Environmental Protection Bureau ("Grantee"). USTDA agrees to provide the Grantee under the terms of this Agreement US$600,000 ("USTDA Grant") to fund the cost of goods and services required for a feasibility study ("Study") on the proposed Shandong Flue Gas Denitrification (deNOx) project ("Project") in the People's Republic of China ("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 Study ("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 Study ("Terms of Reference") are attached as Annex I and are hereby made a part of this Grant Agreement. The Study will examine the technical, financial, environmental, and other critical aspects of the proposed Project. The Terms of Reference for the Study 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 Study.

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 Study. Upon approval of this selection by USTDA, the Grantee and the Contractor shall then enter into a contract for performance of the Study. The Grantee shall notify in writing the U.S. firms that submitted unsuccessful proposals to perform the Study 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 Study. 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 Study 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 Study 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. Study Schedule

(A) Study Completion Date

The completion date for the Study, which is December 31, 2009, is the date by which the parties estimate that the Study 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 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 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 Study, 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 Study 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 Study 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 Vice 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: Dr. Zhang Bo
Vice Director General
Shandong Provincial Environmental Protection Bureau
12 Zhi Jin Shi Street, Jinan
Shandong, 250012, China

Phone: (86-531) 8610-6152
Fax: (86-531) 8603-8443

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.:	11 8/9 1001
Activity No.:	2008-31010B
Reservation No.:	2008310061
Grant No.:	GH2008310021

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 Study, 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 Study, 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 Government of the People's Republic of China, 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. 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: _____

Date: 25 June 2008

Witnessed:

By: _____

For the Government of the People's Republic of China

By: _____

Date: _____

Witnessed:

By: _____

Annex I -- Terms of Reference

Annex II -- USTDA Mandatory Clauses

Annex I

Terms of Reference

Shandong Province is home to over 50,000 megawatts of coal-fired power generation capacity and ranks second among all provinces in terms of coal consumption to power its plants. While these plants have begun to implement desulfurization systems in order to reduce emissions of sulfur dioxide, most have not begun preparations to address nitrogen oxide (NOx) removal. The Ministry of Environmental Protection (MEP) of China and the Grantee have recently focused on reducing NOx emissions.

This Study would assist the Grantee in assessing the technical, economic and financial feasibility of implementing NOx emissions control systems at coal-fired power plants throughout the province. The Study would focus on requirements for retrofitting one particular plant, which would be chosen after consultation with the Grantee for its applicability to serve as a model for other facilities.

Task 1: Initial Meeting / Selection of Study Plant / Project Work Plan and Schedule

1.1 Initial Meeting

The Contractor shall meet with the Grantee to launch the Study. During this meeting the Study's initial work plan shall be reviewed, along with Study goals, objectives, desired outcomes, and reporting formats (Contractor to Grantee) of the Study. During this task, the Contractor shall conduct one-on-one meetings with relevant the Grantee operational centers, clarify the Study scope, and identify the Grantee staff that will be involved with the Study.

1.2 Selection of Study Plant

The Grantee, in consultation with the Contractor, shall identify which power plant shall be used as the basis of the Study. The Contractor shall collect plant specific and regional information relevant to the project, including air pollution emission, control and monitoring standards, project site information, and installation and operation data for existing flue gas facilities and continuous emission monitoring systems (CEMS) units.

1.3 Detailed Study Work Plan and Schedule

The Contractor shall prepare and submit to the Grantee a detailed Study work plan and schedule. The Study work plan and schedule shall specify tasks and sub-tasks, define roles and responsibilities, establish work sequences and set milestones for task completion. The plan shall as a minimum include the following:

- Management structure for the Study team, task responsibilities and reporting requirements;

- Detailed description of each task and sub-task, and team participants' assignments;
- Work span, milestones and key decision points;
- Allocation of work effort; and
- Final Report content requirements, format and scheduling.

Deliverable: The Contractor shall submit the Study work plan and schedule to the Grantee.

Task 2: Power Plant Technical Review

The Contractor shall visit the power plant and review existing operations as well as plans for a deNOx facility and complementary monitoring equipment installation. Specifically, the Contractor shall perform a technical review including the following aspects for the power plant including but not limited to:

- Existing preliminary feasibility study and engineering designs – draft reports, key contacts and schedule prepared by the local design institute;
- Comments on the existing equipment by the plant operators;
- Listing of needed improvements and any planned implementation schedules for new equipment;
- Determine any pre-existing arrangements for equipment purchases; and
- Planned investments for deNOx facility systems.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 2. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 2.

Task 3: Evaluation of Alternatives

Based upon the Technical Review completed in Task 2 and an assumed financing structure agreed upon between the Grantee and the Contractor, the Contractor shall:

- Identify at least two potential technical alternatives for providing the optimum level of deNOx control by the Project;
- Identify and estimate costs of all infrastructure requirements needed to implement the deNOx alternative;
- Define the percentage of installed capacity to be treated, and which systems comprise this percentage for each alternative;
- Document that the power plant is expected to meet Host Country environmental standards upon installation of the deNOx system for each alternative;
- Estimate use cost per ton of NOx removed, and life cycle cost/benefit analysis of control costs (capital, recurring and operations/maintenance) versus costs of noncompliance or emissions fees for each alternative to determine the most economic alternative among the alternatives evaluated;

- Justify the deNOx technology alternative recommended and the reasons for rejecting other alternatives;
- Prepare a summary of the recommended deNOx alternative.

Upon completion of the alternatives evaluation, the Contractor shall meet with the Grantee and power plant operators to discuss the results of the technical analysis and review as they relate to the optimal deNOx system alternative.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 3. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 3.

Task 4: Conceptual Design and Cost Estimate

Based on the deNOx alternative agreed upon with the Grantee in Task 3, the Contractor shall, in conjunction with the applicable design institute(s), perform a conceptual design, prepare specifications, develop preliminary cost estimates (+/- 20%), and develop a high level construction schedule for the Project including but not limited to the following:

- Preliminary drawings for:
    - Plot plan;
    - General arrangement;
    - Electrical and process one line drawings;
    - Process flow diagrams;
    - Master major equipment list;
    - Utility requirements;
    - Waste management system;
    - Facility building descriptions; and
    - Detailed technical specifications and bid documents for the systems, services, and components suitable for procurement of the deNOx system for the Plant in accordance with Host Country practices.

- Capital cost estimates for:
    - DeNOx equipment and auxiliaries;
    - Commissioning, startup, and spares;
    - Cooling water;
    - Building structure;
    - Waste management system;
    - Control room;
    - Interconnects, transformers and switchgear; and
    - Waste transport, storage, and disposal facilities.

- Indirect cost estimates for:
    - Owner's costs;
    - Permitting fees;

    - Financing costs and interest during construction;
    - Legal fees;
    - Real estate and easement costs, if any;
    - Applicable VAT and duties;
    - Inspection; and
    - Insurance.
- Operating cost estimates for:
    - Operations and maintenance;
    - Energy;
    - Administrative;
    - Depreciation and amortization;
    - Interest; and
    - Taxes and fees.

- Construction Schedule of at least two levels in the work breakdown structure (i.e., the major top level schedule tasks with at least one level of subtasks under each major top level task).

- Based on the system design, the Contractor shall prepare detailed technical specifications and bid documents for the systems, services, and components suitable for procurement of a turnkey deNOx system in accordance with Host Country practices.

- The Contractor shall draft technical specifications for any necessary environmental monitoring system improvements, provide cost estimates of structural modifications necessary to install the monitoring equipment, and determine the parameters to be measured.

- In addition, the Contractor shall identify prospective U.S. Sources of Supply for the equipment necessary for the Project; this list shall be organized by equipment type and shall include company names and contact information.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 4. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 4.

Task 5: Economic Analysis

5.1 The Contractor shall develop a pro forma analysis of the Project based upon the information developed in previous tasks. The pro forma will include all equity and debt assumptions, revenue expectation, operating costs, capital costs, interest, interest during construction, depreciation, financing costs and payments, taxes and all other costs (such as permit fees, pollution fees, and fines and penalties), or credits that impact the Project;

5.2 The Contractor shall develop pro forma financial statements for the Project,

including pro forma balance sheet and income statements and proposed return on investment calculations for equity investors.

5.3 The Contractor shall perform sensitivity analyses on revenue, capital cost overruns, operating cost, and fuel costs.

5.4 The Contractor shall perform a risk analysis and identify mitigation steps that can be taken.

5.5 The Contractor shall incorporate these analyses into a Preliminary Information Memorandum suitable for distribution to potential lenders; this memorandum shall comprise the deliverable for Task 5.

Task 6: Implementation and Financing Plan

6.1 Implementation Plan

The Contractor shall prepare an implementation plan that will provide specific recommendations for Project implementation, as well as an action plan for the next steps that should be taken to implement the Project. The implementation plan shall include, at a minimum, the following components:

- DeNOx specification and procurement process;
- Regulatory program revisions to support compliance and enforcement activities associated with operation of deNOx systems;
- Resources and financing plan; implementation schedule;
- Impact analysis; and
- Monitoring and evaluation program.

The implementation plan shall specify for each step the priority, roles and responsibilities of each party, schedule, and budget and staff requirements.

6.2 Financing Plan

The Contractor shall develop financing requirements, prepare a financing plan, and identify the most likely financing source(s). When identifying financing sources, the Contractor shall at a minimum:

- Investigate the willingness of the government of the Host Country to extend a sovereign guarantee to lenders who could finance the necessary equipment and services for the Project;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Analyze the financial creditworthiness of the Host Country from the viewpoint of international lenders;
- Obtain indicative term sheets from potential lenders; and

- Develop a financing plan taking into account the comments and requirements of the above mentioned institutions. The financing plan shall include indicative capital structure, covenants and terms and conditions for borrowings. It shall evaluate interest rate hedging, import duties, stamp taxes and foreign exchange availability.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 6. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 6.

Task 7: Environmental and Regulatory Review

7.1 Environmental Review

The Contractor shall make a preliminary review of the Project's anticipated impact on the environment with reference to local requirements and those of multilateral lending agencies (such as the World Bank). This review shall identify potential negative impacts, discuss the extent to which they can be mitigated, and develop plans for full environmental impact assessment in anticipation of the project moving forward to the implementation stage. This includes the identification of steps that will need to be undertaken by the Grantee subsequent to the completion of the Study and prior to project implementation.

7.2 Regulatory Review

The Contractor shall review and analyze all pertinent laws, regulations and standards governing environmental quality, pollutant discharges to the atmosphere, surface waters and land, potential uses of the deNOx facility wastes, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc., at the international, national, regional and local levels.

7.3 Report

The Contractor shall prepare and deliver to the Grantee a draft Interim Report covering the information reviewed within Task 7. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 7.

Task 8: Development Impact Assessment

The Contractor shall analyze the key Host Country development impacts of the Project, including any potential effects in the areas of infrastructure, human capacity building, technology transfer and productivity improvement and/or market-oriented reform. These development impact factors are intended to provide the decision makers and interested parties with a broader view of the Project's potential effects on the Host Country. The analysis shall focus on what development impacts are likely if the Project is implemented according to the recommendations of the study. While the Contractor shall focus on the

immediate impact of the Project, analysis shall include any additional developmental benefits and/or negative impacts that may result from Project implementation, including spin-off effects.

Task 9: Final Report and Seminar

9.1 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.

9.2 The Contractor shall organize a seminar presenting the main deNOx alternatives to the power plant operators. The seminar shall take place in Shandong Province. U.S. vendors for deNOx system suppliers shall be invited to make presentations at their own cost.

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 People's Republic of China, acting through the Shandong Environmental Protection Bureau ("Client"), dated _____ ("Grant Agreement"). The Client has selected _____ ("Contractor") to perform the feasibility study ("Study") for the Shandong Flue Gas Denitrification (deNOx) project ("Project") in the People's Republic of China ("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 Study 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 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 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 Study. 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 a mobilization 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 a mobilization payment (if any):

"As a condition for this mobilization payment, 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 a mobilization 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 mobilization 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. Study Schedule

(1) Study Completion Date

The completion date for the Study, which is December 31, 2009, is the date by which the parties estimate that the Study 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 Study. 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 Study 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.:	11 8/9 1001
Activity No.:	2008-31010B
Reservation No.:	2008310061
Grant No.:	GH2008310021

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

Shandong Province is home to over 50,000 megawatts of coal-fired power generation capacity and ranks second among all provinces in terms of coal consumption to power its plants. While these plants have begun to implement desulfurization systems in order to reduce emissions of sulfur dioxide, most have not begun preparations to address nitrogen oxide (NOx) removal. The Ministry of Environmental Protection (MEP) of China and the Grantee have recently focused on reducing NOx emissions.

This Study would assist the Grantee in assessing the technical, economic and financial feasibility of implementing NOx emissions control systems at coal-fired power plants throughout the province. The Study would focus on requirements for retrofitting one particular plant, which would be chosen after consultation with the Grantee for its applicability to serve as a model for other facilities.

Task 1: Initial Meeting / Selection of Study Plant / Project Work Plan and Schedule

1.1 Initial Meeting

The Contractor shall meet with the Grantee to launch the Study. During this meeting the Study's initial work plan shall be reviewed, along with Study goals, objectives, desired outcomes, and reporting formats (Contractor to Grantee) of the Study. During this task, the Contractor shall conduct one-on-one meetings with relevant the Grantee operational centers, clarify the Study scope, and identify the Grantee staff that will be involved with the Study.

1.2 Selection of Study Plant

The Grantee, in consultation with the Contractor, shall identify which power plant shall be used as the basis of the Study. The Contractor shall collect plant specific and regional information relevant to the project, including air pollution emission, control and monitoring standards, project site information, and installation and operation data for existing flue gas facilities and continuous emission monitoring systems (CEMS) units.

1.3 Detailed Study Work Plan and Schedule

The Contractor shall prepare and submit to the Grantee a detailed Study work plan and schedule. The Study work plan and schedule shall specify tasks and sub-tasks, define roles and responsibilities, establish work sequences and set milestones for task completion. The plan shall as a minimum include the following:

- Management structure for the Study team, task responsibilities and reporting requirements;
- Detailed description of each task and sub-task, and team participants' assignments;

- Work span, milestones and key decision points;
- Allocation of work effort; and
- Final Report content requirements, format and scheduling.

Deliverable: The Contractor shall submit the Study work plan and schedule to the Grantee.

Task 2: Power Plant Technical Review

The Contractor shall visit the power plant and review existing operations as well as plans for a deNOx facility and complementary monitoring equipment installation. Specifically, the Contractor shall perform a technical review including the following aspects for the power plant including but not limited to:

- Existing preliminary feasibility study and engineering designs – draft reports, key contacts and schedule prepared by the local design institute;
- Comments on the existing equipment by the plant operators;
- Listing of needed improvements and any planned implementation schedules for new equipment;
- Determine any pre-existing arrangements for equipment purchases; and
- Planned investments for deNOx facility systems.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 2. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 2.

Task 3: Evaluation of Alternatives

Based upon the Technical Review completed in Task 2 and an assumed financing structure agreed upon between the Grantee and the Contractor, the Contractor shall:

- Identify at least two potential technical alternatives for providing the optimum level of deNOx control by the Project;
- Identify and estimate costs of all infrastructure requirements needed to implement the deNOx alternative;
- Define the percentage of installed capacity to be treated, and which systems comprise this percentage for each alternative;
- Document that the power plant is expected to meet Host Country environmental standards upon installation of the deNOx system for each alternative;
- Estimate use cost per ton of NOx removed, and life cycle cost/benefit analysis of control costs (capital, recurring and operations/maintenance) versus costs of noncompliance or emissions fees for each alternative to determine the most economic alternative among the alternatives evaluated;
- Justify the deNOx technology alternative recommended and the reasons for rejecting other alternatives;
- Prepare a summary of the recommended deNOx alternative.

Upon completion of the alternatives evaluation, the Contractor shall meet with the Grantee and power plant operators to discuss the results of the technical analysis and review as they relate to the optimal deNOx system alternative.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 3. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 3.

Task 4: Conceptual Design and Cost Estimate

Based on the deNOx alternative agreed upon with the Grantee in Task 3, the Contractor shall, in conjunction with the applicable design institute(s), perform a conceptual design, prepare specifications, develop preliminary cost estimates (+/- 20%), and develop a high level construction schedule for the Project including but not limited to the following:

- Preliminary drawings for:
  - Plot plan;
  - General arrangement;
  - Electrical and process one line drawings;
  - Process flow diagrams;
  - Master major equipment list;
  - Utility requirements;
  - Waste management system;
  - Facility building descriptions; and
  - Detailed technical specifications and bid documents for the systems, services, and components suitable for procurement of the deNOx system for the Plant in accordance with Host Country practices.

- Capital cost estimates for:
  - DeNOx equipment and auxiliaries;
  - Commissioning, startup, and spares;
  - Cooling water;
  - Building structure;
  - Waste management system;
  - Control room;
  - Interconnects, transformers and switchgear; and
  - Waste transport, storage, and disposal facilities.

- Indirect cost estimates for:
  - Owner's costs;
  - Permitting fees;
  - Financing costs and interest during construction;
  - Legal fees;
  - Real estate and easement costs, if any;
  - Applicable VAT and duties;
  - Inspection; and
  - Insurance.

- Operating cost estimates for:
    - Operations and maintenance;
    - Energy;
    - Administrative;
    - Depreciation and amortization;
    - Interest; and
    - Taxes and fees.

- Construction Schedule of at least two levels in the work breakdown structure (i.e., the major top level schedule tasks with at least one level of subtasks under each major top level task).

- Based on the system design, the Contractor shall prepare detailed technical specifications and bid documents for the systems, services, and components suitable for procurement of a turnkey deNOx system in accordance with Host Country practices.

- The Contractor shall draft technical specifications for any necessary environmental monitoring system improvements, provide cost estimates of structural modifications necessary to install the monitoring equipment, and determine the parameters to be measured.

- In addition, the Contractor shall identify prospective U.S. Sources of Supply for the equipment necessary for the Project; this list shall be organized by equipment type and shall include company names and contact information.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 4. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 4.

Task 5: Economic Analysis

5.1 The Contractor shall develop a pro forma analysis of the Project based upon the information developed in previous tasks. The pro forma will include all equity and debt assumptions, revenue expectation, operating costs, capital costs, interest, interest during construction, depreciation, financing costs and payments, taxes and all other costs (such as permit fees, pollution fees, and fines and penalties), or credits that impact the Project;

5.2 The Contractor shall develop pro forma financial statements for the Project, including pro forma balance sheet and income statements and proposed return on investment calculations for equity investors.

5.3 The Contractor shall perform sensitivity analyses on revenue, capital cost overruns, operating cost, and fuel costs.

5.4 The Contractor shall perform a risk analysis and identify mitigation steps that can be taken.

5.5 The Contractor shall incorporate these analyses into a Preliminary Information Memorandum suitable for distribution to potential lenders; this memorandum shall comprise the deliverable for Task 5.

Task 6: Implementation and Financing Plan

6.1 Implementation Plan

The Contractor shall prepare an implementation plan that will provide specific recommendations for Project implementation, as well as an action plan for the next steps that should be taken to implement the Project. The implementation plan shall include, at a minimum, the following components:

- DeNOx specification and procurement process;
- Regulatory program revisions to support compliance and enforcement activities associated with operation of deNOx systems;
- Resources and financing plan; implementation schedule;
- Impact analysis; and
- Monitoring and evaluation program.

The implementation plan shall specify for each step the priority, roles and responsibilities of each party, schedule, and budget and staff requirements.

6.2 Financing Plan

The Contractor shall develop financing requirements, prepare a financing plan, and identify the most likely financing source(s). When identifying financing sources, the Contractor shall at a minimum:

- Investigate the willingness of the government of the Host Country to extend a sovereign guarantee to lenders who could finance the necessary equipment and services for the Project;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Analyze the financial creditworthiness of the Host Country from the viewpoint of international lenders;
- Contact local and international long-term debt financing sources to discuss their requirements for, and interest in, the Project;
- Obtain indicative term sheets from potential lenders; and
- Develop a financing plan taking into account the comments and requirements of the above mentioned institutions. The financing plan shall include indicative capital structure, covenants and terms and conditions for borrowings. It shall evaluate interest rate hedging, import duties, stamp taxes and foreign exchange availability.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 6. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 6.

Task 7: Environmental and Regulatory Review

7.1 Environmental Review

The Contractor shall make a preliminary review of the Project's anticipated impact on the environment with reference to local requirements and those of multilateral lending agencies (such as the World Bank). This review shall identify potential negative impacts, discuss the extent to which they can be mitigated, and develop plans for full environmental impact assessment in anticipation of the project moving forward to the implementation stage. This includes the identification of steps that will need to be undertaken by the Grantee subsequent to the completion of the Study and prior to project implementation.

7.2 Regulatory Review

The Contractor shall review and analyze all pertinent laws, regulations and standards governing environmental quality, pollutant discharges to the atmosphere, surface waters and land, potential uses of the deNOx facility wastes, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc., at the international, national, regional and local levels.

Deliverable: The Contractor shall prepare and deliver to the Grantee a draft Interim Report detailing the information covered within Task 7. The Contractor shall incorporate comments and/or edits from the Grantee into a final Interim Report for Task 7.

Task 8: Development Impact Assessment

The Contractor shall analyze the key Host Country development impacts of the Project, including any potential effects in the areas of infrastructure, human capacity building, technology transfer and productivity improvement and/or market-oriented reform. These development impact factors are intended to provide the decision makers and interested parties with a broader view of the Project's potential effects on the Host Country. The analysis shall focus on what development impacts are likely if the Project is implemented according to the recommendations of the study. While the Contractor shall focus on the immediate impact of the Project, analysis shall include any additional developmental benefits and/or negative impacts that may result from Project implementation, including spin-off and demonstration effects.

Task 9: Final Report and Seminar

9.1 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.

9.2 The Contractor shall organize a seminar presenting the main deNOx alternatives to the power plant operators. The seminar shall take place in Shandong Province. U.S. vendors for deNOx system suppliers shall be invited to make presentations at their own cost.

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.